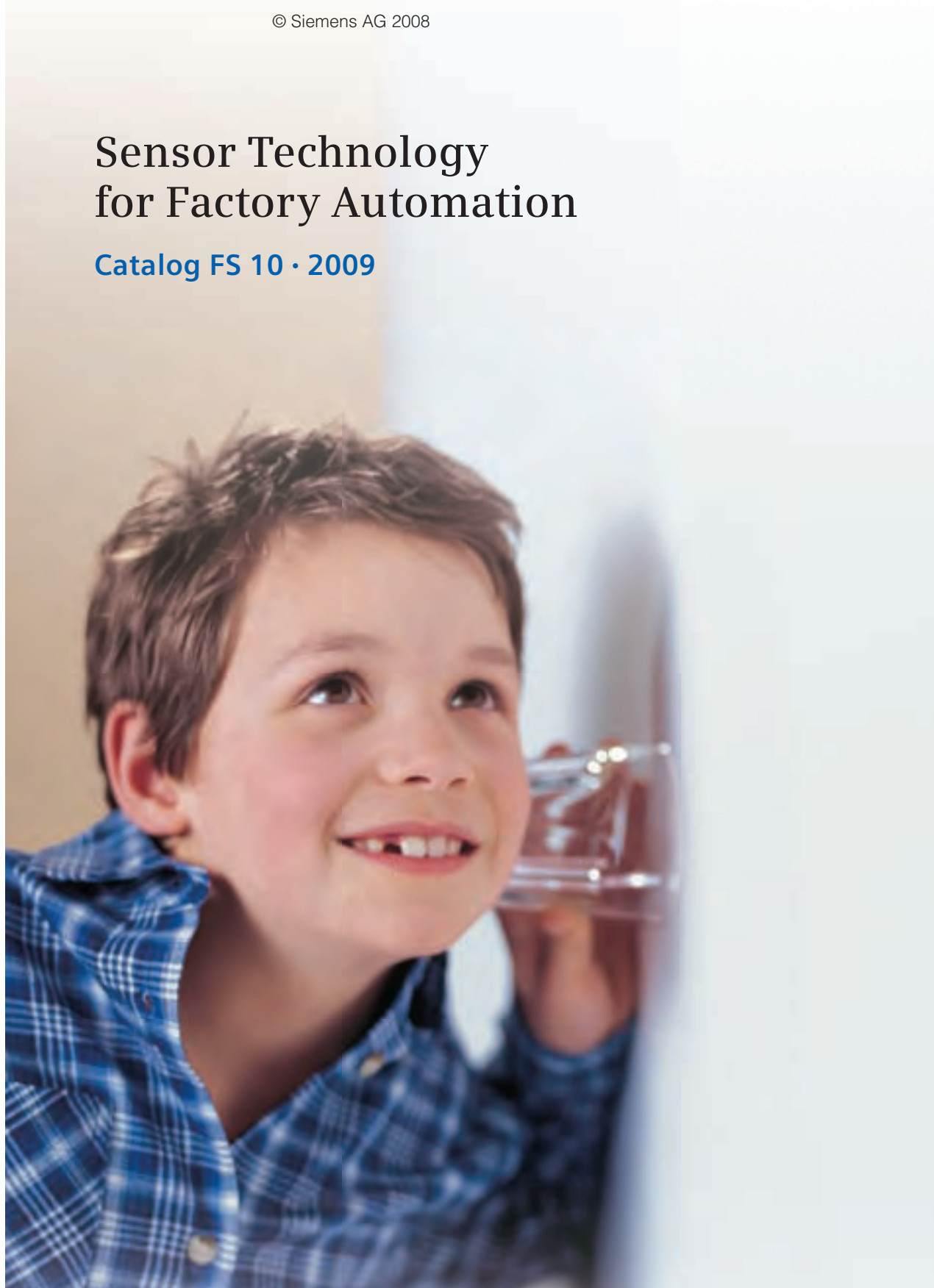


Sensor Technology for Factory Automation










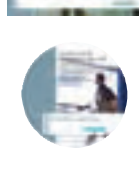
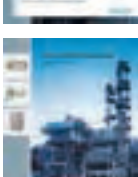


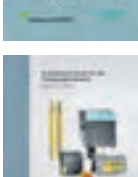
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SIMATIC Sensors

SIEMENS

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SIMATIC Sensors

Sensor Technology for Factory Automation

Catalog FS 10 · 2009



The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001. The certificate is recognized by all IQNet countries.

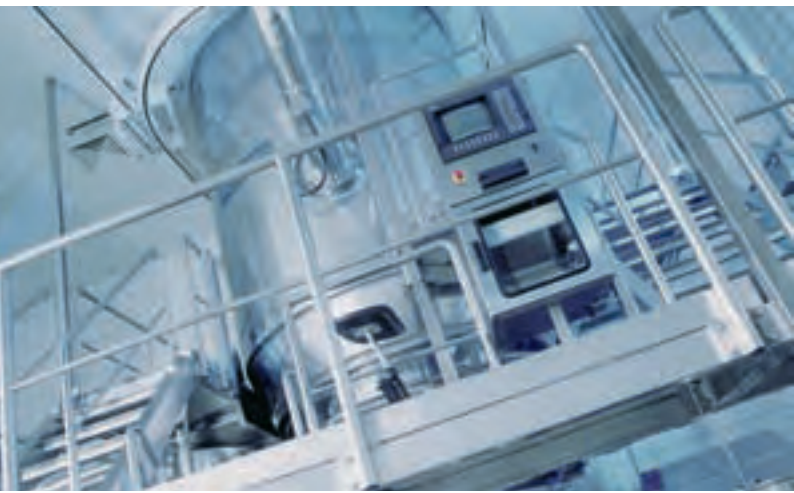
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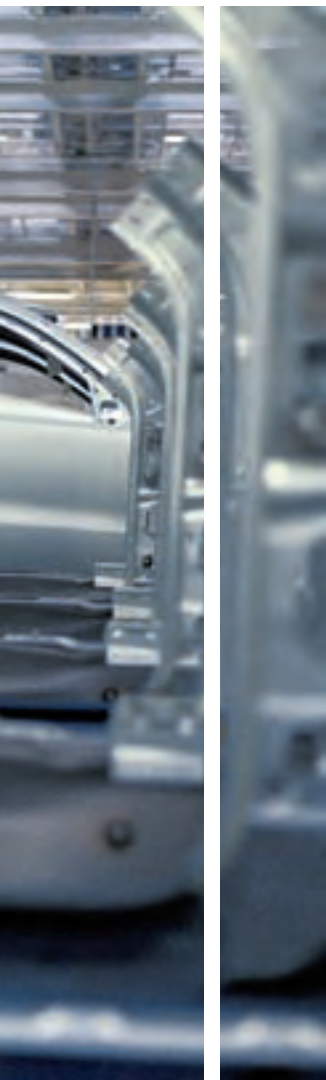
The products contained in this catalog can also be found in the e-Catalog CA 01
Order No.:
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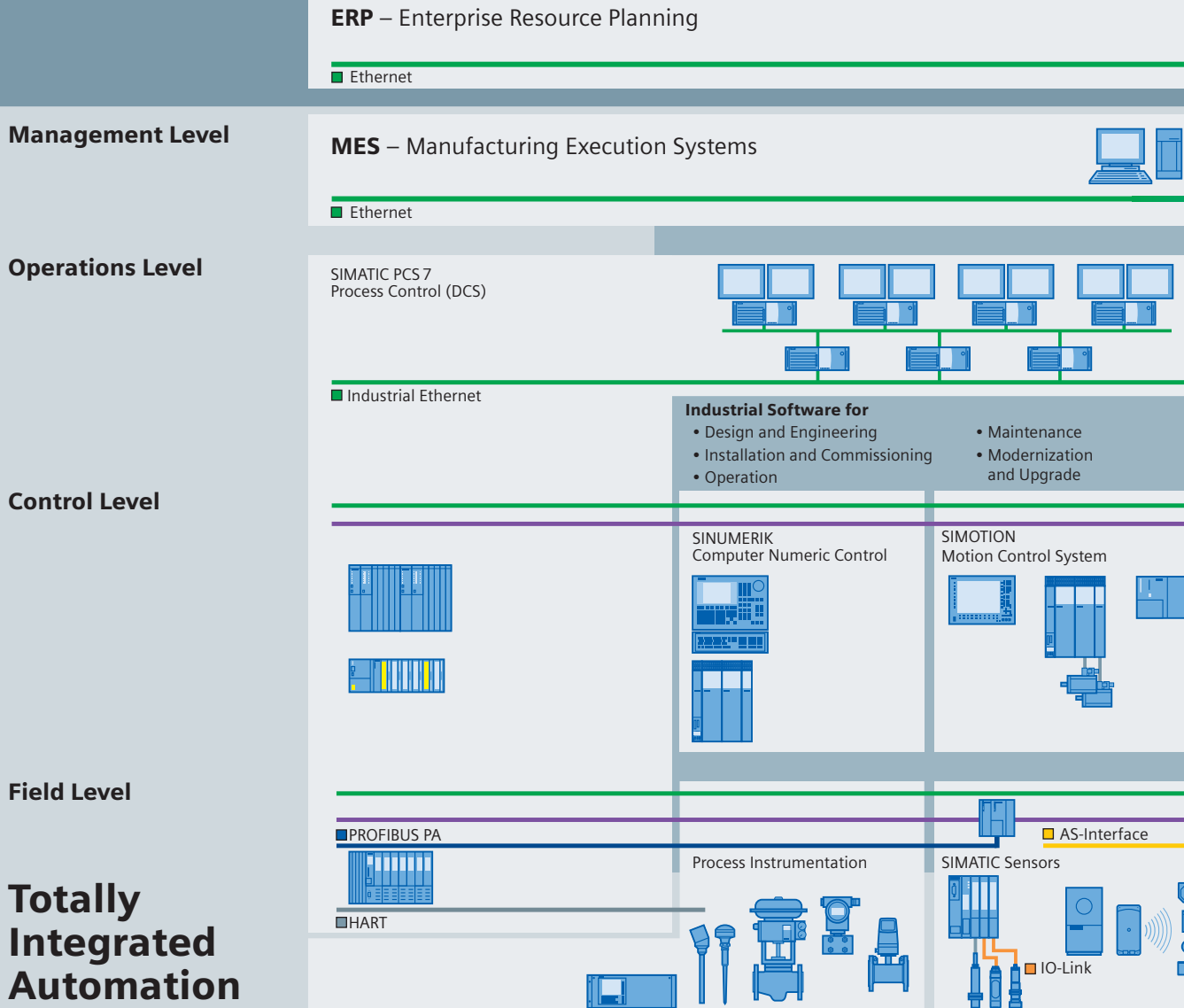
Answers for Industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60 %.

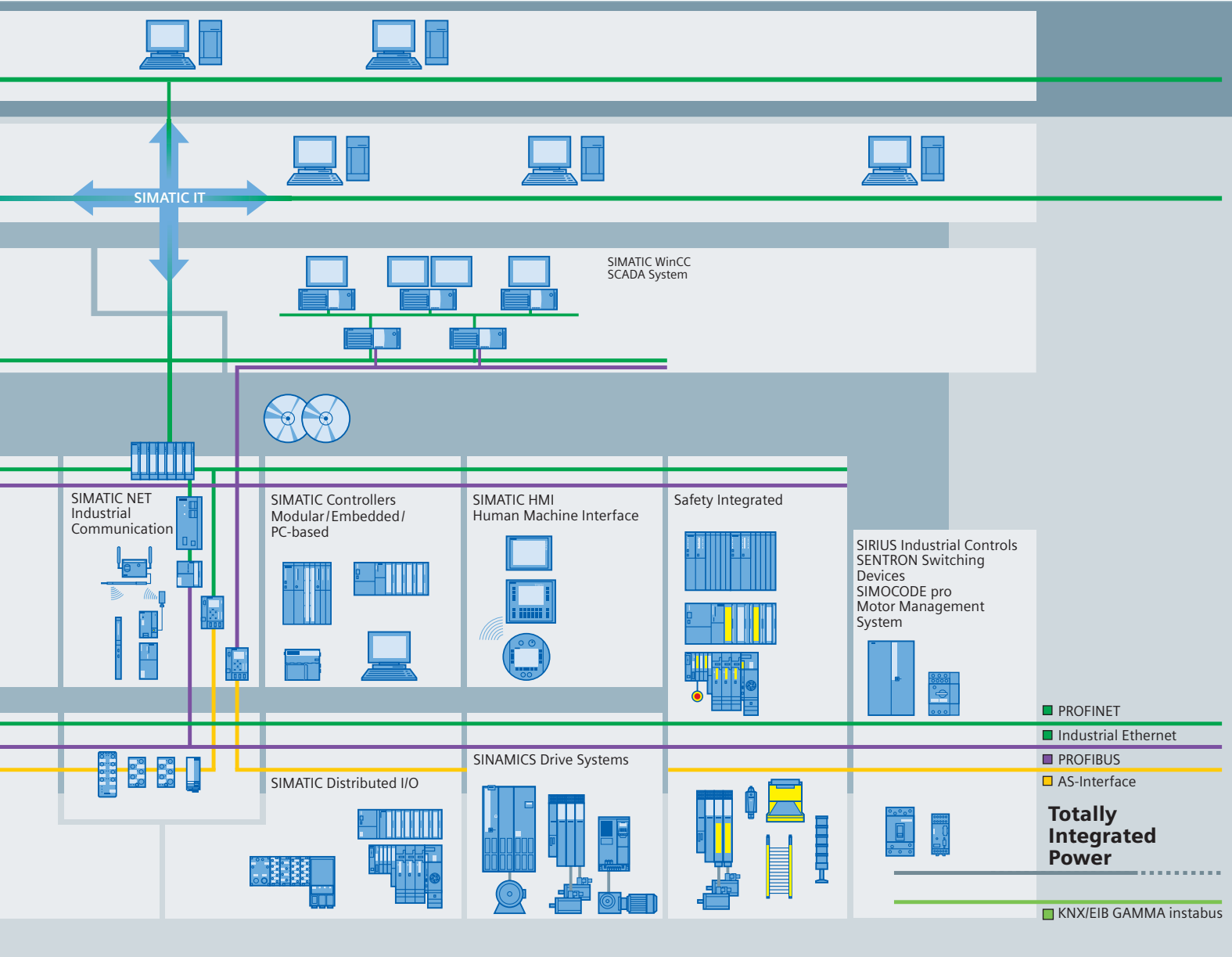
Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.



Setting standards in productivity and competitiveness.

Totally Integrated Automation.

Thanks to Totally Integrated Automation, Siemens is the only provider of an integrated basis for implementation of customized automation solutions – in all industries from inbound to outbound.

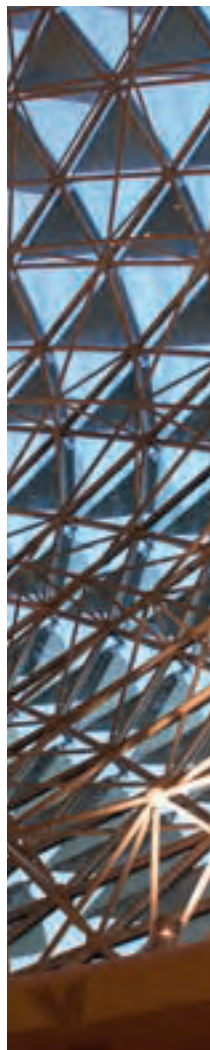


TIA is characterized by its unique continuity.

It provides maximum transparency at all levels with reduced interfacing requirements – covering the field level, production control level, up to the corporate management level. With TIA you also profit throughout the complete life cycle of your plant – starting with the initial planning steps through operation up to modernization, where we offer a high measure of investment security resulting from continuity in the further development of our products and from reducing the number of interfaces to a minimum.

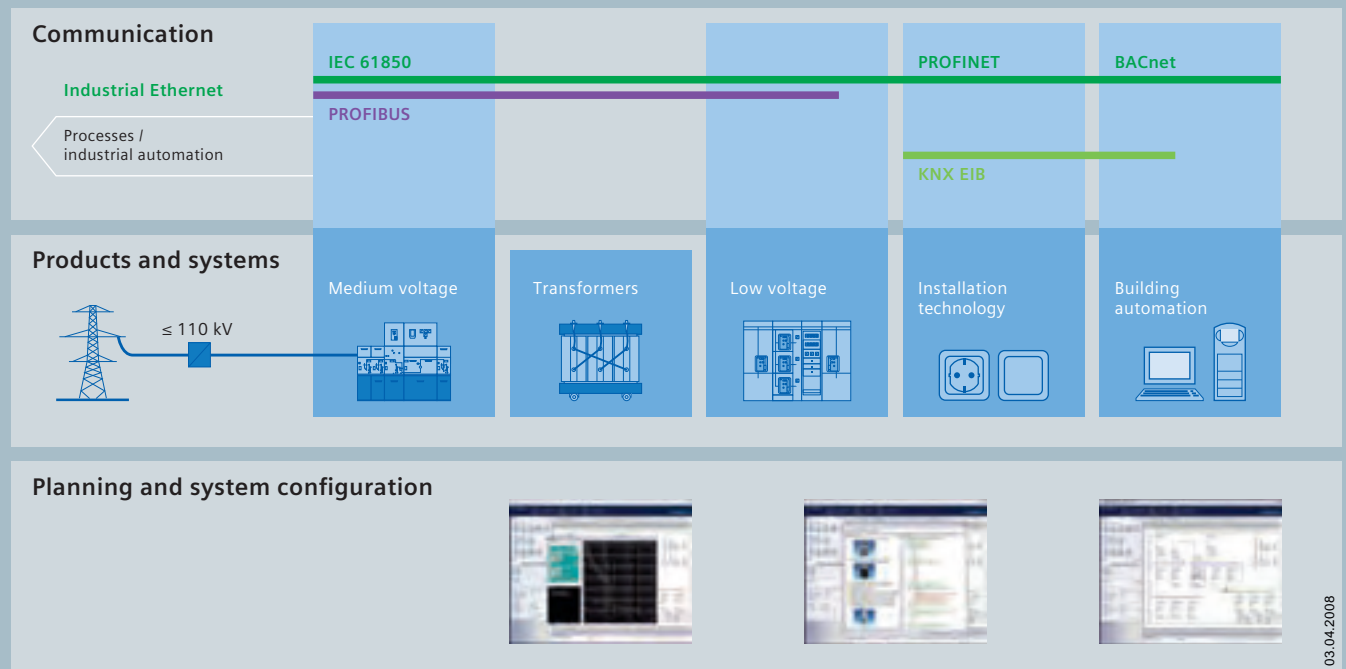
The unique continuity is already a defined characteristic at the development stage of our products and systems.

The result: maximum interoperability – covering the controller, HMI, drives, up to the process control system. This reduces the complexity of the automation solution in your plant. You will experience this, for example, in the engineering phase of the automation solution in the form of reduced time requirements and cost, or during operation using the continuous diagnostics facilities of Totally Integrated Automation for increasing the availability of your plant.



Integrated power distribution from one source.

Totally Integrated Power.



Electrical power distribution in buildings requires integrated solutions. Our response: Totally Integrated Power. This means innovative and integrated, interface-optimized products and systems which have been optimally coordinated and complemented with communication and software modules that link power distribution to building automation or industrial automation. Totally Integrated Power accompanies power distribution projects from one end to the other. From A to Z. From the planning to the building's use: Totally Integrated Power offers significant advantages in every project stage and to everyone involved in the project – the investors, electrical planning engineers, electricians, users and building facility managers.

Our portfolio comprises everything from engineering tools to the matching hardware: from switchgear and distribution systems for medium voltage to transformers, from switching and circuit-protection devices to low-voltage switchgear and busbar trunking systems, as far as to the small distribution board and the wall outlet. It goes without saying that both the medium-voltage switchgear, which requires no maintenance, and the low-voltage switchgear are type-tested, and their busbar connections, too. Comprehensive protection systems ensure the safety of man and machine at any time.

Sensors for factory automation

SIMATIC Sensors

Sensors represent the sense organs for machines and systems that run automated production processes. SIMATIC Sensors from Siemens comprise a complete range of sensor systems for a wide variety of applications in the manufacturing industry.

Through innovative, intelligent products which are integrated in Totally Integrated Automation, SIMATIC Sensors ensure greater productivity, availability, efficiency and cost effectiveness.

SIMATIC Sensors – Productivity You Sense

The extensive range of SIMATIC Sensors

The choice of the right components and their optimum deployment in the overall system is the decisive indicator of a successful automation system. With SIMATIC Sensors we offer you a complete portfolio of innovative, tried and tested sensors. A range that is totally competitive in terms of price, performance, functionality and availability.

Intelligent sensors – the key to greater efficiency

Whereas sensors previously functioned primarily as suppliers of information, intelligent sensors now allow direct evaluation and processing of measured values on site.

This simplifies the architecture of the automation solution and reduces the workload of the higher-level systems.

Global products for greater cost-effectiveness

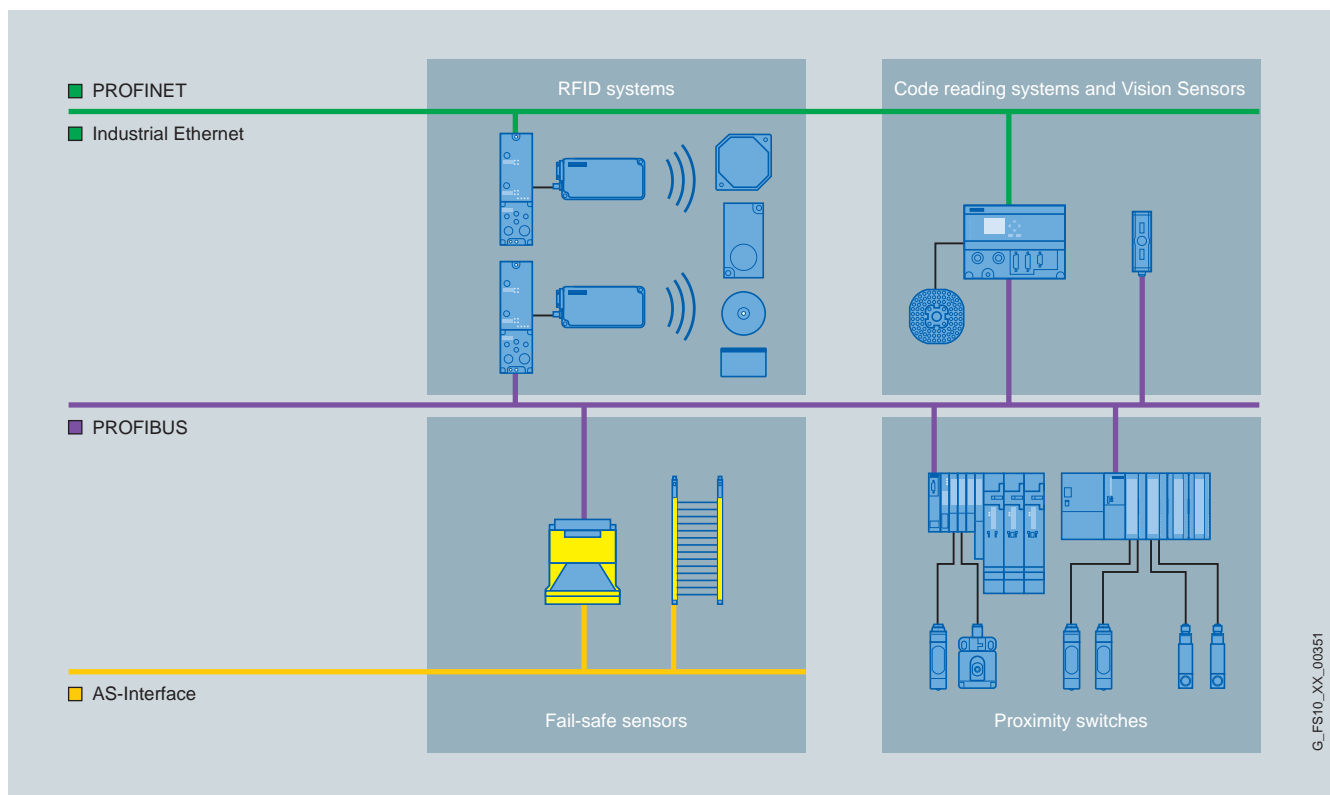
Products that can be used globally and which fit in any automation environment offer additional flexibility when implementing your machines or plants for worldwide use. We support you with worldwide service – on site, via hotline or the Internet – and with contacts in more than 190 countries.

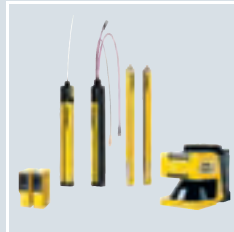
System integration for greater productivity

Sensors are increasingly becoming integral components of automation systems. With the integration of SIMATIC Sensors into Totally Integrated Automation – our unique range of products and systems for the automation of the entire production workflow in all sectors – we offer integration all the way from the sensors to the MES level. This opens up a new dimension with regard to availability and productivity.

Always the right choice

To help you make the right decision every time, we support you in all areas with qualified sales and technical expertise as well as a through competent knowledge of the application. With many years of experience in the field of sensor technology and as a global market leader in automation, we are actively working to advance the development of sensor technology.





Proximity switches

Fail-safe sensors

RFID systems

Code reading systems/vision sensors

	Proximity switches	Fail-safe sensors	RFID systems	Code reading systems/vision sensors
Position measurement/recognition	■			■
Presence detection	■		■	■
Failsafe presence detection		■		
Identification			■	■
Reading/writing data			■	
Pattern/shape comparison				■
Color recognition	■			■

When it is a matter of sensing, counting, measuring, monitoring or positioning of solid, liquid or powder objects, our proximity switches are always the right choice. With equally sharpened senses, plus the right amount of intelligence, our smart proximity switches are equipped with IO-Link. They combine sensors and control into one system. This unique concept ensures maximum plant availability and fault-free operation from the configuration through to the wiring.

For the protection of persons and machines in the industrial environment, maximum process reliability is paramount. Not simply to prevent damage, but also to achieve the greatest possible plant availability and maximum efficiency. A clear case for our optical safety sensors. They ensure safe and reliable all-round protection for persons, machines and systems. They are, of course, integrated into our Safety Integrated concept.

Whether in production, logistics or distribution – whenever you want to know anything about the production or the flow of goods at any time or place, then our intelligent electronic RFID systems put you in a perfect position to do so. They identify reliably, quickly and economically, store data directly on the product and are immune to contamination. In this way they control and optimize material flows, warehouse logistics and order picking.

In modern production systems, the unique coding of products or components is a key requirement. For reading and verifying 1D/2D codes, such as barcodes and data matrix codes, our code reading systems provide just the right products. They also permit the tracing of production batches beyond the production plant.

In the case of application-specific image processing, such as the inspection of small components for shape, type or position, our application-specific vision sensors provide the appropriate support.

Sensor technology for process automation

Process instrumentation, process analytics and weighing technology

Apart from sensor technology for production automation, Siemens also offers an extensive range of sensors for process automation. This allows you to significantly improve the efficiency, availability, utilization and quality of your plants and to leverage high rationalization opportunities through the integration of new systems.

Decades of experience in the measuring, analyzing and controlling of industrial processes is the basis for unsurpassed expertise in all areas of process engineering. In the process

gas chromatography, level measurement and positioners segments we are the global market leader as well as being a technology leader in many other areas.

Through the continuous innovation and improvement of our product range, we are now able to offer you reliable and profitable solutions for every task associated with process automation.

Process instrumentation



Siemens offers a comprehensive range of process instruments for measuring pressure, temperature, flow and level. The range is rounded off by pneumatic valve positioners, process controllers and recorders, as well as process monitors:

- **Pressure measuring instruments**
SITRANS P is a complete range of measuring instruments for measuring relative pressure, differential pressure and absolute pressure. In addition to high measuring accuracy and ruggedness, the modular system features superb operating convenience and functionality as well as a perfect safety concept. In other words: A proven program for all applications.
- **Temperature measuring instruments**
The SITRANS T series are the professionals for temperature measurement, even under extreme conditions. Whether it is hot or cold or they are used in hazardous environments – the communicative SITRANS T meets every expectation in many different sectors.
- **Flow meters**
The selection of the correct flow meter for a particular application can decisively improve your productivity. For all sectors, Siemens offers an extensive selection of magnetic-inductive, Coriolis, ultrasonic, vortex, rotary-piston and orifice flow meters that are suitable for the measurement of a wide range of fluids.

- **Filling-level meters**
Level transmitters from Siemens are used worldwide in the process industry, including the industrial effluent and wastewater sectors, aggregates, cement, mining, storage of dusty material, chemicals, petrochemicals, oil & gas, food & beverages as well as pharmaceuticals. A wide technology and product portfolio always offers the correct solution for your application.
- **Positioners**
SIPART PS2 is your first point of call for high-precision control of valves and dampers in a wide range of sectors and applications. These positioners ensure a rugged performance, high control quality, as well as simple operation. Thanks to the integral microprocessor, SIPART PS2 is far in advance of conventional devices.
- **Process monitoring systems**
Early detection protects your process. For immediate recognition of flow problems, blockages, filter faults, or cavitation in pumps. Our process monitoring equipment is an early warning system for avoidance of expensive process interruptions or plant failures. As a result of their rugged design, our products are resistant to dust, contamination, deposits and moisture.
- **Process controllers**
The SIPART DR series has proven its value more than 250,000 times in the control of all kinds of industrial processes, as well as in mechanical and systems engineering and other industrial areas. The compact controllers with a continuous or step output have been designed especially for space-saving installation in control panels.
- **Process recorders**
The more complex the processes in process engineering, research and development, the higher the demands on visualization and analysis. Irrespective of the measuring, monitoring or recording task involved, we offer future-oriented solutions with the SIREC range of process recorders.

For further information on process instrumentation, visit:

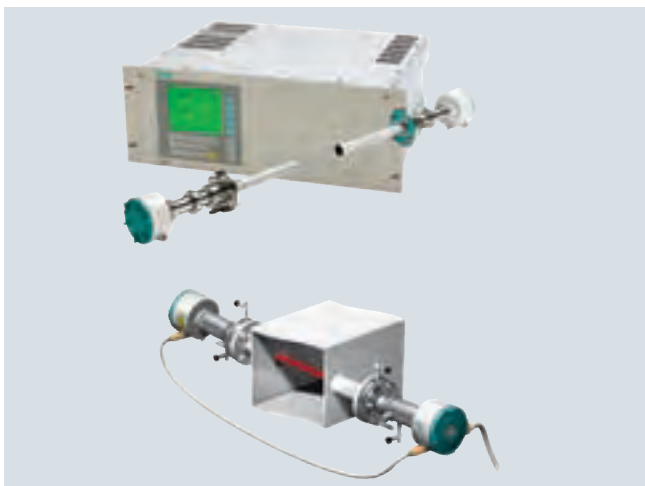
www.siemens.com/processinstrumentation/catalogs
or refer to the Catalog FI 01 "Process Instrumentation and Analytics"

Whether individual solutions or complete system solutions, our proven platform concept "Totally Integrated Automation" stands for uniformity covering data management, communication, configuration and programming. You profit from our versatility in the holistic solution for your process tasks.

And also from the openness of the systems thanks to interfacing using PROFIBUS or HART® communication as standards for simple integration of existing and future components.

All this is supplemented by comprehensive services covering everything from planning and competent technical consulting, commissioning and support for authorization procedures, to maintenance and comprehensive training of your staff. In short: Every conceivable field device and analyzer for process automation from a single source.

Process analytics



Siemens is a leading supplier of process analyzers and process analysis systems. Through innovative analysis technology, tailored plant designs, sound knowledge of the customer application, and professional support, we offer our global customers the optimum solutions for their applications. And with Totally Integrated Automation, Siemens is your competent partner for efficient solutions which integrate the process analyzers into automation systems in the many different sectors of the process industry.

- [Gas analyzers](#)
From flue gas monitoring in refuse combustion plants and power plants up to gas analysis in the chemical industry or the monitoring of rotary kilns in cement works – the continuous monitoring of process gases is carried out by highly precise and reliable analyzers from Siemens. With newly developed gas analyzers, Siemens continues its successful series.
- [Process gas chromatographs](#)
Our many years of experience and innovative technologies in the field of process gas chromatography will be very much to your advantage. The MicroSAM represents a new dimension in this field: being small, compact, powerful and economic, it is capable of performing a wide variety of measuring tasks in many different sectors.

For further information on process analytics, visit:

www.siemens.com/processanalytics/catalogs
or refer to the Catalog PA 01 "Process Analytics Devices"

Weighing technology



Siemens offers an extensive range of weighing system products, from the SIWAREX weighing processors fully integrated in TIA to heavy-duty weigh feeders. Using the SIWAREX load cells and electronic modules for weighing systems together with the Milltronics belt scales, weigh feeders and solids flow meters, the optimum weighing system is available for practically every task. The flexible design of our products makes it possible to implement every weighing solution from simple platform scales or gravimetric level measurement, up to highly complex automatic scales with the minimum of conversion costs.

For further information on weighing systems, visit:

www.siemens.com/siwarex
or refer to the Catalog WT 01 "SIWAREX Weighing System"

Proximity switches



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2/8	IO-Link master	2/100	L20 design	2/226	Operating distance 25–75 mm
2/9	IO-Link I/O modules	2/101	C20 design	2/229	SIMATIC PXI600
2/10	SIMATIC PXS sonar proximity switches	2/102	SIMATIC PXO400	2/230	ATEX, 2–8 mm
2/17	SIMATIC PXS100	2/103	K31 design	2/232	ATEX, 10–35 mm
2/18	K0 compact range	2/105	K30 design	2/234	e1, 2–8 mm
2/20	3SG16 compact form	2/107	SIMATIC PXO500	2/237	e1, 10–15 mm
2/22	Sonar thru-beam sensor	2/108	C40 design	2/239	SIMATIC PXI900
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2/55	SIMATIC PXS800	2/128	Characteristic curves	2/263	Plastic fiber-optic wire for SIMATIC PXO
2/56	M18 ATEX compact range	2/132	SIMATIC PXI inductive proximity switches	2/266	Reflectors for SIMATIC PXO
2/58	M30 K3 ATEX compact range	2/138	SIMATIC PXI200	2/268	Plug-in connections
2/62	SIMATIC PXS900	2/140	Operating distance 0.6–0.8 mm	2/274	Sensor assembly system
2/63	Double-layer sheet monitoring	2/143	Operating distance 1–4 mm	2/275	Mounting hardware for all proximity switches
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2/78	SIMATIC PXO photoelectric proximity switches	2/169	Operating distance 30–40 mm		
2/85	SIMATIC PXO100	2/170	SIMATIC PXI300		
2/86	D4 design	2/172	Operating distance 0.6–1 mm		
2/87	M5 design	2/173	Operating distance 2–4 mm		
2/88	M12 design	2/184	Operating distance 5–12 mm		
2/90	SIMATIC PXO200	2/196	Operating distance 15–22 mm		
2/91	M18S design	2/206	Operating distance 25–40 mm		
2/93	M18 design	2/215	Operating distance 50–65 mm		
2/94	L18 design				

Proximity switches

Introduction

Proximity switches for reliable sensing, counting, measurement or monitoring

Automation solutions are becoming more and more extensive and processes are more complex than ever before. Therefore the seamless control of all processes is more important than ever. To maintain an overview here, it is essential to deploy all the available senses optimally.

Proximity switches offer ideal characteristics for this for sensing, counting, measuring and positioning. Whatever the application or sector, the complete product range can always provide just the right feel for the job.

Highlights

- Contactless detection of objects
- Extensive and complete product range including photoelectric, inductive, sonar and capacitive sensors
- International versions (UL/CSA)
- Up to degree of protection IP69K, depending on type of sensor
- Customer-specific product versions
- Integrated in Totally Integrated Automation with IO-Link

SIMATIC PXS sonar proximity switches

Sonar proximity switches can be used as non-contact proximity switches in many fields of automation.

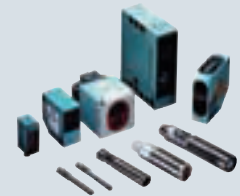
Whenever distances through air have to be evaluated, these devices can be used, because they not only detect objects, but can also output and evaluate the absolute distance between the Sonar proximity switches and the object. Changing environmental conditions (e.g. temperature variations) are compensated during evaluation of the measurement.



SIMATIC PXO photoelectric proximity switches

The photoelectric proximity switches react to changes in the received quantity of light. The light beam emitted from the emitter diode is interrupted or reflected by the object to be detected.

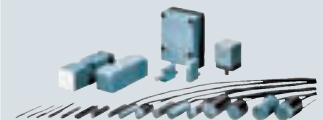
Depending on the type of device, the interruption or reflection of the light beam is evaluated.



SIMATIC PXI inductive proximity switches

Inductive proximity switches are the low-cost solution for non-contact detection of metal objects.

Inductive proximity switches are extremely reliable with a very high repeat accuracy and long service life thanks to no-wear operation as well as their insensitivity to temperature, noise, light and water.



SIMATIC PXC capacitive proximity switches

Capacitive proximity switches are also non-contact sensors for measuring conducting and non-conducting materials in solid, powder or liquid state.



Totally integrated in TIA

IO-Link is the smart concept for the standardized linking of sensors and actuators to the control levels by means of an economical point-to-point connection.

This new communications standard below the fieldbus level allows central fault diagnosis and location as far as the sensor/ actuator level and simplifies commissioning and maintenance by allowing the parameter data to be modified dynamically, direct from the PLC. The result: Greater plant availability and reduced engineering expenditure. As an open interface, the IO-Link can be integrated into all common fieldbus and open automation systems. Consistent interoperability ensures maximum protection of investment.



2

Engineering

Reduced engineering costs

Faster configuration due to central data storage and reproducibility of sensor and actuator parameters.

Reduced number of parameterization tools due to central configuration and data storage in STEP 7.

Simpler integration of devices by defining profiles.

Maximum flexibility: thanks to the open IO-Link solution with IODD Standard, third-party devices can be integrated analogously by means of GSD.

Protection of investment by means of tried and tested topologies and compatibility with conventional connection.

Commissioning

Shorter commissioning times

Homogeneous and significantly reduced wiring expenditure of different sensors and actuators by the use of standardized, shielded 3-wire connecting cables.

Saves time, as no individual parameterization is necessary. Parameters can be copied for similar device configurations.

Uncomplicated parameterization due to central data storage – recurrent default settings at sensors and actuators are avoided.

High degree of flexibility for sensor/ actuator parameterization thanks to optional editing or teaching of setting data.

Operation and maintenance

Greater plant availability

Transparency down to the field level due to the integration of the IO-Link Standard into Totally Integrated Automation.

Shorter conversion times thanks to central parameter and recipe management for field devices as well.

Reduced downtimes due to plant-wide diagnostics all the way to the field level and fast fault clearing and thanks to reporting and displaying pre-failure messages by means of preventive maintenance of sensors and actuators.

Easy clearance of faults by replacing equipment with supported re-parameterizing, because integrated parameter storage is provided in the PLC.

Absolute reliability of all of the Siemens components in the Siemens system due to comprehensive system tests.

IO-Link proximity switches

IO-Link

Introduction

Overview



IO-Link product range

IO-Link is a new, innovative and standardized communication standard for sensors and actuators – defined by PROFIBUS International (PI). The IO-Link technology is based on a point-to-point connection of sensors and actuators to the controller. It is not a bus system but it considerably enhances the conventional point-to-point connection. In addition to the cyclic operating data, comprehensive parameter and diagnostics data are transferred for the connected sensors/actuators. The same 3-wire connecting cable as currently used for standard sensors is used.

Components of an IO-Link system:

Only 2 components are required for using IO-Link:

- IO-Link master
- IO-Link device (e.g. IO-Link sensor/actuator, IO-Link I/O module)

Compatibility of IO-Link

IO-Link ensures the compatibility between IO-Link-capable and standard modules as follows:

- IO-Link sensors/actuators can be operated both on IO-Link modules (master) and on standard I/O modules.
- Both IO-Link sensors/actuators as well as current standard sensors/actuators can be used on IO-Link modules (master).
- If conventional components are used in the IO-Link system, naturally only the standard functions are available in this case.

Expansion by IO-Link I/O modules

The compatibility of IO-Link also permits the connection of standard sensors/actuators, i.e. conventional sensors/actuators can also be connected to IO-Link. This can be implemented especially cost-effectively with IO-Link I/O modules that permit the connection of several sensors/actuators to the controller via one cable.

Analog signals

Another advantage of the IO-Link technology is that analog signals are immediately digitized in the IO-Link sensor and then digitally transferred via the IO-Link communication. This avoids interferences and additional overhead due to cable shields is omitted.

Integration in STEP 7

Integration of the device configuration in the STEP 7 environment ensures

- Easy and quick engineering
- Consistent data management
- Quick locating and clearing of faults

Thus productivity is increased in all phases of the plant's life cycle – configuration, commissioning and operation. With the Siemens IO-Link solution, even sensors and actuators below the fieldbus level are optimally integrated with their complete performance capability in the Totally Integrated Automation (TIA) environment.

Benefits

The IO-Link system offers decisive advantages when connecting complex (intelligent) sensors/actuators:

- Dynamic modification of sensor/actuator parameters direct in the PLC
- Capability of replacing devices during operation without reparameterization due to integrated storage of parameters
- Rapid commissioning thanks to central data management
- Integrated diagnostic information down to the sensor/actuator level
- Uniform wiring and considerably reduced wiring overhead for different sensors/actuators
- Reduced number of parameterization tools
- Integrated communication: Transfer of process data and service data between sensors/actuators and the controller
- Uniform and transparent configuration and programming due to the use of a parameterization tool (Port Configurator Tool, PCT) integrated in SIMATIC STEP 7
- Transparent display of all parameter and diagnostics data
- Reduced configuration and commissioning costs
- Alarm and message displays for preventive maintenance

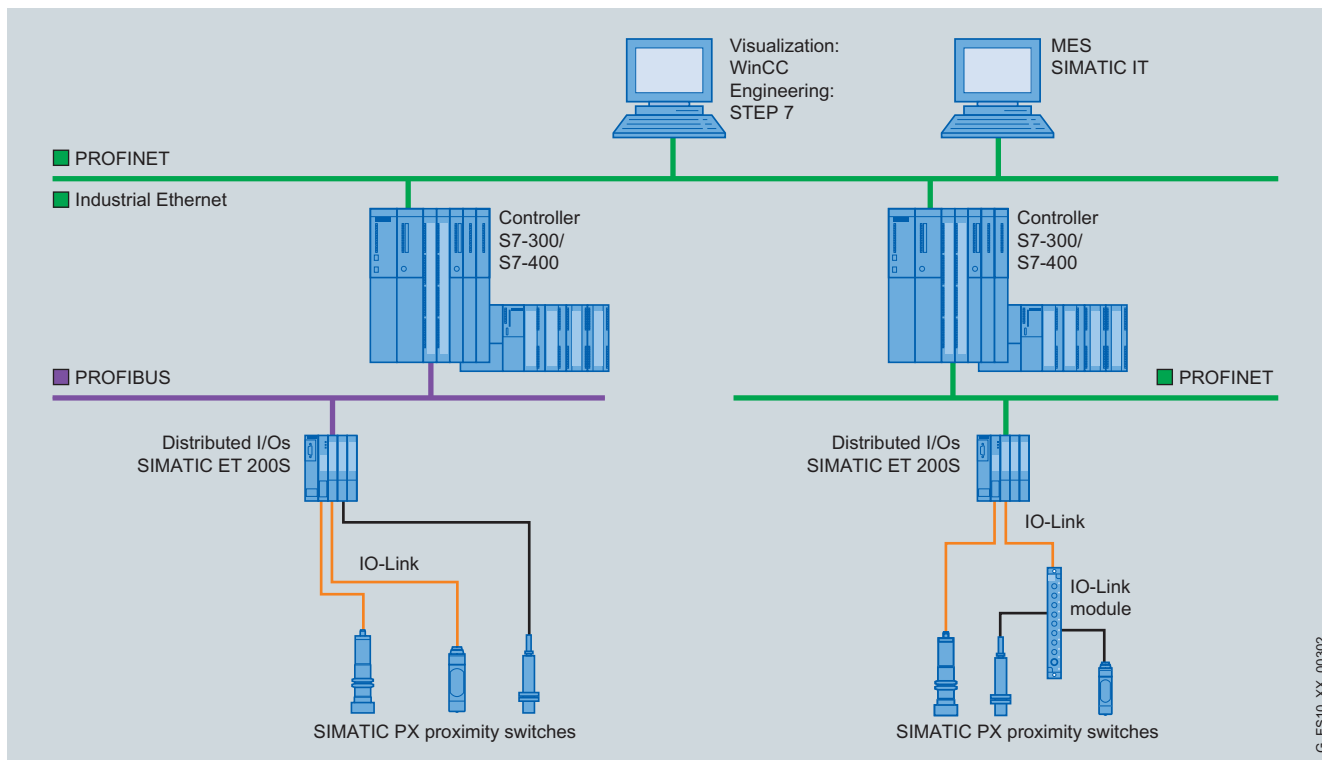
Application

There are two main fields of application for IO-Link. On the one hand, even complex sensors with a large number of parameters can be easily connected to the controller by means of IO-Link. On the other hand, by means of the IO-Link modules this technology turns into an optimum substitute for passive distributors when connecting binary sensors. In both fields of application all diagnostics data are transferred to the higher-level controller via IO-Link.

User benefit (example)

If a complex pressure transducer is used, numerous parameters (e.g. threshold values, hysteresis values) are set during commissioning to ensure smooth operation of the plant. Via IO-Link this data is transferred to the controller and stored there. Should this sensor fail, the sensor simply needs to be replaced. The required parameters are then called from the controller and transferred to the sensor via IO-Link. Without IO-Link, the sensor would have to be laboriously reparameterized on site.

Integration



2

IO-Link proximity switches

IO-Link

SIMATIC PXS310C M18 sonar proximity switches

Overview



SIMATIC PXS310C ultrasonic proximity switch

The SIMATIC PXS310C ultrasonic proximity switch can detect many different objects and signal their distance with millimeter precision. Material and color play no role.

Due to the bidirectional IO-Link interface, the distance data is provided direct as numerical value without complex analog conversion. The sensor can then be easily parameterized from the controller. The IO-Link interface also transfers diagnostic information from the sensor to the controller.

The proximity switch is connected to the IO-Link master via a standard M12 connecting cable. If the proximity switch is connected to a standard I/O module, it operates as proximity switch with switching output.

Characteristics

- M18 compact range
- Small blind zone
- Large sensing range up to 100 cm
- Simple connection method: M12 connector 4-pole, type F
- Supports COM and SIO mode according to the IO-Link specification
- Transfer of measured value and switching state
- Faster transfer of measured values to the controller
- Dynamic change of the parameters

Design

The devices of the M18 IO-Link compact range are always supplied with permanently installed sensors.

Technical specifications

Type	6GR6333-3KS00	
Sensing range	cm	10 ... 100
Standard target	cm	2 x 2
Operational voltage (DC)	V	20 ... 30 (including 10% residual ripple)
Rated operating current I_e	mA	200
No-load supply current I_0	mA	Max. 50
Ultrasonic frequency	kHz	200
Switching frequency f	Hz	5
ON-delay	ms	100
Time delay before availability t_v	ms	120
Path resolution	mm	1
Switching status display	Yellow/green LED	
Enclosure material	Nickel-plated brass; CRASTIN converter cover; epoxy resin converter surface	
Degree of protection	IP67	
Ambient temperature		
• During operation	°C	-25 ... +70
• During storage	°C	-40 ... +85

Selection and Ordering data

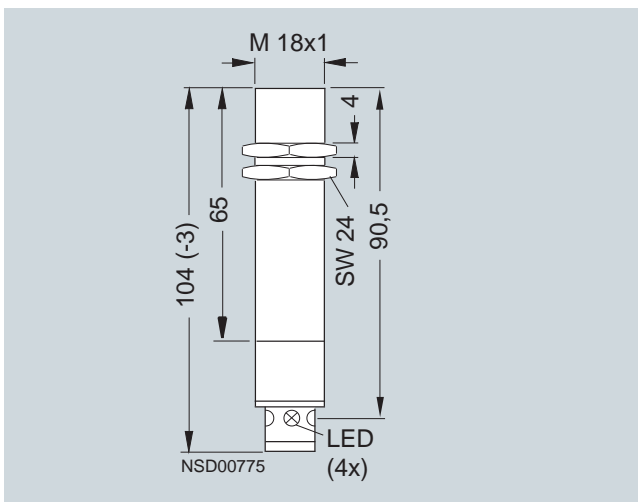
	Sensing range cm	Rated operational current mA	Order No.
PXS310C ultrasonic proximity switch	10 ... 100	200	6GR6 333-3KS00



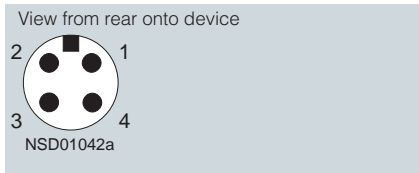
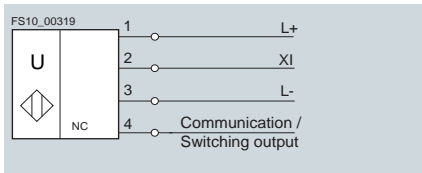
► Preferred type, available from stock.

A: Subject to export regulations AL = N and ECCN = EAR99H.

Dimensions



Schematics



More information

Information on the IO-Link sensors can be found in the Mall at www.siemens.com/simatic-sensors/px

IO-Link proximity switches

IO-Link

IO-Link master

Overview



IO-Link master

IO-Link master module for SIMATIC ET 200S

The electronic module 4SI IO-Link is an IO-Link master and permits the easy integration of sensors and actuators from different manufacturers into the multifunctional, distributed I/O system SIMATIC ET 200S at a total of four ports.

Characteristics

- Up to 4 IO-Link devices (3-wire connection) can be connected to each IO-Link master module.
- Up to 4 standard actuators or encoders (2-wire/3-wire connection) can be connected.
- The electronic module 4SI IO-Link is 15 mm wide and can be used with the following universal terminal modules:
 - TM-E15S26-A1 (screw terminal)
 - TM-E15C26-A1 (spring-loaded terminal)
 - TM-E15N26-A1 (Fast Connect)
- Supports firmware update (as of STEP 7 V5.4 SP4)

Selection and Ordering data Order No.

IO-Link master module	A	6ES7 138-4GA50-0AB0
Electronic module für ET 200S, 4SI IO-Link, 4 point-to-point interfaces, 15 mm width, IO-Link master		

A: Subject to export regulations AL = N and ECCN = EAR99H.

More information

Further information and technical data can be found in the Mall under: "Communication/Networks" --> "Industrial Communication SIMATIC Net" --> "IO-Link" --> "Master"

Overview



The IO-Link technology also permits the connection of standard sensors to the IO-Link master. However, such a direct connection of standard sensors to the IO-Link master does not tap the full potential of IO-Link. The technology of the IO-Link modules provides a solution here.

Their use represents a more cost-effective solution compared to a direct sensor/actuator connection.

IO-Link I/O modules are a practical extension of the ET200S distributed I/O.

The technology of the IO-Link I/O modules extends the IO-Link beyond a pure point-to-point connection and creates distributed structures. It must be considered that the cable length of an IO-Link connection restricts the distance between an IO-Link module and the master to max. 20 m.

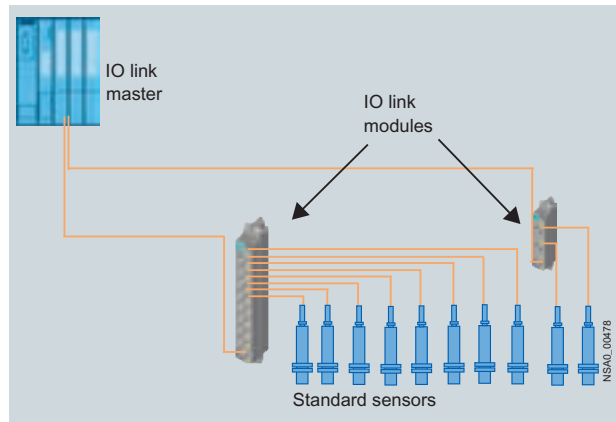
No passive distributors are used and therefore there is no associated laborious and fault-prone wiring.

Transfer of parameters and diagnostic messages

IO-Link I/O modules also permit the transfer of parameters and diagnostic messages. For example, the inputs of the modules can be parameterized as NC or NO contacts via IO-Link. An overload or short circuit in the sensor supply is signaled via the IO-Link master to the controller.

M8 and M12 connections

M8 and M12 connections are available for connecting the sensors. A standard M12 connecting cable is used for connection to the IO-Link master.



Technology with IO-Link I/O modules

Selection and Ordering data

Type	Pin assignment	Connection method	Order No.
IO-Link module K20			
4 inputs	Y	M12	▶ 3RK5 010-0BA10-0AAA
8 inputs	Standard	M8	▶ 3RK5 010-0CA00-0AAA

▶ Preferred type, available from stock.

More information

Further information and technical data are available in the Mall under "Communication/Networks" --> "Industrial Communication SIMATIC NET" --> "IO-Link" --> "I/O Modules"

SIMATIC PXS sonar proximity switches

Introduction

Sonar proximity switches – from 2.5 cm to 10 m – they hear everything



The Sonar proximity switches detect objects in different materials, shapes, colors or consistencies with absolute precision, flexibility and reliability. The range of applications is almost limitless. In fill-level or height sensing, distance measurement or bottle counting – at distances from 2.5 cm to 10 m, they detect objects with widely differing characteristics. Regardless of whether they are liquid, solid, powder or even transparent. The nature of the surfaces is irrelevant, they can be rough or smooth, clean or dirty, wet or dry. The proximity switches are extremely rugged and insensitive to dirt, vibration, ambient light or ambient noise.

Highlights

- Measurement accurate to the millimeter
- Color and material-independent, even transparent objects
- Individual parameter setting
- Small, compact enclosures (K21)
- Very high degree of repeat accuracy
- Can be used all over the world: UL/CSA approvals
- Sensors available for Ex Zone 2/22
- Insensitive to temperature, noise, light or water
- Sensors with IO-Link

Configurator

A configurator for sonar proximity switches is available in the Mall. Based on the technical features required, the desired product can be quickly and easily selected, placed in the shopping cart and ordered.

The configurator can be reached by the following link:
www.siemens.com/simatic-sensors/px

PXS series

The ultrasonic proximity switches are organized in different product families in accordance with their technical version and design:

SIMATIC sensors	Design
PXS100	K0 compact range, 3SG16 compact form, sonar thru-beam sensor
PXS200	M30 K1 compact range, M18S compact range, K21 compact range, K08 compact form
PXS300	M30 K2 compact range, M18 compact range, K65 compact form
PXS400	M30 K3 compact range
PXS800	M18 compact range ATEX, M30 K3 compact range ATEX
PXS900	Double-layer sheet monitoring

Application

The wide range of areas of application for the Sonar proximity switch ultrasonic sensors gives full rein to the imagination:

- Fill level and height sensing
- Spacing measurement
- Winding diameter sensing
- Bottle counting, and much more.

The Sonar proximity switches are extremely rugged and insensitive to dirt, vibration and ambient noise.

Applications in food processing

For use in contact with food or corrosive chemicals, on request, the ultrasonic sensors can be protected with transformer cover foil and supplied in a stainless-steel enclosure.

Objects

Using ultrasonic technology, Sonar proximity switches can detect objects of any kind, this includes liquids, powders or granulates, and colored or transparent objects. Whether the surface of the object is rough or smooth, clean or dirty, wet or dry is of no consequence. Even at a maximum operating distance, all level or smooth surfaces can be reliably detected up to an angular variation of approximately 3° from the sound cone. Depending on the peak-to-valley height of the object, the angular variation may also be higher.

As a rule, the objects can enter the sound cone from any direction.

Sensors for Ex Zone 2/22



These sonar proximity switches are approved according to EU Guideline 94/9/EG (ATEX) Appendix VIII

The approval is for:

- Gas EX II 3G EEx nA II T6 X and
- Dust EX II 3D IP65 T 80 °C X

The functionality of the sonar proximity switches with ATEX approval is identical to that of the standard proximity switches.

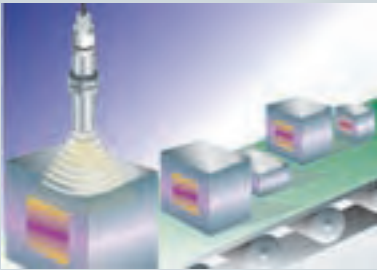
Personal safety



NSDO_00801

Due to their physical characteristics, the ultrasonic proximity switches **cannot** be used for safety-related applications (e.g. for the protection of personnel).

Application examples



Size measurement



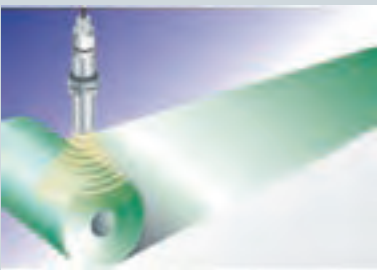
Quality control



Measurement of stack height



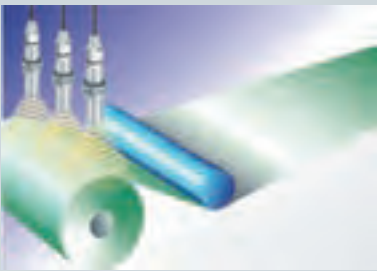
Distance monitoring



Measurement of diameter and speed



Level measurements



Contour measurement



Loop monitoring

SIMATIC PXS sonar proximity switches

Introduction

2

Design

Mounting

Sonar proximity switches can be operated in any mounting position. Mounting positions in which deposits can settle on the transducer surface must however be avoided.

The best results are obtained if the Sonar proximity switches are aligned such that the ultrasound waves hit the object as near to the vertical as possible. If this is not possible (e.g. in the case of bulk material), the maximum possible range must be determined experimentally. This depends on the material, surface and alignment of the objects.

To prevent undesirable reflections, the distance *a* must be maintained from disturbing objects around the axis of the sound cone.

Between the sound cone axis and a smooth wall running in parallel to it, the distance *b* must be maintained to prevent disturbing reflections. The distance *c* must be maintained to ensure that no objects enter the blind zone (see sound cones).

Mounting multiple sensors

Mutual interference between Sonar proximity switches that can result in spurious signals is excluded by maintaining sufficient distances between the sensors or an appropriate alignment.

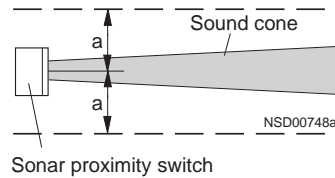
If two Sonar proximity switches of an identical design are mounted opposite each other, the distance *d* must be maintained between them. If two sensors of identical design are arranged in parallel, the distance *e* must be maintained between the sensors.

To avoid mutual interference (cf. function), proximity switches of K0, M30 K2, M30 K3 and M18 compact ranges can be synchronized or operated in multiplex mode.

Fouling

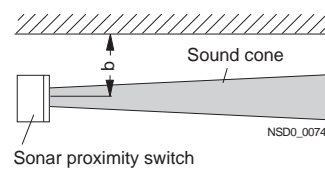
The range of the proximity switch is reduced if the transducer surface is damaged or painted or if water or wet dirt is applied to it.

Clearance *a* around the axis of the sound cone:
keep space free of objects



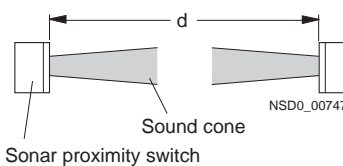
Sonar proximity switches with sensing range	a
cm	cm
6 (5) ... 30	> 6
20 to 130 (100)	> 30
40 to 300	> 60
60 to 600	> 90
80 to 1000	> 150

Distance *b* between two Sonar proximity switches and a smooth surface



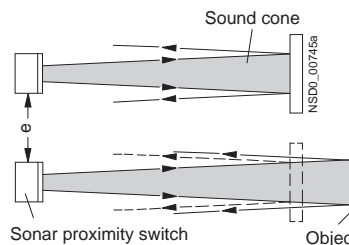
Sonar proximity switches with sensing range	b
cm	cm
6 (5) ... 30	> 3
20 to 130 (100)	> 15
40 to 300	> 30
60 to 600	> 40
80 to 1000	> 70

Distance *d* between two Sonar proximity switches mounted opposite each other with the same sensing range



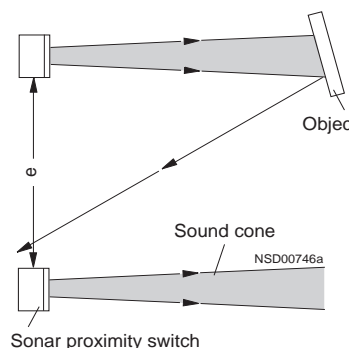
Sonar proximity switches with sensing range	d
cm	cm
6 (5) ... 30	> 120
20 to 130 (100)	> 400
40 to 300	> 1200
60 to 600	> 2500
80 to 1000	> 4000

Distance *e* between two Sonar proximity switches arranged in parallel with the same sensing range, object perpendicular to the axis of the sound cone



Sonar proximity switches with sensing range	e
cm	cm
6 (5) ... 30	> 15
20 to 130 (100)	> 60
40 to 300	> 150
60 to 600	> 250
80 to 1000	> 350

Distance *e* between two Sonar proximity switches arranged in parallel with the same sensing range, object with unfavorable orientation



The distance *e* must be experimentally determined depending on the angle between the object and the Sonar proximity switch.

Function

The Sonar proximity switches only operate through the medium of air and can detect any objects that reflect ultrasound.

The sensors emit ultrasonic pulses cyclically. When an object reflects these pulses, the generated echo is received and converted into an electrical signal. The incoming echo is detected in accordance with its intensity which, in turn, is dependent on the distance between the object and the Sonar proximity switch.

The Sonar proximity switches operate according to the echo propagation principle, i.e. the time difference between the emitted pulse and the echo pulse is evaluated.

The construction of the sensor causes the ultrasonic beam to be emitted in the shape of a cone. Reflecting objects are only detected within this sound cone. Within the blind zone, which lies between the sensor surface and the sensing range, echoes cannot be evaluated for physical reasons.

Resolution

The resolution is the smallest change in the distance to the object that is necessary for a change in the output of the BERO. The internal resolution is 256 or 4096 steps. If values are entered during programming that exceed this resolution, the program will automatically correct them. The corrected values will be displayed in a window with a message.

Example

3RG6014-..... sonar proximity switch (60 to 600 cm)

For a sensing range 60 to 600 cm, this results in a resolution of 1.3 mm:

$$6000 \text{ mm} - 600 \text{ mm} = 5400 \text{ mm}$$

$$5400 \text{ mm} / 4096 = 1.3 \text{ mm} \text{ (12 bit)}$$

If the measuring range is restricted, the step size is reduced because the distance that is split up into 4096 steps has reduced. The smallest step size is, however, limited to 1 mm by the electronics. If the sensing range is restricted, the resolution is enhanced.

Temperature compensation

The Sonar proximity switches of M30 K2, M30 K3 and M18 compact ranges are fitted with temperature sensors and a compensation circuit that equalizes changes in operating distances caused by temperature changes.

Compensation can be performed throughout the temperature range. This means that an absolute precision of $\pm 1.5\%$ (M30 K2 and M30 K3 compact ranges) or of $\pm 2.5\%$ (M18 compact range) is achieved.

Operating modes with switching output

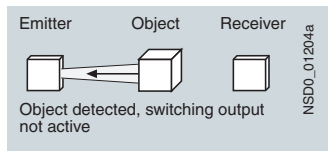
The Sonar proximity switches with switching output can be used in the following modes depending on their type.

Only emitter, only receiver

Two Sonar proximity switches are required in each case for this operating mode. One is parameterized as a receiver and the other is parameterized as the emitter. There are two possible applications:

Thru-beam sensor:

It is only evaluated whether an object lies between the proximity switches. The range is twice the normal range. Adjustment of the operating range and evaluation of the analog output is not relevant in this case.



Active measurement system:

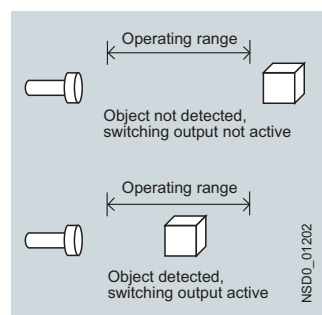
The propagation time of the ultrasonic signal from the emitter to the receiver is measured. The enabling inputs of the two proximity switches must be connected together for this purpose. All options of the proximity switches can still be used; the range is twice the normal range.

Emitter and receiver

This is the normal operating mode of the Sonar proximity switch; it operates as a typical proximity switch.

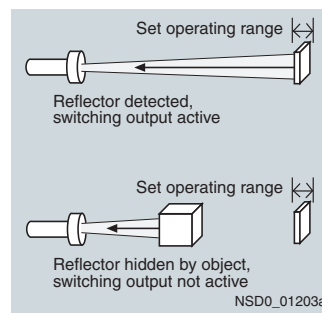
Diffuse sensor:

In this case, the object that is to be detected acts as a reflector. As soon as an object enters the preset operating range, the echo from this object causes the output signal of the proximity switch to change.



Reflex sensor:

In this case, a permanently fixed reflector (e.g. a small metal plate) is mounted opposite the proximity switch. The operating range is adjusted to this reflector. If the path between the proximity switch and the reflector is interrupted, the sensor no longer detects the reflector and this triggers a change in the signal at the switching output.



SIMATIC PXS sonar proximity switches

Introduction

2

Synchronization

In K0, M30 K2, M30 K3 and M18 compact ranges, several devices can be synchronized with each other by simply interconnecting the synchronization outputs of the devices (Pin 2 for NO function, Pin 4 for NC function). Up to 10 devices can be synchronized (or 6 devices in the case of K0 compact range). This allows the sensors to be mounted extremely close to each other in many cases without causing mutual interference.

Advantages

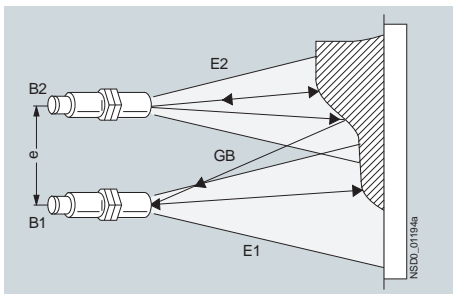
- No additional wiring overheads, simply connect the enable inputs of the individual proximity switches.
- Fast response, because every proximity switch is constantly active.

Disadvantages

- The object cannot be assigned to a particular proximity switch.

Example

Two Sonar proximity switches are mounted at a clearance e that is smaller than the minimum clearance (see mounting guidelines). An object is located in their common sound field. The echo from B2 can reach B1 by reflection (GB). Mutual interference can occur. The object is detected from the two echoes E1 and E2 by Sonar proximity switches B1 and B2. If the two devices are synchronized, there may be no mutual interference, because for example, echo E1 arrives after echo E2 at proximity switch B2. The devices only ever respond to the first echo.



Multiplex function

External multiplex mode

The fourth connection can be used as an external enabling input. This can be used to switch the Sonar proximity switch to active or inactive using an external control without the need to switch the supply voltage on and off. An external multiplex mode can be configured when Sonar proximity switches have to be switched on and off in sequence via the enabling input. In this case, it is ensured that the Sonar proximity switches will not interfere with each other. In contrast to internal multiplex mode, more than 10 Sonar proximity switches can be operated in multiplex mode.

Connection of the enable input:

- Sonar proximity switch active, Enable input XI at L+ or open.
- Sonar proximity switch inactive, enable input XI at 0 ... 3 V DC

Advantages

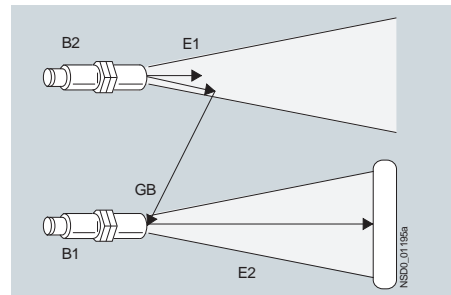
- Reliable protection against mutual interference.
- An object can be assigned to a proximity switch.

Disadvantages

- Additional connection overheads (e.g. a PLC).
- Longer response time than for a synchronization circuit because each proximity switch is only active briefly and then has to wait until all the other proximity switches in the circuit have emitted.

Example: Recognition of narrow objects

Narrow objects are to be recognized and it shall be determined whether one, two or no objects are present.



In this example, echo GB would cause proximity switch B1 to mistakenly detect an object. Synchronization of the proximity switches would not help here because echo pulse E2 would not arrive until after echo GB at proximity switch B1 and a proximity switch only ever detects the first echo. In this example, a PLC must be used to switch cyclically to and fro between the two proximity switches.

Internal multiplex mode

The Sonar proximity switches of K0, M30 K2, M30 K3 and M18 compact ranges can be interconnected to form a network. Up to 10 devices (or 6 devices in the case of K0 compact range) can be operated in series or parallel (see "Synchronization"). No additional electronics is required. The enable inputs of all the proximity switches are simply connected together. On programming, each device is informed about the number of proximity switches in the network as well as its own position (address) in the network. When they have been wired up and the supply voltage has been connected, the proximity switches automatically operate in multiplex mode.

SONPROG programming device

SONPROG Using the SONPROG 3RX4 000 programming device and the relevant software, the Sonar proximity switches of M30 K2, M30 K3 and M18 compact ranges can be individually adapted to the respective application requirements. The device is an interface for the following tasks:

- Checking the parameters of the Sonar proximity switch
- Modifying the parameters of the Sonar proximity switch
- Aligning the Sonar proximity switch to the application.

This enables a Sonar proximity switch to be optimized specifically for an application. The adjustments found can be saved or printed out to facilitate maintenance and documentation of the equipment.

When a Sonar proximity switch has been replaced, the new device can be programmed with the saved data quickly and easily. No new adjustments are necessary.

The main parameters that can be set are

- Lower and upper limit of the operating range
- Hysteresis
- Switching function NO or NC
- Switching frequency
- Lower and upper limit of the analog characteristic
- Analog characteristic, rising or falling
- End of close range
- End of sensing range
- Mean value generation
- Attenuation.

The function can also be set for the device:

- Multiplex function
- Temperature compensation
- Diffuse or reflex sensor.

For a detailed description of the possible settings, see "SONPROG PC interface", page 2/260.

Adjustment with potentiometers

The potentiometers are used to select the required limits (min. or max.) of the switching range.

SIMATIC PXS sonar proximity switches

Introduction

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SIMATIC design	K21	K08	M18S	M18	M18 ATEX	M30 K1	M30 K2	M30 K3	M30 K3 ATEX	K0	K65	Sonar thru-beam sensor	Spherical	3SG16	Double sheet control
PXS100															
• 30 cm										2/18					
• 100 cm										2/18				2/20	
• 150 cm												2/22			
PXS200															
• 25 cm	2/34		2/31												
• 30 cm						2/27									
• 40 cm	2/34	2/36	2/31												
• 70 cm			2/31												
• 80 cm	2/34	2/36													
• 130 cm						2/27									
• 300 cm						2/27									
• 600 cm						2/27									
PXS300															
• 30 cm				2/44			2/40								
• 50 cm										2/46					
• 100 cm				2/44											
• 130 cm							2/40								
• 150 cm										2/46					
• 250 cm										2/46					
• 300 cm							2/40								
• 600 cm							2/40								
PXS400															
• 30 cm								2/50							
• 130 cm								2/50							
• 300 cm								2/50							
• 600 cm								2/50							
• 1000 cm													2/52		
PXS800															
• 30 cm					2/56				2/58						
• 100 cm					2/56										
• 130 cm									2/58						
• 300 cm									2/58						
• 600 cm									2/58						
PXS900															
• 6 cm															2/63

Overview

SIMATIC sensors PXS100

- K0 compact range,
- 3SG16 compact form,
- Sonar thru-beam sensor

Selection table

SIMATIC PXS100



	K0 compact range				Sonar thru-beam sensor	3SG16 compact form
	Fixed sensor head		Separate sensor head			
Sensing range (cm)	6 ... 30	20 ... 100	6 ... 30	20 ... 100	5 ... 150	20 ... 100
Operating mode						
• Diffuse sensor	■	■	■	■		■
• Reflex sensor						■
• Thru-beam sensor					■	
Output						
• 1 switching output	■	■	■	■	■	
• 2 switching outputs						■
• Analog output 0 ... 10 V	■	■	■	■		
Adjustment						
• 1 potentiometer	■	■	■	■		
• Jumper plug						■
Connection						
• M8 connector					■	
• M12 connector	■	■	■	■	■	
• Cable					■	
• Terminals						■
Degree of protection						
• IP65	■	■	■	■		■
• IP67					■	
See page	2/18				2/22	2/20

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXS sonar proximity switches

SIMATIC PXS100

K0 compact range

Overview



K0 compact range with separate and fixed sensor

The Sonar proximity switches of K0 compact range are ready-to-use units with a rectangular enclosure. They are available with two sensing ranges.

- Operate as diffuse sensors
- Adjustable via potentiometer
- Can be synchronized
- Temperature compensation
- Solid-state outputs:
 - switching output
 - analog output
- Connection via M12 connector, type F

Design

The devices of K0 compact range are supplied in the standard version with permanently installed sensors.

The devices of K0 compact range can also be supplied with separate sensors. Due to its small dimensions, the sensor is especially suitable in confined spaces.

The ultrasonic sensor is installed in a cylindrical enclosure separated from the other electronics. In 3RG63 42 devices, the sensor is installed in an M18 shell and in 3RG63 43 devices it is installed in an M30 shell with a length of 25 mm in both cases.

Two nuts are supplied for fixing. The connecting lead of 1.6 m length is molded onto the sensor. The connection to the evaluation electronics located in the enclosure of K0 compact range is established via the preassembled coaxial cable plug. The plug-in socket is installed on the end face of the enclosure.

Function

K0 compact range is designed for simple applications. The devices are only suitable for operation as diffuse sensors.



The sensors can be supplied with analog outputs. The end of operating range or analog range can be set using a potentiometer.

Up to 6 devices can be synchronized with each other.

Technical specifications

Type		3RG63 42	3RG63 43
Sensing range	cm	6 ... 30	20 ... 100
Standard target	cm	1 × 1	2 × 2
Hysteresis <i>H</i>	mm	5	10
Repeat accuracy <i>R</i>	mm	± 0.45	± 1.5
Operational voltage (DC)	V	10 ... 35 (including ± 10% residual ripple, at 10 ... 18 V sensitivity reduced by approx. 30%)	
Rated operational current <i>I_e</i>	mA	100	
No-load supply current <i>I₀</i>	mA	max. 35	
Ultrasonic frequency	kHz	400	200
Switching frequency <i>f</i>	Hz	8	5
Response time	ms	70	90
Power-up delay <i>t_v</i>	ms	7	7
Switching status display		Yellow LED	
Enclosure material		CRASTIN; epoxy resin converter surface	
Degree of protection		IP65; IP68 with separate sensor	
Ambient temperature			
• During operation	°C	0 ... +55	
• During storage	°C	-40 ... +85	

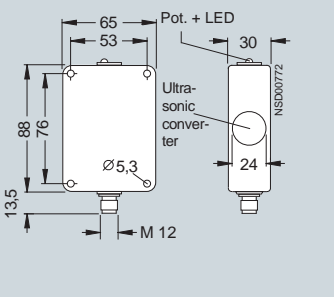
Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Analog output	Order No.
	cm	mA	pnp		
Fixed sensor					
	6 ... 30	100	1 NO	–	▶ 3RG63 42-3AB00
	20 ... 100	100	1 NO	–	▶ 3RG63 43-3AB00
	6 ... 30	100	1 NC	–	3RG63 42-3AA00
	20 ... 100	100	1 NC	–	3RG63 43-3AA00
	6 ... 30	100	–	0 ... 10 V	▶ 3RG63 42-3JK00
	20 ... 100	100	–	0 ... 10 V	▶ 3RG63 43-3JK00
Separate sensor					
	6 ... 30	100	1 NO	–	▶ 3RG63 42-3AB01
	20 ... 100	100	1 NO	–	▶ 3RG63 43-3AB01
	6 ... 30	100	1 NC	–	3RG63 42-3AA01
	20 ... 100	100	1 NC	–	3RG63 43-3AA01
	6 ... 30	100	–	0 ... 10 V	▶ 3RG63 42-3JK01
	20 ... 100	100	–	0 ... 10 V	3RG63 43-3JK01

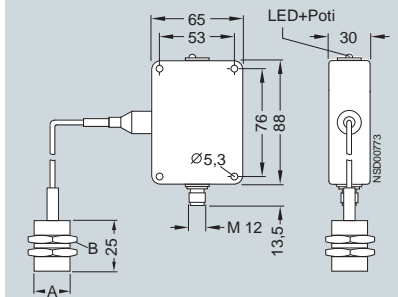
▶ Preferred type, available from stock.

Dimensions

3RG 63 4.-3..00



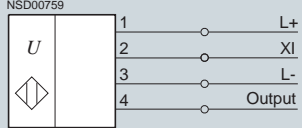
3RG 63 4.-3..01



Type	A	B
3RG63 42-3..01	M18	SW 24
3RG63 43-3..01	M30	SW 36

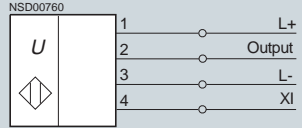
Schematics

NSD00759




NO or analog output

NSD00760



NC

View from rear onto device



NSD01042a

SIMATIC PXS sonar proximity switches

SIMATIC PXS100

3SG16 compact form

Overview



3SG16 compact form

The sonar proximity switch in compact form for DC is a complete, factory-assembled unit, ready for connection. It cannot be combined with devices from the compact range.

- Operates as diffuse sensor or reflex sensor
- Foreground and background suppression
- Adjustable by means of plug-in jumpers
- Solid-state outputs:
 - 2 switching outputs
- Terminal compartment with screw terminals

Design

All components are located in a single box-shaped enclosure. The ultrasonic converter and the terminal compartment are arranged on the same enclosure level.

The electrical connections are made via screw terminals in the terminal compartment; cable entry is through an M20 cable gland.

Aligning unit

To make it easier to align the Sonar proximity switch with the object to be detected, a 3SX6 287 aligning unit is available.

This unit allows swiveling about a horizontal and a vertical axis with an angle of rotation in each case of up to 30°.

Function

Range definition and adjustability

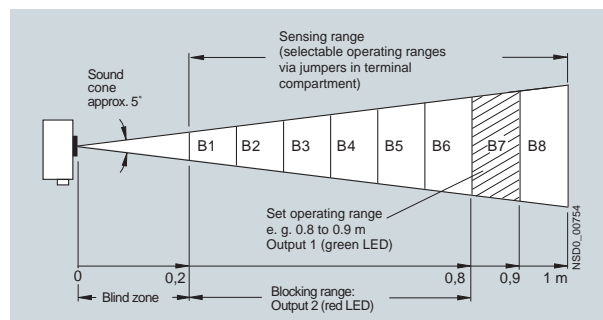
The sonar proximity switch outputs a signal while an object is located in the set operating range or inhibit range outside the blind zone (see figure).

The sensing range between 0.2 and 1 m is subdivided into 8 equal operating ranges of 0.1 m. Each operating range B1 to B8 can be selected using a connector in the terminal compartment.

The Sonar proximity switch signals with one output and one LED in each case whether objects are located in the set operating range or in the so-called inhibit range that precedes it.

With the help of the supplied programming plug, two to eight of the separate operating ranges (B1 to B8) can be combined to form an extended operating range.

The switching range is defined by two programming plugs. The plug is fitted to a pin connector in the terminal compartment of the device. The possible pin assignments are shown in the cover of the terminal compartment.



Modes

Standard operating mode, diffuse sensor

The sonar proximity switch switches when an object enters the sound cone from any direction, output 14 (NO) outputs a 1-signal if the object is located within a set operating range (B1 to B8). Output 24 (SX) outputs a 1-signal if the object is in the inhibit range. Objects in the blind zone do not cause a utilizable signal change on outputs 14 and 24.

Reflex sensor

If a reflector is permanently fixed within a set operating range, the ultrasonic beam will be interrupted by all objects in the inhibit range even those that absorb sound.

In this case, output 14 (NO) changes to the 0-signal. In the case of reflective objects in the inhibit range, output 24 (SX) changes to the 1-signal at the same time.

Technical specifications

Type	3SG16 compact form	
Sensing range	cm	20 ... 100
Standard target	cm	2 × 2
Hysteresis <i>H</i>	mm	10
Repeat accuracy <i>R</i>	mm	± 2
Operational voltage (DC)	V	10 ... 35 (including ± 10% residual ripple, at 10 ... 18 V sensitivity reduced by approx. 30%)
No-load supply current <i>I</i> ₀	mA	< 60
Switching output		
• Rated operational current <i>I</i> _e	mA	150
• Voltage drop	V	2
• Residual current	mA	0.01
Ultrasonic frequency	kHz	200
Switching frequency <i>f</i>	Hz	4
Response time	ms	120
Power-up delay <i>t</i> _v	ms	280
Switching status display		Yellow LED
Enclosure material		CRASTIN; epoxy resin converter surface
Degree of protection		IP65
Ambient temperature		
• During operation	°C	-25 ... 70
• During storage	°C	-40 ... 85

Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Connection	Order No.
	cm	mA	pnp		
3SG16 sonar proximity switches	20 ... 100	150	2 NO	Terminal compartment	3SG16 67-1BJ87

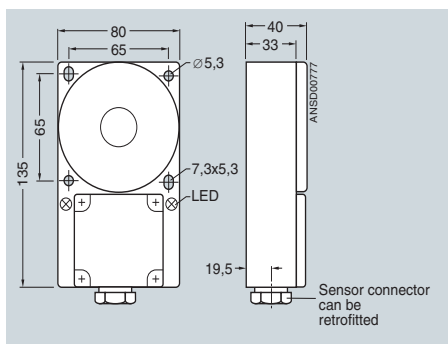
Accessories

Aligning unit

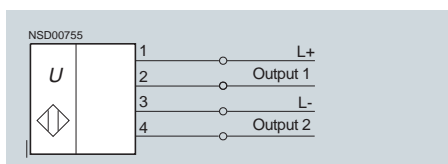
3SX6 287

▶ Preferred type, available from stock.

Dimensions



Schematics



SIMATIC PXS sonar proximity switches

SIMATIC PXS100

Sonar thru-beam sensor

Overview



Sonar thru-beam sensor

The sonar thru-beam sensor comprises an ultrasonic emitter and a receiver. The emitter and receiver circuits are installed in separate box-shaped enclosures of molded plastic.

- Operation as thru-beam sensor
- 3 measurement ranges can be set
- Solid-state output:
 - Switching output
- Connection
 - With 3 m cable
 - With M8 connector, 4-pole, type B
 - With M12 connector, 4-pole, type F

Function

Thru-beam sensor mode

The emitter of the sonar thru-beam sensor emits a narrowly focused continuous tone in the direction of the receiver.

The receiver located opposite evaluates this ultrasonic signal. Interruption of the tone by an object will cause the output signal to change.

Adjustment of sensitivity

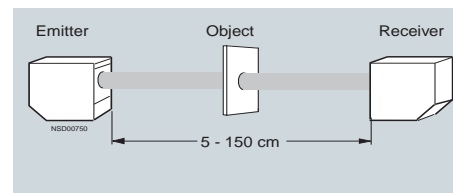
The sensitivity can be adjusted at the receiver module at terminal 2 (NO version) or 4 (NC version).

XI	Switching rate	Emitter/receiver distance
	Hz	cm
Not connected	100	< 150
L-	150	< 80
L+	200	< 40

Object detection

The minimum size of detectable objects depends on the distance between emitter and receiver. If the distance is less than 40 cm, objects 2 cm or larger will be detected. The gap with between two objects must be at least 3 mm.

If the distance is shorter, gaps of even < 1 mm can be detected. At maximum distance, objects greater than 4 cm in size can be detected. In this case the gaps between the objects must be > 1 cm.



Layout


Technical specifications

Type		3RG62 43-P (receiver)	3RG62 43-N (emitter)
Sensing range	cm	-	5 ... 150
Standard target	cm	2 x 2	
Operational voltage (DC)	V	20 ... 30 (including ± 10% residual ripple)	
Rated operational current I_e	mA	100	
No-load supply current I_0	mA	< 20	
Ultrasonic frequency	kHz	-	200
Switching frequency f			
• Up to 40 cm	Hz	200	-
• Up to 80 cm	Hz	150	-
• Up to 150 cm	Hz	100	-
Response time			
• Up to 40 cm	ms	2	-
• Up to 80 cm	ms	1.5	-
• Up to 150 cm	ms	1	-
Power-up delay t_v	ms	< 40	
Status indication		Green LED	
Enclosure material		CRASTIN; epoxy resin converter surface	
Degree of protection		IP67	
Ambient temperature			
• During operation	°C	0 ... +70	
• During storage	°C	-25 ... +85	

Sonar thru-beam sensor

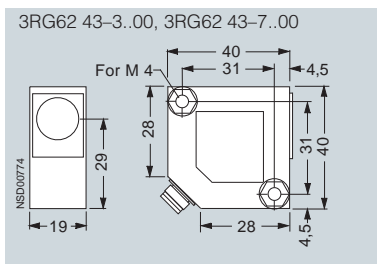
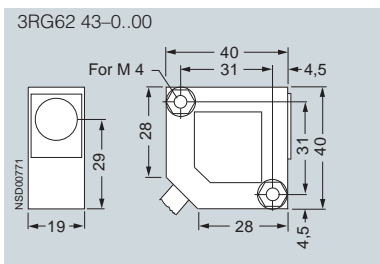
2

Selection and Ordering data

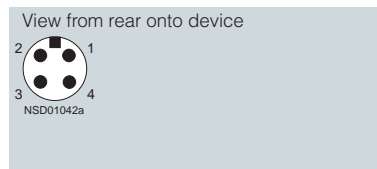
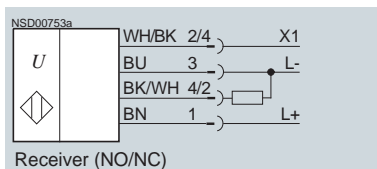
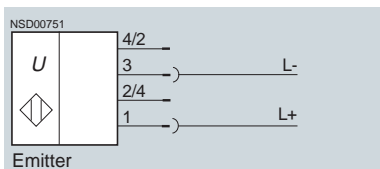
	Sensing range	Rated operational current	Switching output	Connection	Order No.
	cm	mA	pnp		
	5 ... 150	100	1 NO	Cable, 3 m	▶ 3RG62 43-0PB00
	5 ... 150	100	1 NC	Cable, 3 m	3RG62 43-0PA00
	5 ... 150	–	Emitter	Cable, 3 m	▶ 3RG62 43-0NN00
	5 ... 150	100	1 NO	M 8 connector	3RG62 43-7PB00
	5 ... 150	100	1 NC	M 8 connector	3RG62 43-7PA00
	5 ... 150	–	Emitter	M 8 connector	3RG62 43-7NN00
	5 ... 150	100	1 NO	M12 connector	▶ 3RG62 43-3PB00
	5 ... 150	100	1 NC	M12 connector	3RG62 43-3PA00
	5 ... 150	–	Emitter	M12 connector	▶ 3RG62 43-3NN00

▶ Preferred type, available from stock.

Dimensions



Schematics



SIMATIC PXS sonar proximity switches

SIMATIC PXS200

Overview

SIMATIC sensors PXS200

- M30 K1 compact range,
- M18S compact range,
- K21 compact range,
- K08 compact form

Selection table

SIMATIC PXS200



	M30 K1 compact range									
	Fixed sensor head				Swivel-mounted sensor head				Separate sensor head	
Sensing range (cm)	6 ... 30	20 ... 130	40 ... 300	60 ... 600	6 ... 30	20 ... 130	40 ... 300	60 ... 600	6 ... 30	20 ... 130
Operating mode										
• Diffuse sensor	■	■	■	■	■	■	■	■	■	■
• Reflex sensor	■	■	■	■	■	■	■	■	■	■
Output										
• 1 switching output	■	■	■	■	■	■	■	■	■	■
Adjustment										
• 2 potentiometers	■	■	■	■	■	■	■	■	■	■
Connection										
• M12 connector	■	■	■	■	■	■	■	■	■	■
Degree of protection										
• IP65	■	■	■	■	■	■	■	■	■	■
See page	2/27									

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXS200



	K08 compact range			M18S compact range					
	5 ... 40	0 ... 80	0 ... 40	Straight sensor head			Angled sensor head		
Sensing range (cm)	5 ... 40	0 ... 80	0 ... 40	2 ... 25	2.5 ... 40	5 ... 70	2 ... 25	2.5 ... 40	5 ... 70
Operating mode									
• Diffuse sensor	■			■	■	■	■	■	■
• Reflex sensor			■	■	■	■	■	■	■
• Thru-beam sensor		■							
Output									
• 1 switching output				■	■	■	■	■	■
• 2 switching outputs	■	■	■						
• Frequency output				■	■	■	■	■	■
Adjustment									
• Teach-in	■	■	■	■	■	■	■	■	■
Connection									
• M12 connector	■	■	■	■	■	■	■	■	■
Degree of protection									
• IP67	■	■	■	■	■	■	■	■	■
See page	2/36			2/31					

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXS sonar proximity switches

SIMATIC PXS200

2

SIMATIC PXS200



	M18S compact range, 2 switching outputs				K21 compact range		
	Straight sensor head		Angled sensor head				
Sensing range (cm)	2.5 ... 40	5 ... 70	2.5 ... 40	5 ... 70	2 ... 25	2.5 ... 40	0 ... 80
Operating mode							
• Diffuse sensor	■	■	■	■	■	■	
• Reflex sensor					■	■	
• Thru-beam sensor							■
Output							
• 1 switching output					■	■	■
• 2 switching outputs	■	■	■	■			
• Frequency output					■	■	
Adjustment							
• Teach-in	■	■	■	■	■	■	■
Connection							
• M8 connector					■	■	■
• M12 connector	■	■	■	■			
• Cable					■	■	■
Degree of protection							
• IP67	■	■	■	■	■	■	■
See page	2/31				2/34		

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

Overview



M30 design with fixed sensor

The Sonar proximity switches of M30 K1 compact range are ready-to-use all-in-one units with a cylindrical M30 enclosure. They differ with regard to their range, their functional scope and their adjustment or programming capability.

- Operates as diffuse sensor or reflex sensor
- Adjustable via 2 potentiometers
- Electronic switching output
- Connection via M12 connector, 3-pole or 4-pole, Type E, F

Design

Standard version

In the standard version, the devices have a permanently installed sensor.

Version with separate sensor



M30 design with separate sensor

Due to its small dimensions, the sensor is especially suitable in confined spaces.

The ultrasonic sensor is installed in a cylindrical enclosure separated from the other electronics. For 3RG6. 12 devices, the sensor is in an M18 sleeve, for 3RG6. 13 devices, the sensor is installed in an M30 sleeve with a length of 25 mm in each case.

Two nuts are supplied for fixing. The connecting lead, which is 1.6 m long, is cast onto the sensor. The connection to the evaluation electronics located in the M30 enclosure of the compact range is established via the preassembled coaxial cable plug. The plug-in socket is installed on the end face of the enclosure.

Version with swivel sensor

These devices correspond functionally to the other devices of M30 K1 compact range. They are particularly suitable for applications where the standard type cannot be used due to space limitations.



M30 design with swivel sensor

The ultrasonic sensor is hinged with a swivel arm to the tubular enclosure of the signal evaluator. This allows rotation about the cylinder axes as well as perpendicular movement at about 100° to the cylinder axis.

Passive reflector

With the Sonar proximity switches of M30 K1 compact range, a 3RX1 910 passive reflector can be clamped onto the sensor head (see "Accessories").

Where space is limited, objects can be detected which are perpendicular to the Sonar proximity switch (which reduces the installation depth). The blind zone is therefore reduced by about 6 cm.

SIMATIC PXS sonar proximity switches

SIMATIC PXS200

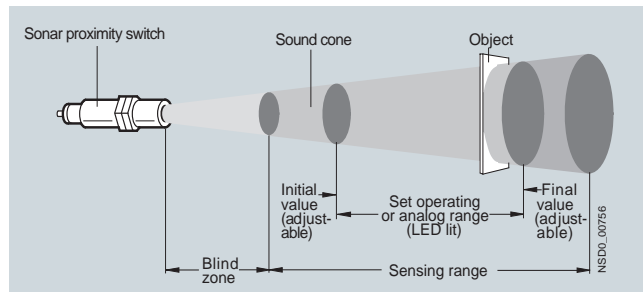
M30 K1 compact range

Function

Range definition and adjustability

Objects within the preset operating range or analog range will be reliably detected causing the switching output or analog output to change state.

The blind zone must be kept clear of any objects since this might cause false outputs. Objects at a distance from the sensor that is outside the set operating range limits will not be signaled at the switching output.



Sound cone

Modes

Standard operating mode, diffuse sensor

An object entering the sound cone from any direction causes the output signal to change when it enters the preset sensing range.







Reflex sensor

If a reflector is permanently fixed within a set operating range, the Sonar proximity switch will be operated by all objects that lie between the Sonar proximity switch and the reflector, even those that absorb sound.

Technical specifications

Type		3RG60 .2	3RG60 .3	3RG60 .4	3RG60 .5
Sensing range	cm	6 ... 30	20 ... 130	60 ... 600	40 ... 300
Standard target	cm	1 × 1	2 × 2	10 × 10	5 × 5
Hysteresis H	mm	10	10	60	20
Repeat accuracy R	mm	± 0.45	± 2	± 9	± 5
Operational voltage (DC)	V	12 ... 30 (including ± 10% residual ripple, at 12 ... 20 V sensitivity reduced by approx. 20%)			
Rated operational current I_e					
• NO contact	mA	300			
• NC contact	mA	300			
No-load supply current I_0	mA	max. 50			
Ultrasonic frequency	kHz	400	200	80	120
Switching frequency f	Hz	8	4	1	2
Response time	ms	80	110	400	200
Power-up delay t_v	ms	280	280	280	280
Switching status display		Yellow LED			
Enclosure material		Brass, nickel-plated; CRASTIN converter cover; epoxy resin converter surface			
Degree of protection		IP65; IP68 with separate sensor		IP65	
Ambient temperature					
• During operation	°C	-25 ... +70			
• During storage	°C	-40 ... +85			

Selection and Ordering data

	Sensing range cm	Rated operational current mA	Switching output pnp	Analog output	Order No.
Fixed sensor					
 3RG60 12-3..00	6 ... 30	300	1 NO	–	▶ 3RG60 12-3AD00
	20 ... 130	300	1 NO	–	▶ 3RG60 13-3AD00
	40 ... 300	300	1 NO	–	▶ 3RG60 15-3AD00
	60 ... 600	300	1 NO	–	▶ 3RG60 14-3AD00
 3RG60 13-3..00	6 ... 30	300	1 NC	–	▶ 3RG60 12-3AC00
	20 ... 130	300	1 NC	–	▶ 3RG60 13-3AC00
	40 ... 300	300	1 NC	–	▶ 3RG60 15-3AC00
	60 ... 600	300	1 NC	–	▶ 3RG60 14-3AC00
 3RG60 15-3..00					
 3RG60 14-3..00					
Swivel sensor					
 3RG60 25-3..00	6 ... 30	300	1 NO	–	3RG60 22-3AD00
	20 ... 130	300	1 NO	–	3RG60 23-3AD00
	40 ... 300	300	1 NO	–	3RG60 25-3AD00
	60 ... 600	300	1 NO	–	3RG60 24-3AD00
	6 ... 30	300	1 NC	–	3RG60 22-3AC00
	20 ... 130	300	1 NC	–	3RG60 23-3AC00
	40 ... 300	300	1 NC	–	3RG60 25-3AC00
	60 ... 600	300	1 NC	–	3RG60 24-3AC00
Separate sensor					
 3RG60 12-3..01	6 ... 30	300	1 NO	–	3RG60 12-3AD01
	20 ... 130	300	1 NO	–	3RG60 13-3AD01
	6 ... 30	300	1 NC	–	3RG60 12-3AC01
	20 ... 130	300	1 NC	–	3RG60 13-3AC01

▶ Preferred type, available from stock.

SIMATIC PXS sonar proximity switches

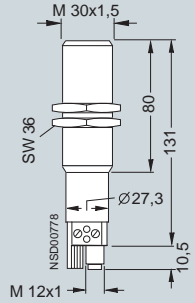
SIMATIC PXS200

M30 K1 compact range

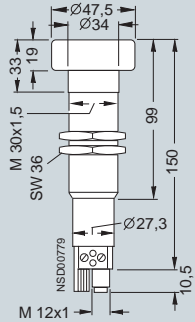
Dimensions

With fixed sensor

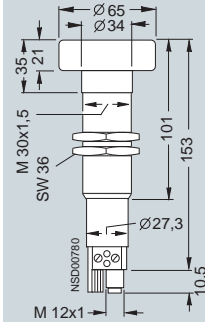
3RG 6. 12-3..00
3RG 6. 13-3..00



3RG 6. 15-3..00

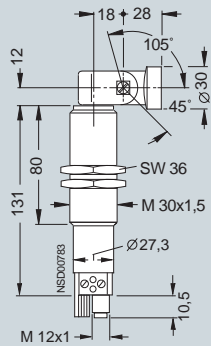


3RG 6. 14-3..00

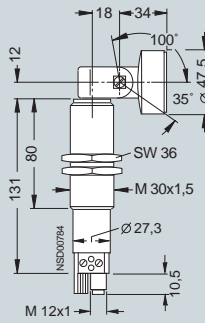


With swiveling sensor

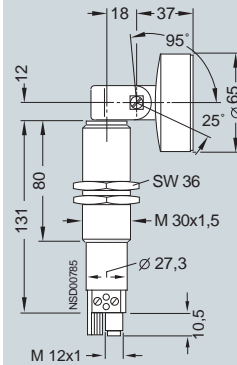
3RG 6. 22-3..00
3RG 6. 23-3..00



3RG 6. 25-3..00

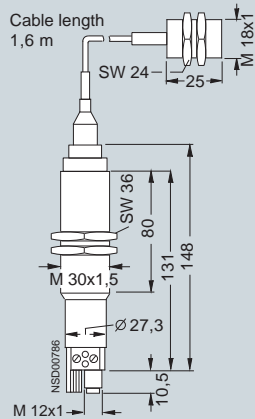


3RG 6. 24-3..00

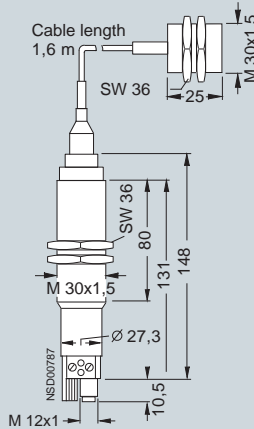


With separate sensor

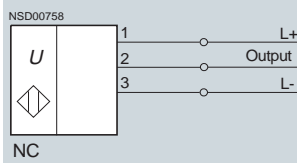
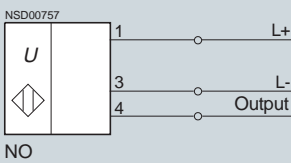
3RG 6. 12-3..01



3RG 6. 13-3..01



Schematics



View from rear onto device



Overview



M18S design

The Sonar proximity switches of the M18S compact series are ready-to-connect complete units in a cylindrical enclosure.

- Can be operated as diffuse sensor or thru-beam sensor
- Adjustable via teach-in (switching output only)
- Electronic outputs:
 - Switching output
 - Frequency output, suitable for connection to LOGO!
- Connected via M12 connector
 - 4-pole, type F (1 output)
 - 5-pole, type G (2 outputs)

Design

M18S compact range can be supplied with an aligned sensor head or an angled sensor head. The small physical size of the sensors makes them ideal for applications where space is limited.

Function

Available as diffuse sensors and reflex sensors. The sensors can be supplied with switching or frequency outputs. Due to their wide range and a minimized close range, they are suitable for a wide variety of applications.

Programming

The sensors with a switching output can be set via the device terminals by means of a teach-in function. For the sensors with a frequency output, the range can be set via the wiring. Evaluation can be performed in a PLC or in a LOGO! mini PLC.

SIMATIC PXS sonar proximity switches

SIMATIC PXS200



M18S compact range

Technical specifications

Type M18S		6GR62 22, 6GR62 32	6GR62 21, 6GR62 31	6GR62 23, 6GR62 32
Number of outputs		1	1	1
Sensing range	cm	2 ... 25 or 0 ... 25	2.5 ... 40 or 0 ... 40	5 ... 70 or 0 ... 70
Adjustment range	cm	3.5 ... 25 or 9 ... 25	4 ... 40 or 11.5 ... 40	7.5 ... 70 or 20 ... 75
Standard target	cm	2 × 2		
Hysteresis <i>H</i>	mm	10 or 2		10 or 3
Repeat accuracy <i>R</i>	mm	± 1 (frequency output ± 2.5)		
Operating voltage (DC)	V	20 ... 30 (including ± 10% residual ripple)		
Rated operating current <i>I_e</i>	mA	150		
No-load supply current <i>I₀</i>	mA	Max. 20		
Ultrasonic frequency	kHz	400	300	200
Switching frequency <i>f</i>	Hz	10		5
ON-delay	ms	50		100
Power-up delay	ms	20		
Switching status display		Yellow LED		
Enclosure material		Brass, nickel-plated; CRASTIN converter cover; epoxy resin converter surface		
Degree of protection		IP67		
Ambient temperature				
• Operation	°C	-25 ... +70		
• Storage	°C	-40 ... +85		

Type M18S		6GR62 21, 6GR62 31	3RG62 23, 6GR62 33
Number of outputs		2	2
Sensing range	cm	2.5 ... 40	5 ... 70
Adjustment range	cm	4 ... 40	7.5 ... 70
Standard target	cm	2 × 2	
Hysteresis <i>H</i>	mm	10	
Repeat accuracy <i>R</i>	mm	± 1 (frequency output ± 2.5)	
Operating voltage (DC)	V	20 ... 30 (including ± 10% residual ripple)	
Rated operating current <i>I_e</i>	mA	375	
No-load supply current <i>I₀</i>	mA	max. 20	
Ultrasonic frequency	kHz	300	200
Switching frequency <i>f</i>	Hz	10	5
ON-delay	ms	50	100
Power-up delay	ms	20	
Switching status display		2 yellow LEDs	
Enclosure material		Brass, nickel-plated; CRASTIN converter cover; epoxy resin converter surface	
Degree of protection		IP67	
Ambient temperature			
• Operation	°C	-25 ... +70	
• Storage	°C	-40 ... +85	

Selection and Ordering data

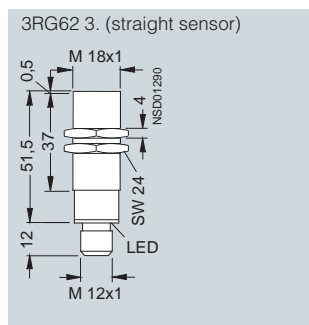
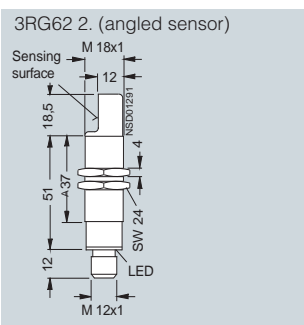
	Sensing range	Rated operational current	Switching output	Operating mode/ frequency output	Order No.
	cm	mA	pnp		
Straight sensor					
	2 ... 25	150	1 NO	Diffuse sensor	▶ 6GR62 32-3AB00
	2.5 ... 40	150	1 NO	Diffuse sensor	▶ 6GR62 31-3AB00
	5 ... 70	150	1 NO	Diffuse sensor	▶ 6GR62 33-3AB00
	0 ... 25	150	1 NO	Reflex sensor	▶ 6GR62 32-3BB00
	0 ... 40	150	1 NO	Reflex sensor	▶ 6GR62 31-3BB00
	0 ... 70	150	1 NO	Reflex sensor	▶ 6GR62 33-3BB00
	2 ... 25	150	-	280 ... 2000 Hz 140 ... 1000 Hz	6GR62 32-3RS00
	2.5 ... 40	150	-	160 ... 1600 Hz 40 ... 400 Hz	6GR62 31-3RS00
	5 ... 70	150	-	150 ... 1400 Hz 75 ... 700 Hz	6GR62 33-3RS00
	2.5 ... 40	375	2 NO	Diffuse sensor	6GR62 31-3AH00
	5 ... 70	375	2 NO	Diffuse sensor	6GR62 33-3AH00
	2.5 ... 40	375	1 NC, 1 NO	Diffuse sensor	6GR62 31-3AJ00
5 ... 70	375	1 NC, 1 NO	Diffuse sensor	6GR62 33-3AJ00	
Angled sensor					
	2 ... 25	150	1 NO	Diffuse sensor	▶ 6GR62 22-3AB00
	2.5 ... 40	150	1 NO	Diffuse sensor	▶ 6GR62 21-3AB00
	5 ... 70	150	1 NO	Diffuse sensor	▶ 6GR62 23-3AB00
	0 ... 25	150	1 NO	Reflex sensor	6GR62 22-3BB00
	0 ... 40	150	1 NO	Reflex sensor	6GR62 21-3BB00
	0 ... 70	150	1 NO	Reflex sensor	6GR62 23-3BB00
	2 ... 25	150	-	280 ... 2000 Hz 140 ... 1000 Hz	6GR62 22-3RS00
	2.5 ... 40	150	-	160 ... 1600 Hz 40 ... 400 Hz	6GR62 21-3RS00
	5 ... 70	150	-	150 ... 1400 Hz 75 ... 700 Hz	6GR62 23-3RS00
	2.5 ... 40	375	2 NO	Diffuse sensor	6GR62 21-3AH00
	5 ... 70	375	2 NO	Diffuse sensor	6GR62 23-3AH00
	2.5 ... 40	375	1 NC, 1 NO	Diffuse sensor	▶ 6GR62 21-3AJ00
5 ... 70	375	1 NC, 1 NO	Diffuse sensor	▶ 6GR62 23-3AJ00	

Accessories

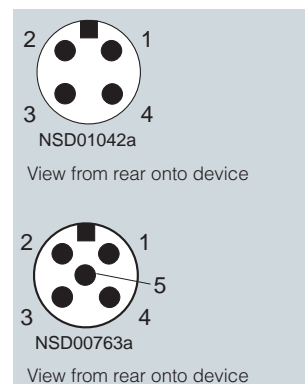
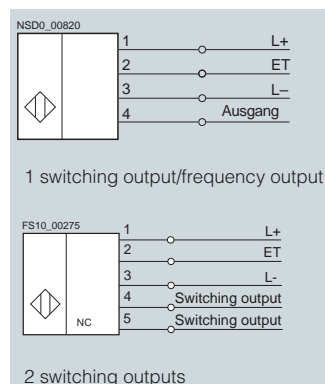
Teach-in adapter, 4-pole	▶	3RX4 010
Teach-in adapter, 5-pole	▶	3RX4 020

▶ Preferred type, available from stock.

Dimensions



Schematics



SIMATIC PXS sonar proximity switches

SIMATIC PXS200

K21 compact range

Overview



K21 compact range

Sonar proximity switches from the K21 compact range are complete, prewired units in a miniature cubic enclosure.

- Operation as a diffuse sensor, reflex sensor or thru-beam sensor
- Adjustable via "teach-in" (with switching output only)
- Solid-state outputs:
 - Switching output
 - Frequency output, suitable for connection to LOGO!
- Wiring via M8 connector
 - 4-pole, type B


Benefits

- Simple, precise object recognition
- Also senses transparent objects and liquids
- Ultrasonic: Not influenced by the object's color or brightness
- Suitable for use in cramped conditions and tough environments
- High degree of protection IP67
- Configured using "teach-in"

Technical specifications

Type		6GR62 42	6GR62 41	6GR62 41-.P.. (receiver) 6GR62 41-.N.. (emitter)
Sensing range	cm	2 ... 25 or 0 ... 25	2.5 ... 40 or 0 ... 40	0 ... 80
Adjustment range	cm	4.5 ... 25 or 9.8 ... 25	4 ... 40 or 12 ... 40	–
Standard target	cm	2 x 2		–
Hysteresis <i>H</i>	mm	2.5	4	–
Repeat accuracy <i>R</i>	mm	± 1 (frequency output ± 2.5)		–
Operating voltage, including 10% residual ripple	V DC	20 ... 30		
Rated operating current <i>I_o</i>				
• Switching output, max.	mA	200		
• Frequency output, max.	mA	100		
No-load current <i>I₀</i> , max.	mA	20		
Ultrasonic frequency	kHz	400	300	
Switching frequency <i>f</i>	Hz	10	5	100
Response time	ms	50	75	5
Power-up delay <i>t_v</i>	ms	150		
Switching status indicator		Yellow LED		Yellow LED, green LED
Enclosure material		ABS / PMMA		
Transformer surface finish		Epoxy resin		
Degree of protection		IP67		
Ambient temperature				
• During operation	°C	-25 ... +70		
• During storage	°C	-40 ... +85		

Selection and Ordering data

	Sensing range cm	Operating mode/ frequency output	Switching output	Connection	Order No.		
K21 compact range							
	2.5 ... 40	Diffuse sensor	NO contact	2 m cable	▶ A	6GR62 41-0AB00	
		Diffuse sensor	NO contact	M8 connector	▶	6GR62 41-7AB00	
		Diffuse sensor	NC contact	2 m cable	▶ A	6GR62 41-0AA00	
		Diffuse sensor	NC contact	M8 connector	▶	6GR62 41-7AA00	
	4 ... 40	40 ... 400 Hz / 80 ... 800 Hz	-	-	2 m cable	▶ A	6GR62 41-0RS00
		40 ... 400 Hz / 80 ... 800 Hz	-	-	M8 connector	▶	6GR62 41-7RS00
	2 ... 25	Diffuse sensor	NO contact	NO contact	2 m cable	▶ A	6GR62 42-0AB00
		Diffuse sensor	NO contact	NO contact	M8 connector	▶	6GR62 42-7AB00
		Diffuse sensor	NC contact	NC contact	2 m cable	▶ A	6GR62 42-0AA00
		Diffuse sensor	NC contact	NC contact	M8 connector	▶	6GR62 42-7AA00
	3.5 ... 25	70 ... 500 Hz / 35 ... 250 Hz	-	-	2 m cable	▶ A	6GR62 42-0RS00
		70 ... 500 Hz / 35 ... 250 Hz	-	-	M8 connector	▶	6GR62 42-7RS00
	0 ... 40	Retroflective sensor	NO contact	NO contact	2 m cable	▶ A	6GR62 41-0BB00
		Retroflective sensor	NO contact	NO contact	M8 connector	▶	6GR62 41-7BB00
		Retroflective sensor	NC contact	NC contact	2 m cable	▶ A	6GR62 41-0BA00
		Retroflective sensor	NC contact	NC contact	M8 connector	▶	6GR62 41-7BA00
0 ... 25	Retroflective sensor	NO contact	NO contact	2 m cable	▶ A	6GR62 42-0BB00	
	Retroflective sensor	NO contact	NO contact	M8 connector	▶	6GR62 42-7BB00	
	Retroflective sensor	NC contact	NC contact	2 m cable	▶ A	6GR62 42-0BA00	
	Retroflective sensor	NC contact	NC contact	M8 connector	▶	6GR62 42-7BA00	
0 ... 80	Thru-beam sensor emitter			2 m cable	▶ A	6GR62 41-0NN00	
	Thru-beam sensor emitter			M8 connector	▶	6GR62 41-7NN00	
	Thru-beam sensor receiver	NO contact	NO contact	2 m cable	▶ A	6GR62 41-0PB00	
	Thru-beam sensor receiver	NO contact	NO contact	M8 connector	▶	6GR62 41-7PB00	
	Thru-beam sensor receiver	NC contact	NC contact	2 m cable	▶ A	6GR62 41-0PA00	
	Thru-beam sensor receiver	NC contact	NC contact	M8 connector	▶	6GR62 41-7PA00	

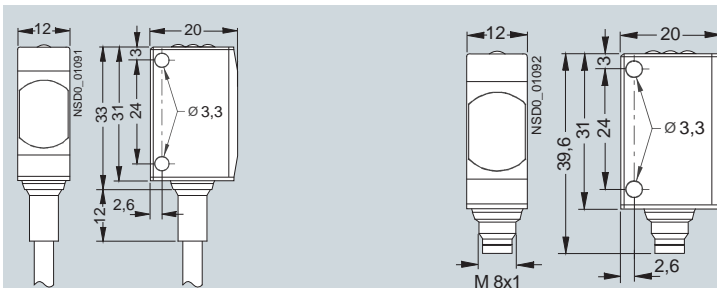
Accessories

Teach-in adapter	▶	3RX4 030
Mounting bracket	▶	3RX7 308-0AA00

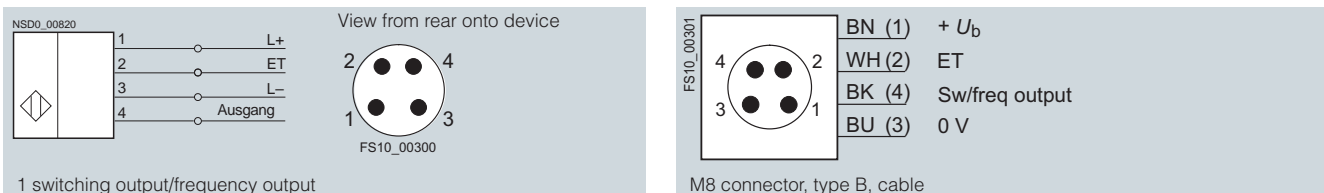
▶ Preferred type, available from stock.

A: Subject to export regulations AL = N and ECCN = EAR99H

Dimensions



Schematics



1 switching output/frequency output

SIMATIC PXS sonar proximity switches

SIMATIC PXS200

K08 compact form

Overview



K08 compact form

The Sonar proximity switches of K08 compact form are ready-to-use all-in-one units with a rectangular metal enclosure.

- 3 versions with different operating modes:
 - Diffuse sensors with background suppression
 - Reflex sensor
 - Thru-beam sensor:
- Diffuse sensor and reflex sensor:
 - Up to 6 devices can be synchronized
 - Adjustment per teach-in
- Solid-state outputs:
 - 1 pnp and 1 npn switching output
 - NO/NC adjustable
- Connection via M12 connector, 5-pole, rotatable by 90°, Type G

Technical specifications

Type		3RG64 51-3CC00	3RG64 51-3DC00	3RG64 51-3SB00
Operating mode		Diffuse sensor	Reflex sensor	Thru-beam sensor
Sensing range	mm	50 ... 400	0 ... 400	0 ... 800
Adjustment range	mm	60 ... 400	160 ... 400	0 ... 800
Standard target	cm	2 × 2	2 × 2	2 × 2
Hysteresis <i>H</i>	mm	10	2	–
Repeat accuracy <i>R</i>	mm	± 1	± 1	–
Operational voltage (DC)	V	20 ... 30 (including ± 10% residual ripple)		
Rated operational current <i>I_e</i>	mA	150		
No-load supply current <i>I₀</i>	mA	Max. 25		
Ultrasonic frequency	kHz	300	300	300
Switching frequency <i>f</i>	Hz	8	8	250
Response time	ms	100	100	100
Power-up delay <i>t_v</i>	ms	250	250	250
Indicators				
• Switching status		Yellow LED		
• Operating voltage		Green LED		
Enclosure material		Metal		
Degree of protection		IP67		
Ambient temperature				
• During operation	°C	–25 ... +70		
• During storage	°C	–40 ... +85		

Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Operating mode	Order No.
	cm	mA	pnp + npn		
	5 ... 40	150	1 selectable NO/NC contact each	Diffuse sensor	3RG64 51-3CC00
	0 ... 40	150	1 selectable NO/NC contact each	Reflex sensor	3RG64 51-3DC00
	–	–	–	Thru-beam sensor emitter	3RG64 51-3NN00
	0 ... 80	150	1 NO each	Thru-beam sensor receiver	3RG64 51-3SB00

► Preferred type, available from stock.

SIMATIC PXS sonar proximity switches

SIMATIC PXS300

Overview

SIMATIC sensors PXS300

- M30 K2 compact range,
- M18 compact range,
- K65 compact form

Selection table

SIMATIC PXS300



	M30 K2 compact range									M18 compact range			K65 compact form			
	Fixed sensor head				Swivel-mounted sensor head				Separate sensor head		Fixed sensor head					
Sensing range (cm)	6 ... 30	20 ... 130	40 ... 300	60 ... 600	6 ... 30	20 ... 130	40 ... 300	60 ... 600	6 ... 30	20 ... 130	5 ... 30	10 ... 100	15 ... 100	6 ... 50	20 ... 150	25 ... 250
Operating mode																
• Diffuse sensor	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
• Reflex sensor	■	■	■	■	■	■	■	■	■	■	■	■	■			
• Thru-beam sensor	■	■	■	■	■	■	■	■	■	■	■	■	■			
Output																
• 1 switching output	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
• 2 switching outputs	■	■	■	■										■	■	■
• Analog output 0 ... 20 mA											■	■	■	■	■	■
• Analog output 4 ... 20 mA											■	■	■	■	■	■
• Analog output 0 ... 10 V											■	■	■	■	■	■
• Frequency output	■	■	■	■							■	■	■	■	■	■
Direct communication with the controller																
• IQ-Sense											■		■			
• IO-Link												■				
Temperature compensation	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Adjustment																
• 1 potentiometer											■		■			
• 2 potentiometers	■	■	■	■	■	■	■	■	■	■						
• Teach-in														■	■	■
• SONPROG programming device	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■
Connection																
• M12 connector	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Degree of protection																
• IP65	■	■	■	■	■	■	■	■	■	■				■	■	■
• IP67											■	■	■			
See page	2/40									2/44			2/46			

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px



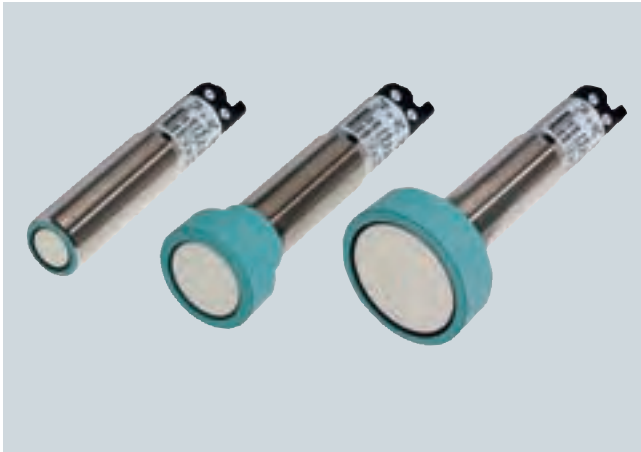
Notes

SIMATIC PXS sonar proximity switches

SIMATIC PXS300

M30 K2 compact range

Overview



M30 design with fixed sensor

The Sonar proximity switches of M30 K2 compact range are ready-to-use all-in-one units with a cylindrical M30 enclosure. They differ with regard to their range, their functional scope and their adjustment or programming capability.

- Operate as diffuse sensor, reflex sensor or thru-beam sensor
- Adjustable via 2 potentiometers, with SONPROG
- Foreground and background suppression
- Synchronization capability, multiplex operation
- Temperature compensation
- Solid-state outputs:
 - 1 or 2 switching outputs
 - Frequency output, suitable for connection to LOGO!
- Connection with M12 connector
 - 4-pole (with 1 output), Type F
 - 5-pole (with 2 outputs), Type G

Design

Standard version

In the standard version, the devices have a permanently installed sensor.

Version with separate sensor



M30 design with separate sensor

Due to its small dimensions, the sensor is especially suitable in confined spaces.

The ultrasonic sensor is installed in a cylindrical enclosure separated from the other electronics. For 3RG6. 12 devices, the sensor is in an M18 sleeve, for 3RG6. 13 devices, the sensor is installed in an M30 sleeve with a length of 25 mm in each case.

Two nuts are supplied for fixing. The connecting lead, which is 1.6 m long, is cast onto the sensor. The connection to the evaluation electronics located in the M30 enclosure of the compact range is established via the preassembled coaxial cable plug. The plug-in socket is installed on the end face of the enclosure.

Version with swivel sensor

These devices correspond functionally to the other devices of M30 K2 compact range. They are particularly suitable for applications where the standard types cannot be used due to space limitations.



M30 design with swivel sensor

The ultrasonic sensor is hinged with a swivel arm to the tubular enclosure of the signal evaluator. This allows rotation about the cylinder axes as well as perpendicular movement at about 100° to the cylinder axis.

Passive reflector

With the Sonar proximity switches of M30 K2 compact range, a 3RX1 910 passive reflector can be clamped onto the sensor head (see "Accessories").

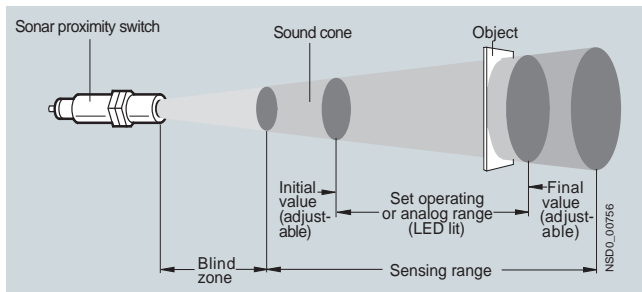
Where space is limited, objects can be detected which are perpendicular to the Sonar proximity switch (which reduces the installation depth). The blind zone is then reduced by about 6 cm.

Function

Range definition and adjustability

Objects within the preset operating range or analog range will be reliably detected causing the switching output or analog output to change state.

The blind zone must be kept clear of any objects since this might cause false outputs. Objects at a distance from the sensor that is outside the set operating range limits will not be signaled at the switching output.



Sound cone

Modes

Standard operating mode, diffuse sensor

An object entering the sound cone from any direction causes the output signal to change when it enters the preset sensing range.

Reflex sensor

If a reflector is permanently fixed within a set operating range, the Sonar proximity switch will be operated by all objects that lie between the Sonar proximity switch and the reflector even those that absorb sound.

Thru-beam sensors.

The Sonar-BERO only evaluates whether or not an object is located between the emitter and the receiver. The range of the arrangement is twice that of a single sensor.

Programming

SONPROG For optimizing to the operating conditions, all sensors of the M30 K2 compact range can be programmed using a PC and the SONPROG 3RX4 000 programming device.

The main parameters that can be changed are:

- Lower and upper limit of the operating range
- Hysteresis
- Switching function NO or NC
- Switching rate
- Lower and upper limit of the analog range
- Analog characteristic, rising or falling
- End of close range
- End of sensing range
- Mean value generation
- Multiplex function
- Temperature compensation
- Sensitivity

Sonar proximity switches with non-standard values available on request. The minimum ordering quantity is 10 units.

Technical specifications




Type		3RG60 .2	3RG60 .3	3RG60 .4	3RG60 .5
Sensing range	cm	6 ... 30	20 ... 130	60 ... 600	40 ... 300
Standard target	cm	1 × 1	2 × 2	10 × 10	5 × 5
Hysteresis <i>H</i>	mm	10	10	60	20
Repeat accuracy <i>R</i>	mm	± 0.45	± 2	± 9	± 5
Operational voltage (DC)	V	12 ... 30 (including ± 10% residual ripple, at 12 ... 20 V sensitivity reduced by approx. 20%)			
Rated operational current <i>I_e</i>					
NO contact	mA	300			
NC contact	mA	300			
No-load supply current <i>I₀</i>	mA	max. 50			
Ultrasonic frequency	kHz	400	200	80	120
Switching frequency <i>f</i>	Hz	8	4	1	2
Response time	ms	80	110	400	200
Power-up delay <i>t_v</i>	ms	280	280	280	280
Switching status display		Yellow LED			
Enclosure material		Brass, nickel-plated; CRASTIN converter cover; epoxy resin converter surface			
Degree of protection		IP65; IP68 with separate sensor		IP65	
Ambient temperature					
• During operation	°C	-25 ... +70			
• During storage	°C	-40 ... +85			

SIMATIC PXS sonar proximity switches

SIMATIC PXS300

M30 K2 compact range

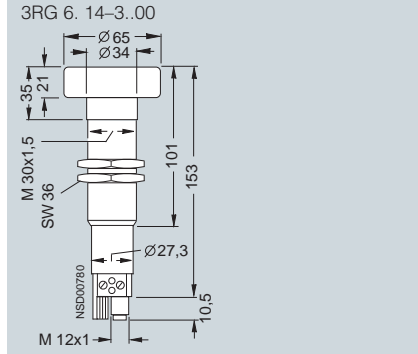
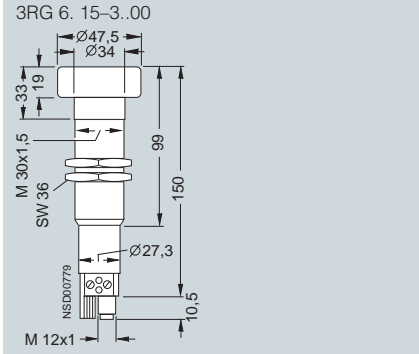
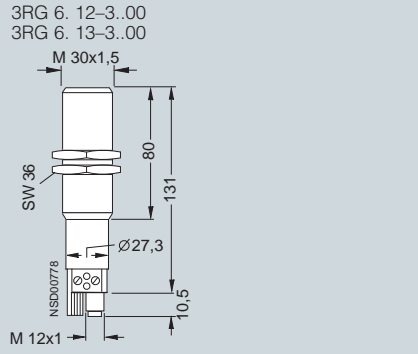
Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Frequency output	Order No.
	cm	mA	pnp		
Fixed sensor					
 3RG60 12-3.00	6 ... 30	300	1 NO	–	▶ 3RG60 12-3AF00
	20 ... 130	300	1 NO	–	▶ 3RG60 13-3AF00
	40 ... 300	300	1 NO	–	▶ 3RG60 15-3AF00
	60 ... 600	300	1 NO	–	▶ 3RG60 14-3AF00
 3RG60 13-3.00	6 ... 30	300	1 NC	–	▶ 3RG60 12-3AE00
	20 ... 130	300	1 NC	–	▶ 3RG60 13-3AE00
	40 ... 300	300	1 NC	–	▶ 3RG60 15-3AE00
	60 ... 600	300	1 NC	–	▶ 3RG60 14-3AE00
 3RG60 15-3.00	6 ... 30	300	2 NO	–	▶ 3RG60 12-3AH00
	20 ... 130	300	2 NO	–	▶ 3RG60 13-3AH00
	40 ... 300	300	2 NO	–	▶ 3RG60 15-3AH00
	60 ... 600	300	2 NO	–	▶ 3RG60 14-3AH00
 3RG60 14-3.00	6 ... 30	–	2 NC	–	▶ 3RG60 12-3AG00
	20 ... 130	–	2 NC	–	▶ 3RG60 13-3AG00
	40 ... 300	–	2 NC	–	▶ 3RG60 15-3AG00
	60 ... 600	–	2 NC	–	▶ 3RG60 14-3AG00
	6 ... 30	300	–	30 ... 150 Hz	▶ 3RG60 12-3RS00
	20 ... 130	300	–	20 ... 130 Hz	▶ 3RG60 13-3RS00
	40 ... 300	300	–	20 ... 150 Hz	▶ 3RG60 15-3RS00
	60 ... 600	300	–	15 ... 150 Hz	▶ 3RG60 14-3RS00
Swivel sensor					
 3RG60 25-3.00	6 ... 30	300	1 NO	–	▶ 3RG60 22-3AF00
	20 ... 130	300	1 NO	–	▶ 3RG60 23-3AF00
	40 ... 300	300	1 NO	–	▶ 3RG60 25-3AF00
	60 ... 600	300	1 NO	–	▶ 3RG60 24-3AF00
	6 ... 30	300	1 NC	–	▶ 3RG60 22-3AE00
	20 ... 130	300	1 NC	–	▶ 3RG60 23-3AE00
	40 ... 300	300	1 NC	–	▶ 3RG60 25-3AE00
	60 ... 600	300	1 NC	–	▶ 3RG60 24-3AE00
Separate sensor					
 3RG60 12-3.01	6 ... 30	300	1 NO	–	▶ 3RG60 12-3AF01
	20 ... 130	300	1 NO	–	▶ 3RG60 13-3AF01
	6 ... 30	300	1 NC	–	▶ 3RG60 12-3AE01
	20 ... 130	300	1 NC	–	▶ 3RG60 13-3AE01
Accessories					
 SONPROG programming device, 100 ... 240 V AC, 24 V DC					▶ 3RX4 000

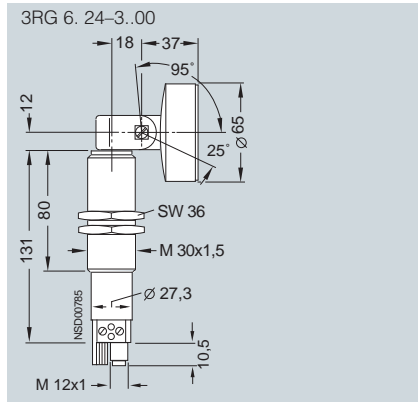
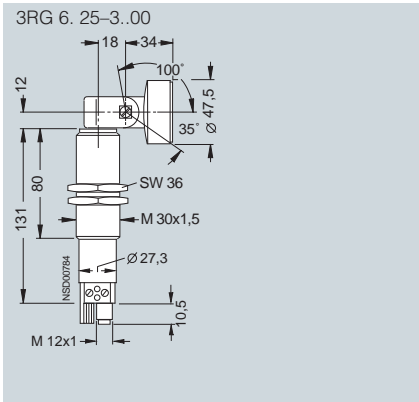
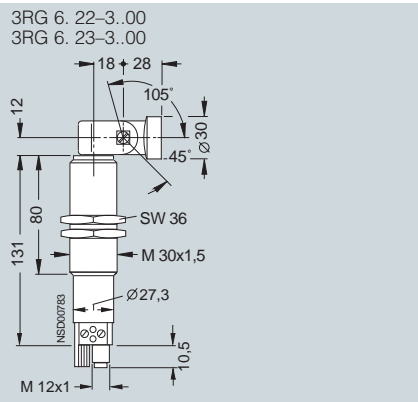
▶ Preferred type, available from stock.

Dimensions

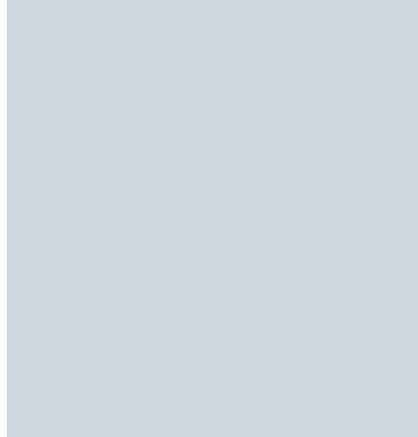
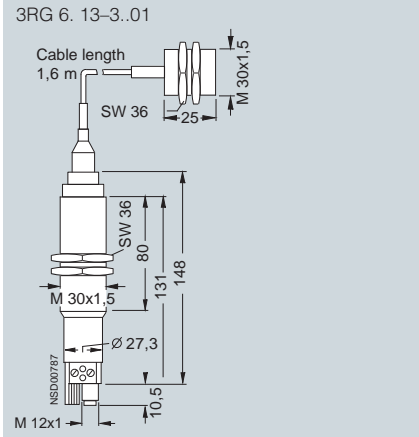
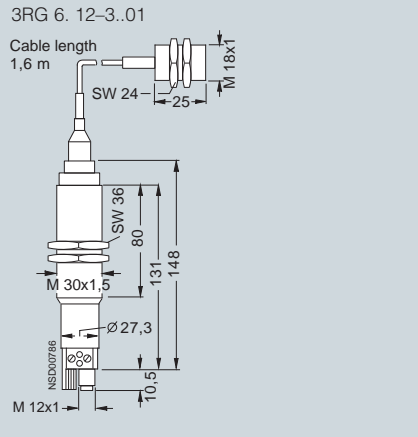
With fixed sensor



With swivel sensor

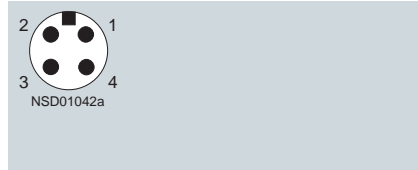
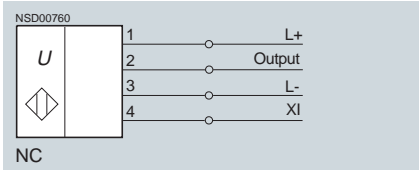
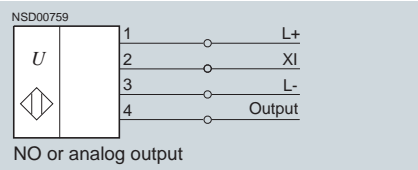


With separate sensor

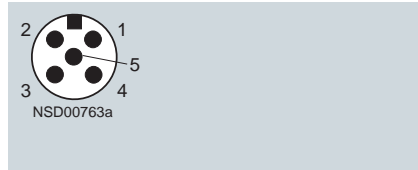
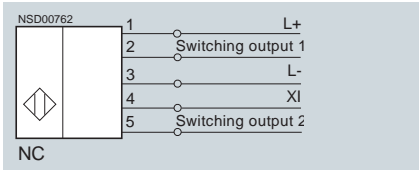
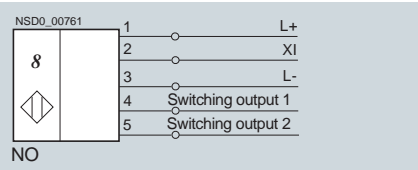


Schematics

M30 K2 compact range



M30 K2 compact range with 2 switching outputs



SIMATIC PXS sonar proximity switches

SIMATIC PXS300

M18 compact range

Overview



M18 design

The Sonar proximity switches of M18 compact range are ready-to-use all-in-one units with a cylindrical enclosure.

- Operates as diffuse sensor, thru-beam sensor and can be parameterized as a reflex sensor with SONPROG
- Adjustable via a potentiometer, with SONPROG programming device
- Background suppression and can be set as foreground suppression with SONPROG
- Synchronization capability, multiplex operation
- Temperature compensation
- Solid-state outputs:
 - Switching output
 - Analog output
 - Frequency output, suitable for connection to LOGO!
- Connection via M12, 4-pole, Type F connector

Design

The devices of M18 compact range are all supplied with permanently installed sensors in the longitudinal axis.

Technical specifications

Type		3RG62 32	3RG62 33
Sensing range	cm	5 ... 30	15 ... 100
Standard target	cm	1 × 1	2 × 2
Hysteresis <i>H</i>	mm	10	
Repeat accuracy <i>R</i>	mm	± 1	± 2
Operational voltage (DC)	V	12 ... 30 (including ± 10% residual ripple; at 12 ... 20 V DC sensitivity reduced by up to 20%)	
Rated operational current <i>I_e</i>	mA	150	
No-load supply current <i>I₀</i>	mA	max. 60	
Ultrasonic frequency	kHz	400	200
Switching frequency <i>f</i>	Hz	5	4
Response time	ms	100	120
Power-up delay <i>t_v</i>	ms	280	280
Switching status display		Yellow LED	
Enclosure material		Brass, nickel-plated; CRASTIN converter cover; epoxy resin converter surface	
Degree of protection		IP67	
Ambient temperature			
• During operation	°C	-25 ... +70	
• During storage	°C	-40 ... +85	

Function

The devices are suitable for operation as diffuse sensor, reflex sensor and thru-beam sensor. The sensors can be supplied with switching, analog or frequency outputs.

Up to 10 sensors of the M18 compact range can be synchronized with each other via the enable inputs. The devices are also suitable for multiplex mode.

For a detailed description, see M30 K2 compact ranges.

Programming


SONPROG For optimizing to the operating conditions, all sensors of the M18 compact range can be programmed using a PC and the SONPROG 3RX4 000 programming device.

The main parameters that can be changed are:

- Lower and upper limit of the operating range
- Hysteresis
- Switching function NO or NC
- Switching frequency
- Lower and upper limit of the analog range
- Analog characteristic, rising or falling
- End of close range
- End of sensing range
- Mean value generation
- Multiplex function
- Temperature compensation
- Susceptibility.

Sonar proximity switches with non-standard values available on request. The minimum ordering quantity is 10 units.

Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Analog/frequency output	Order No.
	cm	mA	pnp		
	5 ... 30	150	1 NO	–	▶ 3RG62 32–3AB00
	15 ... 100	150	1 NO	–	▶ 3RG62 33–3AB00
	5 ... 30	150	1 NC	–	▶ 3RG62 32–3AA00
	15 ... 100	150	1 NC	–	▶ 3RG62 33–3AA00
	5 ... 30	–	–	4 ... 20 mA	▶ 3RG62 32–3LS00
	15 ... 100	–	–	4 ... 20 mA	▶ 3RG62 33–3LS00
	5 ... 30	–	–	0 ... 20 mA	▶ 3RG62 32–3TS00
	15 ... 100	–	–	0 ... 20 mA	▶ 3RG62 33–3TS00
	5 ... 30	–	–	0 ... 10 V	▶ 3RG62 32–3JS00
	15 ... 100	–	–	0 ... 10 V	▶ 3RG62 33–3JS00
	5 ... 30	–	–	250 ... 1500 Hz	▶ 3RG62 32–3RS00
	15 ... 100	–	–	150 ... 1000 Hz	▶ 3RG62 33–3RS00

Communication-capable proximity switches of the M18 IO-Link compact range¹⁾

10 ... 100	of IO-Link	IO-Link	–	6GR63 33-3KS00
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Communication-capable proximity switches of the M18 IQ-Sense range

5 ... 30	From IQ-Sense	IQ-Sense	–	3SF62 32–3JA00
15 ... 100	From IQ-Sense	IQ-Sense	–	3SF62 33–3JA00

Accessories

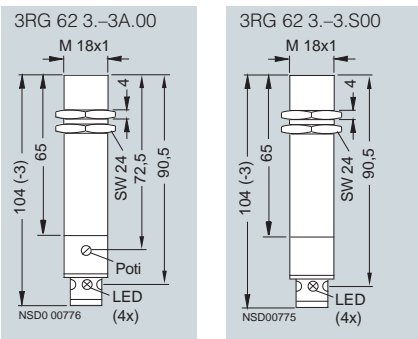


SONPROG programming device,
100 ... 240 V AC, 24 V DC

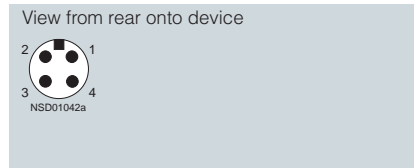
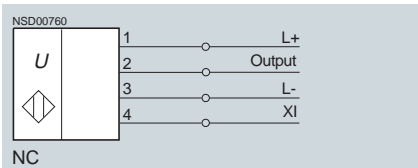
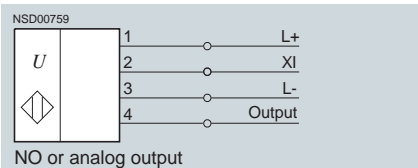
▶ **3RX4 000**

1) for further information, refer to "IO-Link" see page 2/6.
Preferred type, available from stock.

Dimensions



Schematics

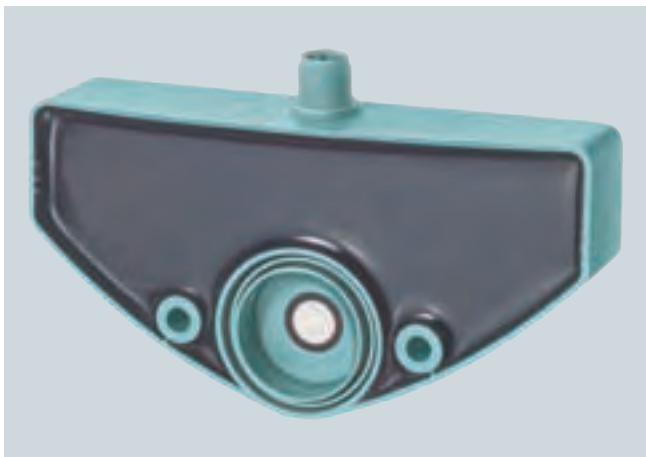


SIMATIC PXS sonar proximity switches

SIMATIC PXS300

K65 compact form

Overview



K65 compact form

The Sonar proximity switches of the K65 compact form are ready-to-use complete self-contained units. They operate with a DC supply. Their enclosure design and function makes them ideal for level applications in small containers.

The devices feature two switching outputs (S_{\min} and S_{\max}) to which different distances can be assigned. This allows, for example, the minimum and maximum fill level in a tank to be evaluated. The values are set using the SONPROG programming device or by means of automatic alignment (teach-in function).

Design

All components are located in a box-shaped enclosure with rounded edges. The ultrasonic converter is mounted in the enclosure – slightly recessed – in the enclosure. The integrated circular sealing ring allows the Sonar proximity switch to be used as a plug with integrated level measuring.

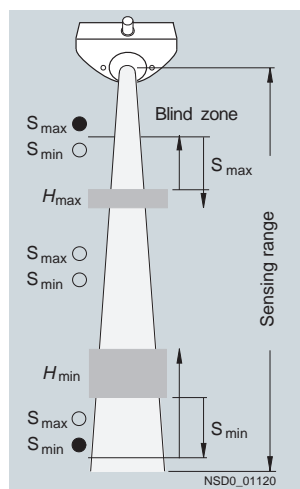
The tank opening must have a minimum diameter of 26 mm. It can be fixed to the tank by means of two M5 screws.

The electric connection is made using a 5-pole connector with M12 thread.

Function

Sensors with switching or analog output

Within the sensing range, the fill level of a container is detected. If the fill level reaches one of the two switching thresholds (S_{\min} , S_{\max}), the corresponding output is set. On emptying or filling, the switching outputs remain set in accordance with the hysteresis (H_{\min} , H_{\max}). This is signaled by the corresponding LED. If the level is located between the two operating ranges, both outputs are reset (see "Definition of the ranges").



Definition of the ranges

Blind zone

Objects at close range cause fault signals, so the user must install the sensor such that the fill level cannot enter close range.

Programming

SONPROG For optimizing to the operating conditions, all sensors of K65 compact form can be programmed using a PC and the 3RX4000 SONPROG programming device.

The main parameters that can be changed are:


- Lower and upper limit of the operating range
- Hysteresis
- Switching function NO or NC
- Switching frequency
- Lower and upper limit of the analog range
- Analog characteristic, rising or falling
- End of close range
- End of sensing range
- Mean value generation
- Multiplex function
- Temperature compensation
- Susceptibility.

Sonar proximity switches with non-standard values available on request. The minimum ordering quantity is 10 units.

Technical specifications

Type		3RG62 52	3RG62 53	3RG62 55
Sensing range	cm	6 ... 50	20 ... 150	25 ... 250
Standard target	cm	1 × 1	2 × 2	5 × 5
Switching threshold				
• S_{max}	cm	8	25	35
• S_{min}	cm	45	140	230
Hysteresis H				
• H_{max} (adjustable)	cm	2	5	10
• H_{min} (adjustable)	cm	10	10	20
Operational voltage (DC)	V	12 ... 30 (including ± 10% residual ripple, at 12 ... 20 V sensitivity reduced by approx. 20%)		
No-load supply current I_0	mA	max. 60		
Switching output				
• Rated operational current I_e	mA	150 or 300 (see Selection and Ordering data)		
• Voltage drop	V	2		
• Switching element function S_{max}		NO contact		
• Switching element function S_{min}		NO/NC programmable		
Ultrasonic frequency	kHz	400	200	120
Response time	ms	20	25	50
Power-up delay t_V	ms	250		
LEDs				
• Switching status		2 yellow LEDs		
• Operating voltage		Green LED		
Enclosure material		CRASTIN; epoxy resin converter surface		
Degree of protection		IP65		
Ambient temperature				
• During operation	°C	-25 ... 70		
• During storage	°C	-40 ... 85		

Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Analog / frequency output	Connection	Order No.
	cm	mA	pnp			
	6 ... 50	150	2 NO	–	M12 connector	3RG62 52-3AH00
	20 ... 150	150	2 NO	–	M12 connector	3RG62 53-3AH00
	25 ... 250	150	2 NO	–	M12 connector	3RG62 55-3AH00
	6 ... 50	300	1 NO	4 ... 20 mA	M12 connector	3RG62 52-3BF00
	20 ... 150	300	1 NO	4 ... 20 mA	M12 connector	3RG62 53-3BF00
	25 ... 250	300	1 NO	4 ... 20 mA	M12 connector	3RG62 55-3BF00
	6 ... 50	300	1 NO	0 ... 20 mA	M12 connector	3RG62 52-3CF00
	20 ... 150	300	1 NO	0 ... 20 mA	M12 connector	3RG62 53-3CF00
	25 ... 250	300	1 NO	0 ... 20 mA	M12 connector	3RG62 55-3CF00
	6 ... 50	300	1 NO	0 ... 10 V	M12 connector	3RG62 52-3GF00
	20 ... 150	300	1 NO	0 ... 10 V	M12 connector	3RG62 53-3GF00
	25 ... 250	300	1 NO	0 ... 10 V	M12 connector	3RG62 55-3GF00
6 ... 30	300	1 NO	30 ... 150 Hz	M12 connector	3RG62 52-3RS00	
20 ... 150	300	1 NO	20 ... 150 Hz	M12 connector	3RG62 53-3RS00	
25 ... 250	300	1 NO	12.5 ... 125 Hz	M12 connector	3RG62 55-3RS00	

Accessories



SONPROG programming device,
100 ... 240 V AC, 24 V DC

▶ **3RX4 000**

Teach-in adapter

▶ **3RX4 010**

▶ Preferred type, available from stock.

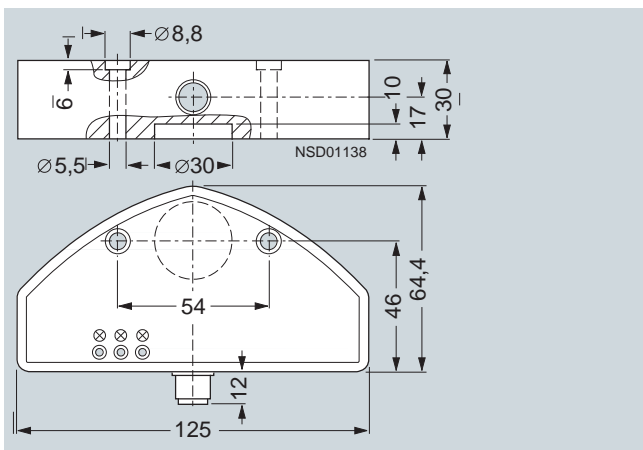
SIMATIC PXS sonar proximity switches

SIMATIC PXS300

K65 compact form

2

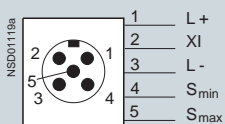
Dimensions



Schematics

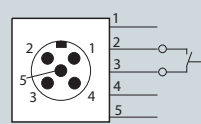
Sensors with switching output

Wiring



View from rear onto device

Automatic alignment



View from rear onto device
 XI must be connected to L-
 for the automatic alignment.

Overview

SIMATIC sensors PXS400

- M30 K3 compact range

Selection table

SIMATIC PXS400											
M30 K3 compact range											
	Fixed sensor head					Swivel-mounted sensor head				Separate sensor head	
Sensing range (cm)	6 ... 30	20 ... 130	40 ... 300	60 ... 600	80 ... 1000	6 ... 30	20 ... 130	40 ... 300	60 ... 600	6 ... 30	20 ... 130
Operating mode											
• Diffuse sensor	■	■	■	■	■	■	■	■	■	■	■
• Reflex sensor	■	■	■	■	■	■	■	■	■	■	■
• Thru-beam sensor	■	■	■	■	■	■	■	■	■	■	■
Output											
• 1 switching output	■	■	■	■	■	■	■	■	■	■	■
• Analog output 0 ... 20 mA	■	■	■	■	■	■	■	■	■	■	■
• Analog output 4 ... 20 mA	■	■	■	■	■	■	■	■	■	■	■
• Analog output 0 ... 10 V	■	■	■	■	■	■	■	■	■	■	■
Temperature compensation	■	■	■	■	■	■	■	■	■	■	■
Adjustment											
• 2 potentiometers	■	■	■	■	■	■	■	■	■	■	■
• SONPROG programming device	■	■	■	■	■	■	■	■	■	■	■
Connection											
• M12 connector	■	■	■	■	■	■	■	■	■	■	■
Degree of protection											
• IP65	■	■	■	■	■	■	■	■	■	■	■
See page	2/50										

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXS sonar proximity switches

SIMATIC PXS400

M30 K3 compact range

Overview



M30 design with fixed sensor

The Sonar proximity switches of M30 K3 compact range are ready-to-use all-in-one units with a cylindrical M30 enclosure. They differ with regard to their range, their functional scope and their adjustment or programming capability.

- Operate as diffuse sensor, reflex sensor or thru-beam sensor
- Adjustable via 2 potentiometers, with SONPROG programming device
- Foreground and background suppression
- Synchronization capability, multiplex operation
- Temperature compensation
- Solid-state outputs:
 - Switching outputs
 - Analog output
- Connection via M12, 5-pole, Type G connector

Design

Standard version

In the standard version, the devices have a permanently installed sensor.

Version with separate sensor



M30 design with separate sensor

Due to its small dimensions, the sensor is especially suitable in confined spaces.

The ultrasonic sensor is installed in a cylindrical enclosure separated from the other electronics. For 3RG6. 12 devices, the sensor is in an M18 sleeve, for 3RG6. 13 devices, the sensor is installed in an M30 sleeve with a length of 25 mm in each case.

Two nuts are supplied for fixing. The connecting lead, which is 1.6 m long, is cast onto the sensor. The connection to the evaluation electronics located in the M30 enclosure of the compact range is established via the preassembled coaxial cable plug. The plug-in socket is installed on the end face of the enclosure.

Version with swivel sensor

These devices correspond functionally to the other devices of M30 K3 compact range. They are particularly suitable for applications where the standard types cannot be used due to space limitations.



M30 design with swivel sensor

The ultrasonic sensor is hinged with a swivel arm to the tubular enclosure of the signal evaluator. This allows rotation about the cylinder axes as well as perpendicular movement at about 100° to the cylinder axis.

Passive reflector

With the Sonar proximity switches of M30 K3 compact range, a 3RX1 910 passive reflector can be clamped onto the sensor head (see "Accessories").

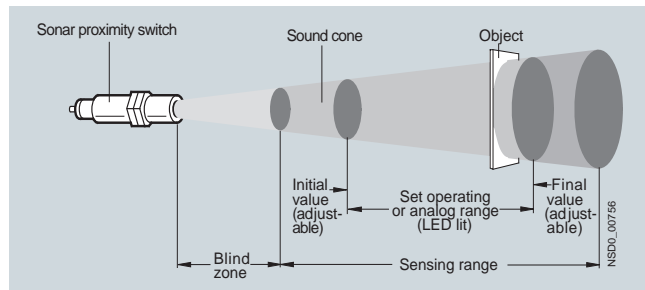
Where space is limited, objects can be detected which are perpendicular to the Sonar proximity switch (which reduces the installation depth). The blind zone is then reduced by about 6 cm.

Function

Range definition and adjustability

Objects within the preset operating range or analog range will be reliably detected causing the switching output or analog output to change state.

The blind zone must be kept clear of any objects since this might cause false outputs. Objects at a distance from the sensor that is outside the set operating range limits will not be signaled at the switching output.



Sound cone

Modes

Standard operating mode, diffuse sensor

An object entering the sound cone from any direction causes the output signal to change when it enters the preset sensing range.

Reflex sensor

If a reflector is permanently fixed within a set operating range, the Sonar proximity switch will be operated by all objects that lie

between the Sonar proximity switch and the reflector even those that absorb sound.

Thru-beam sensors

It is only sensed whether an object is located between the emitter and receiver. The range of the system is doubled as compared to the range of an individual sensor.

Programming

SONPROG For optimizing to the operating conditions, all sensors of the M30 K3 compact range can be programmed using a PC and the SONPROG 3RX4 000 programming device.

The main parameters that can be changed are:

- Lower and upper limit of the operating range
- Hysteresis
- Switching function NO or NC
- Switching rate
- Lower and upper limit of the analog range
- Analog characteristic, rising or falling mean value generation
- End of close range
- End of sensing range
- Multiplex function
- Temperature compensation
- Sensitivity

Sonar proximity switches with non-standard values available on request. The minimum ordering quantity is 10 units.

Technical specifications



Type		3RG61 .2	3RG61 .3	3RG61 .5	3RG61 .4	3RG61 76
Sensing range	cm	6 ... 30	20 ... 130	40 ... 300	60 ... 600	80 ... 1000
Standard target	cm	1 × 1	2 × 2	5 × 5	10 × 10	10 × 10
Hysteresis <i>H</i>	mm	10	10	20	60	80
Repeat accuracy <i>R</i>	mm	± 0.45	± 2	± 5	± 9	± 15
Operational voltage (DC)	V	12 ... 30 (including ± 10% residual ripple, at 12 ... 20 V sensitivity reduced by approx. 20%)				
Rated operational current <i>I_e</i>						
• NO contact	mA	300				300
• NC contact	mA	150 or 300 (see table below)				150
No-load current <i>I₀</i>	mA	max. 50				max. 75
Ultrasonic frequency	kHz	400	200	120	80	60
Switching frequency <i>f</i>	Hz	8	4	2	1	0.5
Response delay	ms	80	110	200	400	800
Power-up delay <i>t_v</i>	ms	280	280	280	280	280
Switching status display		Yellow LED				
Enclosure material		Brass, nickel-plated; CRASTIN converter cover; epoxy resin converter surface				CRASTIN; epoxy resin converter surface
Degree of protection		IP65; IP68 with separate sensor		IP65		IP65
Ambient temperature						
• During operation	°C	-25 ... +70				
• During storage	°C	-40 ... +85				

SIMATIC PXS sonar proximity switches




SIMATIC PXS400

M30 K3 compact range

Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Analog output	Order No.
	cm	mA	pnp		
Fixed sensor					
 3RG61 12-3.00	6 ... 30	300	1 NO	4 ... 20 mA	▶ 3RG61 12-3BF00
	20 ... 130	300	1 NO	4 ... 20 mA	▶ 3RG61 13-3BF00
	40 ... 300	300	1 NO	4 ... 20 mA	▶ 3RG61 15-3BF00
	60 ... 600	300	1 NO	4 ... 20 mA	▶ 3RG61 14-3BF00
	80 ... 1000	300	2 NO	4 ... 20 mA	▶ 3RG61 76-6BH00
 3RG61 13-3.00	6 ... 30	150	1 NC	4 ... 20 mA	3RG61 12-3BE00
	20 ... 130	150	1 NC	4 ... 20 mA	3RG61 13-3BE00
	40 ... 300	150	1 NC	4 ... 20 mA	3RG61 15-3BE00
	60 ... 600	150	1 NC	4 ... 20 mA	3RG61 14-3BE00
	80 ... 1000	150	2 NC	4 ... 20 mA	3RG61 76-6BG00
 3RG61 15-3.00	6 ... 30	300	1 NO	0 ... 20 mA	3RG61 12-3CF00
	20 ... 130	300	1 NO	0 ... 20 mA	3RG61 13-3CF00
	40 ... 300	300	1 NO	0 ... 20 mA	3RG61 15-3CF00
	60 ... 600	300	1 NO	0 ... 20 mA	3RG61 14-3CF00
	80 ... 1000	300	2 NO	0 ... 20 mA	3RG61 76-6CH00
 3RG61 14-3.00	6 ... 30	150	1 NC	0 ... 20 mA	3RG61 12-3CE00
	20 ... 130	150	1 NC	0 ... 20 mA	3RG61 13-3CE00
	40 ... 300	150	1 NC	0 ... 20 mA	3RG61 15-3CE00
	60 ... 600	150	1 NC	0 ... 20 mA	3RG61 14-3CE00
	80 ... 1000	150	2 NC	0 ... 20 mA	3RG61 76-6CG00
 3RG61 76-6.00	6 ... 30	300	1 NO	0 ... 10 V	▶ 3RG61 12-3GF00
	20 ... 130	300	1 NO	0 ... 10 V	▶ 3RG61 13-3GF00
	40 ... 300	300	1 NO	0 ... 10 V	▶ 3RG61 15-3GF00
	60 ... 600	300	1 NO	0 ... 10 V	▶ 3RG61 14-3GF00
	80 ... 1000	300	2 NO	0 ... 10 V	3RG61 76-6GH00
	6 ... 30	150	1 NC	0 ... 10 V	3RG61 12-3GE00
	20 ... 130	150	1 NC	0 ... 10 V	3RG61 13-3GE00
	40 ... 300	150	1 NC	0 ... 10 V	3RG61 15-3GE00
	60 ... 600	150	1 NC	0 ... 10 V	3RG61 14-3GE00
	80 ... 1000	150	2 NC	0 ... 10 V	3RG61 76-6GG00

▶ Preferred type, available from stock.

	Sensing range	Rated operational current	Switching output	Analog output	Order No.	
	cm	mA	pnp			
Swivel sensor						
 3RG61 25-3..00	6 ... 30	300	1 NO	4 ... 20 mA	3RG61 22-3BF00	
	20 ... 130	300	1 NO	4 ... 20 mA	3RG61 23-3BF00	
	40 ... 300	300	1 NO	4 ... 20 mA	3RG61 25-3BF00	
	60 ... 600	300	1 NO	4 ... 20 mA	3RG61 24-3BF00	
	6 ... 30	150	1 NC	4 ... 20 mA	3RG61 22-3BE00	
	20 ... 130	150	1 NC	4 ... 20 mA	3RG61 23-3BE00	
	40 ... 300	150	1 NC	4 ... 20 mA	3RG61 25-3BE00	
	60 ... 600	150	1 NC	4 ... 20 mA	3RG61 24-3BE00	
	6 ... 30	300	1 NO	0 ... 20 mA	3RG61 22-3CF00	
	20 ... 130	300	1 NO	0 ... 20 mA	3RG61 23-3CF00	
	40 ... 300	300	1 NO	0 ... 20 mA	3RG61 25-3CF00	
	60 ... 600	300	1 NO	0 ... 20 mA	3RG61 24-3CF00	
	6 ... 30	150	1 NC	0 ... 20 mA	3RG61 22-3CE00	
	20 ... 130	150	1 NC	0 ... 20 mA	3RG61 23-3CE00	
	40 ... 300	150	1 NC	0 ... 20 mA	3RG61 25-3CE00	
	60 ... 600	150	1 NC	0 ... 20 mA	3RG61 24-3CE00	
	6 ... 30	300	1 NO	0 ... 10 V	3RG61 22-3GF00	
	20 ... 130	300	1 NO	0 ... 10 V	3RG61 23-3GF00	
	40 ... 300	300	1 NO	0 ... 10 V	3RG61 25-3GF00	
	60 ... 600	300	1 NO	0 ... 10 V	3RG61 24-3GF00	
6 ... 30	150	1 NC	0 ... 10 V	3RG61 22-3GE00		
20 ... 130	150	1 NC	0 ... 10 V	3RG61 23-3GE00		
40 ... 300	150	1 NC	0 ... 10 V	3RG61 25-3GE00		
60 ... 600	150	1 NC	0 ... 10 V	3RG61 24-3GE00		
Separate sensor						
 3RG61 12-3..01	6 ... 30	300	1 NO	4 ... 20 mA	3RG61 12-3BF01	
	20 ... 130	300	1 NO	4 ... 20 mA	3RG61 13-3BF01	
	6 ... 30	150	1 NC	4 ... 20 mA	3RG61 12-3BE01	
	20 ... 130	150	1 NC	4 ... 20 mA	3RG61 13-3BE01	
	6 ... 30	300	1 NO	0 ... 20 mA	3RG61 12-3CF01	
	20 ... 130	300	1 NO	0 ... 20 mA	3RG61 13-3CF01	
	6 ... 30	150	1 NC	0 ... 20 mA	3RG61 12-3CE01	
	20 ... 130	150	1 NC	0 ... 20 mA	3RG61 13-3CE01	
	6 ... 30	300	1 NO	0 ... 10 V	3RG61 12-3GF01	
	20 ... 130	300	1 NO	0 ... 10 V	3RG61 13-3GF01	
	6 ... 30	150	1 NC	0 ... 10 V	3RG61 12-3GE01	
	20 ... 130	150	1 NC	0 ... 10 V	3RG61 13-3GE01	
	Accessories					
		SONPROG programming device, 100 ... 240 V AC, 24 V DC				3RX4 000

SIMATIC PXS sonar proximity switches

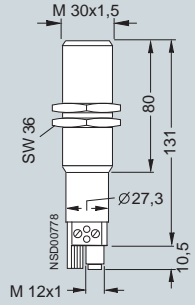
SIMATIC PXS400

M30 K3 compact range

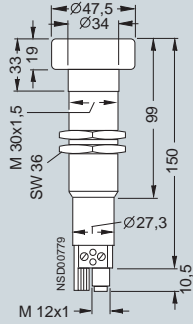
Dimensions

With fixed sensor

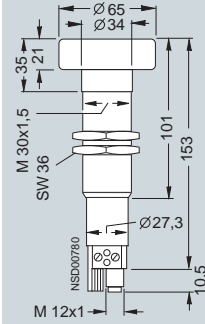
3RG 6. 12-3..00
3RG 6. 13-3..00



3RG 6. 15-3..00

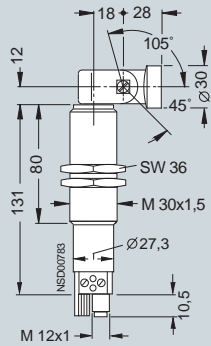


3RG 6. 14-3..00

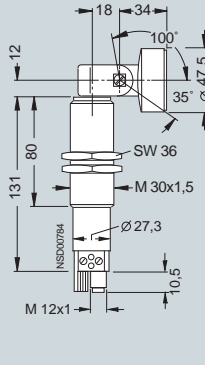


With swivel sensor

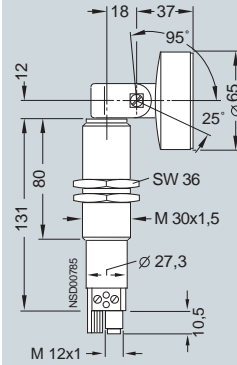
3RG 6. 22-3..00
3RG 6. 23-3..00



3RG 6. 25-3..00

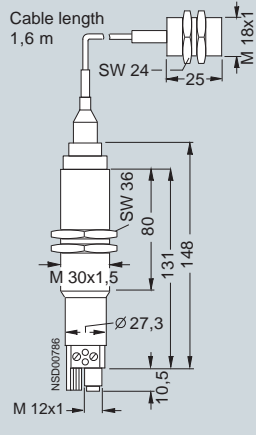


3RG 6. 24-3..00

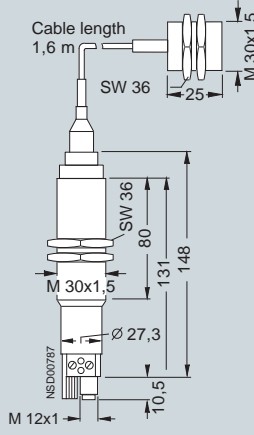


With separate sensor

3RG 6. 12-3..01

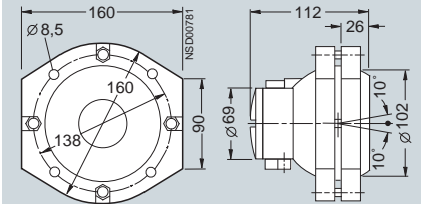


3RG 6. 13-3..01

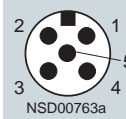
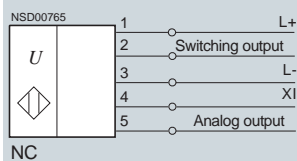
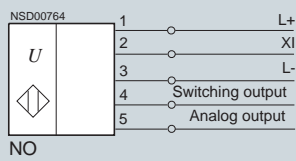


Spherical

3RG 61 76-6..00



Schematics



Overview

SIMATIC sensors PXS800

- M18 ATEX compact range,
- M30 K3 ATEX compact range

Selection table

SIMATIC PXS800



	M18 ATEX compact range		M30 K3 ATEX compact range			
Sensing range (cm)	5 ... 30	15 ... 100	6 ... 30	20 ... 130	40 ... 300	60 ... 600
Operating mode						
• Diffuse sensor	■	■	■	■	■	■
• Reflex sensor	■	■	■	■	■	■
• Thru-beam sensor	■	■	■	■	■	■
Output						
• 1 switching output	■	■	■	■	■	■
• Analog output 0 ... 20 mA	■	■	■	■	■	■
• Analog output 4 ... 20 mA	■	■	■	■	■	■
• Analog output 0 ... 10 V	■	■	■	■	■	■
• Frequency output	■	■	■	■	■	■
• Temperature compensation	■	■	■	■	■	■
Adjustment						
• 1 potentiometer	■	■				
• 2 potentiometers			■	■	■	■
• SONPROG programming device	■	■	■	■	■	■
Connection						
• M12 connector	■	■	■	■	■	■
Degree of protection						
• IP65			■	■	■	■
• IP67	■	■				
Approval for hazardous area						
• Zone 2/22	■	■	■	■	■	■
See page	2/56		2/58			

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXS sonar proximity switches

SIMATIC PXS800

M18 ATEX compact range

Overview



M18 ATEX design

The sonar proximity switches of M18 ATEX compact range are ready-to-use, all-in-one units with a cylindrical enclosure.

- Sensors for Ex Zone 2/22
These sonar proximity switches are approved according to EU Directive 94/9/EG (ATEX) Appendix VIII.
The approval is for:
 - gas EX II 3G EEx nA II T6 X and
 - dust EX II 3D IP65 T 80 °C X
- Operates as diffuse sensor, thru-beam sensor and can be parameterized as a reflex sensor with SONPROG
- Adjustable via a potentiometer using SONPROG programming device
- Background suppression and can be set as foreground suppression with SONPROG
- Synchronization capability, multiplex operation
- Temperature compensation
- Solid-state outputs:
 - switching output
 - analog output
 - frequency output, suitable for connection to LOGO!
- Connection via M12, 4-pole, type F connector

Design

The devices of M18 compact range are all supplied with permanently installed sensors in the longitudinal axis.

Function

The devices are suitable for operation as diffuse sensor, reflex sensor and thru-beam sensor. The sensors can be supplied with switching, analog or frequency outputs.

Up to 10 sensors of the M18 compact range can be synchronized with each other via the enable inputs. The devices are also suitable for multiplex mode.

For a detailed description, see M30 K2 compact ranges.

Programming

SONPROG For optimizing to the operating conditions, all sensors of the M18 compact range can be programmed using a PC and the SONPROG 3RX4 000 programming device.

The main parameters that can be changed are:



- Lower and upper limit of the operating range
- Hysteresis
- Switching function NO or NC
- Switching frequency
- Lower and upper limit of the analog range
- Analog characteristic, rising or falling
- End of close range
- End of sensing range
- Mean value generation
- Multiplex function
- Temperature compensation
- Susceptibility.

Sonar proximity switches with non-standard values available on request. The minimum ordering quantity is 10 units.

Technical specifications

Type		3RG62 32-0XB.	3RG62 33-0XB.
Sensing range	cm	5 ... 30	15 ... 100
Standard target	cm	1 × 1	2 × 2
Hysteresis <i>H</i>	mm	10	
Repeat accuracy <i>R</i>	mm	± 1	± 2
Operational voltage (DC)	V	12 ... 30 V (including ± 10% residual ripple; at 12 ... 20 V DC sensitivity reduced by up to 20%)	
Rated operational current <i>I_e</i>	mA	150	
No-load supply current <i>I₀</i>	mA	max. 60	
Ultrasonic frequency	kHz	400	200
Switching frequency <i>f</i>	Hz	5	4
Response time	ms	100	120
Power-up delay <i>t_v</i>	ms	280	280
Switching status display		Yellow LED	
Enclosure material		...-0XB4: Brass, nickel-plated; CRASTIN converter cover; epoxy resin converter surface ...-0XB7: Stainless steel, CRASTIN converter cover; epoxy resin converter surface with protective foil	
Degree of protection		IP67	
Ambient temperature			
• During operation	°C	-25 ... +70	
• During storage	°C	-40 ... +85	

Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Analog/frequency output	Order No.
	cm	mA	pnP		
Brass, nickel-plated, epoxy resin converter surface					
	5 ... 30	150	1 NO	–	3RG62 32-3AB00-0XB4
	15 ... 100		1 NO	–	3RG62 33-3AB00-0XB4
	5 ... 30		1 NC	–	3RG62 32-3AA00-0XB4
	15 ... 100		1 NC	–	3RG62 33-3AA00-0XB4
	5 ... 30	–	–	4 ... 20 mA	3RG62 32-3LS00-0XB4
	15 ... 100		–	4 ... 20 mA	3RG62 33-3LS00-0XB4
	5 ... 30		–	0 ... 20 mA	3RG62 32-3TS00-0XB4
	15 ... 100		–	0 ... 20 mA	3RG62 33-3TS00-0XB4
	5 ... 30	–	–	0 ... 10 V	3RG62 32-3JS00-0XB4
	15 ... 100		–	0 ... 10 V	3RG62 33-3JS00-0XB4
	5 ... 30		–	250 ... 1500 Hz	3RG62 32-3RS00-0XB4
	15 ... 100		–	150 ... 1000 Hz	3RG62 33-3RS00-0XB4
Stainless steel, epoxy resin converter surface with protective foil					
	5 ... 30	150	1 NO	–	3RG62 32-3AB00-0XB7
	15 ... 100		1 NO	–	3RG62 33-3AB00-0XB7
	5 ... 30		1 NC	–	3RG62 32-3AA00-0XB7
	15 ... 100		1 NC	–	3RG62 33-3AA00-0XB7
	5 ... 30	–	–	4 ... 20 mA	3RG62 32-3LS00-0XB7
	15 ... 100		–	4 ... 20 mA	3RG62 33-3LS00-0XB7
	5 ... 30		–	0 ... 20 mA	3RG62 32-3TS00-0XB7
	15 ... 100		–	0 ... 20 mA	3RG62 33-3TS00-0XB7
	5 ... 30	–	–	0 ... 10 V	3RG62 32-3JS00-0XB7
	15 ... 100		–	0 ... 10 V	3RG62 33-3JS00-0XB7
	5 ... 30		–	250 ... 1500 Hz	3RG62 32-3RS00-0XB7
	15 ... 100		–	150 ... 1000 Hz	3RG62 33-3RS00-0XB7

Accessories

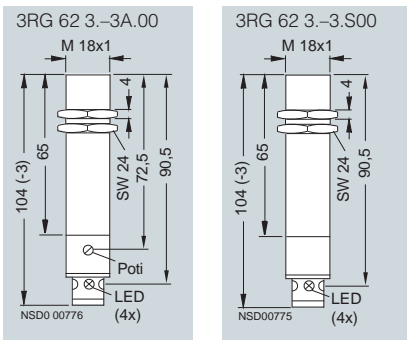


SONPROG programming device,
100 ... 240 V AC, 24 V DC

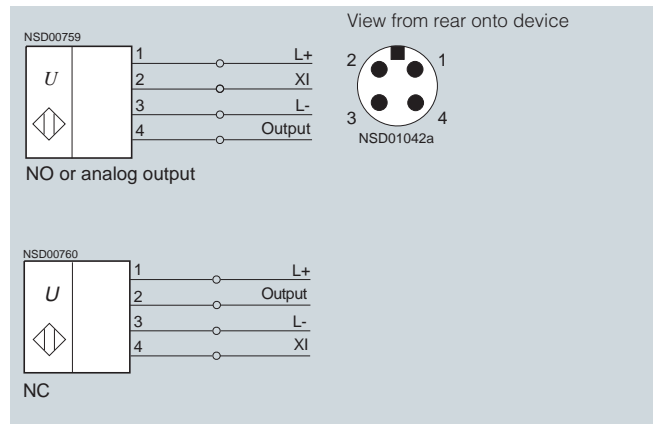
3RX4 000

► Preferred type, available from stock.

Dimensions



Schematics



SIMATIC PXS sonar proximity switches

SIMATIC PXS800

M30 K3 compact range ATEX

Overview



M30 K3 ATEX design with fixed sensor

The M30 K3 ATEX compact range sonar proximity switches are ready-to-use, all-in-one units with a cylindrical M30 enclosure. They differ with regard to their range, their functional scope and their adjustment or programming capabilities.

- Sensors for Ex Zone 2/22
These sonar proximity switches are approved according to EU Directive 94/9/EG (ATEX) Appendix VIII. The approval is for:
 - gas EX II 3G EEx nA II T6 X and
 - dust EX II 3D IP65 T 80 °C X
- Operation as diffuse sensor, reflex sensor or thru-beam sensor
- Adjustable via 2 potentiometers using SONPROG programming device
- Foreground and background suppression
- Synchronization capability, multiplex operation
- Temperature compensation
- Solid-state outputs:
 - switching outputs
 - analog output
- Connection via M12, 5-pole, type G connector

Design

Passive reflector

With the sonar proximity switches of M30 K3 ATEX compact range, a 3RX1 910 passive reflector can be clamped onto the sensor head (see "Accessories").

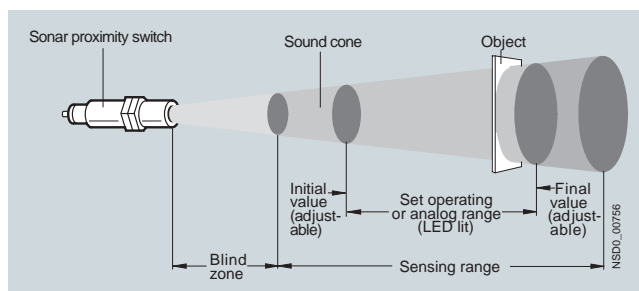
Where space is limited, objects can be detected which are perpendicular to the sonar proximity switch (which reduces the installation depth). The blind zone is then reduced by about 6 cm.

Function

Range definition and adjustability

Objects within the preset operating range or analog range will be reliably detected causing the switching output or analog output to change state.

The blind zone must be kept clear of any objects since this might cause false signals. Objects at a distance from the sensor that is outside the set operating range limits will not be signaled at the switching output.



Sound cone

Operating modes

Standard operating mode, diffuse sensor

An object entering the sound cone from any direction causes the output signal to change when it enters the preset sensing range.

Reflex sensor

If a reflector is permanently fixed within a set operating range, the sonar proximity switch will be operated by all objects that lie between the sonar proximity switch and the reflector, even those that absorb sound.

Thru-beam sensor

It is only sensed whether an object is located between the emitter and receiver. The range of the system is doubled compared to the range of a single sensor.

Programming

SONPROG For optimum adaptation to the operating conditions, all sensors of the M30 K3 compact range can be programmed using a PC and the SONPROG 3RX4 000 programming device.

The main parameters that can be changed are:

- Lower and upper limit of the operating range
- Hysteresis
- Switching function NO or NC
- Switching frequency
- Lower and upper limit of the analog range
- Analog characteristic, rising or falling mean value generation
- End of blind zone
- End of sensing range
- Multiplex function
- Temperature compensation
- Susceptibility.

Sonar proximity switches with non-standard values available on request. The minimum ordering quantity is 10 units.

Technical specifications

Type		3RG61 .2-0XB.	3RG61 .3-0XB.	3RG61 .5-0XB.	3RG61 .4-0XB.
Sensing range	cm	6 ... 30	20 ... 130	40 ... 300	60 ... 600
Standard target	cm	1 × 1	2 × 2	5 × 5	10 × 10
Hysteresis <i>H</i>	mm	10	10	20	60
Repeat accuracy <i>R</i>	mm	± 0.45	± 2	± 5	± 9
Operational voltage (DC)	V	12 ... 30 (including ± 10% residual ripple, at 12 ... 20 V sensitivity reduced by approx. 20%)			
Rated operational current <i>I_e</i>					
• NO	mA	300			
• NC	mA	150 or 300 (see table below)			
No-load current <i>I₀</i>	mA	max. 50			
Ultrasonic frequency	kHz	400	200	120	80
Switching frequency <i>f</i>	Hz	8	4	2	1
Response time	ms	80	110	200	400
Time delay before availability <i>t_v</i>	ms	280	280	280	280
Switching status display		Yellow LED			
Enclosure material		...-XB4 Brass, nickel-plated; CRAFTIN converter cover; epoxy resin converter surface ...-0XB7 Stainless steel, CRAFTIN converter cover; epoxy resin converter surface with protective foil			
Degree of protection		IP65			
Ambient temperature					
• During operation	°C	-25 ... +70			
• During storage	°C	-40 ... +85			





Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Analog output	Order No.
	cm	mA	pnp		
Brass, nickel-plated, epoxy resin converter surface					
 3RG61 12-3.00	6 ... 30	300	1 NO	4 ... 20 mA	3RG61 12-3BF00-0XB4
	20 ... 130	300	1 NO	4 ... 20 mA	3RG61 13-3BF00-0XB4
	40 ... 300	300	1 NO	4 ... 20 mA	3RG61 15-3BF00-0XB4
	60 ... 600	300	1 NO	4 ... 20 mA	3RG61 14-3BF00-0XB4
 3RG61 13-3.00	6 ... 30	150	1 NC	4 ... 20 mA	3RG61 12-3BE00-0XB4
	20 ... 130	150	1 NC	4 ... 20 mA	3RG61 13-3BE00-0XB4
	40 ... 300	150	1 NC	4 ... 20 mA	3RG61 15-3BE00-0XB4
	60 ... 600	150	1 NC	4 ... 20 mA	3RG61 14-3BE00-0XB4
 3RG61 15-3.00	6 ... 30	300	1 NO	0 ... 20 mA	3RG61 12-3CF00-0XB4
	20 ... 130	300	1 NO	0 ... 20 mA	3RG61 13-3CF00-0XB4
	40 ... 300	300	1 NO	0 ... 20 mA	3RG61 15-3CF00-0XB4
	60 ... 600	300	1 NO	0 ... 20 mA	3RG61 14-3CF00-0XB4
 3RG61 14-3.00	6 ... 30	150	1 NC	0 ... 20 mA	3RG61 12-3CE00-0XB4
	20 ... 130	150	1 NC	0 ... 20 mA	3RG61 13-3CE00-0XB4
	40 ... 300	150	1 NC	0 ... 20 mA	3RG61 15-3CE00-0XB4
	60 ... 600	150	1 NC	0 ... 20 mA	3RG61 14-3CE00-0XB4
	6 ... 30	300	1 NO	0 ... 10 V	3RG61 12-3GF00-0XB4
	20 ... 130	300	1 NO	0 ... 10 V	3RG61 13-3GF00-0XB4
	40 ... 300	300	1 NO	0 ... 10 V	3RG61 15-3GF00-0XB4
	60 ... 600	300	1 NO	0 ... 10 V	3RG61 14-3GF00-0XB4
	6 ... 30	150	1 NC	0 ... 10 V	3RG61 12-3GE00-0XB4
	20 ... 130	150	1 NC	0 ... 10 V	3RG61 13-3GE00-0XB4
	40 ... 300	150	1 NC	0 ... 10 V	3RG61 15-3GE00-0XB4
	60 ... 600	150	1 NC	0 ... 10 V	3RG61 14-3GE00-0XB4

SIMATIC PXS sonar proximity switches

SIMATIC PXS800

M30 K3 compact range ATEX

	Sensing range	Rated opera- tional current	Switching output	Analog output	Order No.
	cm	mA	pnp		
Stainless steel, epoxy resin converter surface with protective foil					
 3RG61 12-3..00	6 ... 30	300	1 NO	4 ... 20 mA	3RG61 12-3BF00-0XB7
	20 ... 130	300	1 NO	4 ... 20 mA	3RG61 13-3BF00-0XB7
	40 ... 300	300	1 NO	4 ... 20 mA	3RG61 15-3BF00-0XB7
	60 ... 600	300	1 NO	4 ... 20 mA	3RG61 14-3BF00-0XB7
 3RG61 13-3..00	6 ... 30	150	1 NC	4 ... 20 mA	3RG61 12-3BE00-0XB7
	20 ... 130	150	1 NC	4 ... 20 mA	3RG61 13-3BE00-0XB7
	40 ... 300	150	1 NC	4 ... 20 mA	3RG61 15-3BE00-0XB7
	60 ... 600	150	1 NC	4 ... 20 mA	3RG61 14-3BE00-0XB7
 3RG61 15-3..00	6 ... 30	300	1 NO	0 ... 20 mA	3RG61 12-3CF00-0XB7
	20 ... 130	300	1 NO	0 ... 20 mA	3RG61 13-3CF00-0XB7
	40 ... 300	300	1 NO	0 ... 20 mA	3RG61 15-3CF00-0XB7
	60 ... 600	300	1 NO	0 ... 20 mA	3RG61 14-3CF00-0XB7
 3RG61 14-3..00	6 ... 30	150	1 NC	0 ... 20 mA	3RG61 12-3CE00-0XB7
	20 ... 130	150	1 NC	0 ... 20 mA	3RG61 13-3CE00-0XB7
	40 ... 300	150	1 NC	0 ... 20 mA	3RG61 15-3CE00-0XB7
	60 ... 600	150	1 NC	0 ... 20 mA	3RG61 14-3CE00-0XB7
	6 ... 30	300	1 NO	0 ... 10 V	3RG61 12-3GF00-0XB7
	20 ... 130	300	1 NO	0 ... 10 V	3RG61 13-3GF00-0XB7
	40 ... 300	300	1 NO	0 ... 10 V	3RG61 15-3GF00-0XB7
	60 ... 600	300	1 NO	0 ... 10 V	3RG61 14-3GF00-0XB7
	6 ... 30	150	1 NC	0 ... 10 V	3RG61 12-3GE00-0XB7
	20 ... 130	150	1 NC	0 ... 10 V	3RG61 13-3GE00-0XB7
	40 ... 300	150	1 NC	0 ... 10 V	3RG61 15-3GE00-0XB7
	60 ... 600	150	1 NC	0 ... 10 V	3RG61 14-3GE00-0XB7

Accessories



SONPROG programming device,
100 ... 240 V AC, 24 V DC

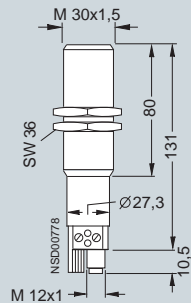
3RX4 000

► Preferred type, available from stock.

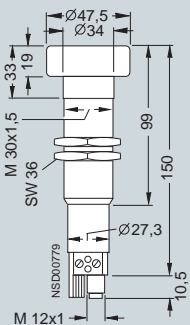
Dimensions

With fixed sensor

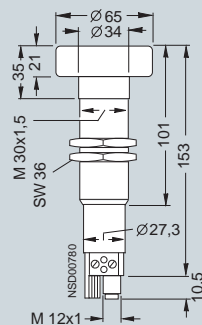
3RG 6. 12-3..00
3RG 6. 13-3..00



3RG 6. 15-3..00

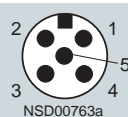
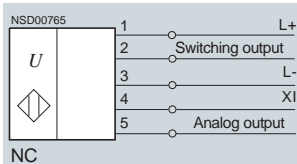
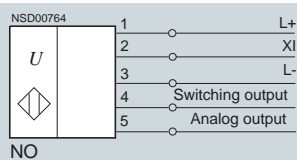


3RG 6. 14-3..00



Schematics

M30 K3 ATEX compact range



SIMATIC PXS sonar proximity switches

SIMATIC PXS900

Overview

SIMATIC sensors PXS900

- Double-layer sheet monitoring

Selection table

SIMATIC PXS900



	Double sheet control
Sensing range (cm)	2 ... 6
Operating mode	
• Thru-beam sensor	■
Output	
• 2 switching outputs	■
Adjustment	
• Teach-in	■
Connection	
• M12 connector	■
Degree of protection	
• IP65	■
See page	2/63

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

Overview



Double-layer sheet monitoring with separate sensors

The 3RX2 210 Sonar proximity switch for double-layer sheet monitoring comprises one signal evaluator and two Sonar sensors (emitter and receiver).

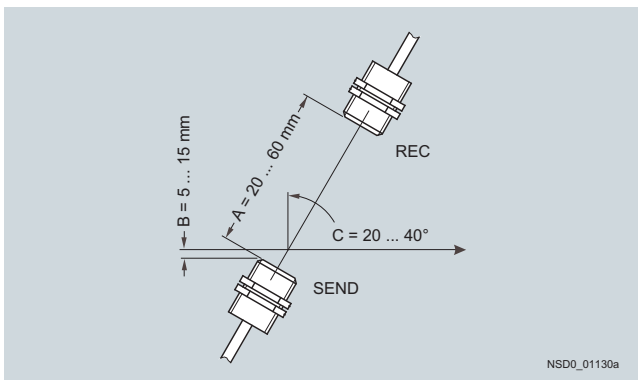
- Reliable detection of multiple layers of paper, plastic sheets or metal foil
- Measuring range from 20 g/m² paper to 1100 g/m² cardboard
- Manual or automatic offset
- Sonar sensors in M18 enclosure
- Short-circuit proof electronic outputs (pnp)
- Connection via M12 connector

Design

The emitter and receiver sensors are of the same type and must be mounted at an angle of 30° (±10°) or 5° to the vertical. The setting is made using the internal S2 switch. If the system is operated at an inclination angle of 5° to 20°, the S2 switch (operating mode) must be set to position "1".

The object to be detected must be located approximately 5 to 15 mm above the emitter. A wider mounting angle increases the flutter range, e.g. at an angle of 40°, fluttering within 60% of the measuring range is permitted.

The spacing between the emitter and receiver must be at least 20 mm and can be up to 60 mm. Precise alignment is essential (±1°). The operating range is reduced if they are not aligned along the axis.



Sensor mounting

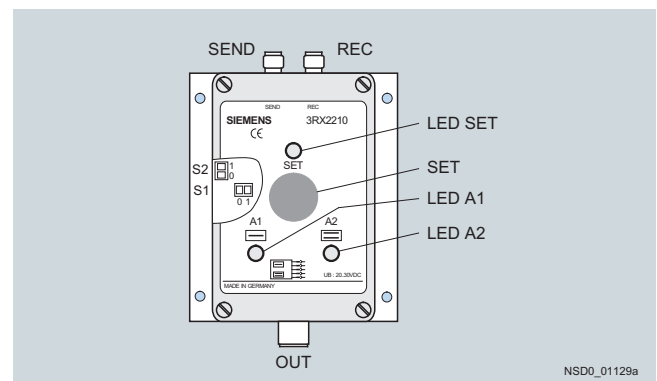
Function

These devices are used mainly for monitoring sheets of paper as well as plastic and metal film. Each sheet is compared to the stored reference value and indicated as a single or double sheet accordingly.

The 3RX2 210 signal evaluator continuously signals the situation between the Sonar sensors at the two outputs A1 and A2. Output A1 "Single sheet" remains active as long as only one sheet is located between the sensors. Output A2 "Double sheet" is activated as soon as two or more sheets are detected between the sensors. Two LEDs also indicate the status of the outputs. The yellow LED A1 indicates a single sheet and the red LED A2 indicates a double sheet.

Programming

The signal evaluator can be set to two different modes.



User interface

Manual setting

Switch S1 (setting) is in position "1".

The sensor is set up for the material to be sensed either by pressing the "SET" button on the top of the device or by applying a control command to the "SET" input of the M12 connector (pin 5). The value obtained remains stored until the setting procedure is repeated. The sensor is set by placing a single sheet between the Sonar sensors and activating the "SET" command.

The 3RX2 210 requires max. 100 ms for the setting; i.e. the "SET" key must be pressed for this time, or a "1" signal (> 6 V) must be present at pin 5. The green LED "SET" flashes during the setting. It lights up permanently following successful setting.

Automatic setting

Switch S1 (setting) is in position "0" (factory setting).

Setting can be performed as described above or automatically when a sheet is fed in and the supply voltage is applied if a sheet lies between the sensors at this moment.

Automatic setting is performed when a sheet is fed in following an interval of 2 s during which a sheet was not detected between the Sonar sensors.

SIMATIC PXS sonar proximity switches

SIMATIC PXS900

Double-layer sheet monitoring

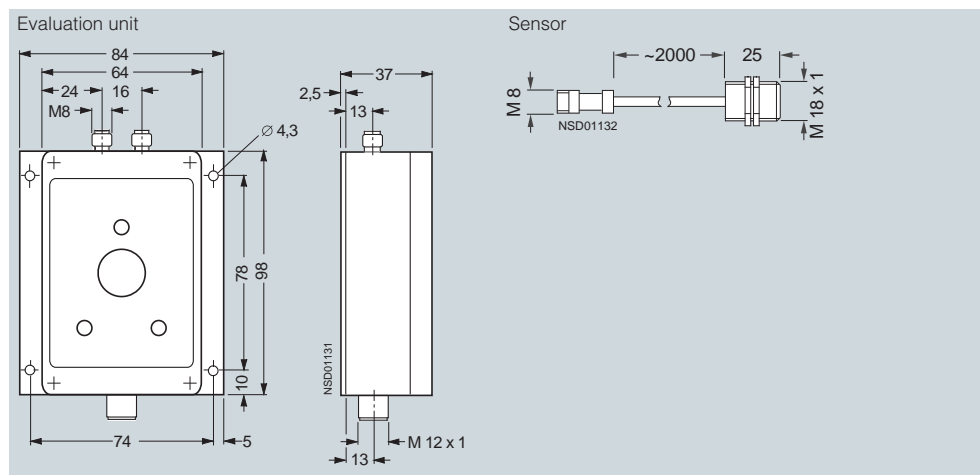
Technical specifications

Type	3RX2 210	
Sensing range	mm	20 ... 60
Material strength (paper, card-board)	g/m ²	20 ... 1100
Operational voltage (DC)	V	18 ... 36 (including ± 10% residual ripple)
No-load current I_0	mA	< 75
Switching output		
• Rated operational current I_e	mA	200
• Voltage drop at 200 mA	V	< 3
Ultrasonic frequency	kHz	200
Switching frequency f	Hz	100
Response time	ms	5
Power-up delay t_v	ms	100
Switching status display	Red and yellow LEDs	
Enclosure material		
• Evaluation unit	Metall	
• Sensor	Brass, nickel-plated; epoxy resin converter surface	
Degree of protection	IP65	
Ambient temperature		
• During operation	°C	0 ... +65
• During storage	°C	-40 ... +85

Selection and Ordering data

	Sensing range	Rated operational current	Switching output	Connection	Order No.
	cm	mA	pnp		
Double-layer sheet monitoring	2 ... 6	200	2 NO	M12 connector	3RX2 210

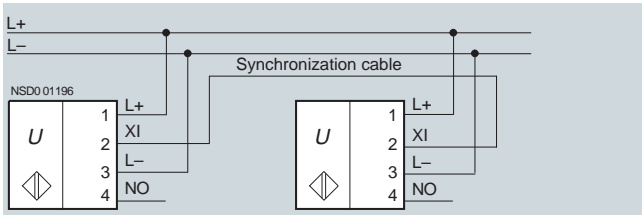
Dimensions



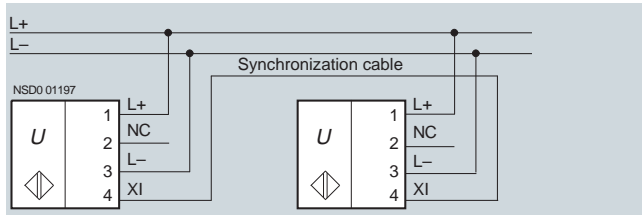
Schematics

Synchronization

NO function

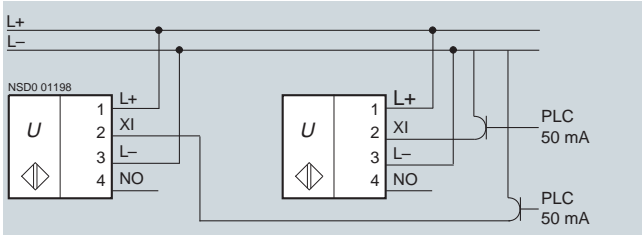


NC function

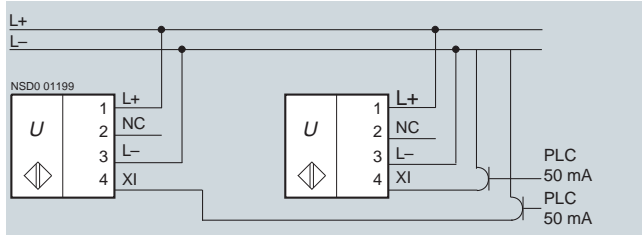


External multiplex mode

NO function

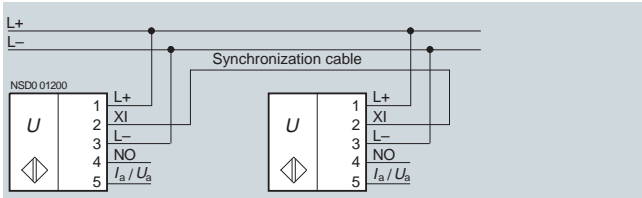


NC function

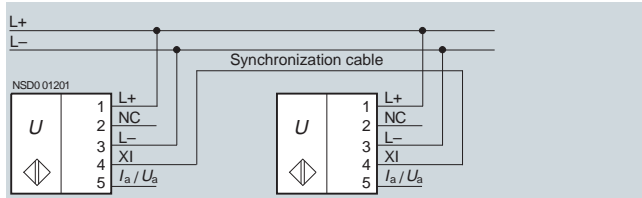


Internal multiplex mode (analog output)

NO function



NC function



SIMATIC PXS sonar proximity switches

Characteristic curves

Characteristic curves

Sound cones

The following diagrams are the results of measurements with Sonar proximity switches, with their production-dependent scatter, at room conditions (20 °C). Standard reflectors moved radially are detected within the possible sensing range by the Sonar proximity switches.

The diagrams apply to the individual types of sensor for the defined reflectors and for larger reflectors.

- Measurement 1 with an aligned object, with the most optimum reflection \Leftrightarrow keep environment free of objects which should not be detected.
- Measurement 2 with an object which has partially aligned surfaces \Leftrightarrow detection of round materials and plates with rounded edges.
- Measurement 3 with an object with a plane surface moving perpendicularly to the sound cone \Leftrightarrow detection of plane surfaces and edges.

Defined reflectors:

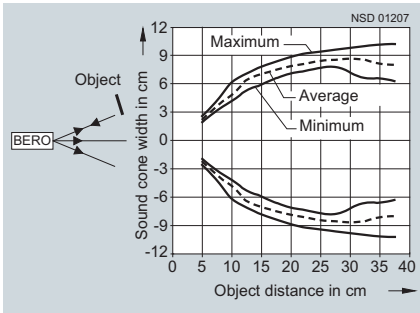
- Measurements 1, 3: plane object
 - 2 cm \times 2 cm, for sensors with sensing ranges up to 130 cm
 - 10 cm \times 10 cm, for sensors with larger sensing ranges
- Measurement 2: cylindrical object, 8 cm diameter.

The following pages show the sound cones for the following designs:

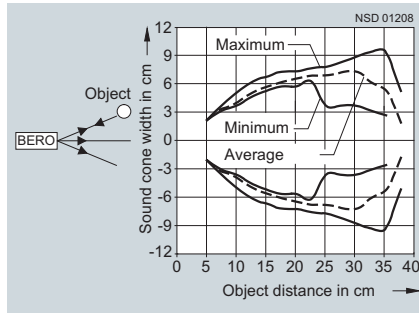
- K0, K08 compact ranges
- Sonar thru-beam sensor
- K65 compact range
- M18, M18S compact ranges
- K21 compact range
- M30 K1, M30 K2 and M30 K3 compact ranges

K0 compact range, sensing range 6 ... 30 cm

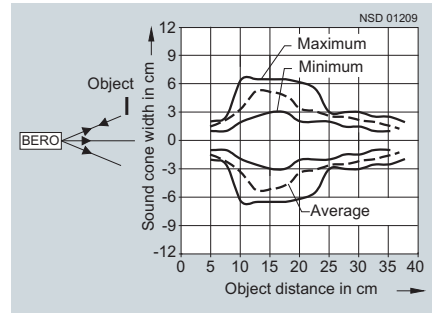
Measurement 1 (most optimum reflection), attenuation 0



Measurement 2 (cylindrical object), attenuation 0

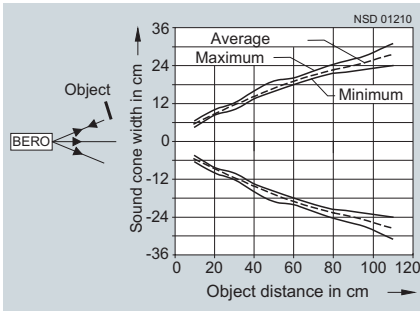


Measurement 3 (plane object), attenuation 0

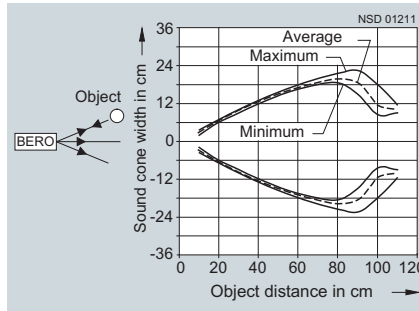


K0 compact range, sensing range 20 ... 100 cm

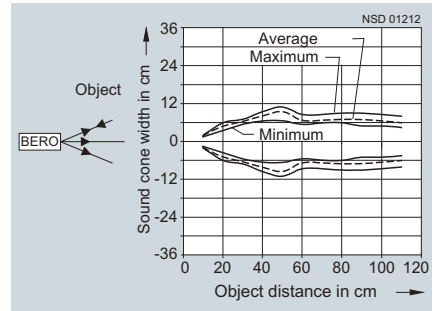
Measurement 1 (most optimum reflection), attenuation 0



Measurement 2 (cylindrical object), attenuation 0

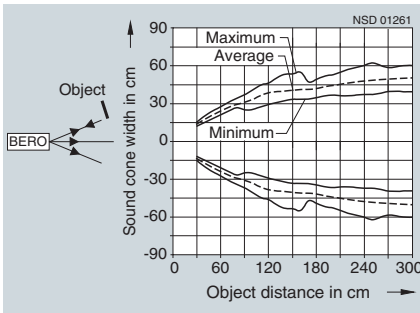


Measurement 3 (plane object), attenuation 0

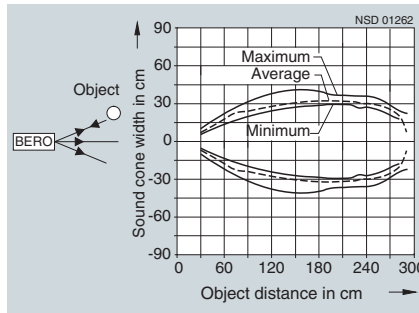


K65 compact form, sensing range 25 ... 250 cm

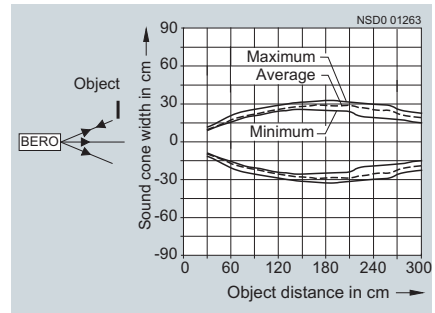
Measurement 1 (most optimum reflection), attenuation 0



Measurement 2 (cylindrical object), attenuation 0

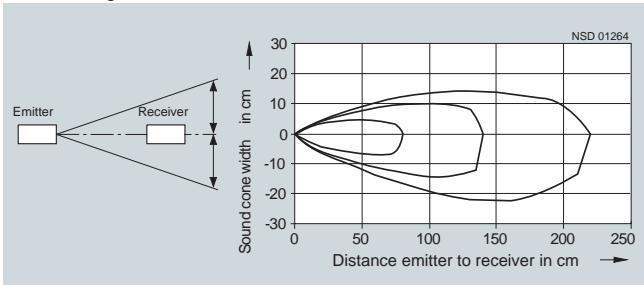


Measurement 3 (plane object), attenuation 0

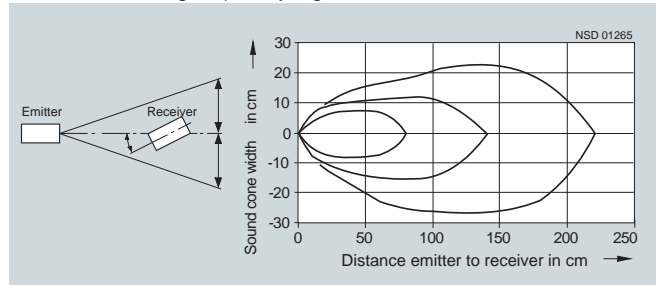


Sonar thru-beam sensor, sensing ranges 5 ... 40 cm, 5 ... 80 cm, 5 ... 150 cm

Receiver angle 0°



Variable receiver angle, optimally aligned

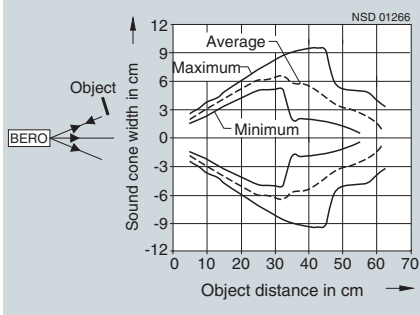


SIMATIC PXS sonar proximity switches

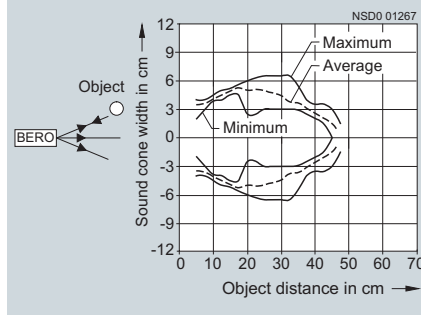
Characteristic curves

M18 compact range, sensing range 5 ... 30 cm

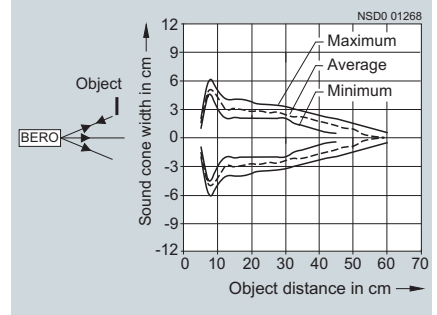
Measurement 1 (most optimum reflection),
attenuation 0



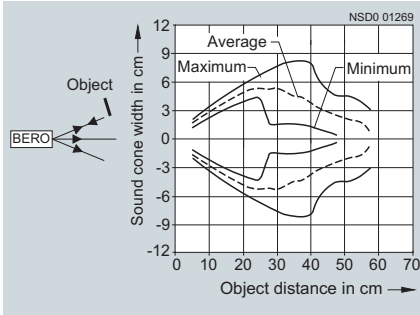
Measurement 2 (cylindrical object), attenuation 0



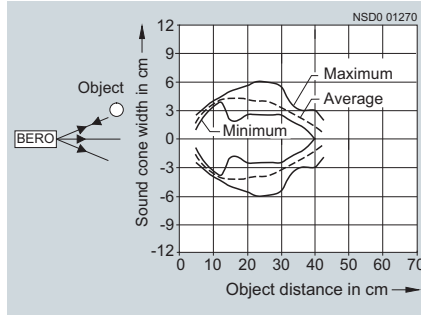
Measurement 3 (plane object), attenuation 0



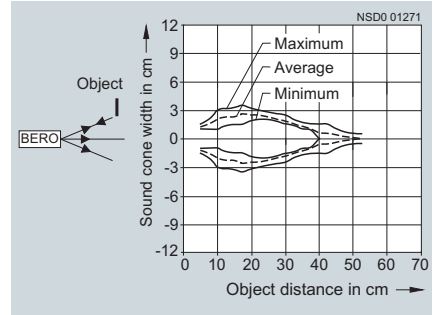
Measurement 1 (most optimum reflection),
attenuation 2



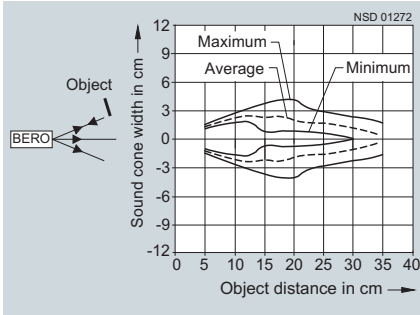
Measurement 2 (cylindrical object), attenuation 2



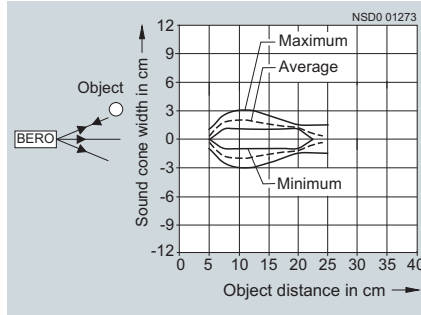
Measurement 3 (plane object), attenuation 2



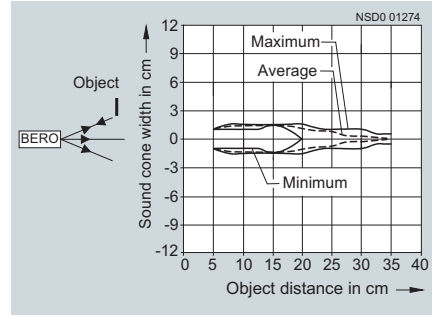
Measurement 1 (most optimum reflection),
attenuation 4



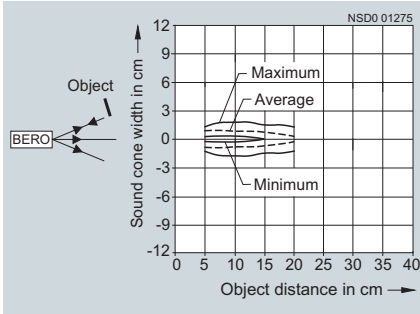
Measurement 2 (cylindrical object), attenuation 4



Measurement 3 (plane object), attenuation 4



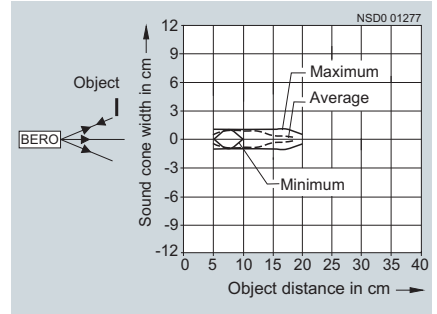
Measurement 1 (most optimum reflection),
attenuation 6



Measurement 2 (cylindrical object), attenuation 6

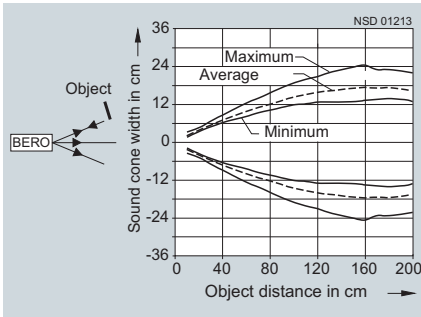


Measurement 3 (plane object), attenuation 6

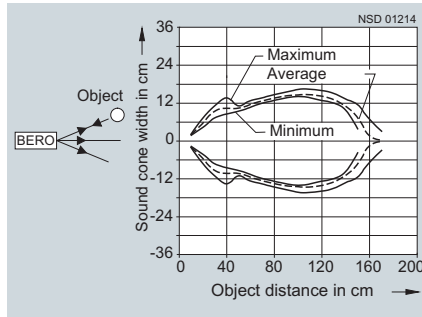


M18 compact range, sensing range 15 ... 100 cm

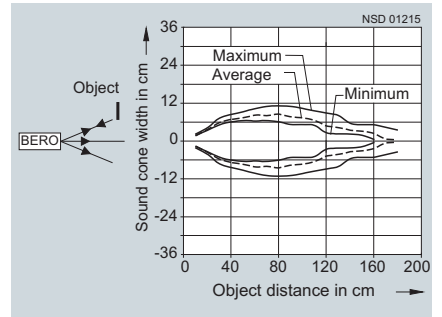
Measurement 1 (most optimum reflection), attenuation 0



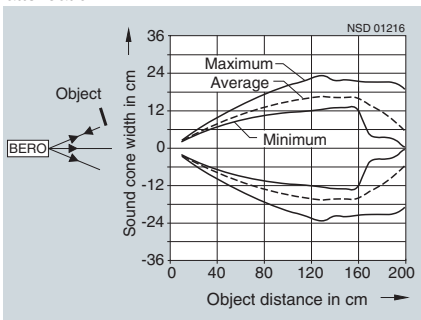
Measurement 2 (cylindrical object), attenuation 0



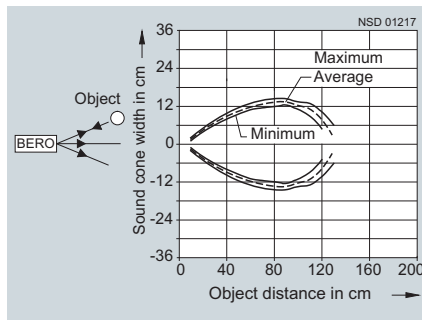
Measurement 3 (plane object), attenuation 0



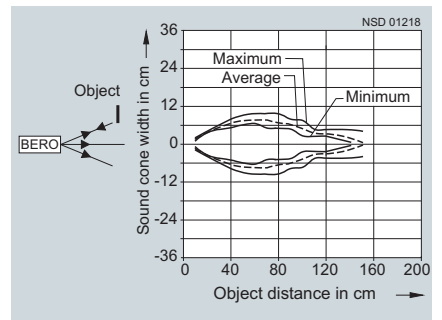
Measurement 1 (most optimum reflection), attenuation 2



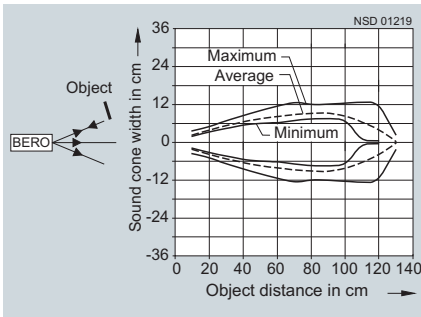
Measurement 2 (cylindrical object), attenuation 2



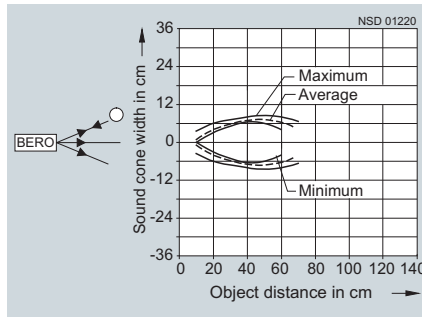
Measurement 3 (plane object), attenuation 2



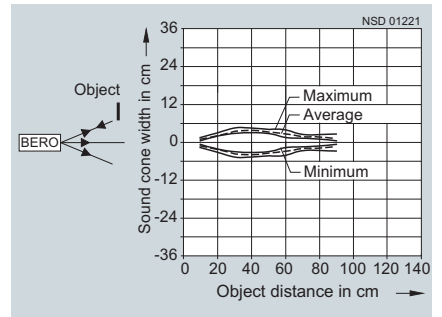
Measurement 1 (most optimum reflection), attenuation 4



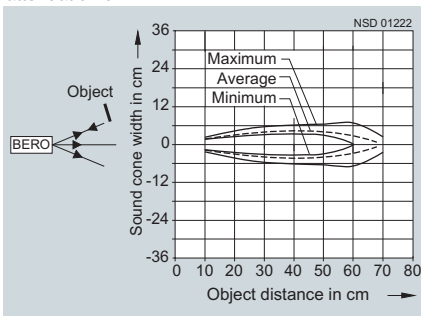
Measurement 2 (cylindrical object), attenuation 4



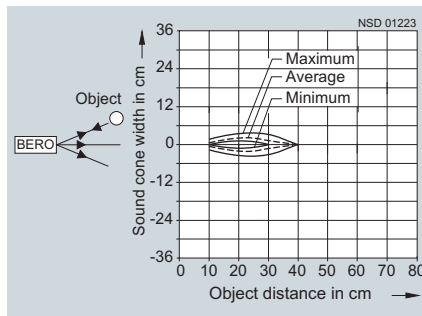
Measurement 3 (plane object), attenuation 4



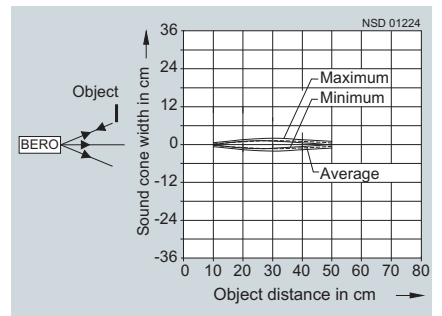
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6



Measurement 3 (plane object), attenuation 6



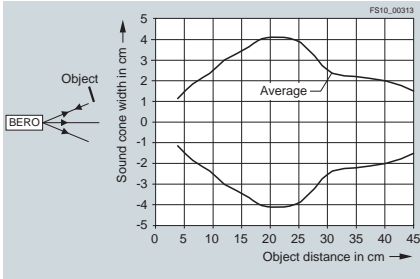
SIMATIC PXS sonar proximity switches

Characteristic curves

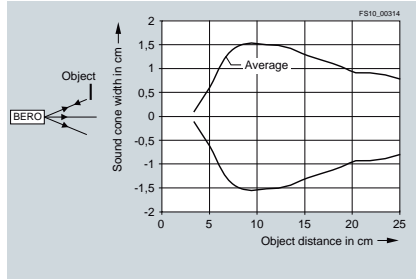
2

M18S compact range, sensing range 2 ... 25 cm

Measurement 1 (most optimum reflection),
attenuation 0

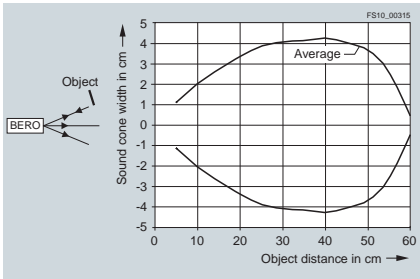


Measurement 2 (plane object), attenuation 0

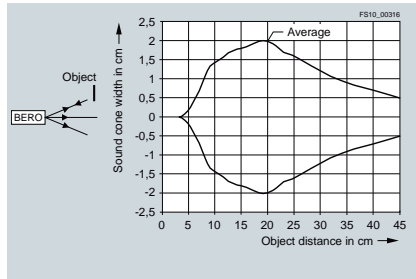


M18S compact range, sensing range 2 ... 40 cm

Measurement 1 (most optimum reflection),
attenuation 0

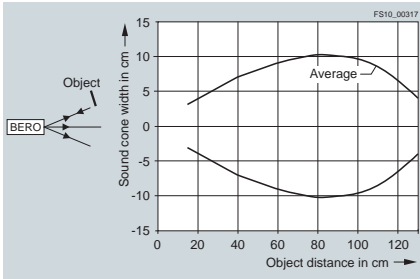


Measurement 2 (plane object), attenuation 0

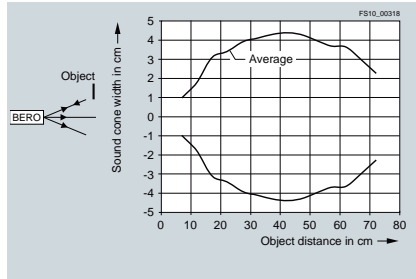


M18S compact range, sensing range 5 ... 70 cm

Measurement 1 (most optimum reflection),
attenuation 0

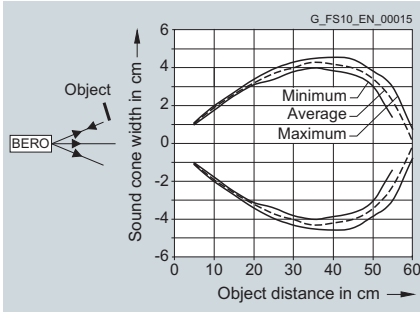


Measurement 2 (plane object), attenuation 0

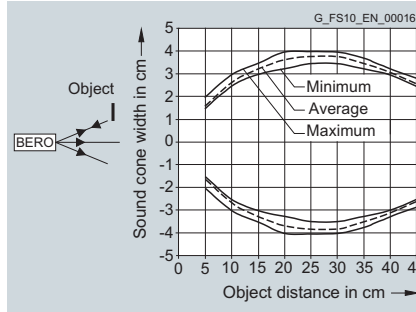


K08 compact range, sensing range 5 ... 40 cm

Measurement 1 (most optimum reflection),
attenuation 0

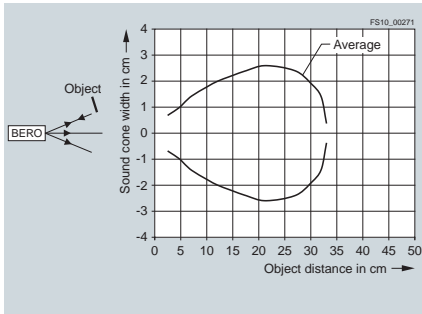


Measurement 2 (plane object), attenuation 0

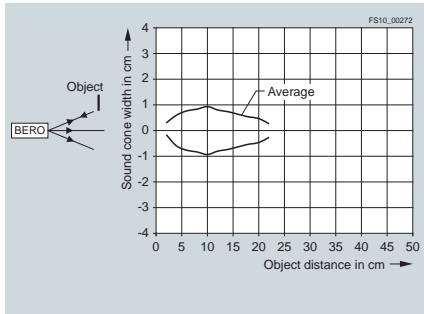


K21 compact range, sensing range 20 ... 250 mm

Measurement 1 (most optimum reflection)

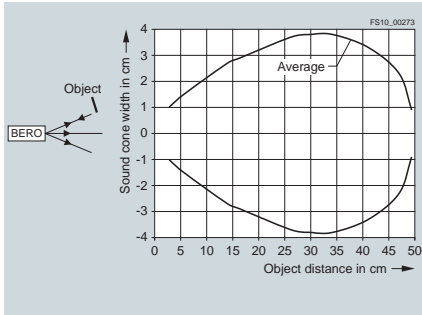


Measurement 2 (plane object)

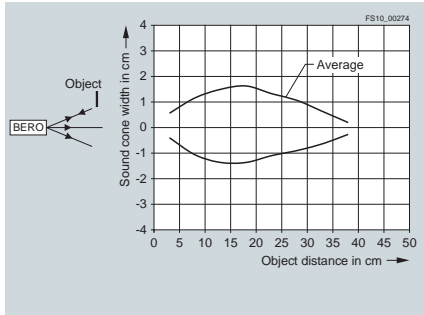


K21 compact range, sensing range 25 ... 400 mm

Measurement 1 (most optimum reflection)



Measurement 2 (plane object)

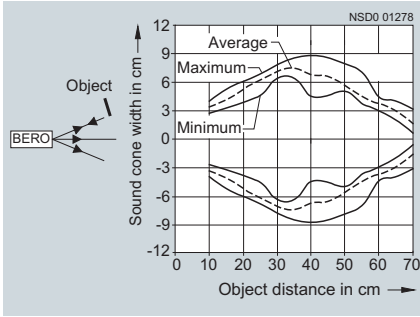


SIMATIC PXS sonar proximity switches

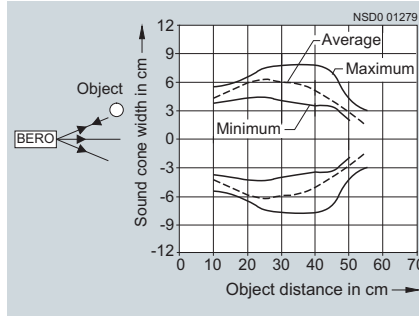
Characteristic curves

M30 K1 to M30 K3 compact range, sensing range 6 ... 30 cm

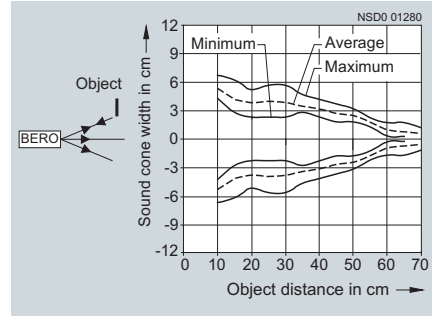
Measurement 1 (most optimum reflection), attenuation 0



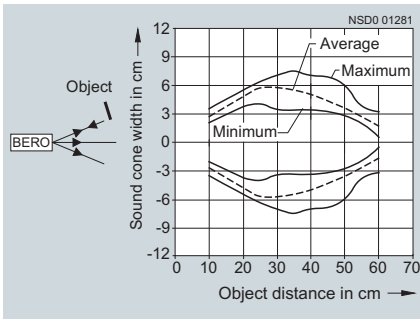
Measurement 2 (cylindrical object), attenuation 0



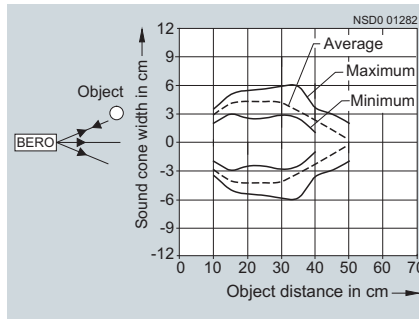
Measurement 3 (plane object), attenuation 0



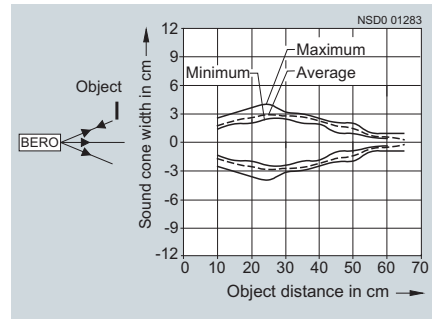
Measurement 1 (most optimum reflection), attenuation 2



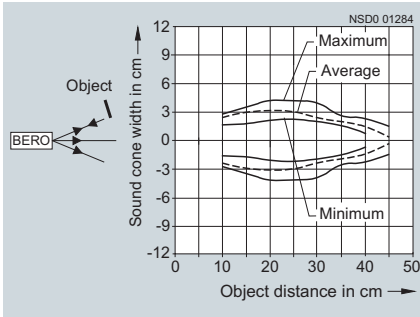
Measurement 2 (cylindrical object), attenuation 2



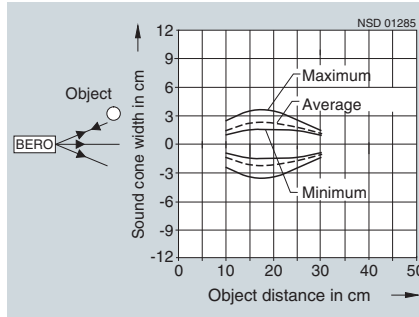
Measurement 3 (plane object), attenuation 2



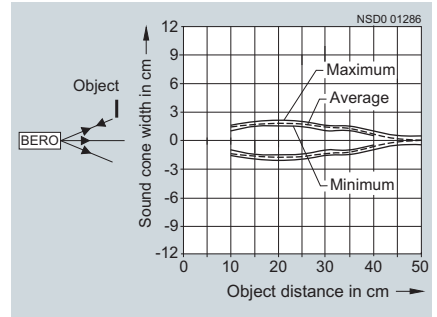
Measurement 1 (most optimum reflection), attenuation 4



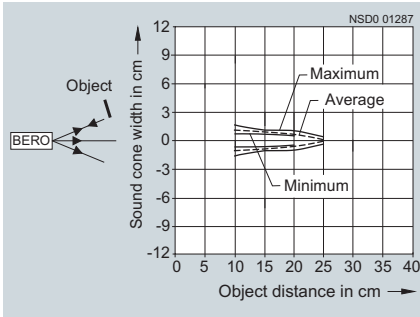
Measurement 2 (cylindrical object), attenuation 4



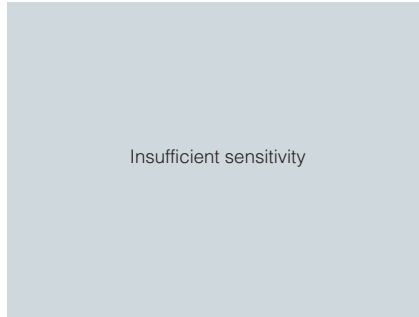
Measurement 3 (plane object), attenuation 4



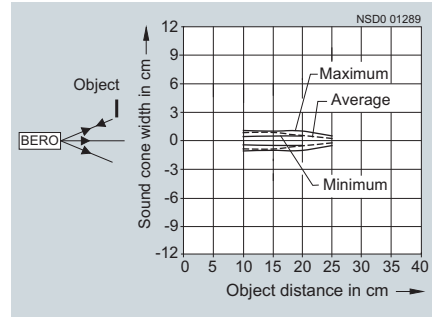
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6



Measurement 3 (plane object), attenuation 6

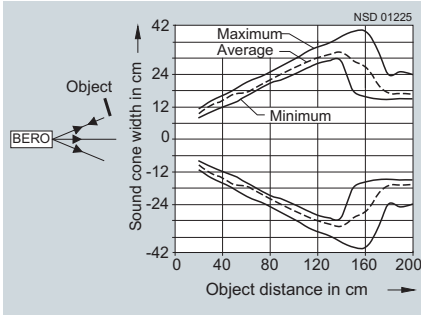


Note: only the sound cones with attenuation 0 apply to M30 K1 compact range.

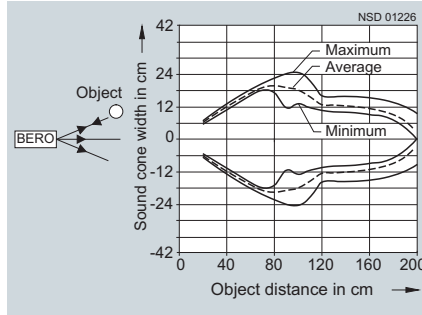
2

M30 K1 to M30 K3 compact range, sensing range 20 ... 130 cm

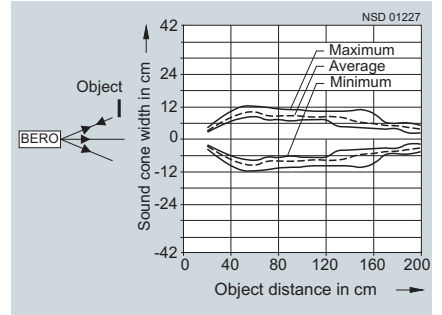
Measurement 1 (most optimum reflection), attenuation 0



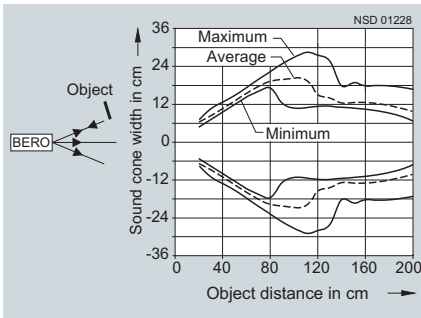
Measurement 2 (cylindrical object), attenuation 0



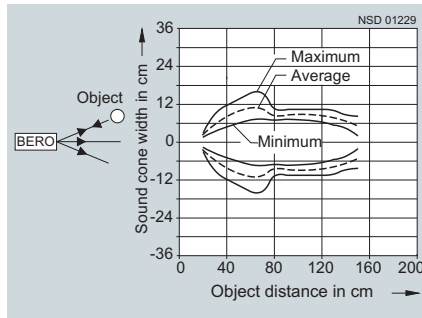
Measurement 3 (plane object), attenuation 0



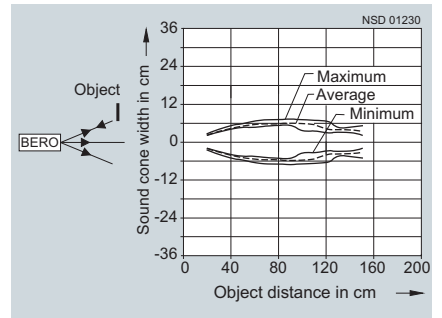
Measurement 1 (most optimum reflection), attenuation 2



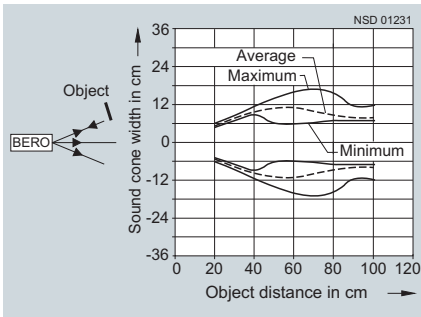
Measurement 2 (cylindrical object), attenuation 2



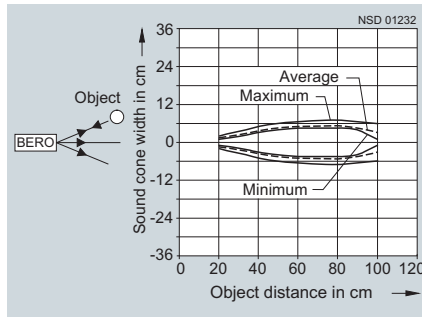
Measurement 3 (plane object), attenuation 2



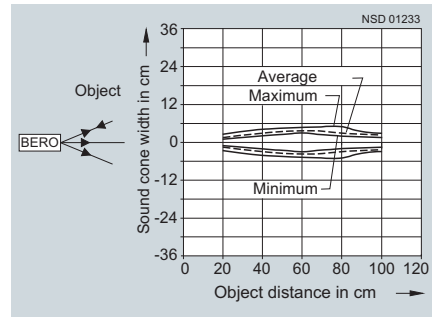
Measurement 1 (most optimum reflection), attenuation 4



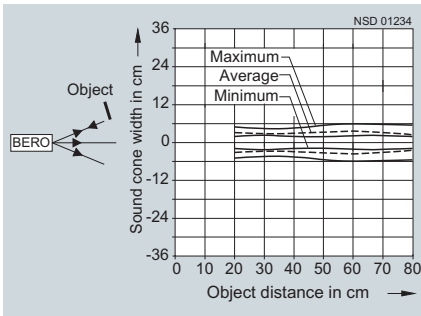
Measurement 2 (cylindrical object), attenuation 4



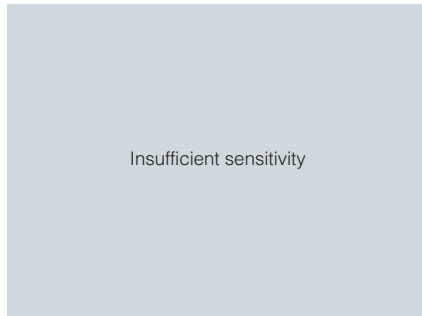
Measurement 3 (plane object), attenuation 4



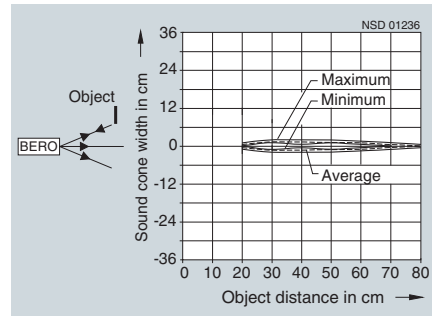
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6



Measurement 3 (plane object), attenuation 6



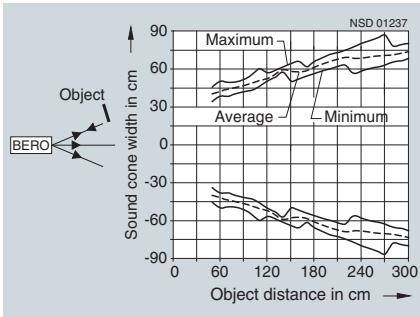
Note: only the sound cones with attenuation 0 apply to M30 K1 compact range.

SIMATIC PXS sonar proximity switches

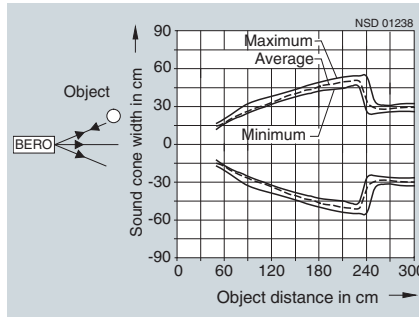
Characteristic curves

M30 K1 to M30 K3 compact range, sensing range 40 ... 300 cm

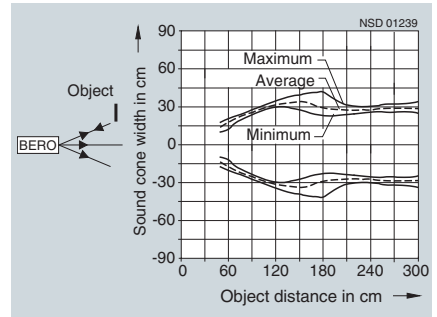
Measurement 1 (most optimum reflection), attenuation 0



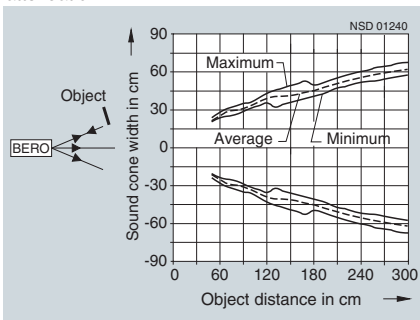
Measurement 2 (cylindrical object), attenuation 0



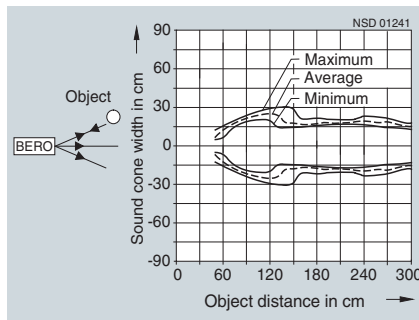
Measurement 3 (plane object), attenuation 0



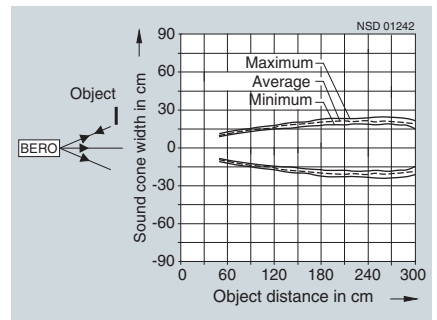
Measurement 1 (most optimum reflection), attenuation 2



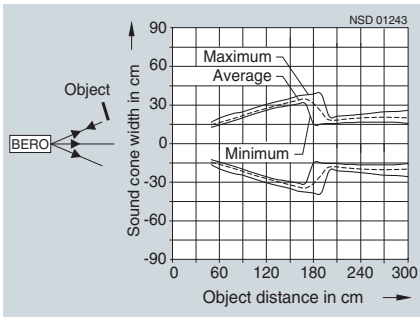
Measurement 2 (cylindrical object), attenuation 2



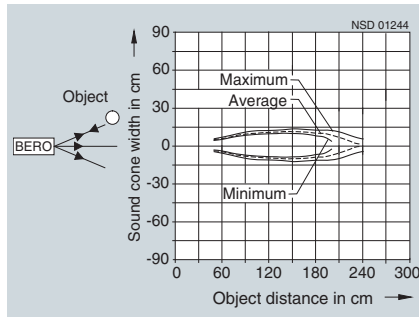
Measurement 3 (plane object), attenuation 2



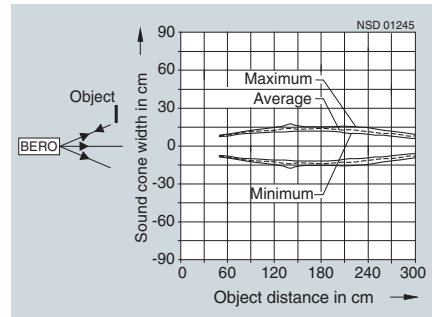
Measurement 1 (most optimum reflection), attenuation 4



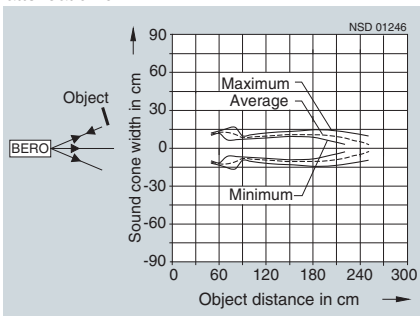
Measurement 2 (cylindrical object), attenuation 4



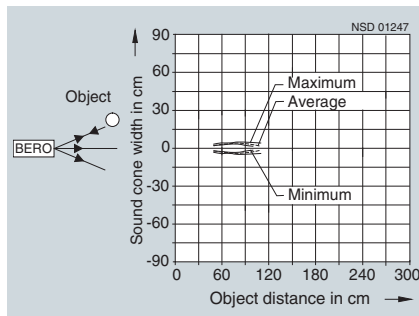
Measurement 3 (plane object), attenuation 4



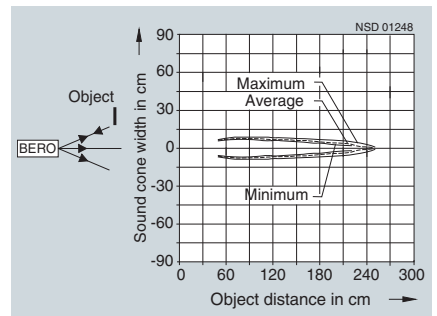
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6



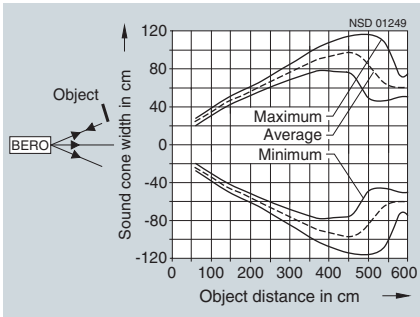
Measurement 3 (plane object), attenuation 6



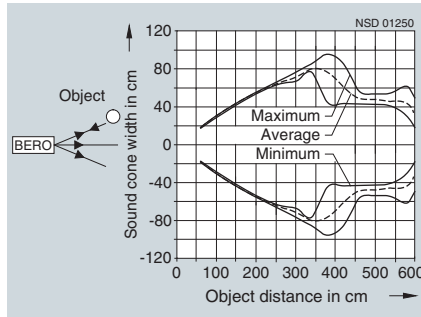
Note: only the sound cones with attenuation 0 apply to M30 K1 compact range.

M30 K1 ... M30 K3 compact range, sensing range 60 ... 600 cm

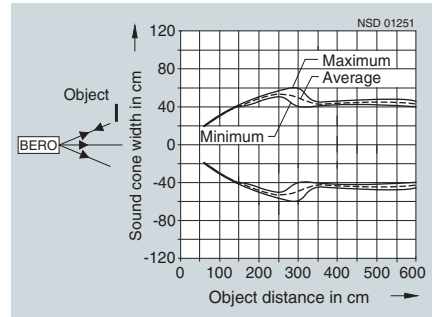
Measurement 1 (most optimum reflection), attenuation 0



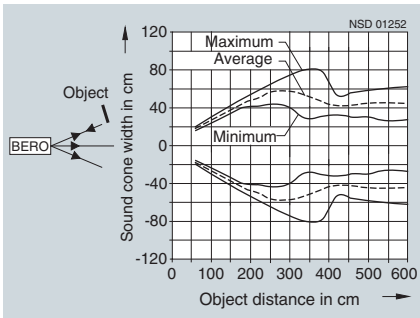
Measurement 2 (cylindrical object), attenuation 0



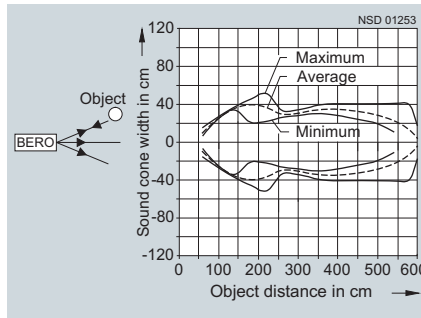
Measurement 3 (plane object), attenuation 0



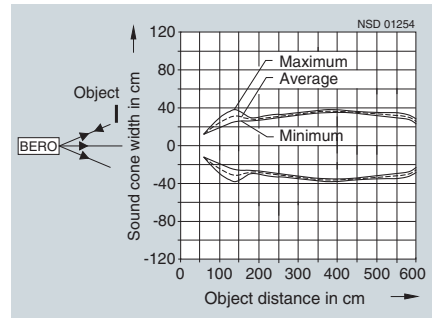
Measurement 1 (most optimum reflection), attenuation 2



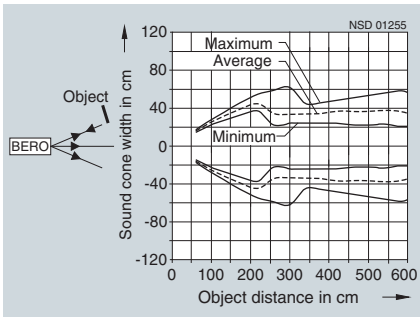
Measurement 2 (cylindrical object), attenuation 2



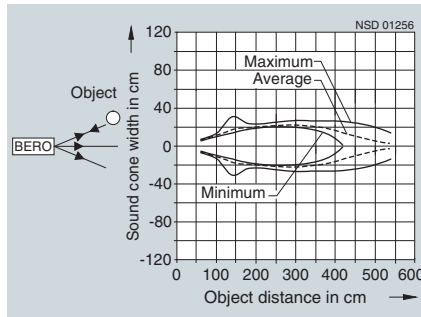
Measurement 3 (plane object), attenuation 2



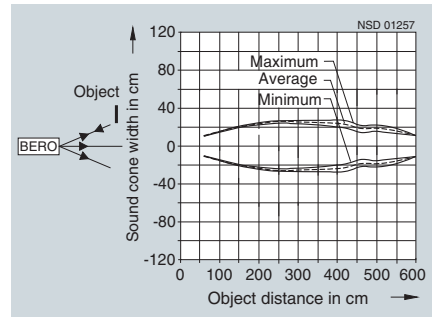
Measurement 1 (most optimum reflection), attenuation 4



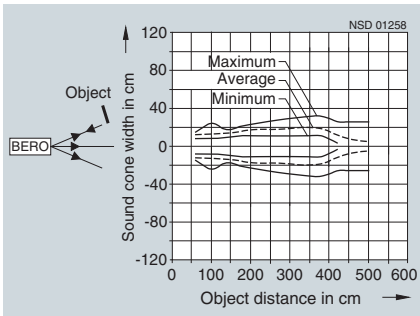
Measurement 2 (cylindrical object), attenuation 4



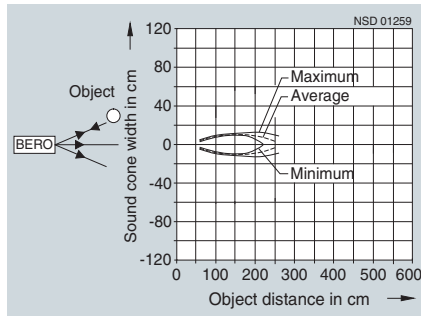
Measurement 3 (plane object), attenuation 4



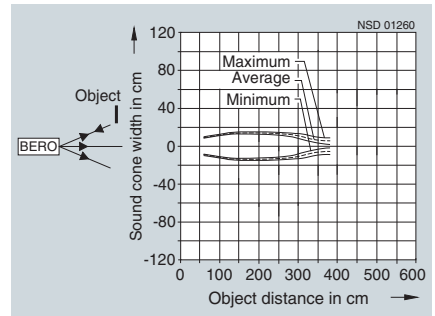
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6



Measurement 3 (plane object), attenuation 6



Note: only the sound cones with attenuation 0 apply to M30 K1 compact range.



Glossary for sonar proximity switches

More information

Active surface

The active surface of an ultrasonic proximity switch is the surface at which the ultrasound is emitted and received (IEC).

Reference axis

The reference axis is the axis running perpendicular to the active surface and through its center (IEC).

Sensing range

The sensing range is defined as the range within which the operating distance can be set (IEC).

With the sonar proximity switches, this range extends from 3 cm to 10 m depending on the type.

The construction of the sensor causes the ultrasonic beam to be emitted in the shape of a cone. Reflecting objects are only detected within this sound cone. Within the blind zone, which lies between the sensor surface and the sensing range, echoes cannot be evaluated for physical reasons.

Operating distance

The operating distance is the distance at which a change in signal is caused at the output when the target approaches the active surface along the reference axis (IEC).

Rated operating distance s_n

The rated operating distance is a conventional variable for the definition of the operating distances. Neither specimen scatter nor changes resulting from external influences such as voltage or temperature are taken into account (IEC).

Effective operating distance s_r

The real operating distance is the operating distance of a particular proximity switch measured at defined temperature, voltage and mounting conditions (IEC).

Accuracy

The accuracy is the permissible error that exists as the difference between the true distance and the indicated value. The accuracy of a Sonar proximity switch depends on internal tolerances as well as certain physical parameters of the air such as humidity, atmospheric pressure and air movement. These parameters influence the sound propagation time and therefore the measured value received.

Atmospheric pressure

Any other atmospheric changes at a permanent site will have a negligible effect on the sound propagation time. Between sea level and 3000 m altitude, the speed of sound is reduced by less than 1%. Sound propagation is not possible in a vacuum.

Air humidity

At room temperature and at lower temperatures, the humidity will have a negligible effect on the sound propagation time. At higher temperatures, the speed of sound increases with humidity.

Air temperature

The sound propagation time is dependent on the air temperature. An air temperature of 20 °C is used as the reference variable here. The speed of sound changes with air temperature here by 0.17%/K. This temperature-dependent change in sound propagation time means that as the temperature increases, the distance to the object appears to become shorter.

A change in temperature of, for example, +10 °C results in a change in the speed of sound of approximately +1.75% and therefore a change in the operating distance of +1.75%.

Gas types

The Sonar proximity switch is designed for operation in atmospheric air. If it is operated in other gases, different values for the speed of sound and attenuation can result in significant measurement errors and even malfunction (e.g. in carbon dioxide).

Air currents

Changes to the speed of sound as a result of constant changes in the flow direction and flow velocity of the air cannot be quantified by means of a generally applicable formula. High-temperature objects, such as glowing metal, cause air turbulence. This will scatter or deflect the ultrasound. An echo will not be generated that can be evaluated.

Precipitation

Average levels of precipitation in the form of rain or snow will not adversely affect the functionality of the sonar proximity switch. The transducer surface should not, however, be wetted. Dewing is permissible.

Paint spray

This has no determinable effect on the functioning of the sonar proximity switch. To prevent any detrimental effect on the sensitivity of the transducer, however, the paint spray must not be allowed to settle on the active transducer surface.

External sound

External sound is distinguished from the system-specific echoes and does not usually cause malfunctions.

Repeat accuracy R

The repeat accuracy is the change in the effective operating distance s_r at defined conditions (IEC).

The repeat accuracy is measured over a period of 8 hours at an ambient temperature of 23 °C (± 5 °C), any relative humidity within the specified range, and a defined supply voltage.

The repeat accuracy of the Sonar proximity switch is 0.15% of full-scale.

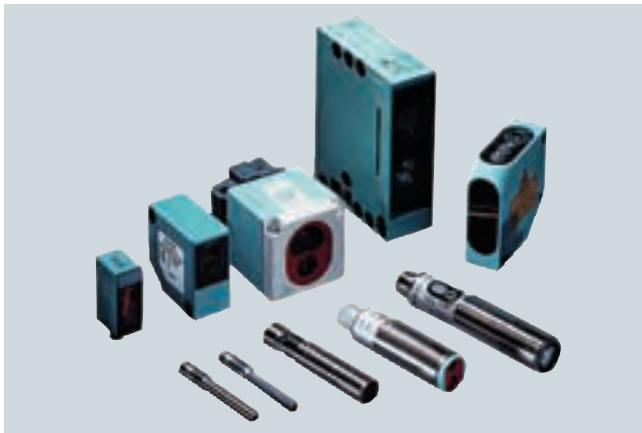


Notes

SIMATIC PXO photoelectric proximity switches

Introduction

Photoelectric proximity switches – fast and accurate sensing with light and laser



Pure photoelectric astuteness – this is what distinguishes these extremely precise, quick-acting and accurately pin-pointing photoelectric proximity switches. This is supplemented by first-class ease of adjustment using a teach-in function or potentiometer and easiest possible handling during operation. With the wide range of different designs, from cubic to cylindrical right down to miniature designs and different types, e.g. as diffuse sensors with or without background suppression, retroreflective or thru-beam sensors, they master any task with a range of up to 50 m superbly.

Highlights

- Extremely precise and quick-acting with pin-point locating ability
- Maximum performance even over large distances
- Small, compact enclosure
- Degree of protection up to IP68
- Adjustable ranges
- Easy commissioning (teach-in)
- Suitable for global use (UL/CSA)

Configurator

A configurator for photoelectric proximity switches is available in the Mall. Based on the technical features required, the desired product can be quickly and easily selected, placed in the shopping cart and ordered.

The configurator can be reached by the following link:
www.siemens.com/simatic-sensors/px

PXO series

The photoelectric proximity switches are organized in different product families in accordance with their technical version and design:

SIMATIC sensors	Version	Design
PXO100	Cylindrical version, mini	D4, M5, M12
PXO200	Cylindrical versions	M18, M18S, L18
PXO300	Cubic version, mini	K21, K21R, K20, L20, C20
PXO400	Cubic version, small	K31, K30
PXO500	Cubic version	C40, L50, L50HF, L50HF adv., C50
PXO600	Cubic version, large	K80, L80HF, L90L
PXO800	Special device amplifiers	GL, LV70

Application

The various versions of the photoelectric proximity switches are predominantly used in the following applications:

- In conveyor systems
- In packaging machines
- In mechanical engineering
- In paper, textile and plastics processing
- In printing machines
- For access control.

These photoelectric sensors detect all objects regardless of their composition, whether metal, wood or plastic.

Special versions of the K20 form in miniature enclosure and the C40 are available for detecting transparent objects. Special devices such as the color sensor or color mark reader can be used to detect differences in color or contrast. The analog laser supports extremely precise distance measurements and position monitoring.

Sensors for Ex Zone 2/22



The K80 ATEX photoelectric proximity switch is approved according to EU Guideline 94/9/EG (ATEX) Appendix VIII

The approval is for:

- Gas EX II 3G EEx nA II T6x and
- Dust EX II 3D IP65 T 80 °C x

The functionality of the photoelectric proximity switches with ATEX approval is identical to that of the standard proximity switches.

Safety-related applications



NSDD_00801

The use of the sensors is not permissible for applications in which the safety of persons is dependent on the function of the proximity switch.

Design

The devices can be mounted in any position. They should be installed in such a manner as to prevent dirt deposits as far as possible. The available accessories enable the devices to be mounted easily and correctly.

Alignment

Diffuse sensor

The sensor must be aligned with the object to be sensed to ensure reliable switching. In devices that have a surplus light function, the relevant LED must be active.

Reflex sensors

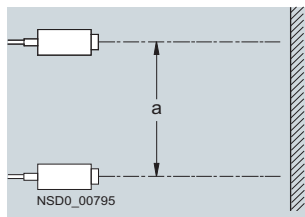
- Place the reflector at the required location and secure it firmly.
- Cover the reflector with adhesive tape so that only the center (approximately 25 % of the surface) remains free.
- Install the reflex sensor so that it switches reliably.
- Finally remove the adhesive tape from the reflector.

Thru-beam sensors

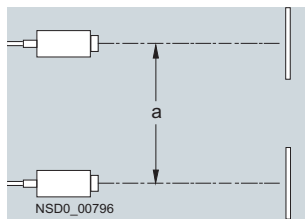
- Place the receiver in the required position and secure it firmly.
- Align the emitter with the receiver as accurately as possible.

Minimum clearance

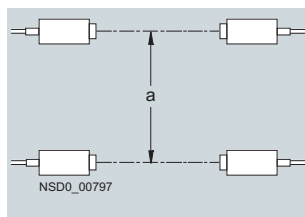
The proximity switches must not interfere with each other. Therefore a minimum distance a must be observed between two sensors. The following distances are recommended values only. The values given are for maximum sensitivity.



Diffuse sensor



Reflex sensor



Thru-beam sensor.

Photoelectric proximity switches Dimension a

D4/M5	50 mm
M12	250 mm
M18	250 mm
K31	250 mm
K30	750 mm
K80	500 mm
L18 (laser light barrier)	150 mm ¹⁾
L50 (laser light scanner)	30 mm
L50 (laser light barrier)	80 mm
C50 (color sensor)	500 mm

1) Focusing at 50 m.

Setting the operating distance

Sensitivity is either adjusted using a built-in potentiometer or taught by means of a teach-in function. When a potentiometer is used, turning clockwise increases sensitivity and thus the achievable operating distance.

Diffuse sensor and diffuse sensor with background suppression

The object is positioned in front of the sensor inside its sensing range. Set the sensitivity, or distance, in such a way that the object to be scanned is sure to be sensed. If necessary, the surplus light display (green LED) must be active. The object must then be removed. If the output remains on, sensitivity must be reduced.

In devices with teach-in function, sensitivity is adjusted automatically. During this process, the sensor is taught the two states "Object there" and "Object not there" by pressing the keys.

Reflex sensors and thru-beam sensors

In normal cases, the sensor is always operated with sensitivity at maximum. This produces the maximum surplus light. It is usually only necessary to reduce sensitivity for sensing very small or transparent objects. The procedure is the same as for diffuse sensors.

Cable length

Long cables between the devices result in:

- Additional capacitive loading (short-circuit protection)
- Increased injection of interference.

For this reason the specified maximum cable length must not be exceeded.

SIMATIC PXO photoelectric proximity switches

Introduction

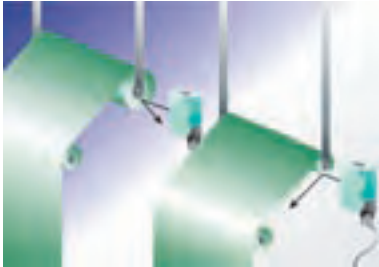
Function

Diffuse sensor (energetic sensor)



The light from the emitter falls on an object and is reflected in a diffuse pattern. Part of this reflected light reaches the receiver located in the same device. If the intensity of the received light is sufficient, the output is switched.

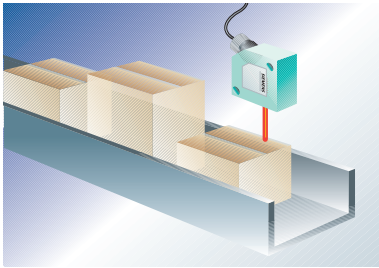
The sensing range depends on the size and color of the object involved as well as its surface texture. The sensing range can be varied within a wide range by means of the built-in potentiometer. The energetic sensor can therefore also be used to detect different colors.



Diffuse sensor with background suppression



Diffuse sensors with background suppression can detect objects up to a specific sensing range. All objects beyond this range are suppressed. The focus level can be adjusted. The background is suppressed due to the geometric constellation between the emitter and the receiver.

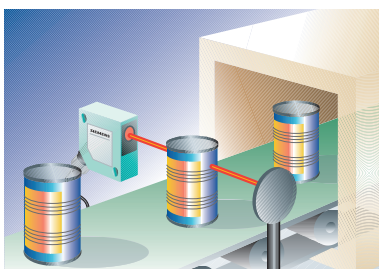


Reflex sensors



The light from the emitter diode is focused through a lens and directed via a polarization filter to a reflector (principle of a 3-way mirror). Part of the reflected light passes through another polarization filter and reaches the receiver. The filters are selected and aligned in such a way that only the light reflected from the reflector reaches the receiver and not the light reflected from other objects within the beam range.

An object that interrupts the light beam from the emitter through the reflector to the receiver causes the output to switch.

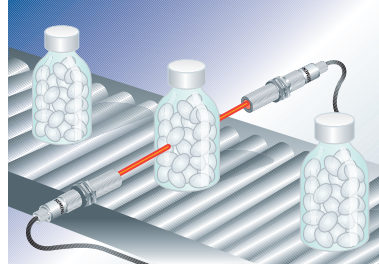


Thru-beam sensors



Thru-beam sensors comprise an emitter and a receiver. The emitter is aligned in such a way that the greatest possible amount of pulsed light from the emitter diode reaches the receiver. The receiver evaluates the incoming light to clearly separate it from the ambient light and other light sources.

Any interruption of the light beam between emitter and receiver causes the output to switch.

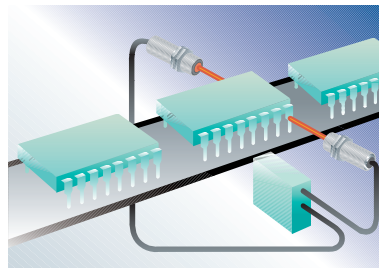


Devices for fiber-optic wires



Optical fibers are fitted in front of the emitter and receiver. They represent the "extended eye" of the photoelectric proximity switch.

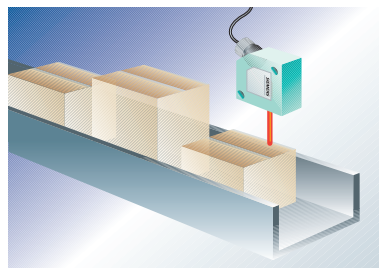
As optical fibers are very small and flexible, they provide a practical solution to the problem of sensing at points that are not easily accessible. Furthermore no electrical potential is transferred.



Laser diffuse sensor with analog output



The analog laser proximity switch can measure the exact distance of an object within its sensing range. Due to the use of visible laser light, the measurement is highly accurate and the output is extremely linear. All laser proximity switches belong to safety class 2, i.e. they are harmless and can be used without any risk to health (e.g. to the eyes).



Color sensors

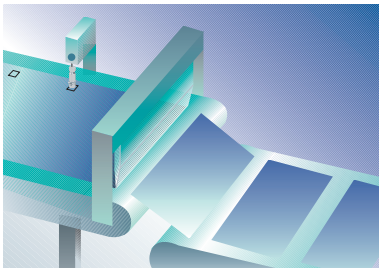
The color sensor functions with an incandescent LED, which illuminates the object.

During sensor adjustment, the light reflected from the object is measured and assigned to the appropriate output. The recognized color is stored in the device in a non-volatile memory, and is immediately available even when the sensor has been switched off and on again. Either three independent colors or one color scale can be saved and evaluated.

The measured color value (RGB) is not available.

Color mark sensor

The color mark sensor uses green or red emitted light. The color is selected automatically depending on the contrast. The mark color and the background color can be set separately by means of two keys.

**Technical specifications**

The table lists data which are independent of the design

Type		Solid-state output	Relay output (K80)	Devices with laser
Voltage drop at 200 mA	V	Max. 2.0	–	Max. 2.4
Operating capacity	mA	Max. 200	2000	Max. 200
Reverse current of outputs	mA	Max. 0.1	–	Max. 0.1
Power-up delay	ms	Max. 20	Max 300	Max. 300
Hysteresis (typical) for diffuse sensors		10%	10%	5%
Repeat accuracy for diffuse sensors		5% of operating distance		
Ambient light limit				
• Sunlight	Lux	10.000		
• Halogen light	Lux	3.000		
Precautions				
• Overload protection		•	–	•
• Overvoltage protection		•	–	•
• Short-circuit protection		•	Back-up fuse required	•
Permissible cable length	m	Max. 250	Max. 250	Max. 100

For further technical specifications, see respective type

SIMATIC PXO photoelectric proximity switches

Introduction

2

Design	D4		M5		M12			M18S			M18	L18
	Diffuse sensor	Thru-beam sensor	Diffuse sensor	Thru-beam sensor	Diffuse sensor	Reflex sensor with polarization filter	Thru-beam sensor	Diffuse sensor	Reflex sensor with polarization filter	Thru-beam sensor	Diffuse sensor with background suppression	Thru-beam sensor
PXO100												
• 5 cm	2/86		2/87									
• 25 cm		2/86		2/87								
• 30 cm					2/88							
• 150 cm						2/88						
• 400 cm							2/88					
PXO200												
• 1 ... 12 cm											2/93	
• 60 cm								2/91				
• 80 cm								2/91				
• 250 cm									2/91			
• 300 cm									2/91			
• 600 cm										2/91		
• 5000 cm												2/94

Design	K21/K21R		K20		L20		C20
	Diffuse sensor	Reflex sensor	Reflex sensor with background suppression	Reflex sensor	Reflex sensor with background suppression	Reflex sensor	Contrast sensor
PXO300							
• 2.5 ... 10 cm			2/99				
• 3 ... 11 cm					2/100		
• 4 ... 15 cm							2/101
• 50 cm	2/97						
• 5 ... 50 cm				2/99			
• 300 cm		2/97					
• 7.5 ... 300 cm						2/100	

Design	K31				K30				
	Diffuse sensor	Diffuse sensor with background suppression	Reflex sensor with polarization filter	Thru-beam sensor	For plastic fiber-optic wires	Diffuse sensor	Reflex sensor	Thru-beam sensor	For plastic fiber-optic wires
PXO400									
• 3 ... 15 cm		2/103							
• 60 cm	2/103								
• 120 cm						2/105			
• 200 cm			2/103						
• 400 cm							2/105		
• 600 cm				2/103					
• 1200 cm								2/105	
• Depending on fiber-optic wire					2/103				2/105

Design	C40				L50			L50HF	L50HF advanced	C50
	Diffuse sensor	Diffuse sensor with background suppression	Reflex sensor with polarization filter	Reflex sensor for transparent objects	Diffuse sensor with background suppression	Laser diffuse sensor with analog output	Laser reflex sensor	Laser diffuse sensor with analog output	Laser diffuse sensor with analog output	Color sensor
PXO500										
• 1.2 ... 3.2 cm										2/114
• 4.5 ... 8.5 cm						2/110				
• 3 ... 15 cm					2/110					
• 3 ... 10 cm								2/112		
• 5 ... 25 cm		2/108								
• 8 ... 30 cm									2/112	
• 70 cm	2/108									
• 100 cm				2/108						
• 600 cm			2/108							
• 2000 cm							2/110			

Design	K80				L80HF	L90L
	Diffuse sensor	Diffuse sensor with background suppression	Reflex sensor with polarization filter	Thru-beam sensor	Laser diffuse sensor with analog output	Diffuse sensor
PXO600						
• 25 ... 75 cm					2/119	
• 20 ... 100 cm		2/116				
• 20 ... 600 cm						2/120
• 20 ... 3000 cm						2/120
• 200 cm	2/116					
• 600 cm			2/116			
• 1200 cm			2/116			
• 5000 cm				2/116		

Design	GL	LV70
	Thru-beam sensor	For plastic fiber-optic wires
PXO800		
• 3 cm	2/123	
• 5 cm	2/123	
• 8 cm	2/123	
• 12 cm	2/123	
• Depending on fiber-optic wire		2/125

SIMATIC PXO photoelectric proximity switches

Introduction



Notes

2

SIMATIC PXO photoelectric proximity switches


SIMATIC PXO100

Overview

SIMATIC sensors PXO100

- D4,
- M5,
- M12.

Selection table

SIMATIC PXO100								
								
	D4		M5		M12			
Operating mode								
• Diffuse sensor	■		■		■			
• Reflex sensor						■		
• Thru-beam sensor		■		■				■
Sensing range								
• 5 cm ... 11 cm	■		■					
• 20 cm ... 30 cm		■		■	■			
• 1 m ... 1.5 m						■		
• 4 m ... 6 m								■
Output								
• pnp	■	■	■	■	■	■	■	■
• npn	■	■	■	■	■	■	■	■
Operating voltage								
• 24 V DC	■	■	■	■	■	■	■	■
Connection								
• M8 connector	■	■	■	■				
• M12 connector					■	■		■
• Cable	■	■	■	■	■	■	■	■
Special features								
• Metal enclosure	■	■	■	■	■	■	■	■
Illuminant								
• Red light					■	■		■
• Infrared light	■	■	■	■				
See page	2/86	2/86	2/87	2/87	2/88	2/88		2/88

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO100

D4 design

Overview



Diffuse sensor (energetic sensor)

- Sensing range 5 cm (not adjustable)


Thru-beam sensor

- Sensing range 25 cm (not adjustable)

Technical specifications

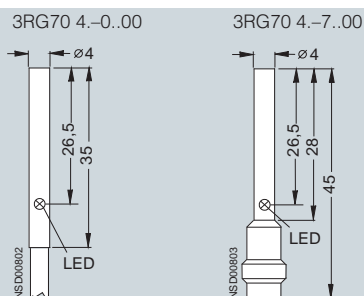
Operating mode		Diffuse sensor	Thru-beam sensor
			
Sensing range	cm	5 (not adjustable)	25 (not adjustable)
Standard target	mm	100 × 100 (white)	–
Operating voltage range (DC)	V	10 ... 30 (max. 20 % residual ripple)	
No-load current I_0 (typ.)	mA	10	5 / 5 (emitter / receiver)
Rated operational current I_e	mA	100	
Switching frequency	Hz	250	250
Switching time	ms	2.5	2.5
Wavelength (illuminant)	nm	880 (IR)	880 (IR)
Indicators		<ul style="list-style-type: none"> • Reliable detection: Yellow LED • Surplus light underrange: Yellow LED flashing 	
Enclosure material		Stainless steel	
Degree of protection		IP67	
Ambient temperature	°C	0 ... +55	
Temperature coefficient	%/K	0.3	
Type		3RG70 40-...00	3RG70 42-...00

Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
	Diffuse sensor	5	880 (IR)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	3RG70 40-0AB00
					npn, light-ON	1	3RG70 40-0GB00
	Thru-beam sensor	25	880 (IR)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	3RG70 42-0AB00
					npn, light-ON	1	3RG70 42-0GB00
				M 8 connector, 3-pole, Type A	Emitter	2	3RG70 42-0BG00
					pnp, light-ON	1	3RG70 42-7AB00
npn, light-ON	1	3RG70 42-7GB00					
Emitter	2	3RG70 42-7BG00					

1) see page 2/127.

Dimensions



Overview



Diffuse sensor (energetic sensor)

- Sensing range 5 cm (not adjustable)


Thru-beam sensor

- Sensing range 25 cm (not adjustable)

Technical specifications

Operating mode		 Diffuse sensor	 Thru-beam sensor
Sensing range	cm	5 (not adjustable)	25 (not adjustable)
Standard target	mm	100 × 100 (white)	–
Operating voltage range (DC)	V	10 ... 30 (max. 20 % residual ripple)	
No-load current I_0 (typ.)	mA	10	5 / 5 (emitter / receiver)
Rated operating current I_e	mA	100	
Switching frequency	Hz	250	250
Switching time	ms	2.5	2.5
Wavelength (illuminant)	nm	880 (IR)	880 (IR)
Indicators			
• Reliable detection		Yellow LED	
• Surplus light underrange		Yellow LED flashing	
Enclosure material		Brass, nickel-plated	
Degree of protection		IP67	
Ambient temperature	°C	0 ... +55	
Temperature coefficient	%/K	0.3	
Type		3RG70 30–...00	3RG70 32–...00

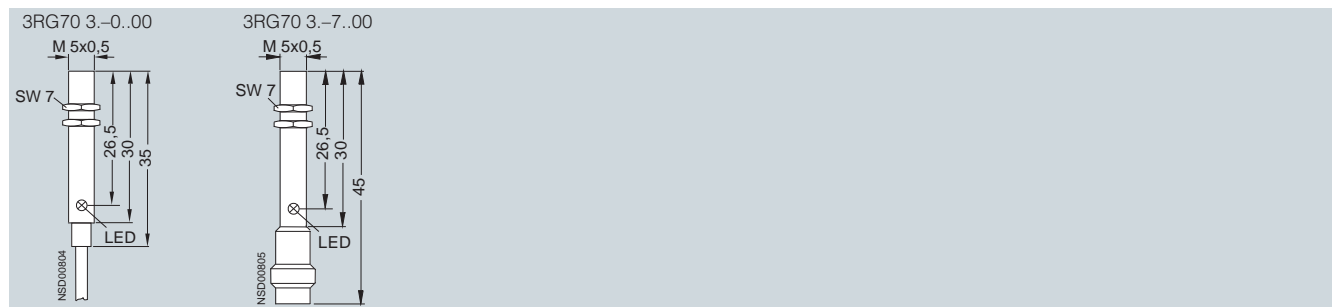
Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
	Diffuse sensor	5	880 (IR)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON npn, light-ON	1 1	3RG70 30–0AB00 3RG70 30–0GB00
				M8 connector, 3-pole, type A	pnp, light-ON npn, light-ON	1 1	3RG70 30–7AB00 3RG70 30–7GB00
	Thru-beam sensor	25	880 (IR)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON npn, light-ON Emitter	1 1 2	3RG70 32–0AB00 3RG70 32–0GB00 3RG70 32–0BG00
					M 8 connector, 3-pole, type A	pnp, light-ON npn, light-ON Emitter	1 1 2

1) see page 2/127.

▶ Preferred type, available from stock.

Dimensions



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO100

M12 design

Overview

Diffuse sensor (energetic sensor)

- Sensing range 30 cm (adjustable via potentiometer)




Reflex sensor

- Sensing range 1.5 m
- Supplied without reflector

Thru-beam sensor

- Sensing range 4 m
- Enabling input for test purposes

Technical specifications

Operating mode		Diffuse sensor	Reflex sensor with polarization filter	Thru-beam sensor
				
Sensing range	cm	30 (adjustable)	150	400
Standard target	mm	200 × 200 (white)	Reflector type D84	–
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)		
No-load current I_0 (typ.)	mA	15	15	15 / 15 (emitter / receiver)
Rated operating current I_e	mA	200		
Switching frequency	Hz	1000	1000	1000
Switching time	ms	0.5	0.5	0.5
Wavelength (illuminant)	nm	660 (red)	660 (red, polarized)	660 (red)
Indicators				
• Switching status		Yellow LED		
• Surplus light		Green LED		
Enclosure material		Brass, nickel-plated		
Degree of protection		IP67		
Ambient temperature	°C	–25 ... +55		
Temperature coefficient	%/K	0.3		
Type		3RG71 20–...00	3RG71 21–...00	3RG71 22–...00

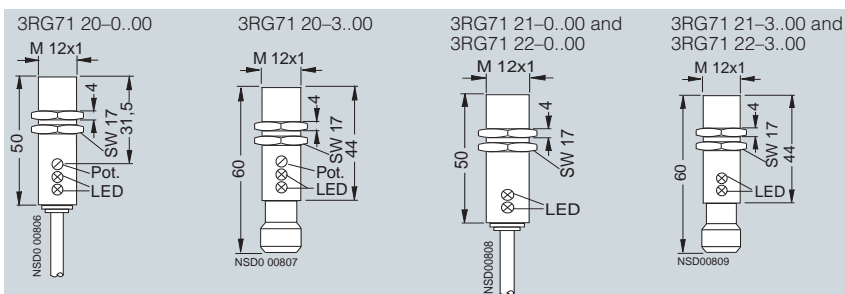
Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.		
	Diffuse sensor	30 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 x 0.34 mm ²	pnp, light-ON	12	▶ 3RG71 20-0AB00 ▶ 3RG71 20-0AA00 ▶ 3RG71 20-0GB00 ▶ 3RG71 20-0GA00		
					pnp, dark-ON	13			
					npn, light-ON	12			
					npn, dark-ON	13			
					M12 connector, 4-pole, type F	pnp, light-ON		12	▶ 3RG71 20-3AB00 ▶ 3RG71 20-3AA00 ▶ 3RG71 20-3GB00 ▶ 3RG71 20-3GA00
						pnp, dark-ON		13	
	Reflex sensor	150	660 (red, polarized)	2 m cable, PUR, 3 x 0.34 mm ²	pnp, light-ON	13	▶ 3RG71 21-0AB00 ▶ 3RG71 21-0AA00 ▶ 3RG71 21-0GB00 ▶ 3RG71 21-0GA00		
					pnp, dark-ON	12			
					npn, light-ON	13			
					npn, dark-ON	12			
					M12 connector, 4-pole, type F	pnp, light-ON		13	▶ 3RG71 21-3AB00 ▶ 3RG71 21-3AA00 ▶ 3RG71 21-3GB00 ▶ 3RG71 21-3GA00
						pnp, dark-ON		12	
Thru-beam sensor	400	660 (red)	2 m cable, PUR, 3 x 0.34 mm ²	pnp, light-ON	13	▶ 3RG71 22-0AB00 ▶ 3RG71 22-0AA00 ▶ 3RG71 22-0GB00 ▶ 3RG71 22-0GA00 ▶ 3RG71 22-0BG00			
				pnp, dark-ON	12				
				npn, light-ON	13				
				npn, dark-ON	12				
				Emitter	7				
				M12 connector, 4-pole, type F	pnp, light-ON		13	▶ 3RG71 22-3AB00 ▶ 3RG71 22-3AA00 ▶ 3RG71 22-3GB00 ▶ 3RG71 22-3GA00 ▶ 3RG71 22-3BG00	
pnp, dark-ON	12								
npn, light-ON	13								
npn, dark-ON	12								
				Emitter	7				

1) see page 2/127.

▶ Preferred type, available from stock.

Dimensions



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO200

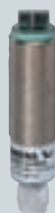
Overview

SIMATIC sensors PXO200

- M18S,
- M18,
- L18.

Selection table

SIMATIC PXO200



	M18S			M18	L18
Operating mode					
• Diffuse sensor	■				
• Diffuse sensor with background suppression				■	
• Reflex sensor		■			
• Thru-beam sensor			■		■
Sensing range					
• 12 cm ... 15 cm				■	
• 60 cm ... 80 cm	■				
• 1 m ... 1.5 m	■				
• 2 m ... 3 m		■			
• 4 m ... 6 m			■		
• 20 m ... 50 m					■
Output					
• pnp	■	■	■	■	■
• npn				■	
Operating voltage					
• 24 V DC	■	■	■	■	■
Connection					
• M12 connector	■	■	■	■	■
• Cable	■	■	■	■	■
Special features					
• Surplus light emission	■	■	■		
• Metal enclosure	■	■	■	■	■
Illuminant					
• Red light	■	■	■	■	
• Laser light, red					■
See page	2/91	2/91	2/91	2/93	2/94

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

Overview

Diffuse sensor (energetic sensor)

- Sensing range 60 or 80 cm (adjustable using a potentiometer)




Reflex sensors

- Sensing range 2.5 m (with angle head) or 3.0 m
- Supplied without reflector


Thru-beam sensor

- Scanning angle 6 m

Technical specifications

Operating mode		Diffuse sensor		Reflex sensor with polarization filter		Thru-beam sensor
						
Sensing range	cm	80 (adjustable)	60 (adjustable)	250 (for 3RG76 51) 300 (for 3RG76 41)		600
Standard target	mm	200 × 200 (white)		Reflector type D84		–
Operating voltage range (DC)	V	10 ... 30 (max. 20 % residual ripple)				
Rated operating current I_e	mA	150				
Switching frequency	Hz	700				
Switching time	ms	0.5				
Wavelength (illuminant)	nm	660 (red)		660 (red, polarized)		660 (red)
Displays		<ul style="list-style-type: none"> • Switching status: Yellow LED • Surplus light: Green LED 				
Enclosure material		Brass, nickel-plated				
Degree of protection		IP67				
Ambient temperature	°C	–25 ... +55				
Temperature coefficient	%/K	0.3				
Type		3RG76 40–...00	3RG76 50–...00	3RG76 41–...00, 3RG76 51–...00		3RG76 42–...00, 3RG76 52–...00

Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.	
	Diffuse sensor	80 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 × 0.34 mm ² , 4 × 0.34 mm ²	pnp, light-ON	12	▶ B 3RG76 40-0AB00	
					pnp, dark-ON	12	▶ B 3RG76 40-0AA00	
					pnp, light-ON and dark-ON	5	▶ B 3RG76 40-0CC00	
					pnp, light-ON and surplus light function	6	B 3RG76 40-0CD00	
					M12 connector, 4-pole, type F	pnp, light-ON	12	▶ B 3RG76 40-3AB00
						pnp, dark-ON	13	▶ B 3RG76 40-3AA00
	Reflex sensor	300	660 (red, polarized)	2 m cable, PUR, 3 × 0.34 mm ² , 4 × 0.34 mm ²	pnp, light-ON	12	▶ B 3RG76 41-0AB00	
					pnp, dark-ON	12	▶ B 3RG76 41-0AA00	
					pnp, light-ON and dark-ON	5	▶ B 3RG76 41-0CC00	
					pnp, light-ON and surplus light function	6	B 3RG76 41-0CD00	
M12 connector, 4-pole, type F	pnp, light-ON	12	▶ B 3RG76 41-3AB00					
	pnp, dark-ON	13	▶ B 3RG76 41-3AA00					
	pnp, light-ON and dark-ON	5	▶ B 3RG76 41-3CC00					
	pnp, light-ON and surplus light function	6	B 3RG76 41-3CD00					

1) see page 2/127.

B: Subject to export regulations AL = N and ECCN = EAR99.

▶ Preferred type, available from stock.

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO200

M18S design

2

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.	
Straight sensor								
	Thru-beam sensor	600	660 (red)	2 m cable, PUR, 3 × 0.34 mm ² 4 × 0.34 mm ²	pnp, light-ON	12	▶ B	3RG76 42-0AB00
					pnp, dark-ON	12	▶ B	3RG76 42-0AA00
					pnp, light-ON and dark-ON	5	▶ B	3RG76 42-0CC00
					pnp, light-ON and surplus light function	6	B	3RG76 42-0CD00
					Emitter	9	▶ B	3RG76 42-0BG00
	M12 connector, 4-pole, type F	pnp, light-ON	12	▶ B	3RG76 42-3AB00			
		pnp, dark-ON	13	▶ B	3RG76 42-3AA00			
		pnp, light-ON and dark-ON	5	▶ B	3RG76 42-3CC00			
		pnp, light-ON and surplus light function	6	B	3RG76 42-3CD00			
		Emitter	9	▶ B	3RG76 42-3BG00			
Angled sensor								
	Diffuse sensor	60 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 × 0.34 mm ² 4 × 0.34 mm ²	pnp, light-ON	12	▶ B	3RG76 50-0AB00
					pnp, dark-ON	12	▶ B	3RG76 50-0AA00
					pnp, light-ON and dark-ON	5	▶ B	3RG76 50-0CC00
					pnp, light-ON and surplus light function	6	B	3RG76 50-0CD00
					M12 connector, 4-pole, type F	pnp, light-ON	12	▶ B
	pnp, dark-ON	13	▶ B	3RG76 50-3AA00				
	pnp, light-ON and dark-ON	5	▶ B	3RG76 50-3CC00				
	pnp, light-ON and surplus light function	6	B	3RG76 50-3CD00				
	Reflex sensor	250	660 (red, polarized)	2 m cable, PUR, 3 × 0.34 mm ² 4 × 0.34 mm ²	pnp, light-ON	12	▶ B	3RG76 51-0AB00
					pnp, dark-ON	12	▶ B	3RG76 51-0AA00
pnp, light-ON and dark-ON					5	▶ B	3RG76 51-0CC00	
pnp, light-ON and surplus light function					6	B	3RG76 51-0CD00	
M12 connector, 4-pole, type F					pnp, light-ON	12	▶ B	3RG76 51-3AB00
pnp, dark-ON	13	▶ B	3RG76 51-3AA00					
pnp, light-ON and dark-ON	5	▶ B	3RG76 51-3CC00					
pnp, light-ON and surplus light function	6	B	3RG76 51-3CD00					
Thru-beam sensor	600	660 (red)	2 m cable, PUR, 3 × 0.34 mm ² 4 × 0.34 mm ²	pnp, light-ON	12	▶ B	3RG76 52-0AB00	
				pnp, dark-ON	12	▶ B	3RG76 52-0AA00	
				pnp, light-ON and dark-ON	5	▶ B	3RG76 52-0CC00	
				pnp, light-ON and surplus light function	6	B	3RG76 52-0CD00	
				Emitter	9	▶ B	3RG76 52-0BG00	
	M12 connector, 4-pole, type F	pnp, light-ON	12	▶ B	3RG76 52-3AB00			
		pnp, dark-ON	13	▶ B	3RG76 52-3AA00			
		pnp, light-ON and dark-ON	5	▶ B	3RG76 52-3CC00			
		pnp, light-ON and surplus light function	6	▶ B	3RG76 52-3CD00			
		Emitter	9	▶ B	3RG76 52-3BG00			

1) see page 2/127.

▶ Preferred type, available from stock.


B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions refer to M18.


Overview

- Diffuse sensor with background suppression
- Sensing range 1 to 12 cm (adjustable via potentiometer)

Technical specifications

Operating mode		Diffuse sensor with background suppression	
			
Sensing range	cm	1 ... 12 (adjustable)	
Standard target	mm	50 × 50 (white)	
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)	
No-load current I_0 (typ.)	mA	25	
Rated operational current I_e	mA	200	
Switching frequency	Hz	500	
Switching time	ms	1	
Wavelength (illuminant)	nm	660 (red)	
Indicators		<ul style="list-style-type: none"> Switching status: Yellow LED Surplus light: Green LED 	
Enclosure material		Brass, nickel-plated	
Degree of protection		IP67	
Ambient temperature	°C	-25 ... +55	
Temperature coefficient	%/K	0.3	
Type		3RG71 34-...00	

Selection and Ordering data

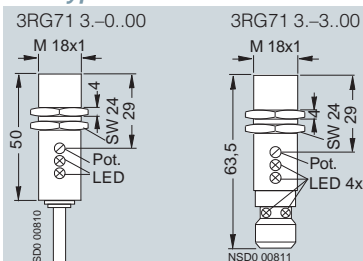
	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.		
	Diffuse sensor with background suppression	1 ... 12 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 × 0.34 mm ²	pnp, light-ON	12	▶ 3RG71 34-0AB00		
					pnp, dark-ON	13		▶ 3RG71 34-0AA00	
					npn, light-ON	12			▶ 3RG71 34-0GB00
					npn, dark-ON	13			
				M12 connector, 4-pole, type F	pnp, light-ON	12	▶ 3RG71 34-3AB00		
					pnp, dark-ON	13		▶ 3RG71 34-3AA00	
					npn, light-ON	12			▶ 3RG71 34-3GB00
					npn, dark-ON	13			

¹⁾ see page 2/127.

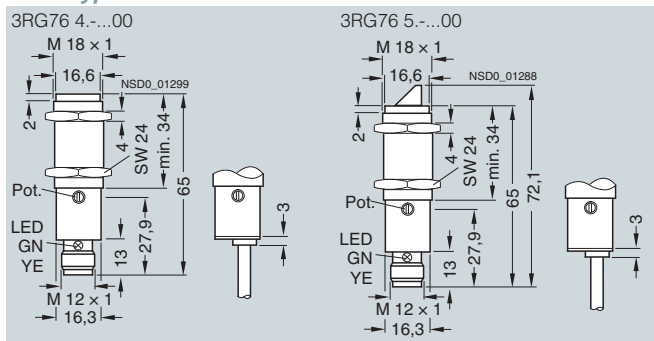
▶ Preferred type, available from stock.

Dimensions

M18 type



M18S type



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO200

L18 design

Overview



Visible laser light (red), laser protection class 2 according to EN 60947-5-2

Thru-beam sensor




- Sensing range 50 m (adjustable using potentiometer)

Supplied without mounting material

Technical specifications

Operating mode		Laser thru-beam sensor	
			
Sensing range	m	50 (adjustable)	
Operating voltage range (DC)	V	10 ... 30	
No-load current I_0 , max.	mA	15 (receiver), 10 (emitter)	
Rated operational current I_e	mA	200	
Switching frequency	Hz	6000	
Switching time	ms	< 0,083	
Wavelength (illuminant)	nm	660 (red laser light)	
Indicators		<ul style="list-style-type: none"> • Switching status: Yellow LED • Surplus light: Red LED • Operating voltage: Green LED 	
Enclosure material		Brass, nickel-plated	
Degree of protection		IP65	
Ambient temperature	°C	-10 ... +60	
Temperature coefficient	%/K	0.1	
Type		3RG71 35-...00, 3RG71 75-...00	

Selection and Ordering data

	Operating mode	Sensing range m	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
Straight sensor							
	Laser thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 x 0.25 mm ²	pnp, light-ON and dark-ON (antivalent) Emitter	5	▶ 3RG71 35-0CC00
					pnp, light-ON and dark-ON (antivalent) Emitter	9	
				M12 connector, 4-pole, type F	pnp, light-ON and dark-ON (antivalent) Emitter	5	▶ 3RG71 35-3CC00
					pnp, light-ON and dark-ON (antivalent) Emitter	9	
Straight sensor							
	Laser thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 x 0.25 mm ²	pnp, light-ON and surplus light function	6	▶ 3RG71 35-0CD00
				M12 connector, 4-pole, type F	pnp, light-ON and surplus light function	6	
Angled sensor							
	Laser thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 x 0.25 mm ²	pnp, light-ON and dark-ON (antivalent) Emitter	5	▶ 3RG71 75-0CC00
					pnp, light-ON and dark-ON (antivalent) Emitter	9	
				M12 connector, 4-pole, type F	pnp, light-ON and dark-ON (antivalent) Emitter	5	▶ 3RG71 75-3CC00
					pnp, light-ON and dark-ON (antivalent) Emitter	9	


1) see page 2/127.

▶ Preferred type, available from stock.

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO200

L18 design

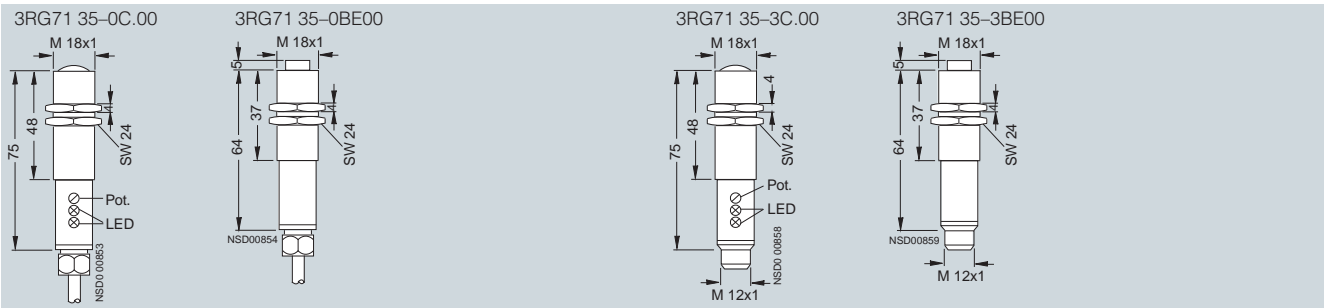
Operating mode	Sensing range m	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
 Laser-Thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 x 0.25 mm ²	pnp, light-ON and surplus light function	6	3RG71 75-0CD00
			M12 connector, 4-pole, type F	pnp, light-ON and surplus light function	6	3RG71 75-3CD00

1) see page 2/127.

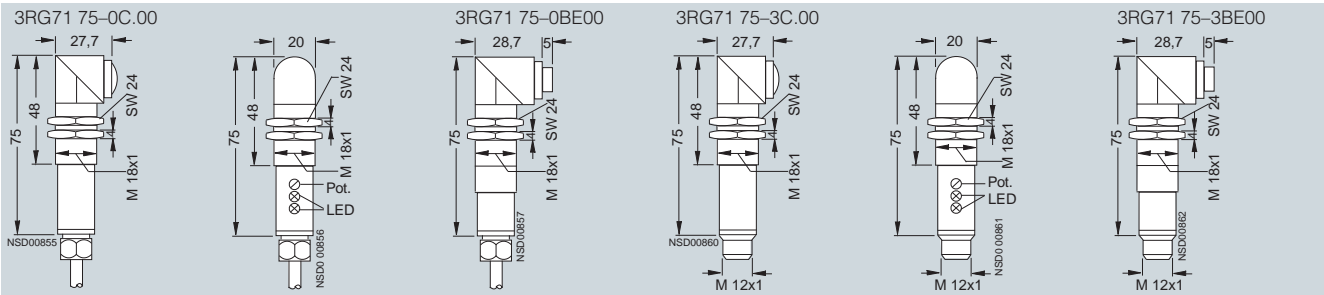
2

Dimensions

Straight sensor



Angled sensor



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO300

Overview

SIMATIC sensors PXO300

- K21,
- K21R,
- K20,
- L20,
- C20.

Selection table

SIMATIC PXO300									
	K21		K21R		K20		L20		C20
Operating mode									
• Diffuse sensor	■		■						
• Diffuse sensor with background suppression					■		■		
• Reflex sensor		■		■		■		■	
• Contrast sensor									■
Sensing range									
• 5 cm ... 11 cm					■		■		
• 12 cm ... 15 cm									■
• 40 cm ... 50 cm	■		■			■			
• 2 m ... 3 m		■		■				■	
Output									
• pnp	■	■	■	■	■	■	■	■	■
• npn	■	■	■	■	■	■			
Operating voltage									
• 24 V DC	■	■	■	■	■	■	■	■	■
Connection									
• M8 connector	■	■	■	■	■	■	■	■	■
• Cable	■	■	■	■	■	■			
Special features									
• Transparent objects						■			
Illuminant									
• Red light	■	■	■	■	■	■			
• Laser light, red							■	■	■
See page	2/97	2/97	2/98	2/98	2/99	2/99	2/100	2/100	2/101

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

Overview

Cubicle molded plastic enclosure, IP68

Diffuse sensor (energetic sensor)



- Sensing range 50 cm

Retroreflective sensor


- Sensing range 3 m

Supplied without mounting accessories and without reflector

Technical specifications

Operating mode	Diffuse sensor		Reflex sensor	
				
Sensing range	cm	50	300	
Standard target	mm	100 × 100 (white 90%)	Reflector type R 60	
Operating voltage range (DC)	V	10 ... 30		
No-load current I_0 (typ.)	mA	28	33	25
Rated operating current I_e	mA	150		
Switching frequency	Hz	700		
Switching time	ms	0.5		
Wavelength (illuminant)	nm	660 (red)		
Indicators		<ul style="list-style-type: none"> • Switching status: Yellow LED • Operating voltage: Red LED 		
Enclosure material		ABS/PMMA		
Degree of protection		IP68		
Ambient temperature	°C	-5 ... +55		
Temperature coefficient	%/K	0.3		
Type		3RG74 00-...00	3RG74 20-...00	3RG74 01-...00
				3RG74 21-...00

Selection and Ordering data

	Operating mode	Sensing range cm	Illumi- nant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.	
	Diffuse sensor	50	660 (red)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	B	3RG74 00-0AB00
					pnp, dark-ON	1	B	3RG74 00-0AA00
					nnp, light-ON	1	B	3RG74 00-0GB00
					nnp, dark-ON	1	B	3RG74 00-0GA00
				M8 connector, 3-pole, type A	pnp, light-ON	1	▶ B	3RG74 00-7AB00
					pnp, dark-ON	1	B	3RG74 00-7AA00
	Retroreflective sensor	300	660 (red)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	B	3RG74 01-0AB00
					pnp, dark-ON	1	B	3RG74 01-0AA00
					nnp, light-ON	1	B	3RG74 01-0GB00
					nnp, dark-ON	1	B	3RG74 01-0GA00
				M8 connector, 3-pole, type A	pnp, light-ON	1	▶ B	3RG74 01-7AB00
					pnp, dark-ON	1	▶ B	3RG74 01-7AA00
			nnp, light-ON	1	B	3RG74 01-7GB00		
			nnp, dark-ON	1	B	3RG74 01-7GA00		

1) see page 2/127.

B: Subject to export regulations AL = N and ECCN = EAR99.


▶ Preferred type, available from stock.

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO300

K21, K21R designs

2

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.	
K21R design								
	Diffuse sensor	50	660 (red)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	B	3RG74 20-0AB00
					pnp, dark-ON	1	B	3RG74 20-0AA00
					npn, light-ON	1	B	3RG74 20-0GB00
					npn, dark-ON	1	B	3RG74 20-0GA00
					M8 connector, 3-pole, type A	pnp, light-ON	1	B
		pnp, dark-ON	1	▶ B	3RG74 20-7AA00			
		npn, light-ON	1	B	3RG74 20-7GB00			
		npn, dark-ON	1	B	3RG74 20-7GA00			
	Reflex sensor	300	660 (red)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	B	3RG74 21-0AB00
					pnp, dark-ON	1	B	3RG74 21-0AA00
npn, light-ON					1	B	3RG74 21-0GB00	
npn, dark-ON					1	B	3RG74 21-0GA00	
M8 connector, 3-pole, type A					pnp, light-ON	1	B	3RG74 21-7AB00
	pnp, dark-ON	1	▶ B	3RG74 21-7AA00				
	npn, light-ON	1	B	3RG74 21-7GB00				
	npn, dark-ON	1	B	3RG74 21-7GA00				

Accessories

Mounting brackets for K21, K21R

▶ **3RX7 308-0AA00**

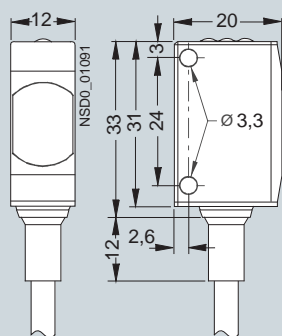
1) see page 2/127.

B: Subject to export regulations AL = N and ECCN = EAR99.

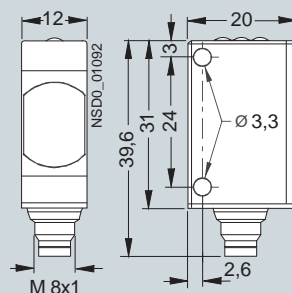
▶ Preferred type, available from stock.

Dimensions

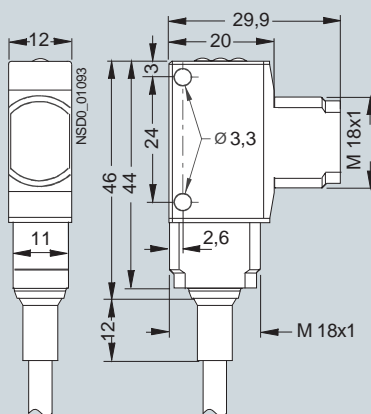
3RG74 0-0-0....



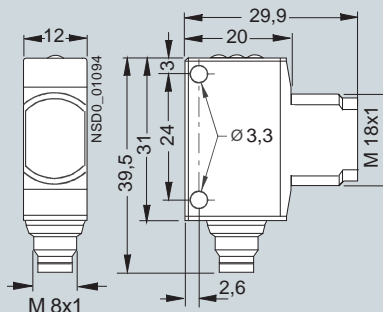
3RG74 0-7-7....



3RG74 2-0-0....



3RG74 2-7-7....



Overview

Diffuse sensor with background suppression

- Sensing range 2.5 to 10 cm (adjustable using teach-in)



Retro-reflective sensors for transparent objects (adjustable with teach-in)

- Sensing range 50 cm


Anti-interference function

Supplied without mounting material and without reflector

Technical specifications

Operating mode		 Diffuse sensor with background suppression	 Reflex sensor for transparent objects
Sensing range	cm	2.5 ... 10 (adjustable)	5 ... 50 (adjustable)
Standard target	mm	100 × 100 (gray 18%)	Reflector type R 60
Operating voltage range (DC)	V	10 ... 30	
No-load current I_0 (typ.)	mA	25	
Rated operating current I_e	mA	100	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (illuminant)	nm	660 (red)	
Indicators			
• Switching status		Yellow LED	
• Surplus light		Green LED	
Enclosure material		Molded plastic (ABS)	
Degree of protection		IP67	
Ambient temperature	°C	-20 ... +60	
Temperature coefficient	%/K	0.3	
Type		3RG74 04-...00	3RG74 01-...52

Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
	Diffuse sensor with background suppression	2.5 ... 10 (adjustable via "teach-in")	660 (red)	2 m cable, PUR, 4 × 0.14 mm ²	Light-ON or dark-ON	pnp 14 npn 14	▶ 3RG74 04-0CH00 3RG74 04-0HH00
				M8 connector, 4-pole, type B	Light-ON or dark-ON	pnp 14 npn 14	▶ 3RG74 04-7CH00 3RG74 04-7HH00
	Reflex sensor for transparent objects	5 ... 50 (adjustable via "teach-in")	660 (red)	2 m cable, PUR, 4 × 0.14 mm ²	Light-ON or dark-ON	pnp 14 npn 14	▶ 3RG74 01-0CH52 3RG74 01-0HH52
				M8 connector, 4-pole, type B	Light-ON or dark-ON	pnp 14 npn 14	▶ 3RG74 01-7CH52 3RG74 01-7HH52

Accessories

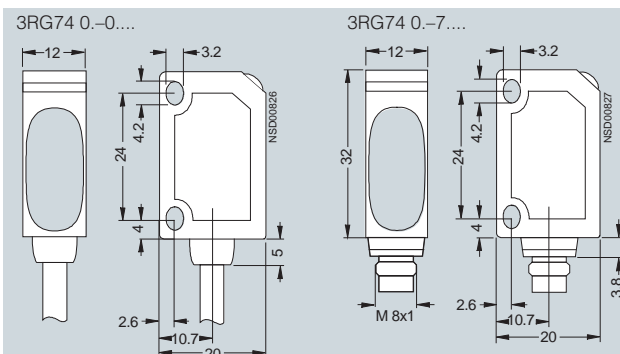
Mounting brackets for K20

▶ **3RX7 308-0AA00**

1) see page 2/127.

▶ Preferred type, available from stock.

Dimensions



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO300

L20 design

Overview

Visible laser light (red),
laser protection class 1 or 2 according to EN 60947-5-2

Diffuse sensor with background suppression

- Sensing range 3 to 11 cm


Retroflective sensor

- Sensing range 7.5 to 300 cm

Technical specifications

	Operating mode	Laser diffuse sensor with background suppression		Reflex sensor
Sensing range	cm	3 ... 11 (adjustable)		7.5 ... 300 (adjustable)
Standard target/reflector	mm	Gray 18%		Reflector type RL 50
Light spot diameter	mm	0.7 mm at 100 mm distance		1 mm at 300 mm distance
Operating voltage range (DC)	V	10 ... 30		
No-load current I_0 , max.	mA	≤ 30		≤ 25
Rated operating current I_e	mA	100		
Switching frequency	kHz	1		4
Wavelength (illuminant)	nm	650 (red laser light, class 2)		650 (red laser light, class 1)
Displays		Yellow LED		
• Switching status		Green LED		
• Surplus light				
Enclosure material		Molded plastic (ABS)		
Degree of protection		IP67		
Ambient temperature	°C	-20 ... +60		
Type		3RG74 06-7CH61		3RG74 07-7CH00

Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
	Diffuse sensor with background suppression	3 ... 11 (adjustable via "teach-in")	650 (laser red)	M 8 connector, 4-pole, type B	Light-ON or dark-ON	pnp 14	3RG74 06-7CH61
	Retroflective sensor	7,5 ... 300 (adjustable via "teach-in")	650 (laser red)	M 8 connector, 4-pole, type B	Light-ON or dark-ON	pnp 14	3RG74 07-7CH00

Accessories

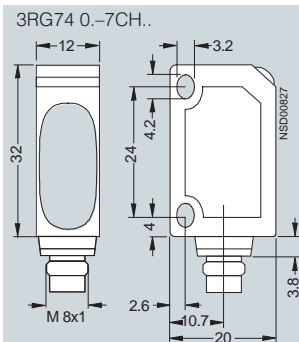
Mounting brackets for L20

3RX7 308-0AA00

1) see page 2/127.

▶ Preferred type, available from stock.



Dimensions




Overview

- Visible laser light (red)
 Laser protection class 2 according to EN 60947-5-2
 Contrast sensor for color mark sensing
- Sensing range 4 to 15 cm

Technical specifications

Operating mode	Contrast sensor	
		
Sensing range	cm	4 ... 15 (adjustable via teach-in)
Light spot diameter	mm	0.7 in focus
Operating voltage range (DC)	V	10 ... 30
No-load current I_0 , max.	mA	≤ 25
Output current I_A	mA	100
Switching frequency	Hz	4000
Wavelength (illuminant)	nm	650 (red)
Indicators		
• Switching state output		Yellow LED
• Surplus light		Green LED
Enclosure material		Molded plastic (ABS)
Degree of protection		IP67
Ambient temperature	°C	-20 ... +60
Type		3RG74 08-7CH00

Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
	Contrast sensor	4 ... 15 (adjustable via "teach-in")	650 (red)	M8 connector, 4-pole, type B	pnp	14	3RG74 08-7CH00

Accessories

Mounting brackets for C20

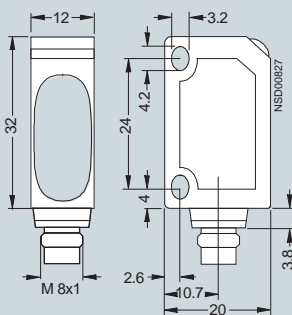
3RX7 308-0AA00

1) see page 2/127.

▶ Preferred type, available from stock.

Dimensions

3RG74 08-7CH00



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO400

Overview

SIMATIC sensors PXO400

- K31,
- K30.

Selection table

SIMATIC PXO400



	K31					K30				
Operating mode										
• Diffuse sensor	■					■				
• Diffuse sensor with background suppression		■								
• Reflex sensor			■				■			
• Thru-beam sensor				■				■		
• For plastic fiber-optic wires					■					■
Sensing range										
• Depending on fiber-optic wire					■					■
• 12 cm ... 15 cm		■								
• 60 cm ... 70 cm	■									
• 1 m ... 1.5 m						■				
• 2 m ... 3 m			■							
• 4 m ... 6 m				■			■			
• 12 m ... 15 m								■		
Output										
• pnp	■	■	■	■	■	■	■	■	■	■
• npn	■	■	■	■	■	■	■	■	■	■
Operating voltage										
• 24 V DC	■	■	■	■	■	■	■	■	■	■
Connection										
• M8 connector	■	■	■	■	■	■	■	■	■	■
• Cable	■	■	■	■	■	■	■	■	■	■
Illuminant										
• Red light		■	■		■		■			■
• Infrared light	■			■		■		■		
See page	2/103					2/105				

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

Overview

Diffuse sensor; energetic sensor

- Sensing range 60 cm (adjustable via potentiometer)

Diffuse sensor with background suppression

- Sensing range 3 to 15 cm (adjustable via potentiometer)

Reflex sensor

- Sensing range 2 m (adjustable via potentiometer)
- Supplied without reflector

Thru-beam sensor




- Sensing range 6 m (adjustable via potentiometer)



Sensor for plastic fiber-optic wires

- Sensing range depends on type of optical fiber

Supplied without mounting material

Technical specifications

Operating mode		Diffuse sensor	Diffuse sensor with background suppression	Reflex sensor with polarization filter
				
Sensing range	cm	60 (adjustable)	3 ... 15 (adjustable)	200 (adjustable)
Standard target	mm	200 × 200 (white)	100 × 100 (white)	Reflector type D 84
Operating voltage range (DC)	V	10 ... 30 (max. 20 % residual ripple)		
No-load current I_0 , max.	mA	15	25	15
Rated operating current I_e	mA	200		
Switching frequency	Hz	1000	500	1000
Switching time	ms	0.5	1	0.5
Wavelength (illuminant)	nm	880 (IR)	660 (red)	660 (red, polarized)
Displays				
• Switching status		Yellow LED		
• Surplus light		Green LED		
Enclosure material		Molded plastic (PBTP, Crastin)		
Degree of protection		IP65		
Ambient temperature	°C	-25 ... +55		
Temperature coefficient	%/K	0.3		
Type		3RG70 10-...	3RG70 14-...	3RG70 11-...



Operating mode		Thru-beam sensor	Sensor for plastic optical fibers
			
Sensing range	cm	600 (adjustable)	Depending on type of optical fiber
Standard target	mm	–	100 × 100 (white)
Operating voltage range (DC)	V	10 ... 30 (max. 20 % residual ripple)	
No-load current I_0 , max.	mA	15	
Rated operating current I_e	mA	200	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (illuminant)	nm	880 (IR)	660 (red)
Displays			
• Switching status		Yellow LED	
• Surplus light		Green LED	
Enclosure material		Molded plastic (PBTP, Crastin)	
Degree of protection		IP65	
Ambient temperature	°C	-25 ... +55	
Temperature coefficient	%/K	0.3	
Type		3RG70 12-...	3RG70 13-...

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO400

K31 design

Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.	
	Diffuse sensor	60 (adjustable via potentiometer)	880 (IR)	2 m cable, PUJ, 3 × 0.14 mm ²	pnp, light-ON	1	▶ B 3RG70 10-0AB01 3RG70 10-0AA01 3RG70 10-0GB00 3RG70 10-0GA00	
					pnp, dark-ON	1		
				M8 connector, 3-pole, type A	pnp, light-ON	1	▶ B 3RG70 10-7AB01 3RG70 10-7AA01 3RG70 10-7GB00 3RG70 10-7GA00	
					pnp, dark-ON	1		
					npn, light-ON	1		
					npn, dark-ON	1		
	Diffuse sensor with background suppression	3 ... 15 (adjustable via potentiometer)	660 (red)	2 m cable, PUJ, 3 × 0.14 mm ²	pnp, light-ON	1	▶ 3RG70 14-0AB00 3RG70 14-0AA00 3RG70 14-0GB00 3RG70 14-0GA00	
					pnp, dark-ON	1		
				M8 connector, 3-pole, type A	pnp, light-ON	1	▶ 3RG70 14-7AB00 3RG70 14-7AA00 3RG70 14-7GB00 3RG70 14-7GA00	
					pnp, dark-ON	1		
					npn, light-ON	1		
					npn, dark-ON	1		
	Reflex sensor	200 (adjustable via potentiometer)	660 (red, polarized)	2 m cable, PUJ, 3 × 0.14 mm ²	pnp, light-ON	1	▶ B 3RG70 11-0AB01 3RG70 11-0AA01 3RG70 11-0GB00 3RG70 11-0GA00	
					pnp, dark-ON	1		
				M8 connector, 3-pole, type A	pnp, light-ON	1	B 3RG70 11-7AB01 3RG70 11-7AA01 3RG70 11-7GB00 3RG70 11-7GA00	
					pnp, dark-ON	1		
					npn, light-ON	1		
					npn, dark-ON	1		
	Thru-beam sensor	600 (adjustable via potentiometer)	880 (IR)	2 m cable, PUJ, 3 × 0.14 mm ²	pnp, light-ON	1	▶ B 3RG70 12-0AB01 3RG70 12-0AA01 3RG70 12-0GB00 3RG70 12-0GA00	
					pnp, dark-ON	1		
					npn, light-ON	1	▶ B 3RG70 12-0GB00 3RG70 12-0GA00 3RG70 12-0BG01	
					npn, dark-ON	1		
					Emitter	2		
					M8 connector, 3-pole, type A	pnp, light-ON	1	▶ B 3RG70 12-7AB01 3RG70 12-7AA01 3RG70 12-7GB00 3RG70 12-7GA00 3RG70 12-7BG01
					pnp, dark-ON	1		
					npn, light-ON	1		
					npn, dark-ON	1		
					Emitter	2		
					Emitter	2		
	Sensor for plastic optical fibers	Depends on FO wire	660 (red)	2 m cable, PUJ, 3 × 0.14 mm ²	pnp, light-ON	1	▶ 3RG70 13-0AB00 3RG70 13-0AA00 3RG70 13-0GB00 3RG70 13-0GA00	
					pnp, dark-ON	1		
					npn, light-ON	1	▶ 3RG70 13-0GB00 3RG70 13-0GA00 3RG70 13-7AB00 3RG70 13-7AA00 3RG70 13-7GB00 3RG70 13-7GA00	
					npn, dark-ON	1		
					M8 connector, 3-pole, type A	pnp, light-ON	1	
						pnp, dark-ON	1	
					npn, light-ON	1		
					npn, dark-ON	1		

Accessories

Mounting brackets for K30, K31 ▶ **3RX7 910**

Fiber-optic conductors ▶ see from page 2/263

1) See page 2/127.

B: Subject to export regulations AL = N and ECCN = EAR99.

▶ Preferred type, available from stock.

Dimensions

See page 2/106.

Overview

Diffuse sensor; energetic sensor

- Sensing range 1.2 m (adjustable via potentiometer)

Reflex sensor

- Sensing range 4 m (adjustable via potentiometer)
- Supplied without reflector

Thru-beam sensor



- Sensing range 12 m (adjustable via potentiometer)



Sensor for plastic fiber-optic wires

- Sensing range depends on type of optical fiber (see page 2/263)

Supplied without mounting material

Technical specifications

Operating mode		Diffuse sensor	Reflex sensor with polarization filter
			
Sensing range	cm	120 (adjustable)	400 (adjustable)
Standard target	mm	200 × 200 (white)	Reflector type D 84
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)	
No-load current I_0 , max.	mA	15	15
Rated operational current I_e	mA	200	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (illuminant)	nm	880 (IR)	660 (red, polarized)
Indicators			
• Switching status		Yellow LED	
• Surplus light		Green LED	
Enclosure material		Molded plastic (PBTP, Crastin)	
Degree of protection		IP67	
Ambient temperature	°C	-25 ... +55	
Temperature coefficient	%/K	0.3	
Type		3RG70 10-...00	3RG70 11-...00

Operating mode		Thru-beam sensor	Sensor for plastic optical fibers
			
Sensing range	cm	1200 (adjustable)	Depending on type of optical fiber
Standard target	mm	-	100 × 100 (white)
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)	
No-load current I_0 , max.	mA	15	
Rated operational current I_e	mA	200	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (illuminant)	nm	880 (IR)	660 (red)
Indicators			
• Switching status		Yellow LED	
• Surplus light		Green LED	
Enclosure material		Molded plastic (PBTP, Crastin)	
Degree of protection		IP67	
Ambient temperature	°C	-25 ... +55	
Temperature coefficient	%/K	0.3	
Type		3RG70 12-...00	3RG70 13-...00

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO500

Overview

SIMATIC sensors PXO500

- C40,
- L50,
- L50HF,
- C50.

Selection table

SIMATIC PXO500



	C40			L50			L50HF	L50HF advanced	C50
Operating mode									
• Diffuse sensor	■			■			■	■	
• Diffuse sensor with background suppression		■			■				
• Reflex sensor			■			■			
• Color sensor									■
Sensing range									
• 1.2 cm ... 3.2 cm									■
• 5 cm ... 11 cm				■			■		
• 12 cm ... 15 cm					■				
• 20 cm ... 30 cm		■						■	
• 60 cm ... 70 cm	■								
• 1 m ... 1.5 m			■						
• 4 m ... 6 m			■						
• 20 m ... 50 m						■			
Output									
• pnp	■	■	■		■	■	■	■	3 x ■
• npn	■	■	■		■	■			
• Analog				■			■	■	
Direct communication with the controller	ET 200S (via IQ-Sense)		ET 200S (via IQ-Sense)						
Operating voltage									
• 24 V DC	■	■	■	■	■	■	■	■	■
• 20 ... 265/320 V AC/DC									
Connection									
• M12 connector	■	■	■	■	■	■	■	■	■
• Cable				■	■	■			
Special features									
• Timing function				■			■	■	
• Surplus light emission					■	■			
• Transparent objects			■						
Illuminant									
• Red light	■	■	■						
• Laser light, red				■	■	■	■	■	
• Incandescent light									■
See page	2/108			2/110			2/112	2/112	2/114

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO500

C40 design

Overview

Diffuse sensor; energetic sensor

- Sensing range 70 cm (adjustable via "teach-in")

Diffuse sensor with background suppression

- Sensing range 5 to 25 cm (adjustable via "teach-in")

Reflex sensor

- Sensing range 6 m (adjustable via "teach-in")



Reflex sensor for transparent objects



- Sensing range 1 m (adjustable via "teach-in")

External "teach-in"


Supplied with mounting bracket, without reflector.

Technical specifications


Operating mode		Diffuse sensor	Diffuse sensor with background suppression
			
Sensing range	cm	70 (adjustable)	5 ... 25 (adjustable)
Standard target	mm	200 × 200 (white)	100 × 100 (gray)
Operating voltage range (DC)	V	10 ... 30	
No-load current I_0 , max.	mA	35	25
Rated operational current I_e	mA	200	250
Switching frequency	Hz	1000	200
Switching time	ms	0.5	2.5
Wavelength (illuminant)	nm	660 (red)	
Indicators			
• Switching status		Yellow LED	
• Surplus light		Green LED	
Enclosure material		Molded plastic (PBTP)	
Degree of protection		IP67	
Ambient temperature	°C	-25 ... +55	
Temperature coefficient	%/K	0.1	
Type		3RG72 40-...00	3RG72 44-...00

Operating mode		Reflex sensor with polarization filter	Reflex sensor for transparent objects
			
Sensing range	cm	600 (adjustable)	100 (adjustable)
Standard target	mm	Reflector type D 84	Reflector type D 84
Operating voltage range (DC)	V	10 ... 30	
No-load current I_0 , max.	mA	35	
Rated operational current I_e	mA	200	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (illuminant)	nm	660 (red, polarized)	
Indicators			
• Switching status		Yellow LED	
• Surplus light		Green LED	
Enclosure material		Molded plastic (ABS)	
Degree of protection		IP67	
Ambient temperature	°C	-25 ... +55	
Temperature coefficient	%/K	0.1	
Type		3RG72 41-...00	3RG72 41-...52

Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
	Diffuse sensor	70 (adjustable via "teach-in")	660 (red)	M12 connector, 4-pole, type F	pnp, light-ON or dark-ON	16	▶ 3RG72 40-3CH00
					npn, light-ON or dark-ON	16	3RG72 40-3HH00
	Diffuse sensor with background suppression	5 ... 25 (adjustable via "teach-in")	660 (red)	M12 connector, 4-pole, type F	pnp, light-ON or dark-ON	16	▶ 3RG72 44-3CH00
					npn, light-ON or dark-ON	16	3RG72 44-3HH00
	Reflex sensor with polarization filter	600 (adjustable via "teach-in")	660 (red, polarized)	M12 connector, 4-pole, type F	pnp, light-ON or dark-ON	16	▶ 3RG72 41-3CH00
					npn, light-ON or dark-ON	16	3RG72 41-3HH00
	Reflex sensor for transparent objects	100 (adjustable via "teach-in")	660 (red, polarized)	M12 connector, 4-pole, type F	pnp, light-ON or dark-ON	16	▶ 3RG72 41-3CH52
					npn, light-ON or dark-ON	16	3RG72 41-3HH52

Communication-capable proximity switches with C40 IQ-Sense design

	Diffuse sensor	70	660 (red)	for connection to the 4 IQ-Sense sensor module	IQ-Sense	9	▶ B	3SF72 40-3JQ00
	Reflex sensor	600	660 (red)	for connection to the 4 IQ-Sense sensor module	IQ-Sense	9	▶ B	3SF72 41-3JQ00

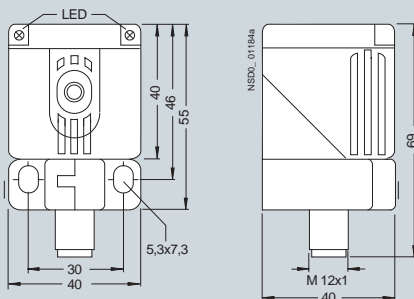
1) See page 2/127.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

3RG72 4.-3....



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO500

L50 design

Overview

Visible laser light (red)
 Laser protection class 2 according to EN 60947-5-2

Diffuse sensor with background suppression

- Sensing range 3 to 15 cm (adjustable via potentiometer)

Diffuse sensor with analog output




- Sensing range 4.5 to 8.5 cm (adjustable via potentiometer)



Reflex sensor

- Sensing range 20 m (adjustable via potentiometer)
- Supplied without reflector


Supplied without mounting material

Technical specifications

Operating mode	Laser diffuse sensor with background suppression		Laser reflex sensor
			
Sensing range	cm	3 ... 15 (adjustable)	2000 (adjustable)
Standard target/reflector	mm	100 × 100 (white)	Reflector type RL 50
Operating voltage range (DC)	V	10 ... 30 (max. 10 % residual ripple)	
No-load current I_0 , max.	mA	50	
Rated operational current I_e	mA	200	
Switching frequency	Hz	2500	
Switching time	ms	< 0.2	
Wavelength (illuminant)	nm	650 (red laser light)	
LEDs			
• Switching status		Yellow LED	
• Surplus light		Red LED	
• Operating voltage		Green LED	
Enclosure material		Molded plastic (ABS)	
Degree of protection		IP67	
Ambient temperature	°C	-20 ... +45	
Temperature coefficient	%/K	0.1	
Type		3RG70 56-...00	3RG70 57-...00

Operating mode	Laser diffuse sensor with analog output	
		
Sensing range	mm	45 ... 85 (adjustable)
Resolution	µm	80
Linearity	ms	< 1% of measuring range (40 mm)
Measuring spot diameter (at 65 mm distance)	mm	< 0.8
Operating voltage range (DC)	V	18 ... 28 (max. 10 % residual ripple)
No-load current I_0 , max.	mA	35
Analog output	V	0 ... 10
Output current, max.	mA	3
Switching frequency	Hz	500
Switching time	ms	1
Wavelength (illuminant)	nm	650
LEDs		
• Surplus light		Red LED
• Operating voltage		Green LED
Enclosure material		Molded plastic (ABS)
Degree of protection		IP67
Ambient temperature	°C	0 ... +45
Temperature coefficient	µm/K	18
Type		3RG70 56-.CM00
		3RG70 56-.CM03

Selection and Ordering data

	Operating mode	Sensing range/resolution	Illuminant nm	Connection	Switching output/ analog output	Circuit diagram number ¹⁾	Order No.			
	Laser diffuse sensor with background suppression	3 ... 15 cm (adjustable via potentiometer)	650 (red laser light)	2 m cable, PUR, 4 x 0.25 mm ²	Light-ON and dark-ON (antivalent)	pnp 5 nnp 5	3RG70 56-0CC00 3RG70 56-0HC00			
					Light-ON and surplus light function	pnp 6 nnp 6	3RG70 56-0CD00 3RG70 56-0HD00			
						M12 connector, 4-pole, type F	Light-ON and dark-ON (antivalent)	pnp 5 nnp 5	3RG70 56-3CC00 3RG70 56-3HC00	
				Light-ON and surplus light function	pnp 6 nnp 6	3RG70 56-3CD00 3RG70 56-3HD00				
					Laser reflex sensor	2000 cm (adjustable via potentiometer)	650 (red laser light)	2 m cable, PUR, 4 x 0.25 mm ²	Light-ON and dark-ON (antivalent)	pnp 5 nnp 5
				Light-ON and surplus light function					pnp 6 nnp 6	3RG70 57-0CD00 3RG70 57-0HD00
	M12 connector, 4-pole, type F	Light-ON and dark-ON (antivalent)	pnp 5 nnp 5						3RG70 57-3CC00 3RG70 57-3HC00	
	Light-ON and surplus light function	pnp 6 nnp 6	3RG70 57-3CD00 3RG70 57-3HD00							
		Laser diffuse sensor with analog output	45 ... 85 mm/80 µm	650 (red laser light)	6 m cable, PVC, 4 x 0.34 mm ² , shielded	analog 0 ... 10 V, rising signal	- 15	3RG70 56-1CM00		
	- 15					3RG70 56-1CM03				
	45 ... 85 mm/20 µm		650 (red laser light)	M12 connector, 4-pole, type F	analog 0 ... 10 V, rising signal	- 15	3RG70 56-3CM00			
					- 15	3RG70 56-3CM03				

Accessories

Mounting brackets for L50

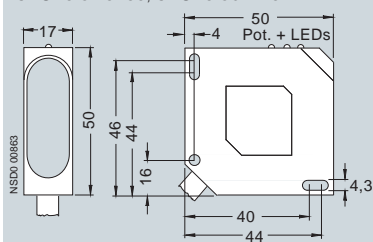
3RX7 302

1) See page 2/127.

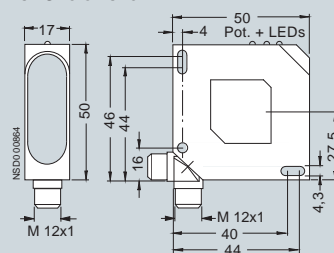
▶ Preferred type, available from stock.

Dimensions

3RG70 5-0..00, 3RG70 56-1..0.

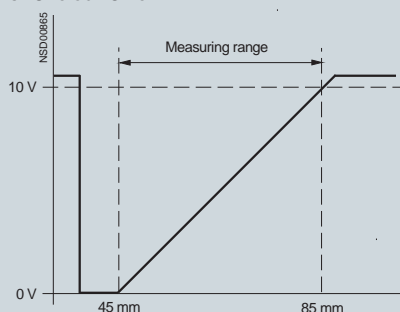


3RG70 5-3..0.



Characteristic curves

3RG70 56-CM0.



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO500

L50 HF, L50HF advanced designs

Overview

Visible laser light (red),
laser protection class 2 according to EN 60947-5-2

Diffuse sensor with analog output, parameterizable using
teach-in buttons



Resolution < 0.1% of full-scale value

Two digital channels, can be set as 2 switching outputs or
1 switching output and 1 trigger input

Analog output 4 to 20 mA (scaling can be set)

Supplied without mounting material

Technical specifications


Operating mode		Laser diffuse sensor with analog output	
			
Sensing range	mm	30 ... 100	80 ... 300
Resolution	%/MBE	< 0.1	
Linearity	%/MBE	< 0.25	
Light spot diameter (at end of sensing range)	mm	1.5 x 3.25	2 x 4.5
Operating voltage range (DC)	V	18 ... 30	
No-load current I_0 , max.	mA	40	
Analog output	mA	4 ... 20	
Output current per switching output	mA	100	
Recommended load	W	≤ 500	
Switching frequency	Hz	1000	
Switching time	ms	< 1	
Wavelength (illuminant)	nm	650	
LEDs			
• Ready for operation		Green LED	
• Status display		Red LED	
• Switching state, input/output		Yellow LED (2 x)	
• Status display, trigger input		Green LED	
• Object valid		Green LED	
• Timer function active		Green LED	
• Measured value centering active		Green LED	
Enclosure material		Molded plastic (ABS)	
Degree of protection		IP67	
Ambient temperature	°C	-10 ... +60	
Temperature coefficient	%/K	0.02	
Connection		M12 connector, 8-pole, Type O	
Type		3RG70 56-3NQ00	3RG70 56-3NQ61

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO500

L50 HF, L50HF advanced designs

Selection and Ordering data

	Operating mode Design	Sensing range mm	Illuminant nm	Connection	Analog output mA	Circuit diagram number ¹⁾	Order No.
	Laser diffuse sensor with analog output L50 HF	30 ... 100	650 (red laser light)	M12 connector, 8-pole, Type O	4 ... 20	pnp 20	3RG70 56-3NQ00
	Laser diffuse sensor with analog output L50 HF advanced	80 ... 300	650 (red laser light)	M12 connector, 8-pole, Type O	4 ... 20	pnp 20	3RG70 56-3NQ61

HF L50 design

Accessories

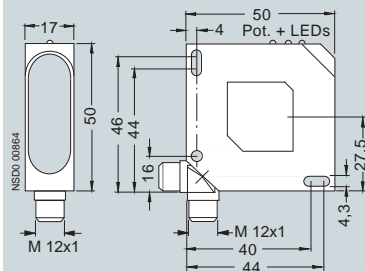
Mounting brackets for L50 HF	3RX7 302
Cable plug, shielded, 8 x 0.25 mm ²	3RX8 000-0CB81-1GF0

1) See page 2/127.

▶ Preferred type, available from stock.

Dimensions

3RG70 56-3NQ..



2

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO500

C50 design


Overview

- Color sensor with three individually adjustable switch outputs
- 3 color ranges can be learned
- Long-term stable and neutral color white-light transmitter LEDs
- 5 tolerance levels selectable

- Sensing range 12 to 32 mm
- Transparent objects with reflection film detectable
- Trigger function via activation input
- External Teach-in


Supplied without mounting material and without reflector

Technical specifications

Operating mode	Color sensor
	
Operating voltage	DC 12 ... 28 V
Max. residual ripple	10%
Reverse polarity protection, short-circuit protection	yes
Current consumption during no-load operation	≤ 40 mA at 24 V DC
Switching outputs	Q1 ... Q3, PNP NO contact
Max. output current	100 mA
Max. voltage drop at the switching output	< 2.4 V
Power-up delay	< 300 ms
Switching frequency	500 Hz
Switching status indicator CH1 ... CH3	3 x Yellow LED
Operating voltage indicator	Green LED
Tolerance level indicator Tol1 ... Tol5	3 x Red LED

Response time	10 ms
Pulse stretching/dropout delay	50 ms
Sensing range for light spot ø4 mm	12 ... 32 mm
Sensing range tolerance for light spot ø 4 mm	± 6 mm for mean tolerance
Color resolution tolerance	Adjustable in 5 stages
Illuminant	White light, pulsed
Light spot diameter at a distance of 22 mm	4 mm
Ambient light limit	EN 60947-5-2
Enclosure material	ABS
Degree of protection	IP67
Ambient temperature range	-10 ... +55 °C
Storage temperature range	-20 ... +80 °C
Type of connection	M12 connector, 8-pole
Max. permissible lead length	100 m
Weight	40 g

Selection and Ordering data

	Operating mode	Sensing range mm	Illuminant	Connection	Switching output	Circuit diagram number ¹⁾	Order No.
	Color sensor PXO560 with 3 switching outputs	12 ... 32	White light, pulsed	M12 connector, 8-pole, Type O	3 x pnp	17	3RG70 50-3NB00

Accessories

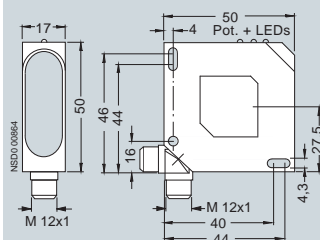
Mounting bracket for form C50	▶	3RX7302
Cable plug, shielded, 8 x 0.25 mm ² , 5 m	▶	3RX8000-OCB81-1GF0
Reflection film for detection of transparent objects	▶	3RX7307-0AB00

1) See page 2/127.

▶ Preferred type, available from stock.

Dimensions

3RG70 50-3NB00



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO600

Overview

- K80,
- L80HF,
- L90L.

Selection table

SIMATIC PXO600



	K80				L80HF	L90L
Operating mode						
• Diffuse sensor	■				■	■
• Diffuse sensor with background suppression		■				
• Reflex sensor			■			
• Thru-beam sensor				■		
Sensing range						
• 60 cm ... 75 cm					■	
• 1 m ... 1.5 m		■				
• 2 m ... 3 m	■					
• 4 m ... 6 m			■			■
• 12 m ... 15 m			■			
• 20 m ... 50 m				■		■
Output						
• pnp	■	■	■	■	■	■
• npn	■	■	■	■		
• Relay	■		■	■		
• Analog					■	■
Direct communication with the controller	ET 200S (via IQ-Sense)	ET 200S (via IQ-Sense)	ET 200S (via IQ-Sense)			
Operating voltage						
• 24 V DC	■	■	■	■	■	■
• 20 ... 265/320 V AC/DC	■		■	■		
Connection						
• M12 connector	■	■	■	■	■	■
• Terminals	■	■	■	■		
Special features						
• Timing function	■	■	■	■		
• Surplus light emission	■	■	■	■		
Illuminant						
• Red light			■			
• Infrared light	■	■		■		
• Laser light, red					■	
• Laser light, infrared						■
Approval for hazardous area						
• Zone 2/22	■		■	■		
See page	2/116				2/119	2/120

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO600

K80 design

Overview

Versions for use in potentially explosive environments acc. to 94/9/EG (ATEX exists):

- Zone 2 (gases, vapors, mist) according to classification II 3G
- Zone 22 (dust atmosphere, non-conductive dust) according to classification II 3D

Diffuse sensor (energetic sensor)

- Sensing range 2 m (adjustable via potentiometer)

Diffuse sensor with background suppression

- Sensing range 0.2 to 1 m (adjustable via potentiometer)

Reflex sensor

- Sensing range 6 m (adjustable via potentiometer)

- Supplied without reflector

- "Advanced" version 1 to 12 m

Thru-beam sensor

- Sensing range 50 m (adjustable via potentiometer)



Rated operating voltage 24 V DC or 240 V AC/DC



Inputs and outputs

- Electronics output pnp or npn
 - Programmable as light-ON or dark-ON
 - Light-ON and dark-ON (antivalent)
- Relay output 20 to 320 V AC/DC
- Timing function (delayed pick-up or drop-out, pulse shaping)
- Enabling input for test purposes




Supplied without mounting material

Technical specifications

Operating mode	Diffuse sensor				Diffuse sensor with background suppression				
									
Sensing range	m	2 (adjustable)				0.2 ... 1 (adjustable)			
Standard target	mm	400 x 400 (white)				200 x 200 (white)			
Operating voltage range (DC)	V	10 ... 36	–	10 ... 36	10 ... 36	–	10 ... 36	–	
No-load current I_0 , max.	mA	30	–	30	30	–	45	–	
Operating voltage range (AC/DC)	V	–	20 ... 265	200	–	–	–	–	
No-load power, max.	VA	–	2	–	–	–	–	–	
Rated operating current I_e	mA	200	2000 (at 240 V AC)	200	200	–	200	–	
Switching frequency, max.	Hz	1000	20	1000	1000	20	250	–	
Switching time, max.	ms	0.5	20	0.5	2	–	2	–	
Wavelength (illuminant)	nm	880 (IR)				880 (IR)			
Switching state/surplus light function display		LED yellow/LED green							
Enclosure material		Molded plastic (PBTP)							
Degree of protection		IP67							
Approval for Ex Zones 2/22		no	no	yes	no	no	yes	no	
Ambient temperature	°C	–5 ... +55	–5 ... +55	–5 ... +40	–5 ... +55	–5 ... +55	–5 ... +55	–5 ... +55	
Temperature coefficient	%/K	0.3							
Type		3RG72 00-...00, 3RG72 10-...00	3RG72 10-6MC00	3RG72 00-3CC00- 0XB4	3RG72 04-...00, 3RG72 14-...00	–	–	–	

Operating mode	Reflex sensor with polarization filter				Thru-beam sensor				
									
Sensing range	m	6/12 (adjustable)				50 (adjustable)			
Reflector	mm	Reflector type D 84				–			
Operating voltage range (DC)	V	10 ... 36	–	10 ... 36	10 ... 36	–	10 ... 36	–	
No-load current I_0 , max.	mA	30	–	30	30	–	–	–	
Operating voltage range (AC/DC)	V	–	20 ... 265	–	–	20 ... 320	–	–	
No-load power, max.	VA	–	2	–	–	2	–	–	
Rated operating current I_e	mA	200	2000 (at 240 V AC)	200	200	2000 (at 240 V AC)	200	–	
Switching frequency, max.	Hz	1000	20	1000	1000	20	1000	–	
Switching time, max.	ms	0.5	20	0.5	0.5	20	0.5	–	
Wavelength (illuminant)	nm	660 (red, polarized)				880 (IR)			
Switching state/surplus light function display		LED yellow/LED green							
Enclosure material		Molded plastic (PBTP)							
Degree of protection		IP67							
Approval for Ex Zones 2/22		no	no	yes	no	no	yes	no	
Ambient temperature	°C	–5 ... +55	–5 ... +55	–5 ... +40	–5 ... +55	–5 ... +55	–5 ... +55	–5 ... +40	
Temperature coefficient	%/K	0.3							
Type		3RG72 01-...00, 3RG72 01-...61, 3RG72 11-...00, 3RG72 11-...61	3RG72 11-6MC00, 3RG72 11-6MC61	3RG72 01- 3CC-0XB4	3RG72 02- ...00, 3RG72 12- ...00	3RG72 12-6MC00, 3RG72 02-6FG00	3RG72 02- ...-0XB4, 3RG72 12- ...-0XB4	–	

Selection and Ordering data

	Operating mode	Sensing range m	Illuminant nm	Connection	Switching output		Circuit diagram number ¹⁾	Order No.	
K80 design									
	Diffuse sensor	2 (adjustable via potentiometer)	880 (IR)	M12 connector, 4-pole, type F	Light-ON and dark-ON (antivalent)	pn-p	5	▶	3RG72 00-3CC00
						npn	5		3RG72 00-3HC00
				M12 connector, 5-pole, type G	Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pn-p	8	B	3RG72 10-3DK00
						npn	8	B	3RG72 10-3EK00
				Pg 11, 4-pole	Light-ON and dark-ON (antivalent)	pn-p			3RG72 00-6CC00
		npn			3RG72 00-6HC00				
Pg 11, with enabling input, 5-pole	Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pn-p	11	B	3RG72 10-6DK00				
		npn	11	B	3RG72 10-6EK00				
Pg 11, 5-pole	Relay, Light-ON and dark-ON, with timing function (0.1 ... 10 s)	Relay	10	▶ B	3RG72 10-6MC00				
K80 design									
	Diffuse sensor with background suppression	0.2 ... 1 (adjustable via potentiometer)	880 (IR)	M12 connector, 4-pole, Type F	Light-ON and dark-ON (antivalent)	pn-p	5	▶	3RG72 04-3CC00
						npn	5		3RG72 04-3HC00
				M12 connector, 5-pole, Type G	Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pn-p	8		3RG72 14-3DK00
						npn	8		3RG72 14-3EK00
Pg 11, 4-pole	Light-ON and dark-ON (antivalent)	pn-p		▶	3RG72 04-6CC00				
		npn			3RG72 04-6HC00				
Pg 11, with enabling input, 5-pole	Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pn-p	11		3RG72 14-6DK00				
		npn	11		3RG72 14-6EK00				
K80 design									
	Reflex sensor	6 (adjustable via potentiometer)	660 (red, polarized)	M12 connector, 4-pole, Type F	Light-ON and dark-ON (antivalent)	pn-p	5	▶	3RG72 01-3CC00
						npn	5		3RG72 01-3HC00
				M12 connector, 5-pole, Type G	Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pn-p	8	B	3RG72 11-3DK00
						npn	8	B	3RG72 11-3EK00
				Pg 11, 4-pole	Light-ON and dark-ON (antivalent)	pn-p	11	▶	3RG72 01-6CC00
				npn	11		3RG72 01-6HC00		
		Pg 11, with enabling input, 5-pole	Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pn-p	11	B	3RG72 11-6DK00		
				npn	11	B	3RG72 11-6EK00		
		Pg 11, 5-pole	Relay, Light-ON and dark-ON, with timing function (0.1 ... 10 s)	-	10	▶ B	3RG72 11-6MC00		
	12 (adjustable via potentiometer)	660 (red, polarized)	M12 connector, 4-pole, Type F	Light-ON and dark-ON (antivalent)	pn-p	5	▶	3RG72 01-3CC61	
Pg 11, 4-pole	Light-ON and dark-ON (antivalent)		pn-p		▶	3RG72 01-6CC61			
Pg 11, 5-pole	Relay, Light-ON and dark-ON, with timing function (0.1 ... 10 s)		Relay	10	▶ B	3RG72 11-6MC61			

1) See page 2/127.



▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO600

K80 design

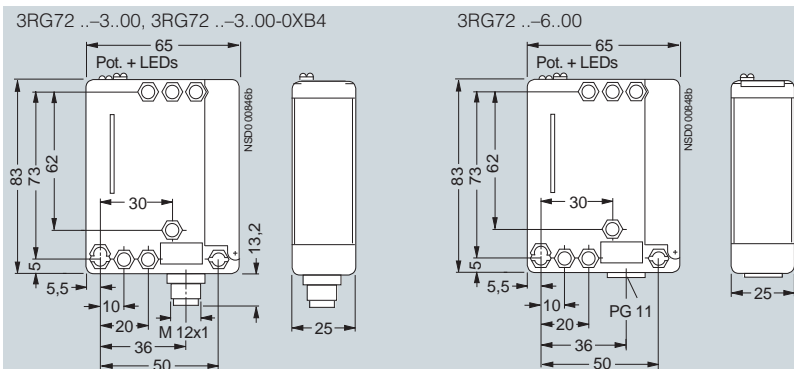
	Operating mode	Sensing range m	Illuminant nm	Connection	Switching output	Circuit diagram number ¹⁾	Order No.			
K80 design										
	Thru-beam sensor	50 (adjustable via potentiometer)	880 (IR)	M12 connector, 4-pole, Type F	Light-ON and dark-ON (antivalent)	pnp 5	▶	3RG72 02-3CC00 3RG72 02-3HC00		
					Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pnp 6			B	3RG72 12-3DK00
					Light-ON and dark-ON (antivalent)	pnp 11				
					Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pnp 11			B	3RG72 12-6DK00 3RG72 12-6EK00
					Relay, Light-ON and dark-ON, with timing function (0.1 ... 10 s)	– 10			▶ B	
					Emitter DC with enabling input	– 7			▶	3RG72 02-3BG00
Emitter DC with enabling input	– 11	▶	3RG72 02-6BG00							
Emitter AC/DC with enabling input	– 11	▶ B	3RG72 02-6FG00							
K80 ATEX design										
	Diffuse sensor	2 (can be set with potentiometer)	880 (IR)	M12 connector, 4-pole, type F	Light-ON and dark-ON (antivalent)	pnp 5	▶	3RG72 00-3CC00-0XB4		
	Reflex sensor	6 (can be set with potentiometer)	660 (red, polar.)	M12 connector, 4-pole, Type F	Light-ON and dark-ON (antivalent)	pnp 5	▶	3RG72 01-3CC00-0XB4		
		12 (can be set with potentiometer)	660 (red, polarized)	M12 connector, 4-pole, Type F	Light-ON and dark-ON (antivalent)	pnp 5	▶	3RG72 01-3CC61-0XB4		
	Thru-beam sensor	50 (can be set with potentiometer)	880 (IR)	M12 connector, 4-pole, Type F	Light-ON and dark-ON (antivalent)	pnp 5	▶	3RG72 02-3CC00-0XB4		
		–	–	–	Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pnp 6	▶ B	3RG72 12-3DK00-0XB4		
–	–	–	–	Sender with enable input	– 7	▶	3RG72 02-3BG00-0XB4			
Communication-capable proximity switches with K80 IQ-Sense form										
	Diffuse sensor	2	880 (IR)	M12 connector, 4-pole, Type F	for connection to the 4IQ-Sense sensor module	– 9	▶ B	3SF72 10-3JQ00		
	Diffuse sensor with background suppression	0.2 ... 1	880 (IR)	M12 connector, 4-pole, Type F	for connection to the 4IQ-Sense sensor module	– 9	▶ B	3SF72 14-3JQ00		
	Reflex sensor	8	660 (red, polar.)	M12 connector, 4-pol., Type F	for connection to the 4IQ-Sense sensor module	– 9	▶ B	3SF72 11-3JQ00		
Accessories										
	Mounting brackets for K80						▶	3RX7 303		

1) See page 2/127.

B: Subject to export regulations AL = N and ECCN = EAR99

▶ Preferred type, available from stock.

Dimensions





Overview


Visible laser light (red),
laser protection class 2 according to EN 60947-5-2
Diffuse sensor with analog output,
parameterizable using teach-in buttons
Resolution < 0.1% of full-scale value

Two digital channels, adjustable as 2 switching outputs or 1
switching output and 1 trigger input
Analog output 4 to 20 mA (scaling can be set)
Supplied without mounting material

Technical specifications

Operating mode		Laser diffuse sensor with analog output	
			
Sensing range	mm	250 ... 750	
Resolution	%/MBE	< 0.1	
Linearity	%/MBE	< 0.25	
Light spot diameter (at end of sensing range)	mm	2 x 4.5	
Operating voltage range (DC)	V	18 ... 30	
No-load supply current I_0 , max.	mA	40	
Analog output	mA	4 ... 20	
Output current per switching output	mA	100	
Recommended load	W	≤ 500	
Switching frequency	Hz	1000	
Switching time	ms	< 1	
Wavelength (illuminant)	nm	650	
Indicators			
• Ready for operation/Status display			Green LED/Red LED
• Switching state, input/output			Yellow LED (2 x)
• Status display, trigger input			Green LED
• Object valid			Green LED
• Timer function active			Green LED
• Measured value centering active			Green LED
Enclosure material		PBT	
Degree of protection		IP67	
Ambient temperature	°C	-10 ... +60	
Temperature coefficient	%/K	0,02	
Connection		M12 connector, 8-pole, type O	
Type		3RG72 56-3NQ00	

Selection and Ordering data

Operating mode Design	Sensing range mm	Illuminant nm	Connection	Analog output	Circuit diagram number ¹⁾	Order No.
 Laser diffuse sensor with analog output L80HF	250 ... 750	650 (red laser light)	M12 connector, 8-pole, type O	4 ... 20 mA pnp	20	3RG72 56-3NQ00

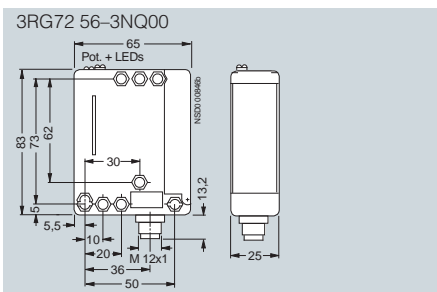
Accessories

Mounting brackets for L80 HF	▶	3RX7 303
Cable plug, shielded, 8 × 0.25 mm ²	▶	3RX8 000-0CB81-1GF0

1) See page 2/127.

▶ Preferred type, available from stock.

Dimensions



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO600

SIMATIC PXO650 L90L

Overview

Measuring laser sensor based on the principle of optical running-time measurement


- Measuring laser with IR light; laser class 1
- Pilot laser for adjustment with visible red light; laser class 2
- Wired via M12 4-pole or 5-pole connector
- Range 6 m; range with reflector 30 m

- Rated operating voltage 24 V DC
- 1 or 2 solid-state outputs pnp
- NO or NC contact, adjustable via "teach-in"
- Analog output 4 to 20 mA
- Timer function

Technical specifications

Sensing range	0.2 ... 6 m	0.2 ... 6 m	0.2 ... 30 m
Standard target/reflector	white 90%, 100 x 100 mm		R250 reflector, 250 x 250 mm
Operating mode	Distance sensor/jogging		Distance sensor/reflex sensor
Light spot diameter (at end of sensing range)	4 x 12 mm		45 x 60 mm
Reproducibility			
• Slow	10 mm		5 mm
• Fast	15 mm		10 mm
Operating voltage range	18 ... 30 V DC		
No-load supply current I_0 , max.	125 mA at 24 V DC		
Rated operating current I_e	100 mA		
Analog output	-	4 ... 20 mA	
Response time			
• Slow	80 ms		65 ms
• Fast	13 ms		13 ms
Wavelength (illuminant)			
• Measuring laser	905 nm, IR, invisible, class 1		
• Pilot laser	650 nm, red, visible, class 2		
Displays			
• Switching status	Green LED		
• Operating voltage	Yellow LED	2 yellow LEDs	
• Operating mode	Orange LED		
Adjustment menu	-	4 x red LEDs	
Enclosure material	Plastic ABS		
Degree of protection	IP67		
Ambient temperature during operation	-20 ... +50 °C		
Ambient temperature during storage	-40 ... +80 °C		
Temperature coefficient	0.3%/K		
Type	6GR1654-3AD20	6GR1654-3CH20	6GR1654-3CH21

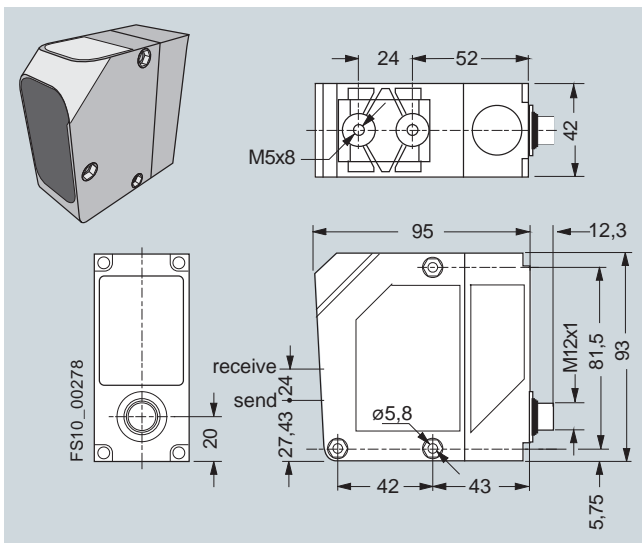
Selection and Ordering data

	Sensing range m	Connection	Switching output	Analog output mA	Circuit diagram number ¹⁾	Order No.
	0.2 ... 6	M12 connector, 4-pole, type F	1 x light-ON or dark-ON	-	pnp 12	6GR1654-3AD20
	0.2 ... 6	M12 connector, 5-pole, type F	2 x light-ON or dark-ON	4 ... 20	pnp 19	6GR1654-3CH20
	0.2 ... 30	M12 connector, 5-pole, type G	2 x light-ON or dark-ON	4 ... 20	pnp 19	6GR1654-3CH21

SIMATIC
PXO560 L90L

1) See page 2/127.

Dimensions



SIMATIC PXO photoelectric proximity switches

SIMATIC PXO800

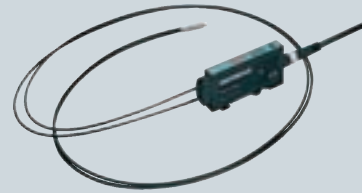
Overview

SIMATIC sensors PXO800

- GL fork sensor,
- LV70 fiber-optic conductor sensor.

Selection table

SIMATIC PXO800



	GL	LV70
Operating mode		
• Thru-beam sensor	■	
• For plastic fiber-optic wires		■
Sensing range		
• Depending on fiber-optic wire		■
• 1.2 cm ... 3.2 cm	■	
• 5 cm ... 11 cm	■	
• 12 cm ... 15 cm	■	
Output		
• pnp	■	■
Operating voltage		
• 24 V DC	■	■
Connection		
• M8 connector	■	■
• Cable		■
Special features		
• Surplus light emission		■
Illuminant		
• Red light	■	■
See page	2/123	2/125

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

Overview

PXO830 GL fork sensor for detecting small objects.

- Molded plastic enclosure with screw-on or dovetail fastening.
- Wired with 3 or 4-pole M8 connector.
- 4 different fork widths:
 - GL30 = 30 mm
 - GL50 = 50 mm
 - GL80 = 80 mm
 - GL120 = 120 mm
- NO or NC contact, adjustable via "teach-in".
- Versions with external "teach-in".

Technical specifications

		PXO830 GL30	PXO830 GL50	PXO830 GL80	PXO830 GL120
Operating mode		Thru-beam sensor			
Fork width	mm	30	50	80	120
Operating voltage range	V DC	10 ... 30			
No-load supply current I_o , max.	mA	30			
Rated operating current I_e	mA	100			
Switching frequency	Hz	2000			
Wavelength (illuminant)	nm	640 (red, visible)			
Switching status indicators		4 x yellow LEDs			
Enclosure material		Plastic ABS			
Degree of protection		IP67			
Ambient temperature					
• During operation	°C	-20 ... +60			
• During storage	°C	-20 ... +80			
Temperature coefficient	%/K	0.3			
Type		6GR1802-....	6GR1804-....	6GR1806-....	6GR1808-....

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO800

SIMATIC PXO830 GL

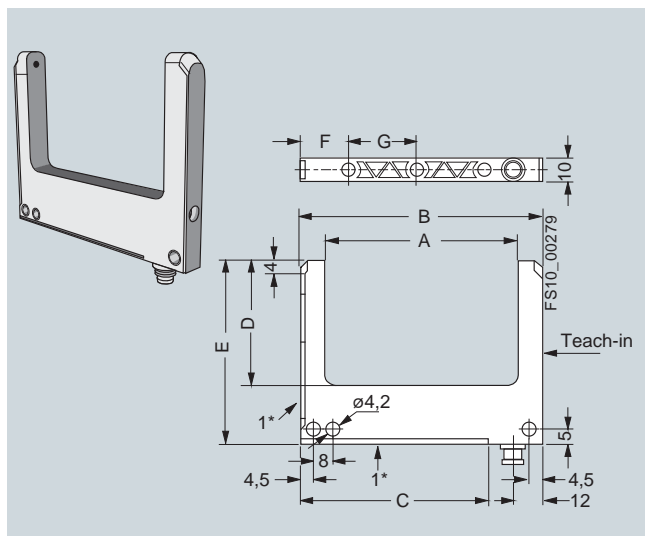
Selection and Ordering data

Fork width mm	Connection	Switching output	External "teach-in"	Circuit diagram number ¹⁾	Order No.
30	M 8 connector, 3-pole, Type A	Light-ON or dark-ON	npn -	1	6GR1802-7AD00
30	M 8 connector, 4-pole, Type B	Light-ON or dark-ON	npn yes	14	6GR1802-7BD05
50	M 8 connector, 3-pole, Type A	Light-ON or dark-ON	npn -	1	6GR1804-7AD00
50	M 8 connector, 4-pole, Type B	Light-ON or dark-ON	npn yes	14	6GR1804-7BD05
80	M 8 connector, 3-pole, Type A	Light-ON or dark-ON	npn -	1	6GR1806-7AD00
80	M 8 connector, 4-pole, Type B	Light-ON or dark-ON	npn yes	14	6GR1806-7BD05
120	M 8 connector, 3-pole, Type A	Light-ON or dark-ON	npn -	1	6GR1808-7AD00
120	M 8 connector, 4-pole, Type B	Light-ON or dark-ON	npn yes	14	6GR1808-7BD05

SIMATIC
PXO830 GL

1) See page 2/127.

Dimensions



All dimensions in mm

MLFB	A Fork width	B	C	D	E	F	G
6GR1802	30	50	30	34	59.5	20	
6GR1804	50	70	50	54	79.5	20	28
6GR1806	80	100	80	54	79.5	20	2 x 28
6GR1808	120	140	120	54	79.5	20	3 x 28

Overview

Fiber-optic wire sensor for snapping onto a DIN rail to DIN46277-3. Plastic fiber-optic wires 3RX7.... may be used.

Connection with cable or M8 connector. The function and range depend upon the type of fiber-optic wire used (see data of your selected fiber-optic wire)

- Rated operating voltage 24 V DC
- Electronic output pnp
- NO or NC contact, adjustable via "teach-in"
- LV70A with analog output 0 ... 10 V

Technical specifications


		PXO840 LV70	PXO840 LV70HF	PXO840 LV70A
Operating mode		Sensor/thru-beam sensor, depending on fiber-optic wire		
Sensing range		Depending on fiber-optic wire		
Standard target/reflector		Depending on fiber-optic wire		
Operating mode		Standard	Standard, Fast, Fine, High Distance	
Operating voltage range (DC)	V DC	10 ... 30		
No-load supply current I_0 , max.	mA	≤ 20 at 24 V	≤ 25 at 24 V	
Rated operating current I_e	mA	100		
Analog output	V	-	0 ... 10	
Switching frequency				
• Standard	Hz	1500	1000	
• Fast mode	Hz	-	8000	
• Fine mode	Hz	-	125	
• High Distance mode	Hz	-	125	
Wavelength (illuminant)	nm	660, red, visible		
Indicators				
• Switching status		Yellow LED	Yellow LED	
• Operating voltage		Green LED	Green LED	
• Configuration		-	Red LED	
• Key lock		-	Red LED	
• Make/break function		-	Red LED	
• Adjustment mode		-	Red LED	
• Timer function		-	Red LED	
• Function mode		-	Red LED	
Display		no	4-character, red	
Enclosure material		Plastic (ABS)		
Degree of protection		IP64		
Ambient temperature				
• During operation	°C	-20 ... +60		
• During storage		-20 ... +80		
Temperature coefficient	%/K	0.3		
Type		6GR1810-BD05	6GR1811-7BD05	6GR1811-0CJ05

SIMATIC PXO photoelectric proximity switches

SIMATIC PXO800

SIMATIC PXO840 LV70

Selection and Ordering data

	Connection	Illuminant nm	Switching output	Analog output	Circuit diagram number ¹⁾	Order No.
	Cable, 2 m PVC, 4 x 0.14 mm ²	660, red	Light-ON or dark-ON	-	pnp 14	6GR1810-0BD05
	M8 connector, 4-pole, type B	660, red	Light-ON or dark-ON	-	pnp 14	6GR1810-7BD05
	M8 connector, 4-pole, type B	660, red	Light-ON or dark-ON	-	pnp 14	6GR1811-7BD05
	Cable, 2 m PVC, 5 x 0.14 mm ²	660, red	Light-ON or dark-ON	0 ... 10 V	pnp 18	6GR1811-0CJ05

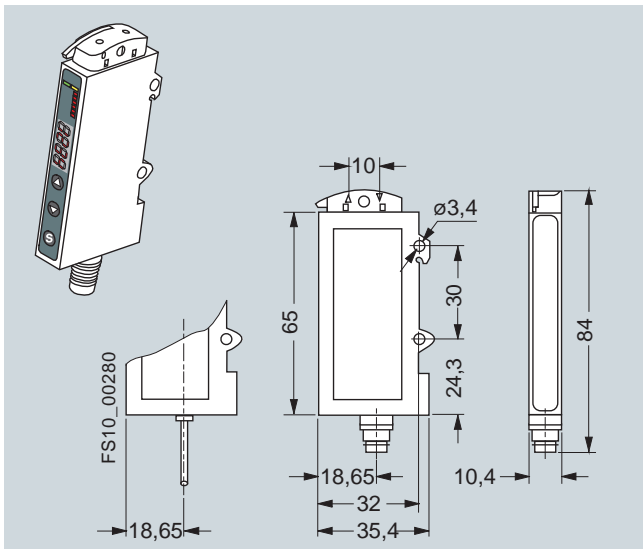
Accessories

3RX7 plastic fiber-optic conductor

see page 2/264

1) See page 2/127.

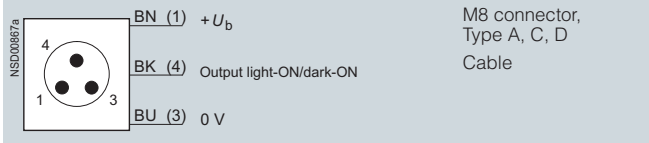
Dimensions



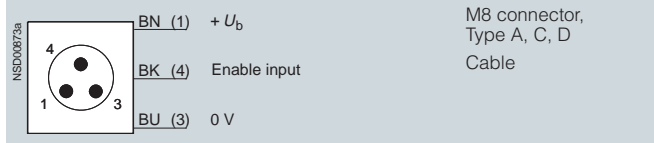


Schematics

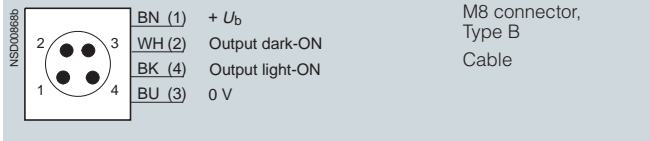
Circuit diagram 1



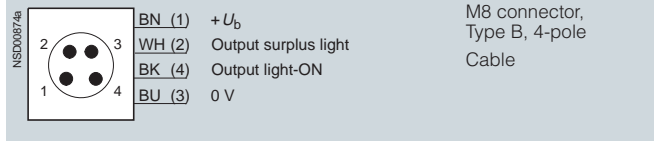
Circuit diagram 2



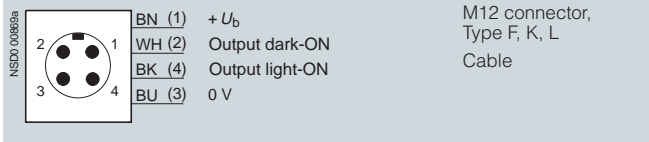
Circuit diagram 3



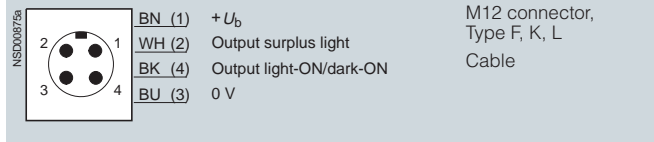
Circuit diagram 4



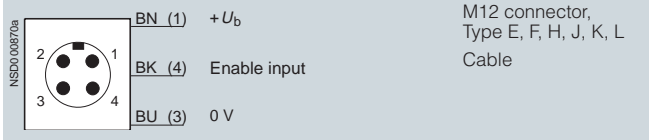
Circuit diagram 5



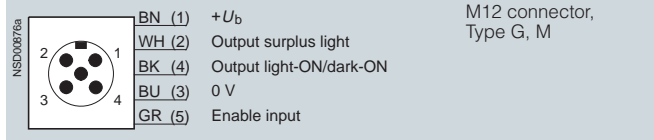
Circuit diagram 6



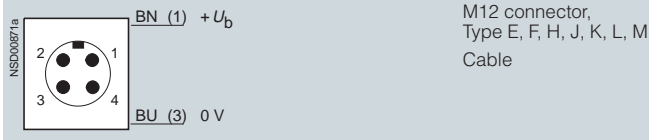
Circuit diagram 7



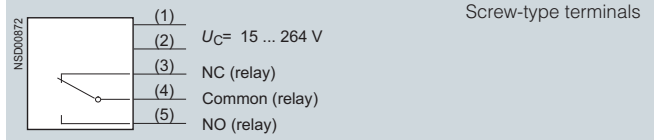
Circuit diagram 8



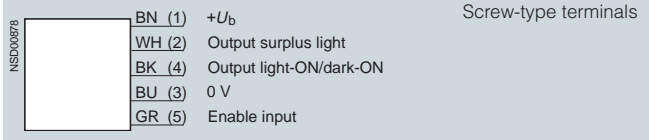
Circuit diagram 9



Circuit diagram 10



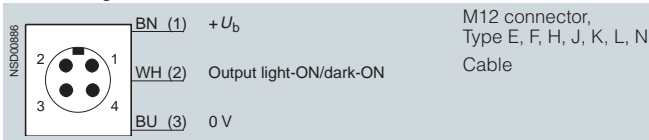
Circuit diagram 11



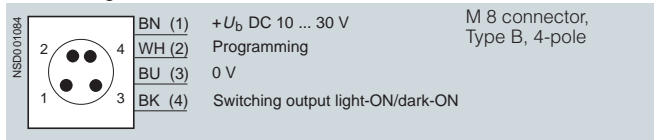
Circuit diagram 12



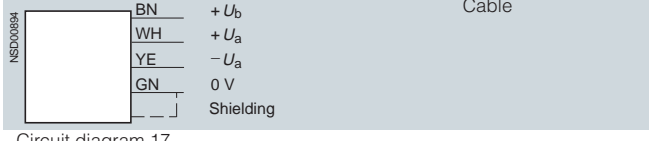
Circuit diagram 13



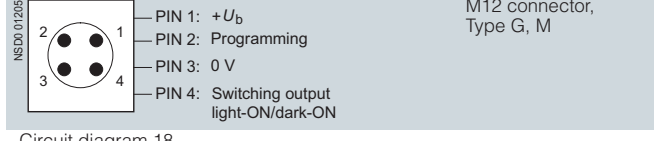
Circuit diagram 14



Circuit diagram 15



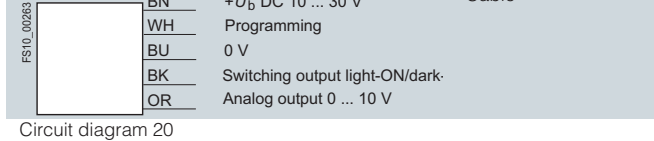
Circuit diagram 16



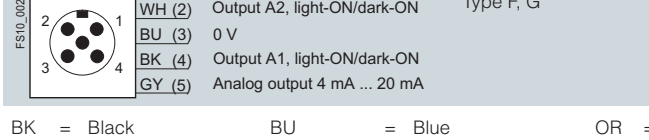
Circuit diagram 17



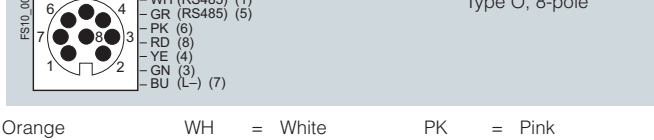
Circuit diagram 18



Circuit diagram 19



Circuit diagram 20



- BK = Black
- BU = Blue
- OR = Orange
- WH = White
- PK = Pink
- BN = Brown
- GR or GY = Gray
- RD = Red
- YE = Yellow
- GN = Green

SIMATIC PXO photoelectric proximity switches

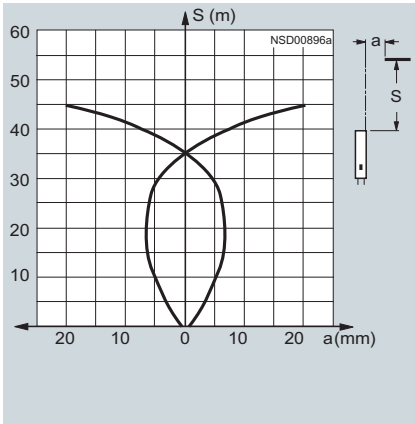
Characteristic curves

2

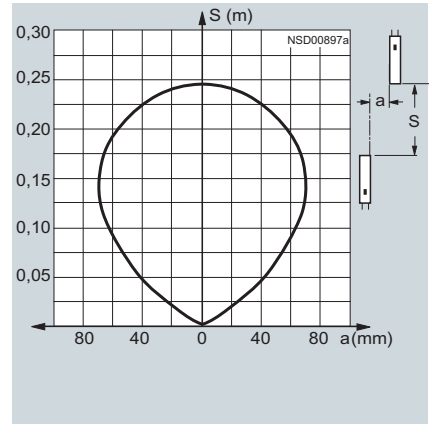
Characteristic curves

D4 and M5 design

Diffuse sensor

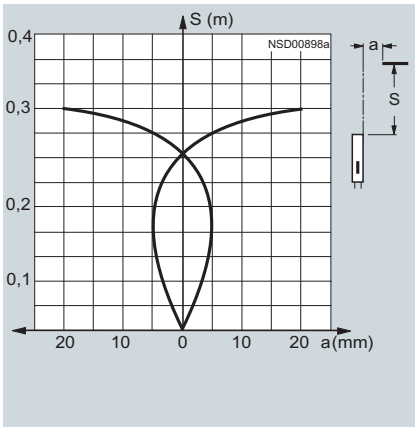


Thru-beam sensor

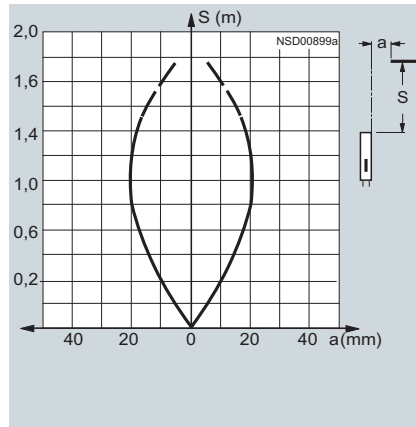


M12 design

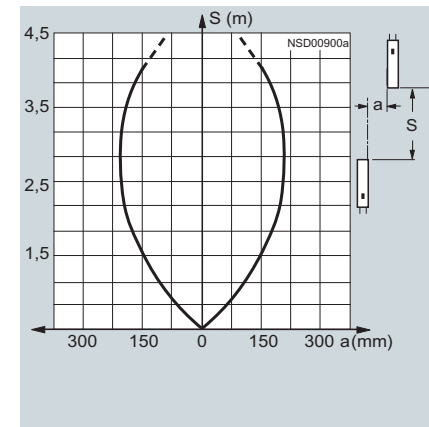
Diffuse sensor



Reflex sensor

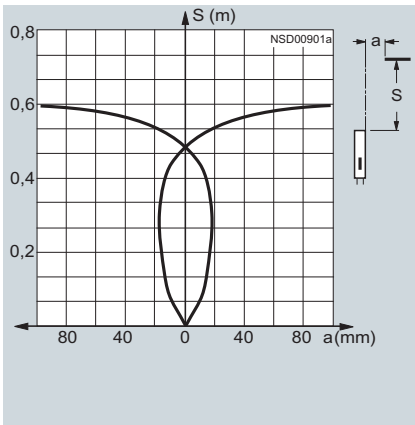


Thru-beam sensor

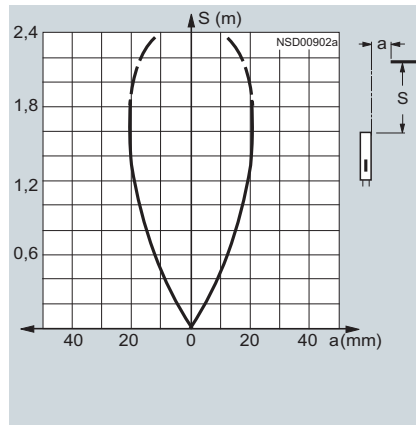


M18 design

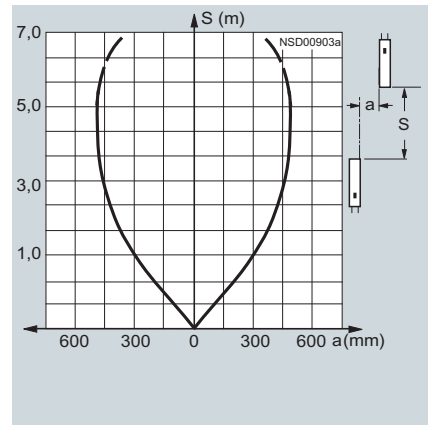
Diffuse sensor



Reflex sensor



Thru-beam sensor

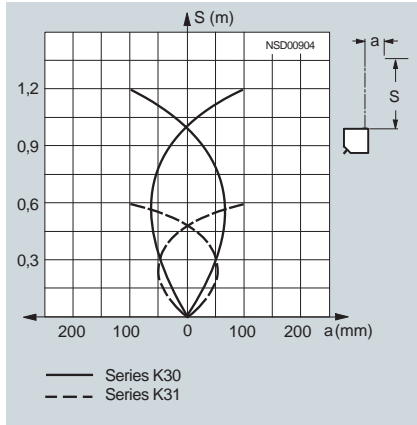


SIMATIC PXO photoelectric proximity switches

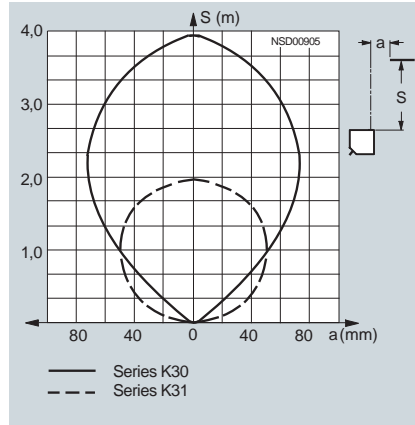
Characteristic curves

K30 and K31 design

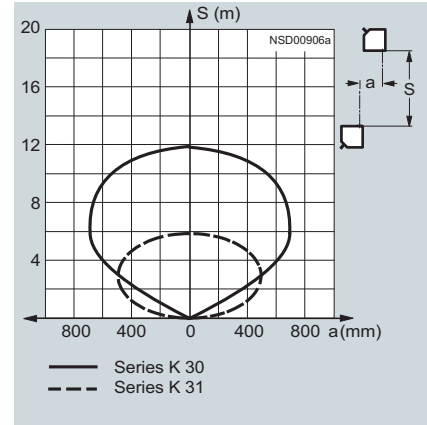
Diffuse sensor



Reflex sensor

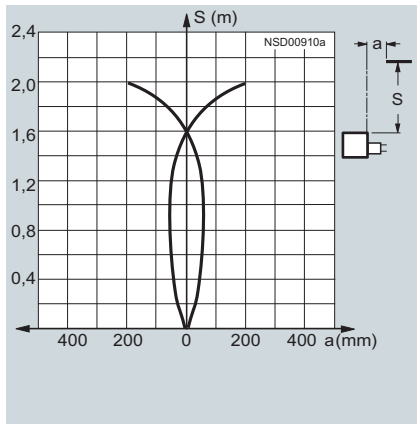


Thru-beam sensor

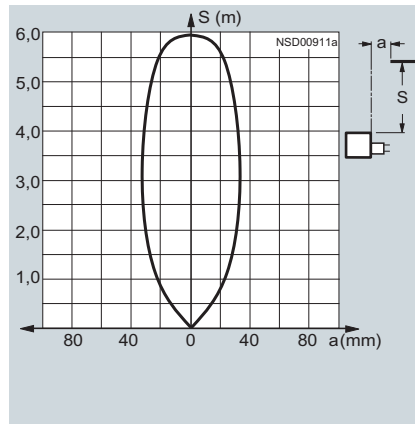


K80 design

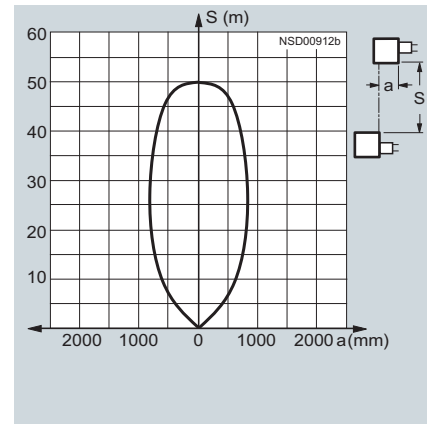
Diffuse sensor



Reflex sensor



Thru-beam sensor



2

SIMATIC PXO photoelectric proximity switches

Glossary for photoelectric proximity switches

More information

Terms associated with the technology of photoelectric proximity switches are explained below. Some of the terms are defined in IEC 60947-5-2.

Anti-interference function

This function prevents mutual interference between photoelectric proximity switches. The specified clearances between the devices does not have to be observed for devices with an anti-interference function. It is therefore possible to align two reflex sensors, for example, with a common reflector.

Function of the outputs

Dark-ON

The "dark-ON" function means that this output is conducting (current-carrying) when **no** light reaches the receiver.

Light-ON

The "light-ON" function means that this output is conducting (current-carrying) when light reaches the receiver.

Antivalent

The devices with antivalent output have 2 outputs. One output is **dark-ON**, and the other is **light-ON**.

Surplus light

As an alternative, some devices can be supplied with a different configuration of outputs, one output light-ON and the other for signaling the surplus light.

Output current

The devices are designed for a maximum output current (rated operating current, see Technical specifications). If this current is exceeded, even briefly, the built-in overload and short-circuit protection will be activated. Destruction of the device is effectively prevented.

Incandescent lamps, capacitors and other strongly capacitive loads (e.g. long leads) have a similar effect to an overload.

A minimum load current (smallest operating current) is not required. A built-in pull-up resistor ensures that an output signal is always available.

Auto-collimation

With these devices, the optical axes of the emitter and receiver are identical. The device only has one optical axis. This means that there is no blind zone range in front of the proximity switch and the accuracy of the switching point is higher.

Spurious signal suppression

The devices feature spurious signal suppression. It prevents the occurrence of spurious signals from the moment of application of the operating voltage until the moment when the device is ready for operation (approximately 5 ms).

Sensing range

The sensing range is the range within which the operating distance can be set. This term replaces any other previously used terms (sensing range/transmission range).

Correction factors

The specified sensing ranges of diffuse sensors are achieved with the specified surfaces by using matte white standard paper. The following correction factors (approximate values) apply to other surfaces:

Test card	100%	Black neoprene	20%
White paper	80%	Automobile tires	15%
Light-colored wood	73%	Sheet aluminum	
White plastic	70%	• raw	200%
Cork	65%	• black, anodized	150%
Printed newspaper	60%	• matte (brushed)	120%
PVC, gray	57%	Stainless steel, polished	230%
Black plastic	22%		

Enabling input

With photoelectric proximity switches with a test input, the emitter can be switched on or off. Function monitoring can be implemented with appropriate evaluation of the output signal (light barrier: no obstruction of light beam / diffuse sensors: reflecting object exists).

To disable the proximity switch, the enabling input must be connected to 0 V. The enabling input does not have to be used for operation.

Ambient light limit

Ambient light is the light produced by external light sources. The luminescence level is measured on the light incidence surface. Thanks to the use of modulated light, the devices are insensitive to ambient light.

There is, however, an upper limit for the intensity of any external light which is referred to as the ambient light limit. It is specified for sunlight (unmodulated light) and halogen light (light modulated at twice the frequency of the electricity supply). Reliable operation is not possible above the relevant ambient light limit.

SIMATIC PXO photoelectric proximity switches



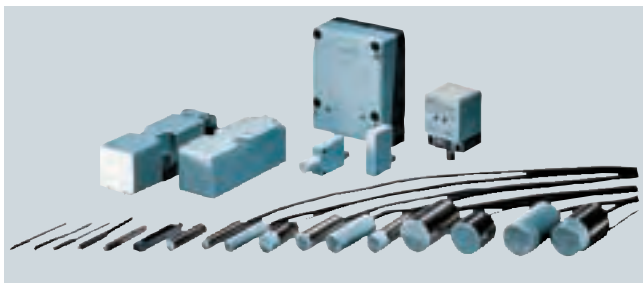
Notes

2

SIMATIC PXI inductive proximity switches

Introduction

Inductive proximity switches – rugged, accurate and reliable



For contact-free detection of metal objects, proximity switches are quite simply the most cost-effective solution. If an excellent wire of electricity or magnetism moves towards the sensor or away from it, the signal automatically changes.

With their excellent repeat accuracy, they are extremely reliable. And thanks to their wear-free operation and insensitivity to temperature, noise, light and water, they have a long service life. We have covered the complete application spectrum with a wide range of different types and ranges.

Highlights

- Extremely compact and rugged
- High degree of protection (IP67/IP68/IP69K)
- Correction factor 1
- High sensing ranges
- Fast switching frequencies
- Flexible mounting
- Especially suitable for small spaces
- Can be used all over the world: UL/CSA approvals

Configurator

A configurator for inductive proximity switches is available in the Mall. Based on the technical features required, the desired product can be quickly and easily selected, placed in the shopping cart and ordered.

The configurator can be reached by the following link:
www.siemens.com/simatic-sensors/px

PXI series

The inductive proximity switches are organized in different product families in accordance with their technical design:

SIMATIC sensors product family	Version
PXI200	Sensors for standard applications, typical values: <ul style="list-style-type: none"> • Operating voltage up to 34 V DC • Degree of protection up to IP67 • Operating distance acc. to standard
PXI300	Sensors for applications with special requirements: <ul style="list-style-type: none"> • Increased operating voltages • Higher degrees of protection • Above-standard operating distance
PXI400	Sensors without reduction factor
PXI600	Sensors with special approvals: <ul style="list-style-type: none"> • ATEX sensors for hazardous area Zone 2 • Sensors with e1 type approval
PXI900	<ul style="list-style-type: none"> • Pressure-resistant sensors up to 500 bar • Sensors with analog output

Application

Inductive proximity switches are the low-cost solution for non-contact detection of metal objects. They are used in sectors in which metal components play an important role, e.g.

- In the automotive industry
- In mechanical engineering
- In the robotics industry
- In conveyor systems
- In the paper and printing industry

The induction principle and the experience gained by Siemens over many years have made the inductive proximity switches what they are: extremely reliable with a very high repeat accuracy and long service life thanks to a lack of wearing parts as well as their insensitivity to temperature, noise, light and water.

Approvals

3RG40, 3RG41 devices with M 12 or M 18 connectors as well as terminal compartments are UL and CSA listed. For a complete overview, see the Appendix in the FS 10 Catalog.

Sensors for Ex Zone 2/22



The PXI600 inductive proximity switches are approved according to EU Guideline 94/9/EG (ATEX) Appendix VIII

The approval is for:

- Gas EX II 3G EEx nA II T6x and
- Dust EX II 3D IP65 T 80 °C

The functionality of the inductive proximity switches with ATEX approval is identical to that of the standard proximity switches.

Sensors with e1 type approval

In the product family SIMATIC PXI, proximity switches with e1 type approval according to the guideline 72/245/EEC are used in motor vehicles. The functionality of proximity switches with e1 approval is identical to that of standard proximity switches.

Personal safety



Use of the inductive proximity switches is not permissible for applications in which the safety of persons is dependent on the function of the proximity switch.

NSDO_00801

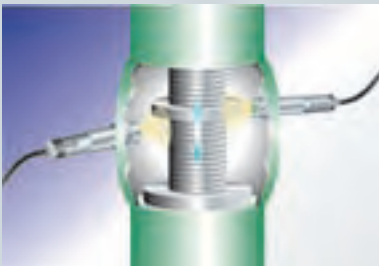
Application examples



Recognition of broken drills



Recognition of positioning screws on the wheel for velocity or direction control



Recognition of the valve position (completely open or closed)



Recognition of cans and lids

Design

Selection

When selecting an inductive proximity switch, first the suitable product family (PXI200, PXI300, etc.) for the requirements must be selected according to the overview.

In the product families the proximity switches are sorted in ascending order based on their operating distance. Here it must be considered that the specified operating distance is according to the standard. If elements are used that are smaller than the standard target or are made of different materials, the operating distances become smaller in practical applications (see under "Further information", keywords "Standard target", "Operating distance", "Reduction factors").

Most inductive proximity switches are available in different designs:

- For flush and non-flush-mounting
- With 2, 3, or 4 wires
- pnp or npn switching
- As NO or NC contact
- With connection by means of a plug-in connector (M12 or combination connector 8 mm), or with integrated cable (for details, see "Further information")

Accessories

A cable box is required for sensors with connection plug. They are listed in the chapter "Accessories". The suitable cable box is identified by the plug type code. This code is included in the order data of the sensors and in the order data of the cable boxes. Further accessories are usually not required (fastening nuts are supplied together with cylindrical sensors).

Mounting

Inductive proximity switches can be mounted in any position. However, mounting positions where metallic objects (e.g. bore chips) can deposit on the sensing area are not permissible.

If sensors are affixed with nuts, the maximum tightening torques must be adhered to. Otherwise the proximity switch could be damaged.

Design	Material	Tightening torque Nm
M8	Brass	2
	Stainless steel	5
M12	Brass	10
	Molded plastic	1
	Stainless steel	25
M14	Molded plastic	0.5
M18	Brass	20
	Molded plastic	3
	Stainless steel	50
M30	Brass	40
	Molded plastic	5
	Stainless steel	100

Connecting cables

Generally speaking, the cables used are highly flexible with oil-resistant, polyurethane (PUR) outer sheaths and a standard length of 2 m.

Please order devices with a PVC cable for applications in which cables will come into contact with acid or lye.

For devices intended for use as per UL and CSA, order a PVC cable.

Cables in alternative lengths and materials can be supplied on request.

SIMATIC PXI inductive proximity switches

Introduction

Do not route proximity switch connecting cables in a cable duct that runs parallel to cables that are used to switch inductive loads (e.g. contactor coils, solenoid valves, motors) or to conduct currents from electronic motorized operating mechanisms.

Keep cables as short as possible; however, when routed under ideal conditions (low coupling capacitance, minimal interference voltages), they may have a length of up to 300 m.

The following measures may be taken to reduce the effect of interference:

- Distance from cables causing interference > 100 mm
- Shields
- Coils (of contactors, relays, solenoid valves) are wired with RC elements or varistors.

Electrical connection

See under "Circuit diagrams", page 2/242. This number of the respective associated circuit diagram is listed in the selection tables of the proximity switches. For further circuits, refer to "Typical circuit diagrams".

Minimum clearances

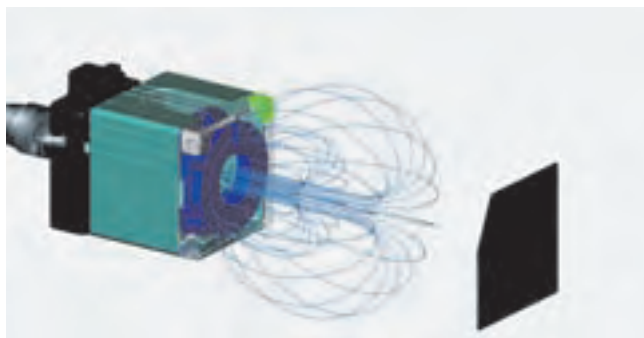
To prevent the proximity switches from switching without object, it is absolutely essential that the clearances around the sensing area of metallic objects are unobstructed. Furthermore, the minimum clearance to adjacent inductive sensors must be ensured (see diagrams in the selection tables).

Degrees of protection

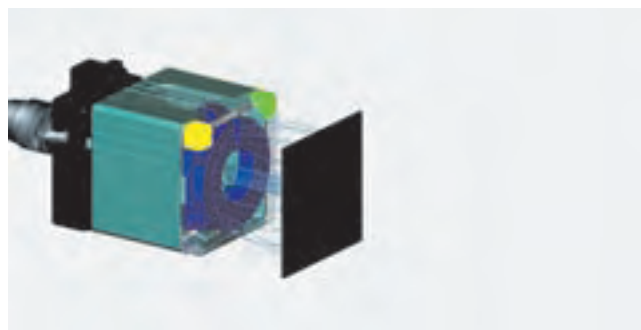
See "Further information".

Function

In the proximity switch, a high-frequency alternating field is generated, which emerges from the "sensing area" of the proximity switch. The size of this alternating field determines the "sensing range" of the switch. The approach of an electrically and/or magnetically conductive material attenuates this field. Both states (field attenuated or not attenuated) are evaluated in the proximity switch and result in a signal change at the output.



Field not attenuated



Field attenuated

Technical specifications

General technical specifications

Hysteresis H	$H \leq 0.2 s_r$
Max. permissible cable length (unshielded)	
• AC/DC	100 m/300 m
Ambient temperature	
• During operation	-25 ... +85 °C ^{1) 2)}
• During storage	-40 ... +85 °C ¹⁾
Shock resistance	30 × g, 18 ms duration
Resistance to vibration	55 Hz, 1 mm amplitude
Reduction factor	
• Proximity switch for flush or non-flush mounting (typical values)	
- Stainless steel	0.7 ... 0.9
- Aluminum	0.35 ... 0.5
- Copper	0.2 ... 0.4
- Brass	0.3 ... 0.6
• Proximity switch without a reduction factor	1
Voltage drop	
• 2-wire proximity switch	≤ 8 V
• 3-wire proximity switch	≤ 2.5 V
• 4-wire proximity switch	≤ 2.5 V
Approvals	IEC 60947-5-2 EN 60947-5-2 (VDE 0660, Part 208)

1) Up to +70 °C for some proximity switches; see selection and ordering data.

2) At ambient temperatures of > 50 °C, the output current for some proximity switches is restricted; see selection and ordering data.



Notes

SIMATIC PXI inductive proximity switches

Introduction

2

Design	Cylindrical designs								
	Ø 3 mm	Ø 4 mm	M5	Ø 6,5 mm	M8	Ø 8 mm	M12	Ø 12 mm	M14
SIMATIC PXI200	see page								
• 0.6 mm	2/140								
• 0.8 mm		2/141	2/141						
• 1 mm					2/142, 2/143				
• 1.5 mm				2/144	2/146, 2/147	2/146			
• 2 mm							2/148, 2/149		
• 2.5 mm				2/152	2/152				2/153, 2/154
• 4 mm							2/155, 2/156		
• 5 mm									2/158
• 8 mm									
• 10 mm									
• 15 mm									
• 20 mm									
• 30 mm									
• 40 mm									
SIMATIC PXI300	see page								
• 0.6 mm		2/172	2/172						
• 1 mm					2/172				
• 2 mm					2/175		2/173, 2/174	2/174	
• 2.5 mm				2/177	2/177				2/176
• 3 mm				2/178	2/178				
• 4 mm							2/180–2/183	2/181	
• 5 mm									2/184
• 6 mm					2/187		2/187		
• 8 mm									
• 10 mm							2/195		
• 12 mm									
• 15 mm									
• 20 mm									
• 22 mm									
• 25 mm									
• 30 mm									
• 35 mm									
• 40 mm									
• 30/40 mm									
• 25/40 mm (selectable)									
• 50 mm									
• 65 mm									
SIMATIC PXI400	see page								
• 1.5 mm					2/217				
• 3 mm							2/218		
• 4 mm					2/219				
• 5 mm									
• 8 mm							2/221		
• 10 mm									
• 12 mm									
• 15 mm									
• 20 mm									
• 25 mm									
• 35 mm									
• 40 mm									
• 75 mm									
SIMATIC PXI600	see page								
• 2 mm							2/230		
• 4 mm							2/230		
• 5 mm									
• 8 mm									
• 10 mm									
• 15 mm									
• 35 mm									
SIMATIC PXI900	see page								
• 3 mm									2/240
• 0 ... 6 mm							2/241		

SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Overview

SIMATIC sensors PXI200

Sensors for standard applications. Typical values:

- Operating voltage up to 34 V DC
- Degree of protection up to IP67
- Operating distance acc. to standard

Selection table

SIMATIC PXI200										
Design, Ø	3 mm	4 mm	M5	5 mm x 5 mm	M8	6.5 mm	8 mm x 8 mm	M12	12 mm x 40 mm	12 mm x 32 mm
Operating distance										
• 0 ... 0.8 mm (PXI.1.)	0.6 mm	0.8 mm	0.8 mm	0.8 mm						
• 1 ... 4 mm (PXI.2.)					1 mm 1.5 mm 2.5 mm	1.5 mm 2.5 mm	1.5 mm	2 mm 4 mm	2 mm 4 mm	2 mm
Output										
• NO contact/NC contact	■ / —	■ / ■	■ / ■	■ / —	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■
• pnp/npn	■ / —	■ / —	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / —	■ / —
Number of wires	3	3	3	3	2, 3, 4	3	3	2, 3, 4	3, 4	4
Operating voltage										
• 10/15 ... 30/35 V DC	■	■	■	■	■	■	■	■	■	■
Connection										
• M8 connector		■	■		■	■	■		■	
• M12 connector					■			■	■	
• Cable	■	■	■	■	■	■	■	■	■	■
Degree of protection										
• IP65 / IP67	— / ■	— / ■	— / ■	— / ■	— / ■	— / ■	— / ■	— / ■	— / ■	— / ■
See page	2/140	2/141	2/141	2/141	from 2/142	from 2/144	2/146	from 2/148	2/150	2/150

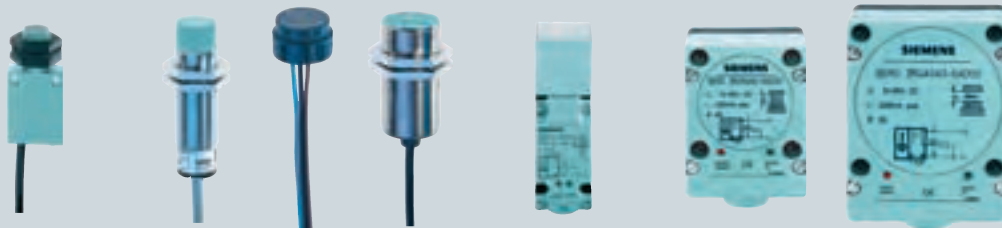
A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXI inductive proximity switches

SIMATIC PXI200

2

SIMATIC PXI200



Design, Ø	Box with M14	M18	Button 18 mm	M30	40 mm x 40 mm	60 mm x 80 mm	80 mm x 100 mm
Operating distance							
• 1 ... 4 mm (PXI.2.)	2.5 mm						
• 5 ... 10 mm (PXI.3.)	5 mm	5 mm 8 mm	5 mm	10 mm			
• 12 ... 22 mm (PXI.4.)				15 mm	15 mm 20 mm		
• 25 ... 40 mm (PXI.5.)						30 mm	40 mm
Output							
• NO contact/NC contact	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■
• pnp/npn	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / —	■ / —
Number of wires	2, 3, 4	2, 3, 4	3	2, 3, 4	2, 3, 4	4	4
Operating voltage							
• 10/15 ... 30/35 V DC	■	■	■	■	■	■	■
Connection							
• M12 connector	■	■		■	■		
• Cable	■	■	■	■			
• Terminal compartment					■	■	■
Degree of protection							
• IP65 / IP67	— / ■	— / ■	— / ■	— / ■	■ / ■	■ / —	■ / —
See page	2/153	from 2/157	2/158	from 2/162	from 2/165	2/169	2/169

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 0.6 mm

Technical specifications

Class		Standard duty
Number of wires		3-wire
Design		Ø 3 mm, mini
Installation in metal		Flush
Rated operating distance s_n		0.6 mm
Enclosure material		Stainless steel
Operational voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 10
Rated operational current I_e	mA	100
Switching frequency f	Hz	5000
Repeat accuracy R	mm	0.01
Power-up delay t_v	ms	10
Switching status display		Yellow LED
Precautions		<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection
Degree of protection		IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.
With 2 m cable, PUR		$3 \times 0.055 \text{ mm}^2$
NO contact, pnp	11	3RG46 03-2AB00

1) See page 2/242.

► Preferred type, available from stock.

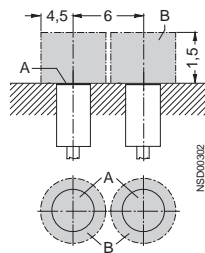
Dimensions

Mounting instructions

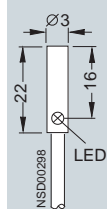
Dimension depending on form

A = active surface

B = metal-free area



3RG46 03-2AB00



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 0.8 mm

2

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	3-wire	3-wire
Design		5 mm x 5 mm, mini	Ø 4 mm, mini	M5, mini
Installation in metal		Flush	Flush	Flush
Rated operating distance s_n		0.8 mm	0.8 mm	0.8 mm
Enclosure material		Brass, nickel-plated	Stainless steel	Stainless steel
Operating voltage (DC)	V	10 ... 30	10 ... 30	10 ... 30
No-load supply current I_0	mA	≤ 10	≤ 10	≤ 10
Rated operational current I_e	mA	200	200	200
Switching frequency f	Hz	5000	5000	5000
Repeat accuracy R	mm	0.01	0.01	0.01
Power-up delay t_v	ms	10	8	10
Switching status display		Yellow LED	Yellow LED	Yellow LED
Precautions		<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR					
NO contact, pnp	11	▶	3 × 0.14 mm ² 3RG42 36-0AG00	▶	3 × 0.14 mm ² 3RG42 00-1AB00
NC contact, pnp	12		–	▶	3RG42 00-1AA00
NO contact, npn	13		3RG46 36-0GB00		3RG46 10-0BF00
					3RG46 10-0GB00
With 8 mm combination plug					
NO contact, pnp	2	A, C	–	▶	3RG42 00-7AB00
NC contact, pnp	3	A	–		3RG42 10-7AG00
NO contact, npn	4	A, C	–		3RG42 10-7AF00
					3RG46 10-7GB00

1) See page 2/242.

2) See from page 2/268.

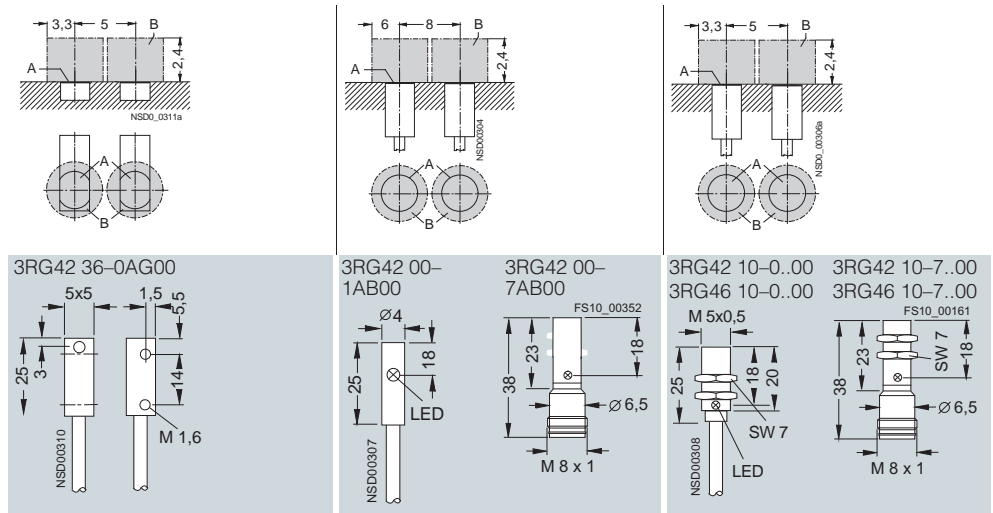
▶ Preferred type, available from stock

Dimensions

Mounting instructions

Dimension depending on form

A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 1 mm

Technical specifications

Class		Standard duty	Standard duty
Number of wires		3-wire	4-wire
Design		M8	M8
Installation in metal		Flush	Flush
Rated operating distance s_n		1 mm	1 mm
Enclosure material		Stainless steel	Stainless steel
Operational voltage (DC)	V	15 ... 34	10 ... 30
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 1
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	50
Switching frequency f	Hz	1500	1500
Repeat accuracy R	mm	0.1	0.1
Power-up delay t_v	ms	40	40
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	4 × 0.14 mm ²
NO contact, pnp	11	▶	3RG40 11-0AG00	—
NC contact, pnp	12		3RG40 11-0AF00	—
NO contact, npn	13	▶	3RG40 11-0GB00	—
NO contact and NC contact, pnp	10		—	▶ 3RG40 11-0CC00
With 8 mm combination plug				
NO contact, pnp	2	A, C	▶ 3RG40 11-7AG00	—
NC contact, pnp	3	A	3RG40 11-7AF00	—
NO contact and NC contact, pnp	1	B	—	B 3RG40 11-7CC00
With M12 connector				
NO contact, pnp	2	E, F	▶ 3RG40 11-3AG00	—
NC contact, pnp	3	F	3RG40 11-3AF00	—
NO contact, npn	4	E, F	3RG40 11-3GB00	—
NO contact and NC contact, pnp	4	F	—	3RG40 11-3CC00

1) See page 2/242.

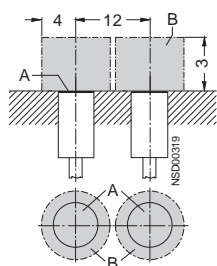
2) See from page 2/268.

▶ Preferred type, available from stock

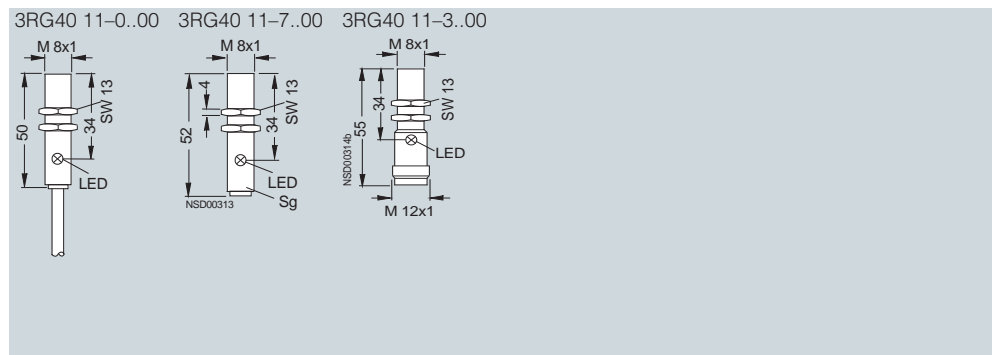
B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class	Standard duty (PLC)	
Number of wires	2-wire	
Design	M8	
Installation in metal	Flush	
Rated operating distance s_n	1 mm	
Enclosure material	Stainless steel	
Operating voltage (DC)	V	15 ... 34
No-load supply current I_0	mA	≤ 1.5
Rated operational current I_e	mA	25
Switching frequency f	Hz	1500
Repeat accuracy R	mm	0.1
Power-up delay t_v	ms	40
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	
Degree of protection	IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			
NO contact	15	▶ B	3RG40 11-0JB00
With 8 mm combination plug			
NO contact	7	A	3RG40 11-7JB00
With M12 connector			
NO contact	6	E, F	3RG40 11-3JB00

1) See page 2/242.

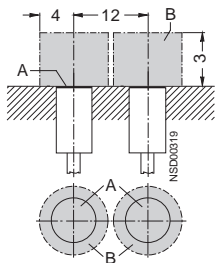
2) See from page 2/268.

▶ Preferred type, available from stock

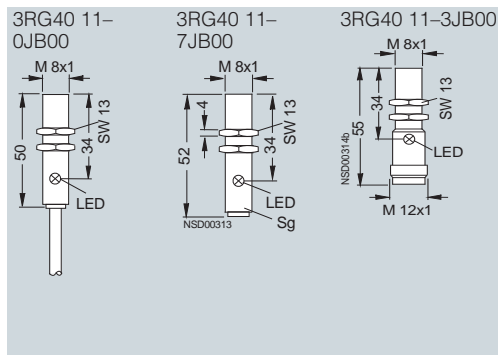
B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 1.5 mm

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	3-wire	3-wire
Design		Ø 6.5 mm, mini	Ø 6.5 mm, Shorty	Ø 6.5 mm
Installation in metal		Flush	Flush	Flush
Rated operating distance s_n		1.5 mm	1.5 mm	1.5 mm
Enclosure material		Stainless steel	Stainless steel	Stainless steel
Operating voltage (DC)	V	10 ... 30	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 10	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e	mA	200	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	3000	1500	1500
Repeat accuracy R	mm	0.02	0.1	0.1
Power-up delay t_v	ms	10	40	40
Switching status display		Yellow LED	Yellow LED	Yellow LED
Precautions				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		–	•	•
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR			3 × 0.14 mm ²	3 × 0.25 mm ²	3 × 0.25 mm ²
NO contact, pnp	11	▶	3RG42 01-1AB00	3RG40 50-0AG33	3RG40 50-0AG05
NC contact, pnp	12		–	B 3RG40 50-0AF33	3RG40 50-0AF05
NO contact, npn	13		–	3RG40 50-0GB33	3RG40 50-0GB05
NC contact, npn	14		–	3RG40 50-0GA33	3RG40 50-0GA05
With 8 mm combination plug					
NO contact, pnp	2	A ▶	3RG42 01-7AG00	3RG40 50-7AG33	3RG40 50-7AG05
NC contact, pnp	3	A ▶	3RG42 01-7AF00	B 3RG40 50-7AF33	3RG40 50-7AF05
NO contact, npn	4	A	3RG46 01-7GB00	3RG40 50-7GB33	3RG40 50-7GB05
NC contact, npn	5	A	–	B 3RG40 50-7GA33	3RG40 50-7GA05

1) See page 2/242.

2) See from page 2/268.

▶ Preferred type, available from stock

B: Subject to export regulations AL = N and ECCN = EAR99

SIMATIC PXI inductive proximity switches

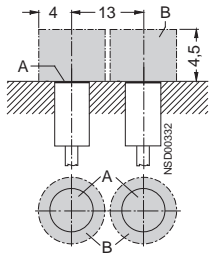
SIMATIC PXI200

Operating distance 1.5 mm

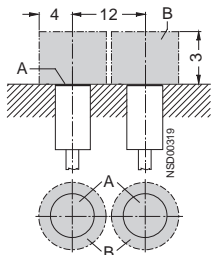
Dimensions

Mounting instructions

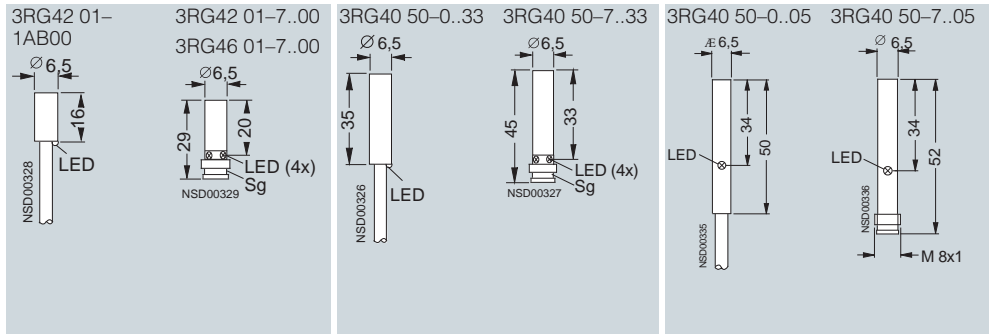
3RG42 01, 3RG46 01-7



3RG40 50



A = active surface
B = metal-free area



2

SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 1.5 mm

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	3-wire	3-wire
Design		M8, mini	Ø 8 mm, Shorty	8 mm × 8 mm
Installation in metal		Flush	Flush	Flush
Rated operating distance s_n		1.5 mm	1.5 mm	1.5 mm
Enclosure material		Brass, nickel-plated	Stainless steel	Brass, nickel-plated
Operating voltage (DC)	V	10 ... 30	15 ... 34	10 ... 30
No-load supply current I_0	mA	≤ 10	≤ 17 (24 V); ≤ 30 (34 V)	≤ 10
Rated operational current I_e	mA	200	200 (≤ 50 °C); 150 (≤ 85 °C)	200
Switching frequency f	Hz	3000	1500	1000
Repeat accuracy R	mm	0.01	0.1	0.07
Power-up delay t_v	ms	10	40	10
Switching status display		Yellow LED	Yellow LED	Yellow LED
Precautions				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		–	•	–
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.	
With 2 m cable, PUR						
NO contact, pnp	11	▶	3 × 0.14 mm ² 3RG42 11-0AG31	▶	3 × 0.25 mm ² 3RG40 51-0AG33	
NC contact, pnp	12		–	B	3RG40 51-0AF33	
NO contact, npn	13		–		3RG40 51-0GB33	
NC contact, npn	14		–		3RG40 51-0GA33	
With 8 mm combination plug						
NO contact, pnp	2	A	▶	3RG42 11-7AG31	▶	3RG40 51-7AG33
NC contact, pnp	3	A	▶	3RG42 11-7AF31	B	3RG40 51-7AF33
NO contact, npn	4	A		3RG46 11-7GB31		3RG40 51-7GB33
NC contact, npn	5	A		–	B	3RG40 51-7GA33

1) See page 2/242.

2) See from page 2/268.

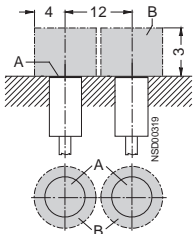
B: Subject to export regulations AL = N and ECCN = EAR99

▶ Preferred type, available from stock.

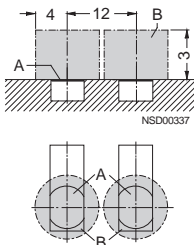
Dimensions

Mounting instructions

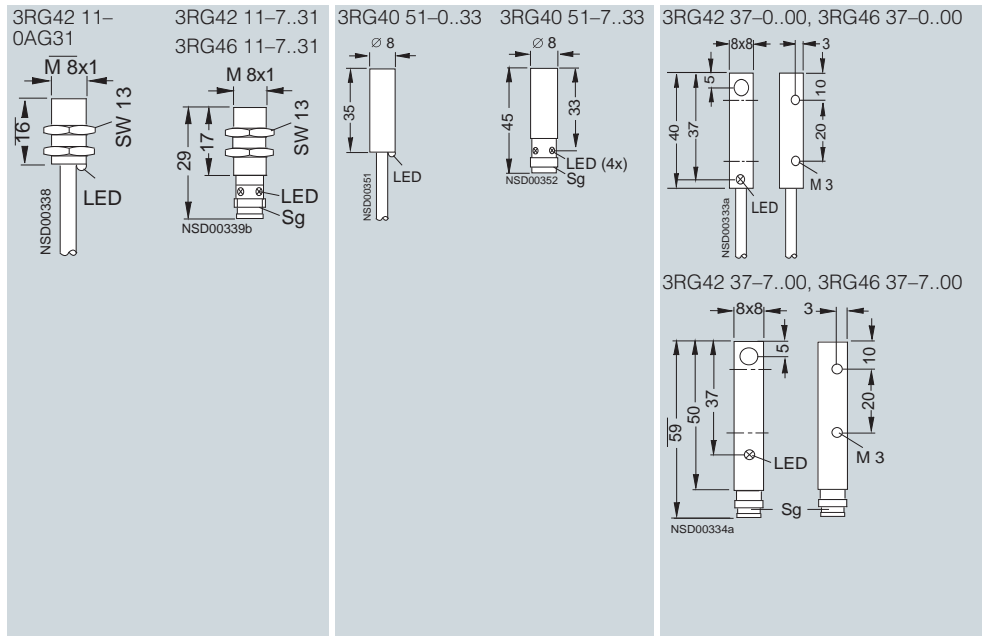
3RG42 11, 3RG46 11, 3RG40 51



3RG42 37, 3RG46 37



A = active surface
B = metal-free area



Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	3-wire	4-wire
Design		M8, Shorty	M8	M8
Installation in metal		Flush	Flush	Flush
Rated operating distance s_n		1.5 mm	1.5 mm	1.5 mm
Enclosure material		Stainless steel	Stainless steel	Stainless steel
Operating voltage (DC)	V	15 ... 34	15 ... 34	10 ... 30
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 1.0
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	50
Switching frequency f	Hz	1500	1500	1500
Repeat accuracy R	mm	0.1	0.1	0.1
Power-up delay t_v	ms	40	40	40
Switching status display		Yellow LED	Yellow LED	Yellow LED
Precautions				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		•	•	•
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR					
NO contact, pnp	11	▶	3RG40 11-0AG33	▶	3RG40 11-0AG05
NC contact, pnp	12	▶ B	3RG40 11-0AF33	▶	3RG40 11-0AF05
NO contact, npn	13		3RG40 11-0GB33		3RG40 11-0GB05
NC contact, npn	14		3RG40 11-0GA33		3RG40 11-0GA05
NO contact and NC contact, pnp	10		–		▶ 3RG40 11-0CC05
With 8 mm combination plug					
NO contact, pnp	2	A ▶	3RG40 11-7AG33	▶	3RG40 11-7AG05
NC contact, pnp	3	A ▶ B	3RG40 11-7AF33	▶	3RG40 11-7AF05
NO contact, npn	4	A	3RG40 11-7GB33		–
NC contact, npn	5	A B	3RG40 11-7GA33		–
NO contact and NC contact, pnp	1	F	–		B 3RG40 11-7CC05
With M12 connector					
NO contact, pnp	2	E, F	–	▶	3RG40 11-3AG05
NC contact, pnp	3	F	–		3RG40 11-3AF05
NO contact, npn	4	E, F	–		3RG40 11-3GB05
NC contact, npn	5	F	–		3RG40 11-3GA05
NO contact and NC contact, pnp	1	F	–		3RG40 11-3CC05

1) See page 2/242.

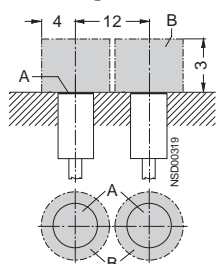
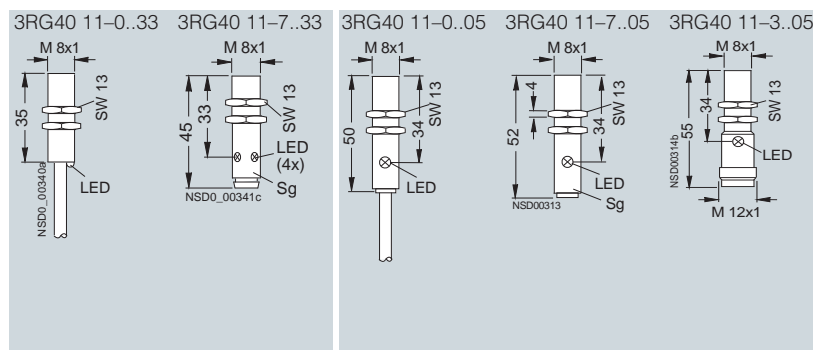
2) See from page 2/268.

▶ Preferred type, available from stock

B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions

Mounting instructions

A = active surface;
B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 2 mm

Technical specifications

Class	Standard duty			
	3-wire	4-wire	3-wire	4-wire
Number of wires				
Design	M12, Shorty	M12, Shorty	M12	M12
Installation in metal	Flush	Flush	Flush	Flush
Rated operating distance s_n	2 mm	2 mm	2 mm	2 mm
Enclosure material	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Operating voltage (DC)	V 15 ... 34	15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA ≤ 17 (24 V); ≤ 30 (34 V)	≤ 1.0	≤ 17 (24 V); ≤ 30 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	50	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 1200	800	1200	1200
Repeat accuracy R	mm 0.1	0.1	0.1	0.1
Power-up delay t_v	ms 40	3	40	40
Switching status display	Yellow LED	Yellow LED	Yellow LED	Yellow LED
Precautions				
• Spurious signal suppression	•	•	•	•
• Short-circuit-proof/overload-proof	•	•	•	•
• Reverse-polarity protection	•	•	•	•
• Wire-break protection	•	•	•	•
• Inductive interference protection	•	•	•	•
• Radio interference protection	•	•	•	•
Degree of protection	IP67	IP67	IP67	IP67
Type	3RG40 12-.A.33 3RG40 12-.G.33	3RG40 12-0CD10 3RG40 12-3CD11	3RG40 12-.A.01 3RG40 12-.G.00	3RG40 12-0CD00 3RG40 12-3CD00

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶	3RG40 12-0AG33	▶ B 3RG40 12-0AG01
NC contact, pnp	12	B	3RG40 12-0AF33	B 3RG40 12-0AF01
NO contact, npn	13	▶ B	3RG40 12-0GB33	▶ B 3RG40 12-0GB00
NC contact, npn	14	B	3RG40 12-0GA33	B 3RG40 12-0GA00
NO contact and NC contact, pnp	10		4 × 0.14 mm ² 3RG40 12-0CD10	▶ B 3RG40 12-0CD00
With M12 connector				
NO contact, pnp	2	E, F	▶ 3RG40 12-3AG33	▶ B 3RG40 12-3AG01
NC contact, pnp	3	F	B 3RG40 12-3AF33	▶ B 3RG40 12-3AF01
NO contact, npn	4	E, F	B 3RG40 12-3GB33	▶ B 3RG40 12-3GB00
NC contact, npn	5	F	3RG40 12-3GA33	-
NO contact and NC contact, pnp	1	F	4-wire 3RG40 12-3CD11	▶ B 3RG40 12-3CD00

1) See page 2/242.

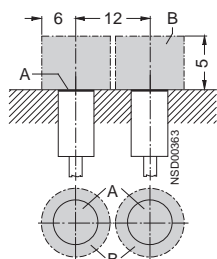
2) See from page 2/268.

▶ Preferred type, available from stock.

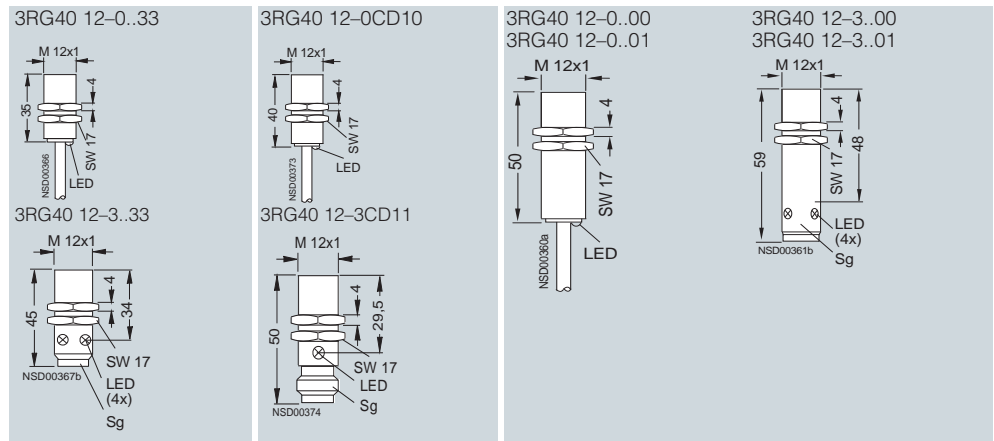
B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class		Standard duty (PLC)
Number of wires		2-wire
Design		M12
Installation in metal		Flush
Rated operating distance s_n		2 mm
Enclosure material		Brass, nickel-plated
Operating voltage		
• DC	V	15 ... 34
No-load supply current I_0		
• At 24 V DC	mA	1.5
Rated operational current I_e		
• Continuous	mA	25
Minimum load current		mA
		2
Switching frequency f		Hz
		700
Repeat accuracy R		mm
		0.1
Power-up delay t_v		ms
		40
Switching status display		Yellow LED
Precautions		
• Spurious signal suppression		•
• Short-circuit-proof/overload-proof		—
• Reverse-polarity protection		•
• Wire-break protection		•
• Inductive interference protection		•
• Radio interference protection		•
Degree of protection		IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			2 × 0.25 mm ²
NO contact	15	▶ B	3RG40 12-0JB00
With M12 connector			
NO contact	6	E, F ▶ B	3RG40 12-3JB00

1) See page 2/242.

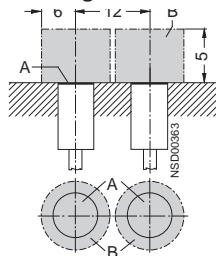
2) See from page 2/268.

▶ Preferred type, available from stock

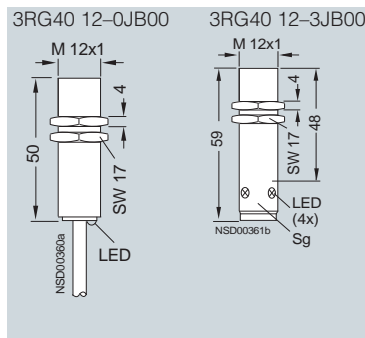
B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 2 mm

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	4-wire	4-wire
Design		Cubic 12 mm x 40 mm	Cubic 12 mm x 40 mm	Cubic 12 mm x 32 mm
Installation in metal		Flush	Flush	Flush
Rated operating distance s_n		2 mm	2 mm	2 mm
Enclosure material		Molded plastic	Molded plastic	Molded plastic
Operating voltage (DC)	V	15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)	≤ 1.0
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	50	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	800	1200	1200
Repeat accuracy R	mm	0.2	0.1	0.1
Power-up delay t_v	ms	40	40	40
Switching status display		Yellow LED	Yellow LED	–
Precautions				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		•	•	–
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	3 × 0.25 mm ²	4 × 0.14 mm ²
NO contact, pnp	11		3RG40 70-0AG45	–	–
NO contact and NC contact, pnp	10		–	–	3RG40 71-0CD00
With 8 mm combination plug					
NO contact, pnp	2	A	3RG40 70-7AG45	–	–
NO contact and NC contact, pnp	1	F	–	3RG40 70-7CD45	–

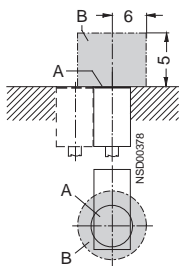
1) See page 2/242.

2) See from page 2/268.

▶ Preferred type, available from stock

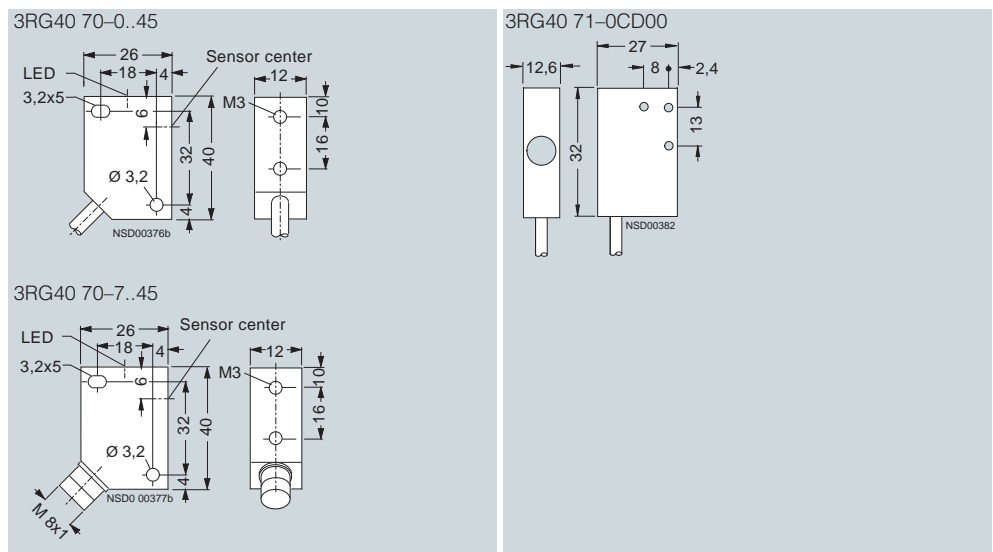
Dimensions

Mounting instructions



A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 2 mm

Technical specifications

Class		Standard duty	Standard duty
Number of wires		3-wire	4-wire
Design		Cubic 12 mm x 40 mm	Cubic 12 mm x 40 mm
Installation in metal		Flush	Flush
Rated operating distance s_n		2 mm	2 mm
Enclosure material		Molded plastic	Molded plastic
Operating voltage (DC)	V	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 40 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	1200	1200
Repeat accuracy R	mm	0.1	0.1
Power-up delay t_v	ms	40	40
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP67	IP67

Selection and Ordering data

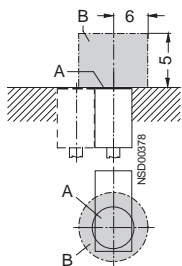
Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$	$4 \times 0.14 \text{ mm}^2$
NO contact, pnp	11		3RG40 70-0AG01	—
NC contact, pnp	12		3RG40 70-0AF01	—
NO contact and NC contact, pnp	10		—	3RG40 70-0CD00
With 8 mm combination plug				
NO contact, pnp	2	A	3RG40 70-7AG01	—
NO contact and NC contact, pnp; LED corresp. to NO contact	1	B	—	3RG40 70-7CD01
NO contact and NC contact, pnp; LED corresp. to NC contact	1	B	—	3RG40 70-7CD02
With M12 connector				
NO contact, pnp	2	E, F	3RG40 70-3AG01	—
NC contact, pnp	3	F	3RG40 70-3AF01	—
NO contact and NC contact, pnp	1	F	—	3RG40 70-3CD00

1) See page 2/242.

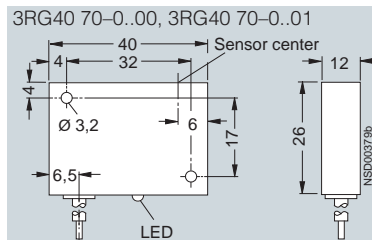
2) See from page 2/268.

Dimensions

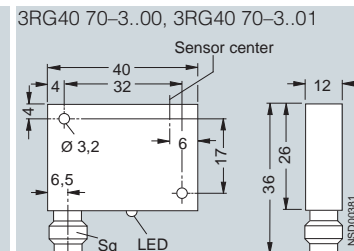
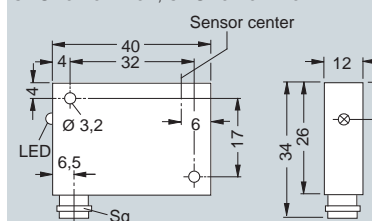
Mounting instructions

A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.



3RG40 70-7..01, 3RG40 70-7..02



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 2.5 mm

Technical specifications

Class		Standard duty	Standard duty
Number of wires		3-wire	3-wire
Design		Ø 6.5 mm	M8
Installation in metal		Not flush	Not flush
Rated operating distance s_n		2.5 mm	2.5 mm
Enclosure material		Stainless steel	Stainless steel
Operational voltage (DC)	V	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	900	1200
Repeat accuracy R	mm	0.08	0.1
Power-up delay t_v	ms	40	40
Switching status display		Yellow LED	Yellow LED
Precautions		•	•
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	3 × 0.25 mm ²
NO contact, pnp	11		3RG40 60-0AG33	3RG40 21-0AG33
NC contact, pnp	12	B	3RG40 60-0AF33	B 3RG40 21-0AF33
NO contact, npn	13	B	3RG40 60-0GB33	3RG40 21-0GB33
NC contact, npn	14	B	3RG40 60-0GA33	3RG40 21-0GA33
With 8 mm combination plug				
NO contact, pnp	2	A	3RG40 60-7AG33	3RG40 21-7AG33
NC contact, pnp	3	A	B 3RG40 60-7AF33	B 3RG40 21-7AF33
NO contact, npn	4	A	3RG40 60-7GB33	3RG40 21-7GB33
NC contact, npn	5	A	B 3RG40 60-7GA33	B 3RG40 21-7GA33

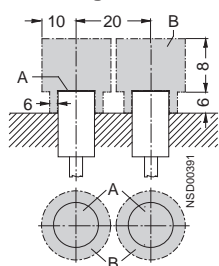
1) See page 2/242.

2) See from page 2/268.

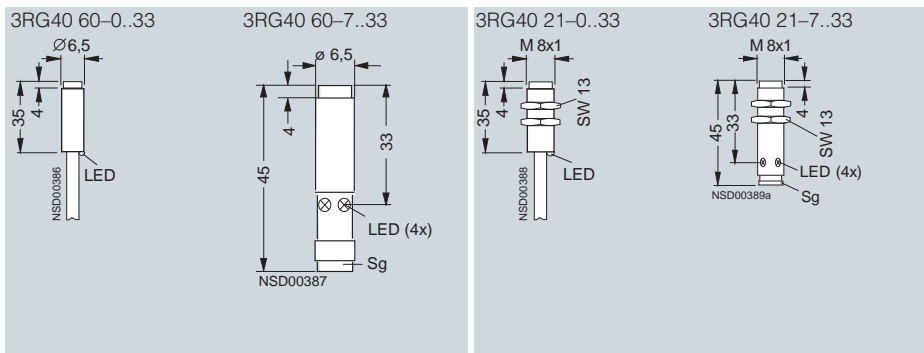
B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class		Standard duty	Standard duty
Number of wires		3-wire	4-wire
Design		M14	M14
Installation in metal		Flush	Flush
Rated operating distance s_n		2.5 mm	2.5 mm
Enclosure material		Molded plastic	Molded plastic
Operational voltage (DC)	V	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	800	800
Repeat accuracy R	mm	0.1	0.1
Power-up delay t_v	ms	40	40
Switching status display		Yellow LED	Yellow LED
Precautions		<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$	$4 \times 0.14 \text{ mm}^2$
NO contact, npn	13	B	3RG40 72-0GB00	—
NC contact, npn	14	▶ B	3RG40 72-0GA00	—
NO contact and NC contact, npn	10	—	—	▶ B 3RG40 72-0CD00
With M12 connector				
NO contact, npn	4	E, F	B 3RG40 72-3GB00	—
NC contact, npn	5	F	B 3RG40 72-3GA00	—
NO contact and NC contact, npn	1	F	—	▶ B 3RG40 72-3CD00

1) See page 2/242.

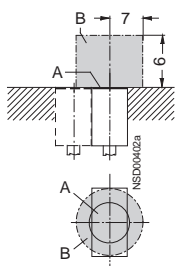
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99

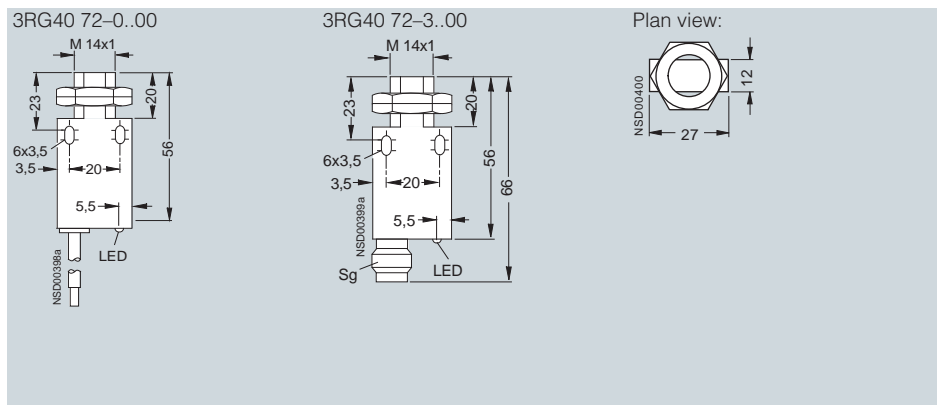
Dimensions

Mounting instructions



A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 2.5 mm

Technical specifications

Class	Standard duty (PLC)	
Number of wires	2-wire	
Design	M14	
Installation in metal	Flush	
Rated operating distance s_n	2.5 mm	
Enclosure material	Molded plastic	
Operating voltage		
• DC	V	15 ... 34
No-load supply current I_0		
• At 24 V DC	mA	1.5
Rated operational current I_e		
• Continuous	mA	25
Minimum load current	mA	2
Switching frequency f	Hz	800
Repeat accuracy R	mm	0.1
Power-up delay t_v	ms	40
Switching status display	Yellow LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	—	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			2 × 0.25 mm ²
NO contact	15	B	3RG40 72-0JB00
With M12 connector			
NO contact	6	E, F	3RG40 72-3JB00

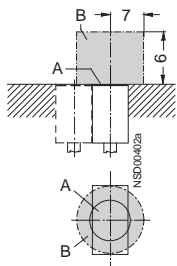
1) See page 2/242.

2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions

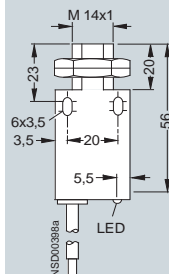
Mounting instructions



A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.

3RG40 72-0..00



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 4 mm

Technical specifications

Class	Standard duty			
	3-wire	4-wire	3-wire	4-wire
Number of wires	M12, Shorty	M12, Shorty	M12	M12
Design	Not flush	Not flush	Not flush	Not flush
Installation in metal	Not flush	Not flush	Not flush	Not flush
Rated operating distance s_n	4 mm	4 mm	4 mm	4 mm
Enclosure material	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Operational voltage (DC)	V 15 ... 34	V 15 ... 34	V 15 ... 34	V 15 ... 34
No-load supply current I_0	mA ≤ 17 (24 V); ≤ 30 (34 V)	mA 1.0	mA ≤ 17 (24 V); ≤ 30 (34 V)	mA ≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	mA 50	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	mA 200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 800	Hz 800	Hz 800	Hz 800
Repeat accuracy R	mm 0.2	mm 0.2	mm 0.2	mm 0.2
Power-up delay t_v	ms 40	ms 40	ms 40	ms 40
Switching status display	Yellow LED	Yellow LED	Yellow LED	Yellow LED
Precautions				
• Spurious signal suppression	•	•	•	•
• Short-circuit-proof/overload-proof	•	•	•	•
• Reverse-polarity protection	•	•	•	•
• Wire-break protection	•	•	•	•
• Inductive interference protection	•	•	•	•
• Radio interference protection	•	•	•	•
Degree of protection	IP67	IP67	IP67	IP67
Type	3RG40 22-.A.33 3RG40 22-.G.33	3RG40 22-0CD10 3RG40 22-3CD11	3RG40 22-.A.01 3RG40 22-.G.00	3RG40 22-0CD00 3RG40 22-3CD00

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶	3 × 0.25 mm ² 3RG40 22-0AG33	▶ B 3RG40 22-0AG01
NC contact, pnp	12	B	3RG40 22-0AF33	▶ B 3RG40 22-0AF01
NO contact, npn	13	B	3RG40 22-0GB33	▶ B 3RG40 22-0GB00
NC contact, npn	14		3RG40 22-0GA33	B 3RG40 22-0GA00
4 × 0.14 mm ²				
NO contact and NC contact, pnp	10		3RG40 22-0CD10	▶ B 3RG40 22-0CD00
With M12 connector				
3-wire				
NO contact, pnp	2	E, F ▶	3RG40 22-3AG33	▶ B 3RG40 22-3AG01
NC contact, pnp	3	F B	3RG40 22-3AF33	▶ B 3RG40 22-3AF01
NO contact, npn	4	E, F B	3RG40 22-3GB33	▶ B 3RG40 22-3GB00
NC contact, npn	5	F B	3RG40 22-3GA33	B 3RG40 22-3GA00
4-wire				
NO contact and NC contact, pnp	1	F	3RG40 22-3CD11	B 3RG40 22-3CD00

1) See page 2/242.

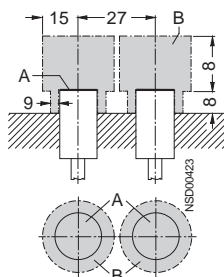
2) See from page 2/268.

▶ Preferred type, available from stock.

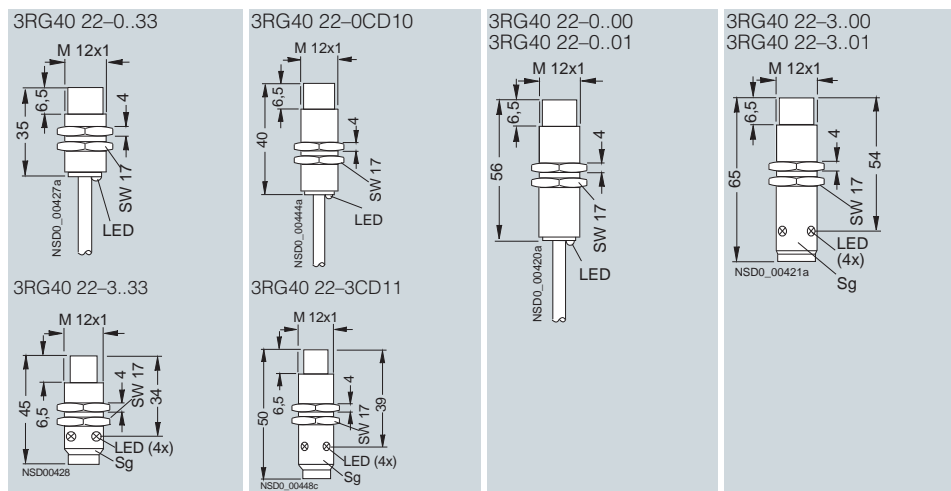
B: Subject to export regulations AL = N and ECCN = EAR99

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 4 mm

Technical specifications

Class		Standard duty	Standard duty (PLC)
Number of wires		3-wire	2-wire
Design		Cubic 12 mm x 40 mm	M12
Installation in metal		Not flush	Not flush
Rated operating distance s_n		4 mm	4 mm
Enclosure material		Molded plastic	Brass, nickel-plated
Operational voltage (DC)	V	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 1.5 (24 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	25
Minimum load current		–	2
Switching frequency f	Hz	800	300
Repeat accuracy R	mm	0.2	0.2
Power-up delay t_v	ms	40	40
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression	•	•	•
• Short-circuit-proof/overload-proof	•	•	–
• Reverse-polarity protection	•	•	•
• Wire-break protection	•	•	•
• Inductive interference protection	•	•	•
• Radio interference protection	•	•	•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			$3 \times 0.34 \text{ mm}^2$	$2 \times 0.25 \text{ mm}^2$
NO contact, pnp	11		3RG40 80-0AG45	–
NO contact	15		–	▶ B 3RG40 22-0JB00
With 8 mm combination plug				
NO contact, pnp	2	A	3RG40 80-7AG45	–
With M12 connector				
NO contact	6	E, F	–	▶ B 3RG40 22-3JB00

1) See page 2/242.

2) See from page 2/268.

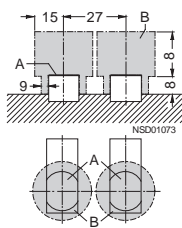
▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

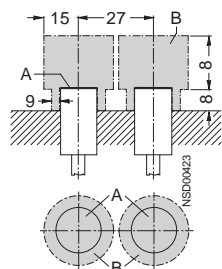
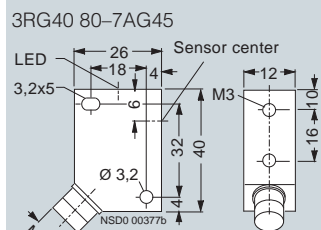
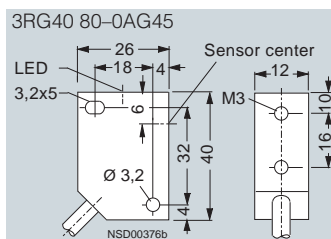
Dimensions

Mounting instructions

3RG40 80-AG45

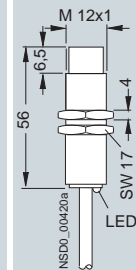


3RG40 22-JB00

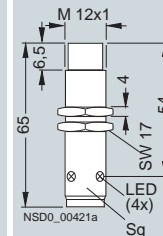
A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.

3RG40 22-0JB00



3RG40 22-3JB00



Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	3-wire	4-wire
Design		M18, Shorty	M18	M18
Installation in metal		Flush	Flush	Flush
Rated operating distance s_n		5 mm	5 mm	5 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Operational voltage (DC)	V	15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	800	800	800
Repeat accuracy R	mm	0.15	0.15	0.15
Power-up delay t_v	ms	40	40	40
Switching status display		Yellow LED	Yellow LED	Yellow LED
Precautions				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		•	•	•
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	3 × 0.25 mm ²	4 × 0.14 mm ²
NO contact, pnp	11	▶ B	3RG40 13-0AG33	▶ B 3RG40 13-0AG01	—
NC contact, pnp	12	B	3RG40 13-0AF33	B 3RG40 13-0AF01	—
NO contact, npn	13	B	3RG40 13-0GB33	▶ B 3RG40 13-0GB00	—
NC contact, npn	14	B	3RG40 13-0GA33	3RG40 13-0GA00	—
NO contact and NC contact, pnp	10	—	—	—	▶ B 3RG40 13-0CD00
With M12 connector					
NO contact, pnp	2	E, F	▶ B 3RG40 13-3AG33	▶ B 3RG40 13-3AG01	—
NC contact, pnp	3	F	B 3RG40 13-3AF33	B 3RG40 13-3AF01	—
NO contact, npn	4	E, F	B 3RG40 13-3GB33	B 3RG40 13-3GB00	—
NC contact, npn	5	F	B 3RG40 13-3GA33	B 3RG40 13-3GA00	—
NO contact and NC contact, pnp	1	F	—	—	▶ B 3RG40 13-3CD00

1) See page 2/242.

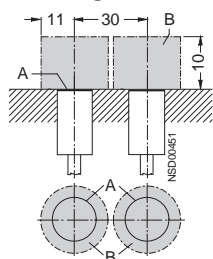
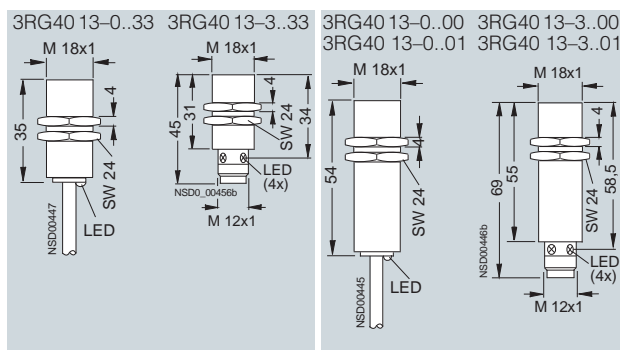
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions

A = active surface
B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 5 mm

Technical specifications

Class		Standard duty	Standard duty
Number of wires		3-wire	4-wire
Design		Ø 18 mm (button)	M14
Installation in metal		Flush	Not flush
Rated operating distance s_n		5 mm (3,2 mm)	5 mm
Enclosure material		Molded plastic	Molded plastic
Operational voltage (DC)	V	10 ... 30	15 ... 34
No-load supply current I_0	mA	≤ 1.5	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	50	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	100	300
Repeat accuracy R	mm	0.15	0.1
Power-up delay t_v	ms	1.0	40
Switching status display		–	Yellow LED
Precautions			
• Spurious signal suppression	–		•
• Short-circuit-proof/overload-proof	–		•
• Reverse-polarity protection	•		•
• Wire-break protection	–		•
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				4 × 0.14 mm ²
NO contact and NC contact, pnp	10	–	–	B 3RG40 82–0CD00
With M12 connector				
NO contact and NC contact, pnp	1	F	–	B 3RG40 82–3CD00
With single wires, 0.5 m, PVC			3 × 0.25 mm ²	
NO contact, pnp	11	▶	3RG40 75–0AJ00	–
NC contact, pnp	12	–	3RG40 75–0AH00	–
NO contact, npn	13	▶	3RG40 75–0GJ00	–

1) See page 2/242.

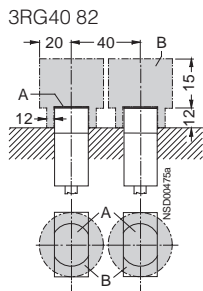
2) See from page 2/268.

▶ Preferred type, available from stock.

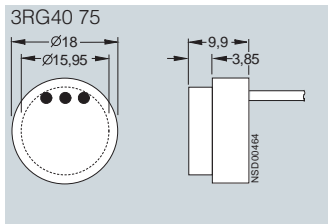
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

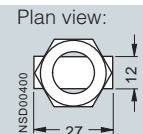
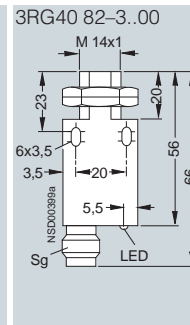
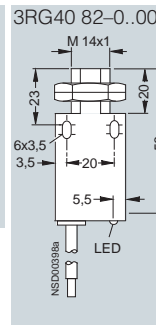
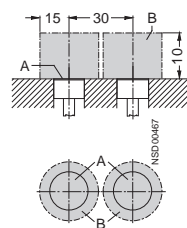
Mounting instructions



A = active surface
B = metal-free area



Mounting instructions



3RG40 75–0GJ00 also possible with non-embedding mounting:
Rated operating distance
 $s_n = 3,2$ mm

Technical specifications

Class	Standard duty (PLC)	
Number of wires	2-wire	
Design	M18	
Installation in metal	Flush	
Rated operating distance s_n	5 mm	
Enclosure material	Brass, nickel-plated	
Operational voltage (DC)		
• DC	V	15 ... 34
No-load supply current I_0		
• At 24 V DC	mA	≤1.5
Rated operational current I_e		
• Continuous	mA	25
Minimum load current	mA	2
Switching frequency f	Hz	400
Repeat accuracy R	mm	0.15
Power-up delay t_v	ms	40
Switching status display	Yellow LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	—	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$2 \times 0.25 \text{ mm}^2$
NO contact	15	▶ B	3RG40 13-0JB00
With M12 connector			
NO contact	6	E, F ▶ B	3RG40 13-3JB00

1) See page 2/242.

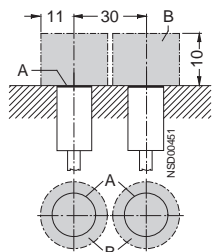
2) See from page 2/268.

▶ Preferred type, available from stock.

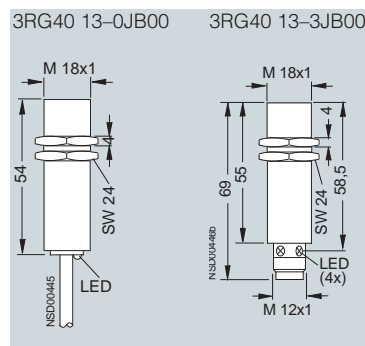
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 8 mm

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	3-wire	4-wire
Design		M18, Shorty	M18	M18
Installation in metal		Not flush	Not flush	Not flush
Rated operating distance s_n		8 mm	8 mm	8 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Operating voltage (DC)	V	15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	500	500	500
Repeat accuracy R	mm	0.2	0.2	0.2
Power-up delay t_v	ms	40	40	40
Switching status display		Yellow LED	Yellow LED	Yellow LED
Precautions				
• Spurious signal suppression	•	•	•	•
• Short-circuit-proof/overload-proof	•	•	•	•
• Reverse-polarity protection	•	•	•	•
• Wire-break protection	•	•	•	•
• Inductive interference protection	•	•	•	•
• Radio interference protection	•	•	•	•
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	3 × 0.25 mm ²	4 × 0.14 mm ²
NO contact, pnp	11	B	3RG40 23-0AG33	▶ B 3RG40 23-0AG01	—
NC contact, pnp	12	B	3RG40 23-0AF33	B 3RG40 23-0AF01	—
NO contact, npn	13	B	3RG40 23-0GB33	B 3RG40 23-0GB00	—
NC contact, npn	14	B	3RG40 23-0GA33	B 3RG40 23-0GA00	—
NO contact and NC contact, pnp	10	—	—	—	▶ B 3RG40 23-0CD00
With M12 connector					
NO contact, pnp	2	E, F	B 3RG40 23-3AG33	▶ B 3RG40 23-3AG01	—
NC contact, pnp	3	F	B 3RG40 23-3AF33	B 3RG40 23-3AF01	—
NO contact, npn	4	E, F	B 3RG40 23-3GB33	B 3RG40 23-3GB00	—
NC contact, npn	5	F	B 3RG40 23-3GA33	—	—
NO contact and NC contact, pnp	1	F	—	—	B 3RG40 23-3CD00

1) See page 2/242.

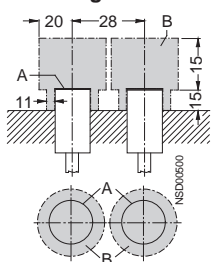
2) See from page 2/268.

▶ Preferred type, available from stock.

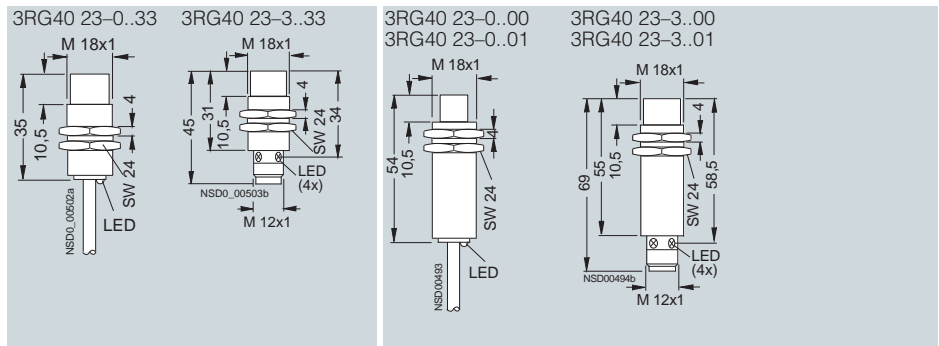
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface;
B = metal-free area



Technical specifications

Class	Standard duty (PLC)	
Number of wires	2-wire	
Design	M18	
Installation in metal	Not flush	
Rated operating distance s_n	8 mm	
Enclosure material	Brass, nickel-plated	
Operating voltage		
• DC	V	15 ... 34
No-load supply current I_0		
• At 24 V DC	mA	≤ 1.5
Rated operational current I_e		
• Continuous	mA	25
Minimum load current	mA	2
Switching frequency f	Hz	200
Repeat accuracy R	mm	0.2
Power-up delay t_v	ms	40
Switching status display	Yellow LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	–	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP67	
Type	3RG40 23-..JB00	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			
NO contact	15	▶ B	3RG40 23-0JB00
With M12 connector			
NO contact	6	E, F ▶ B	3RG40 23-3JB00

1) See page 2/242.

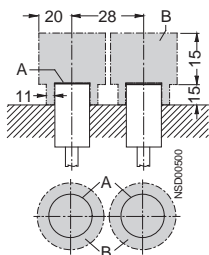
2) See from page 2/268.

▶ Preferred type, available from stock.

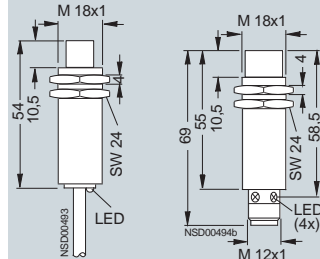
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions

A = active surface
B = metal-free area

3RG40 22-0..00 3RG40 22-3..00



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 10 mm

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	3-wire	4-wire
Design		M30, Shorty	M30	M30
Installation in metal		Flush	Flush	Flush
Rated operating distance s_n		10 mm	10 mm	10 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Operating voltage (DC)	V	15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	300	300	300
Repeat accuracy R	mm	0.3	0.3	0.3
Power-up delay t_v	ms	40	40	40
Switching status display		Yellow LED	Yellow LED	Yellow LED
Precautions				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		•	•	•
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	3 × 0.25 mm ²	4 × 0.14 mm ²
NO contact, pnp	11	B	3RG40 14-0AG33	▶ B 3RG40 14-0AG01	—
NC contact, pnp	12	B	3RG40 14-0AF33	▶ B 3RG40 14-0AF01	—
NO contact, npn	13	B	3RG40 14-0GB33	▶ B 3RG40 14-0GB00	—
NC contact, npn	14	B	3RG40 14-0GA33	B 3RG40 14-0GA00	—
NO contact and NC contact, pnp	10	—	—	—	▶ B 3RG40 14-0CD00
With M12 connector					
NO contact, pnp	2	E, F	▶ B 3RG40 14-3AG33	▶ B 3RG40 14-3AG01	—
NC contact, pnp	3	F	B 3RG40 14-3AF33	B 3RG40 14-3AF01	—
NO contact, npn	4	E, F	B 3RG40 14-3GB33	B 3RG40 14-3GB00	—
NC contact, npn	5	F	B 3RG40 14-3GA33	—	—
NO contact and NC contact, pnp	1	F	—	—	B 3RG40 14-3CD00

1) See page 2/242.

2) See from page 2/268.

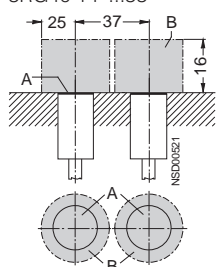
▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

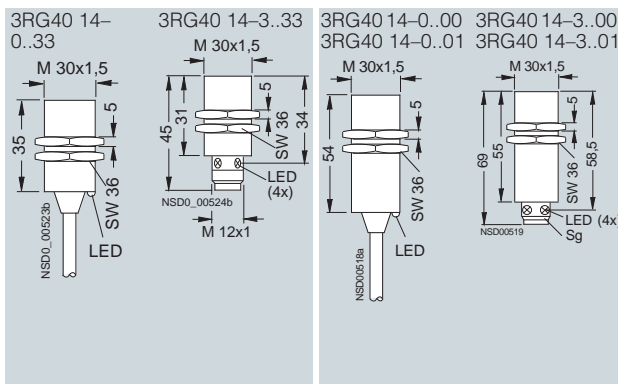
Dimensions

Mounting instructions

3RG40 14-...33



A = active surface
B = metal-free area



Technical specifications

Class	Standard duty (PLC)		Standard duty
Number of wires	2-wire		4-wire
Design	M30		M30
Installation in metal	Flush		Flush
Rated operating distance s_n	10 mm		10 mm
Enclosure material	Brass, nickel-plated		Brass, nickel-plated
Operating voltage			
• DC	V	15 ... 34	15 ... 34
No-load supply current I_0			
• At 24 V DC	mA	≤1.5	15
Rated operational current I_e			
• Continuous	mA	25	200
Minimum load current	mA	2	–
Switching frequency f	Hz	300	300
Repeat accuracy R	mm	0.3	0.3
Power-up delay t_v	ms	40	40
Switching status display	Yellow LED		–
Precautions			
• Spurious signal suppression	•		•
• Short-circuit-proof/overload-proof	–		•
• Reverse-polarity protection	•		•
• Wire-break protection	•		•
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection	IP67		IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact	15	▶ B	3RG40 14-0JB00	–
NO contact and NC contact, pnp	10	–	–	▶ B 3RG40 14-0CD00
With M12 connector				
NO contact	6	E, F	B 3RG40 14-3JB00	–
NO contact and NC contact, pnp	1	F	–	B 3RG40 14-3CD00

1) See page 2/242.

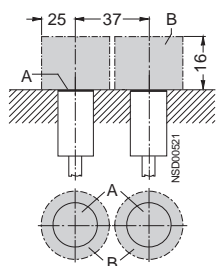
2) See from page 2/268.

▶ Preferred type, available from stock.

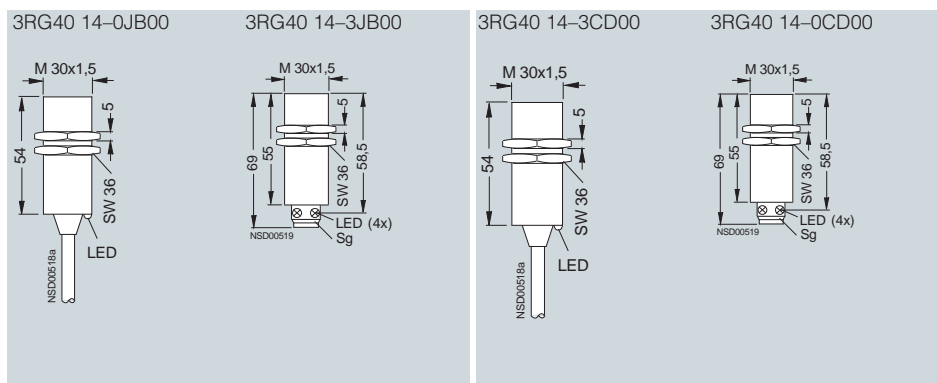
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 15 mm

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	3-wire	4-wire
Design		M30, Shorty	M30	M30
Installation in metal		Not flush	Not flush	Not flush
Rated operating distance s_n		15 mm	15 mm	15 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Operating voltage (DC)	V	15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	300	300	300
Repeat accuracy R	mm	0.4	0.4	0.4
Power-up delay t_v	ms	40	40	40
Switching status display		Yellow LED	Yellow LED	Yellow LED
Precautions		•	•	•
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		•	•	•
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
Degree of protection		IP67	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$	$3 \times 0.25 \text{ mm}^2$	$4 \times 0.14 \text{ mm}^2$
NO contact, pnp	11	B	3RG40 24-0AG33	▶ B 3RG40 24-0AG01	—
NC contact, pnp	12	B	3RG40 24-0AF33	B 3RG40 24-0AF01	—
NO contact, npn	13	B	3RG40 24-0GB33	B 3RG40 24-0GB00	—
NC contact, npn	14	B	3RG40 24-0GA33	B 3RG40 24-0GA00	—
NO contact and NC contact, pnp	10	—	—	—	▶ B 3RG40 24-0CD00
With M12 connector					
NO contact, pnp	2	E, F	B 3RG40 24-3AG33	▶ B 3RG40 24-3AG01	—
NC contact, pnp	3	F	B 3RG40 24-3AF33	B 3RG40 24-3AF01	—
NO contact, npn	4	E, F	B 3RG40 24-3GB33	B 3RG40 24-3GB00	—
NC contact, npn	5	F	B 3RG40 24-3GA33	—	—
NO contact and NC contact, pnp	1	F	—	—	B 3RG40 24-3CD00

1) See page 2/242.

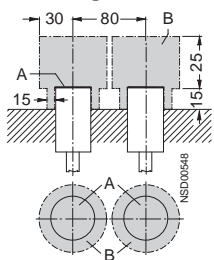
2) See from page 2/268.

▶ Preferred type, available from stock.

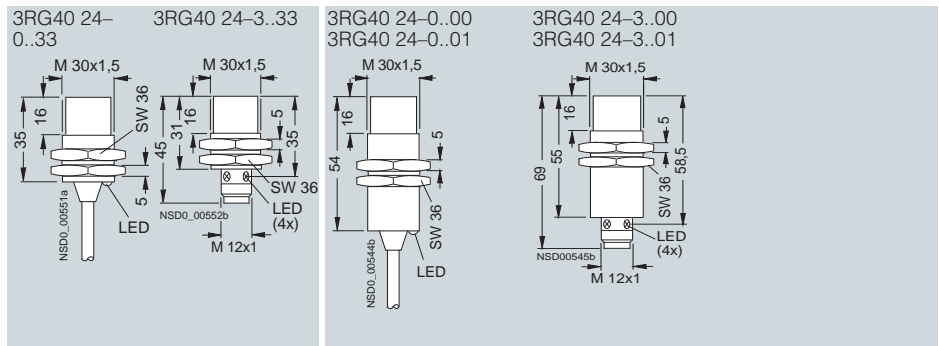
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 15 mm

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		3-wire	4-wire	4-wire
Design		Cubic 40 mm x 40 mm	Cubic 40 mm x 40 mm	Cubic 40 mm x 40 mm
Installation in metal		Flush	Flush	Flush
Rated operating distance s_n		15 mm	15 mm	15 mm
Enclosure material		Molded plastic	Molded plastic	Molded plastic
Operating voltage	V	15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 25 (24 V); ≤ 40 (34 V)	≤ 30 (24 V); ≤ 50 (34 V)	≤ 30 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	100	100	50
Repeat accuracy R	mm	0.75	0.75	0.75
Power-up delay t_v	ms	100	100	100
LEDs				
• Switching status		Yellow LED	Yellow LED	Yellow LED
• Supply voltage		Green LED	Green LED	Green LED
Precautions				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	–	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		•	•	•
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
Degree of protection		IP65	IP65	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With M12 connector, rotatable					
NO contact and NC contact, pnp	1	F	–	–	▶ B 3RG40 38–3CD00
NO contact and NC contact, npn	–	F	–	–	B 3RG40 38–3GD00
With terminal box					
NO contact, pnp	19	▶	3RG40 31–6AG01	–	–
NC contact, pnp	20		3RG40 31–6AF01	–	–
NO contact, npn	21	▶	3RG40 31–6GB00	–	–
NO contact and NC contact, pnp	18		–	▶ B 3RG40 31–6CD00	–

1) See page 2/242.

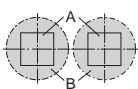
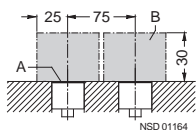
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

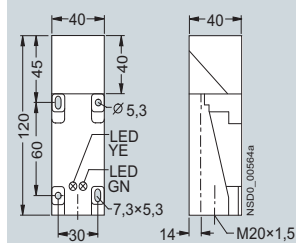
Dimensions

Mounting instructions



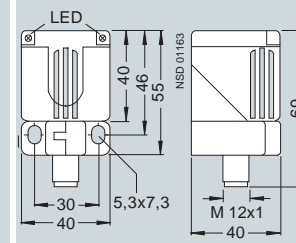
A = active surface;
B = metal-free area

3RG40 31–6..0.



The active surface can be adjusted in 5 directions.

3RG40 38–3..00



The active surface can be adjusted in 5 directions. With rotatable connector..

SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 15 mm

Technical specifications

Class	Standard duty (PLC)		Standard duty (PLC)
Number of wires	2-wire		2-wire
Design	M30		Cubic 40 mm × 40 mm
Installation in metal	Not flush		Flush
Rated operating distance s_n	15 mm		15 mm
Enclosure material	Brass, nickel-plated		Molded plastic
Operating voltage			
• DC	V	15 ... 34	15 ... 34
No-load supply current I_0			
• At 24 V DC	mA	≤ 1.5	≤ 1.5
Rated operational current I_e			
• Continuous	mA	25	25
Minimum load current	mA	2	2
Switching frequency f	Hz	180	100
Repeat accuracy R	mm	0.4	0.75
Power-up delay t_v	ms	40	100
Switching status display	Yellow LED		Yellow LED
Precautions			
• Spurious signal suppression	•		•
• Short-circuit-proof/overload-proof	—		—
• Reverse-polarity protection	•		•
• Wire-break protection	•		•
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection	IP67		IP65

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			2 × 0.25 mm ²	
NO contact	15	▶ B	3RG40 24-0JB00	—
With M12 connector				
NO contact	6	E, F	B	3RG40 24-3JB00
With terminal box				0.5 ... 2.5 mm ²
NO contact	22	—	▶	3RG40 31-6JB00

1) See page 2/242.

2) See from page 2/268.

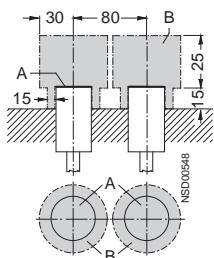
▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

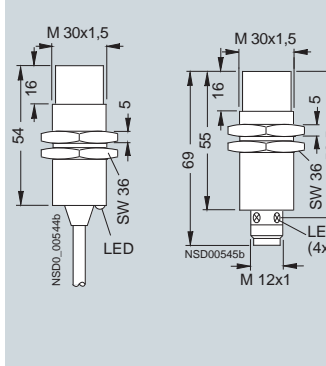
Mounting instructions

3RG40 24-0..00
3RG40 24-3..00



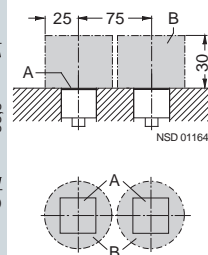
A = active surface
B = metal-free area

3RG40 24-0..00 3RG40 24-3..00



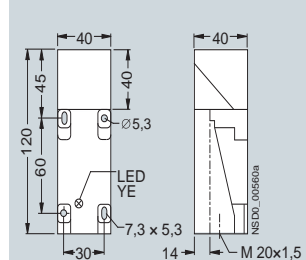
Mounting instructions

3RG40 31-6JB00



A = active surface
B = metal-free area

3RG40 31-6JB00



The active surface can be adjusted in 5 directions.

Technical specifications

Class		Standard duty	Standard duty
Number of wires		3-wire	4-wire
Design		Cubic 40 mm × 40 mm	Cubic 40 mm × 40 mm
Installation in metal		Not flush	Not flush
Rated operating distance s_n		20 mm	20 mm
Enclosure material		Molded plastic	Molded plastic
Operating voltage	V	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 25 (24 V); ≤ 40 (34 V)	≤ 30 (24 V); ≤ 50 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	75	75
Repeat accuracy R	mm	0.75	0.75
Power-up delay t_v	ms	100	100
LEDs			
• Switching status		Yellow LED	Yellow LED
• Supply voltage		Green LED	Green LED
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	–
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP65	IP65

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With terminal box			
NO contact, pnp	19	▶ 3RG40 41-6AG01	–
NC contact, pnp	20	3RG40 41-6AF01	–
NO contact, npn	21	3RG40 41-6GB00	–
NO contact and NC contact, pnp	18	–	▶ B 3RG40 41-6CD00

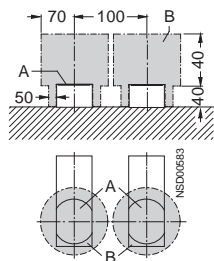
1) See page 2/242.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

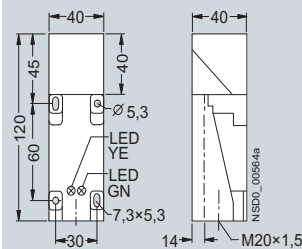
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG40 41-6..0.



The active surface can be adjusted in 5 directions.

SIMATIC PXI inductive proximity switches

SIMATIC PXI200

Operating distance 20 mm

Technical specifications

Class	Standard duty (PLC)	
Number of wires	2-wire	
Design	Cubic 40 mm x 40 mm	
Installation in metal	Not flush	
Rated operating distance s_n	20 mm	
Enclosure material	Molded plastic	
Operating voltage		
• DC	V	15 ... 34
No-load supply current I_0		
• At 24 V DC	mA	≤ 1.5
Rated operational current I_e		
• Continuous	mA	25
Minimum load current	mA	2
Switching frequency f	Hz	75
Repeat accuracy R	mm	0.75
Power-up delay t_v	ms	100
LEDs		
• Switching status	Yellow LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	–	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP65	

Selection and Ordering data

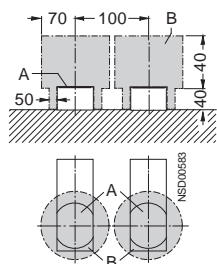
Switching output	Circuit diagram number ¹⁾	Order No.
With terminal box		0.5 ... 2.5 mm ²
NO contact	22	3RG40 41-6JB00

1) See page 2/242.

▶ Preferred type, available from stock.

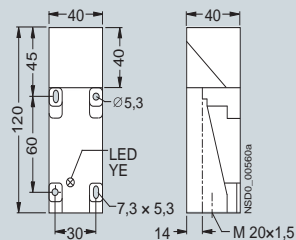
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG40 41-6JB00



The active surface can be adjusted in 5 directions.

Technical specifications

Class	Standard duty		Standard duty	
Number of wires	4-wire		4-wire	
Design	Cubic 60 mm x 80 mm		Cubic 80 mm x 100 mm	
Installation in metal	Not flush		Not flush	
Rated operating distance s_n	30 mm		40 mm	
Enclosure material	Molded plastic		Molded plastic	
Operating voltage				
• DC	V	15 ... 34		15 ... 34
No-load supply current I_0				
• At 24 V DC	mA	≤ 30 (24 V); ≤ 50 (34 V)		≤ 30 (24 V); ≤ 50 (34 V)
Rated operational current I_e				
• Continuous	mA	200 (≤ 50 °C); 150 (≤ 85 °C)		200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	50		10
Repeat accuracy R	mm	1.0		1.0
Power-up delay t_v	ms	100		200
LEDs				
• Switching status		Yellow LED		Yellow LED
• Supply voltage		Green LED		Green LED
Precautions				
• Spurious signal suppression		•		•
• Short-circuit-proof/overload-proof		•		•
• Reverse-polarity protection		•		•
• Wire-break protection		•		•
• Inductive interference protection		•		•
• Radio interference protection		•		•
Degree of protection		IP65		IP65

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With terminal box		0.5 ... 2.5 mm ²	0.5 ... 2.5 mm ²
NO contact and NC contact, pnp	18	B 3RG40 42-6CD00	B 3RG40 43-6CD00

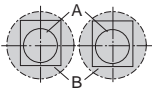
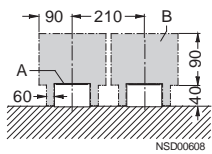
1) See page 2/242.

B: Subject to export regulations AL = N and ECCN = EAR99.

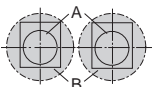
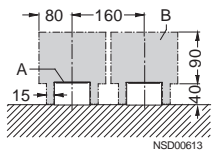
Dimensions

Mounting instructions

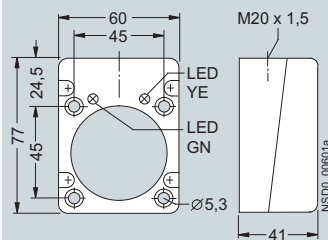
3RG40 42-6CD00



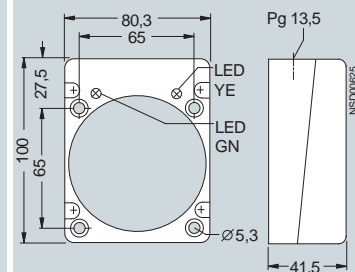
3RG40 43-6CD00

A = active surface
B = metal-free area

3RG40 42-6CD00



3RG40 43-6CD00



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Overview

SIMATIC sensors PXI300

Sensors for applications with special requirements:

- Increased operating voltages
- Higher degrees of protection
- Operating distances better than specified in standard

Selection table

SIMATIC PXI300								
Type, Ø	4 mm	M5	M8	M12	Box with M14	6.5 mm	8 mm x 8 mm	M18
Operating distance								
• 0 ... 0.8 mm (PXI.1.)	0.6 mm	0.6 mm						
• 1 ... 4 mm (PXI.2.)			1 mm 2 mm 2.5 mm 3 mm	2 mm 4 mm	2.5 mm	2.5 mm 3 mm	3 mm	
• 5 ... 10 mm (PXI.3.)			6 mm	6 mm 10 mm	5 mm			5 mm 8 mm
• 12 ... 22 mm (PXI.4.)								12 mm 20 mm
Output								
• NO contact/NC contact	■ / —	■ / —	■ / ■	■ / ■	■ / ■	■ / —	■ / —	■ / ■
• pnp/npn	■ / —	■ / —	■ / ■	■ / ■	■ / —	■ / —	■ / ■	■ / ■
Number of wires	3	3	3	2, 3	2, 3	3	3	2, 3
Operating voltage								
• 10/15 ... 30/35 V DC	■	■	■	■		■	■	■
• 10 ... 65 V DC			■	■	■			■
• 20 ... 265/320 V AC/DC				■	■			■
Connection								
• M8 connector			■			■	■	
• M12 connector			■	■	■			■
• Cable	■	■	■	■	■	■	■	■
Degree of protection								
• IP65 / IP67			— / ■	— / ■	— / ■	— / ■	— / ■	— / ■
• IP68 / IP69K	■ / —	■ / —	■ / —	■ / ■		■ / —		■ / ■
See page	2/172	2/172	from 2/172	from 2/173	2/176, 2/184	from 2/178	2/179	from 2/185

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXI300



Type, Ø	18 mm	M30	40 mm x 40 mm	60 mm x 80 mm	80 mm x 100 mm
Operating distance					
• 5 ... 10 mm (PXI33.)	5 mm 8 mm	10 mm			
• 12 ... 22 mm (PXI34.)		15 mm 22 mm	15 mm 20 mm		
• 25 ... 40 mm (PXI35.)		40 mm	25 mm 30 mm 35 mm 40 mm	30 mm	30 mm 40 mm
• 50 ... 75 mm (PXI36.)				50 mm	65 mm
Output					
• NO contact/NC contact	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■
• pnp/npn	■ / ■	■ / ■	■ / ■	■ / —	■ / —
Number of wires	3	2, 3	2, 3, 4	2, 3	2, 3
Operating voltage					
• 10/15 ... 30/35 V DC	■	■	■		
• 10 ... 65 V DC		■	■	■	■
• 20 ... 265/320 V AC/DC		■	■	■	■
Connection					
• M12 connector		■	■		
• Cable	■	■	■		
• Terminal compartment			■	■	■
Degree of protection					
• IP65 / IP67		— / ■	■ / ■	■ / —	■ / —
• IP68 / IP69K	■ / ■	■ / ■	■ / ■		
See page	from 2/186	from 2/192	from 2/197	from 2/207	from 2/211

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 0.6 mm
Operating distance 1 mm

Technical specifications

Class	IP68	IP68	Extra duty (65 V DC)
Number of wires	3-wire	3-wire	3-wire
Design	Ø 4 mm, mini	M5, mini	M8
Installation in metal	Flush	Flush	Flush
Rated operating distance s_n	0.6 mm	0.6 mm	1 mm
Enclosure material	Stainless steel	Stainless steel	Stainless steel
Operational voltage (DC) V	10 ... 30	10 ... 30	10 ... 65
No-load supply current I_0 mA	≤ 10	≤ 10	≤ 10
Rated operational current I_e mA	200	200	200
Switching frequency f Hz	3000	3000	5000
Repeat accuracy R mm	0.01	0.01	0.1
Power-up delay t_v ms	8	8	40
Switching status display	–	–	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68	IP68	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR					
NO contact, pnp	11	▶	3 × 0.14 mm ² 3RG46 00-0AG02	▶	3 × 0.14 mm ² 3RG46 10-0AG02
NC contact, pnp	12	▶	–	▶	3RG40 11-0AB00 3RG40 11-0AA00
With 8 mm combination plug					
NO contact, pnp	2	A	–	▶	3RG40 11-7AB00
NC contact, pnp	3	A	–	▶	3RG40 11-7AA00
With M12 connector					
NO contact, pnp	2	E, F	–	▶	3RG40 11-3AB00
NC contact, pnp	3	F	–	▶	3RG40 11-3AA00

1) See page 2/242.

2) See from page 2/268.

▶ Preferred type, available from stock.

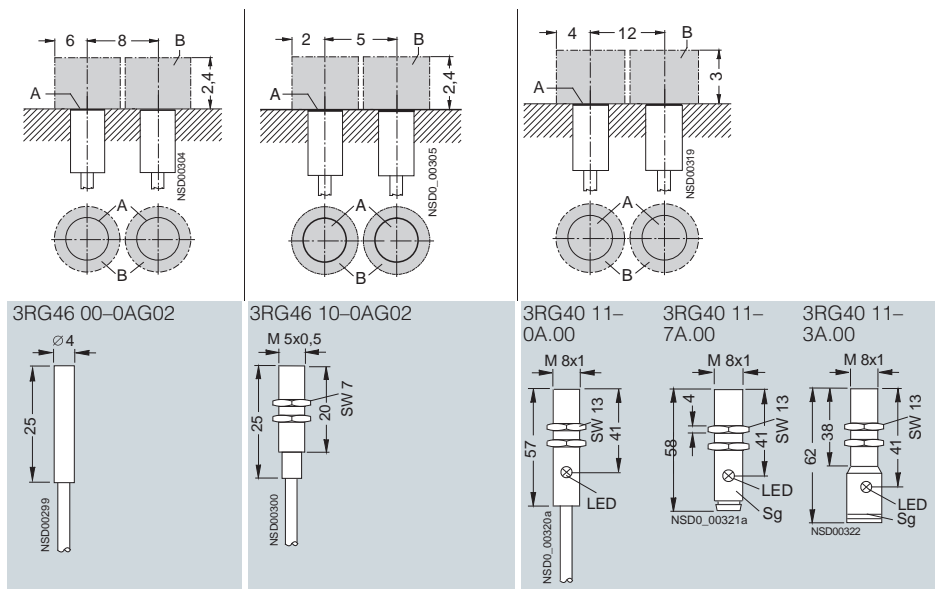
Dimensions

Mounting instructions

Dimension depending on form

A = active surface

B = metal-free area



Technical specification

Class		Extra duty (65 V DC)	Extra duty (AC/DC)
Number of wires		3-wire	2-wire
Design		M12	M12
Installation in metal		Flush	Flush
Rated operating distance s_n		2 mm	2 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 10	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	200
• 20 ms	mA	–	1800
Minimum load current	mA	–	5
Switching frequency f	Hz	4000	25/1200 (AC/DC)
Repeat accuracy R	mm	0.1	0.04
Power-up delay t_v	ms	40	100
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression	•		•
• Short-circuit-proof/overload-proof	•		–
• Reverse-polarity protection	•		•
• Wire-break protection	•		•
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶ B	3RG40 12-0AB00	–
NC contact, pnp	12	▶	3RG40 12-0AA00	–
NO contact	16	–	–	▶ B 3RG40 12-0KB00
NC contact	17	–	–	B 3RG40 12-0KA00
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG40 12-3AB00	–
NC contact, pnp	3	F	3RG40 12-3AA00	–
NO contact	8	E, F	–	▶ B 3RG40 12-3KB00
NC contact	9	F	–	B 3RG40 12-3KA00

1) See page 2/242.

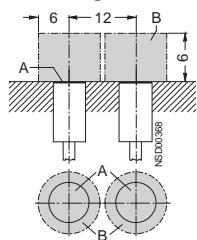
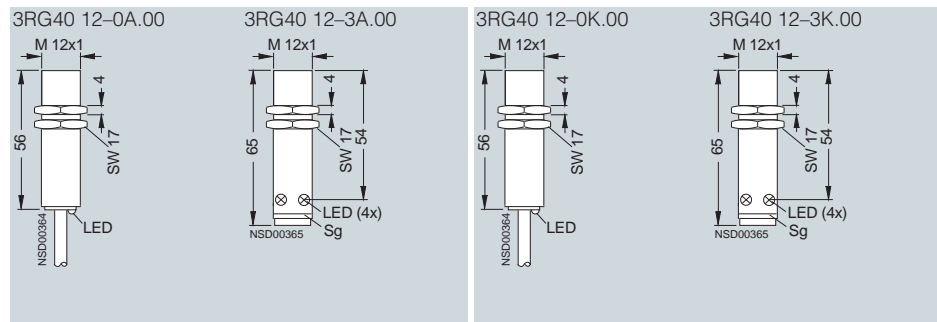
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions

A = active surface
B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 2 mm

Technical specifications

Class	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K
Number of wires	3-wire	3-wire	3-wire
Design	Ø 12 mm	M12	M12
Installation in metal	Flush	Flush	Flush
Rated operating distance s_n	2 mm	2 mm	2 mm
Enclosure material	Molded plastic	Molded plastic	Brass, nickel-plated
Operating voltage (DC)	V 15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA ≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 1200	1200	1200
Repeat accuracy R	mm 0.1	0.1	0.1
Power-up delay t_v	ms 40	40	40
Switching status display	Yellow LED	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With M12 connector					
NO contact, pnp	2	E, F	–	–	B 3RG40 12–3AG31
With 2 m cable					
NO contact, pnp	11		PUR, 3 × 0.25 mm ²	PUR, 3 × 0.25 mm ²	PVC, 3 × 0.25 mm ²
NO contact, pnp	11		B 3RG40 52–0AG30	B 3RG40 12–0AG30	B 3RG40 12–0AG31
NC contact, pnp	12		B 3RG40 52–0AF30	B 3RG40 12–0AF30	–
NO contact, npn	13		B 3RG40 52–0GB30	B 3RG40 12–0GB30	B 3RG40 12–0GB31
NC contact, npn	14		B 3RG40 52–0GA30	B 3RG40 12–0GA30	–

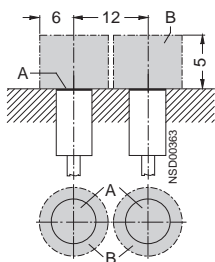
1) See page 2/242.

2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99.

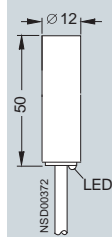
Dimensions

Mounting instructions

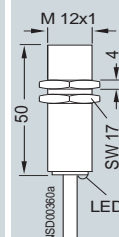


A = active surface
B = metal-free area

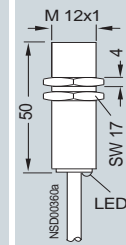
3RG40 52–0..30



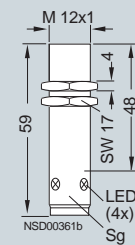
3RG40 12–0..30



3RG40 12–0..31



3RG40 12–3..31



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 2 mm

Technical specifications

Class	Greater rated operating distance		Greater rated operating distance
Number of wires	3-wire		3-wire
Design	M8, Shorty		M8
Installation in metal	Flush		Flush
Rated operating distance s_n	2 mm		2 mm
Enclosure material	Stainless steel		Stainless steel
Operating voltage (DC)	V	15 ... 34	10 ... 34
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	600	600
Repeat accuracy R	mm	0.1	0.1
Power-up delay t_v	ms	40	40
Switching status display	Yellow LED		Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 		<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP67		IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	3 m, 3 × 0.25 mm ²
NO contact, pnp	11	▶ B	3RG41 11-0AG33	▶ 3RG41 11-0AG00
NC contact, pnp	12	B	3RG41 11-0AF33	–
NO contact, npn	13		3RG41 11-0GB33	–
NC contact, npn	14		3RG41 11-0GA33	–
With 8 mm combination plug				
NO contact, pnp	2	A	B 3RG41 11-7AG33	–
NC contact, pnp	3	A	▶ B 3RG41 11-7AF33	–
NO contact, npn	4	A	B 3RG41 11-7GB33	–
NC contact, npn	5	A	B 3RG41 11-7GA33	–
With M12 connector				
NO contact, pnp	2	E, F	–	▶ 3RG41 11-3AG00
NO contact, npn	2	E, F	–	

1) See page 2/242.

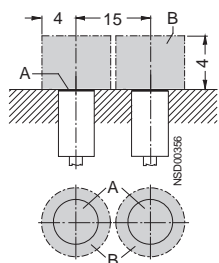
2) See from page 2/268.

▶ Preferred type, available from stock.

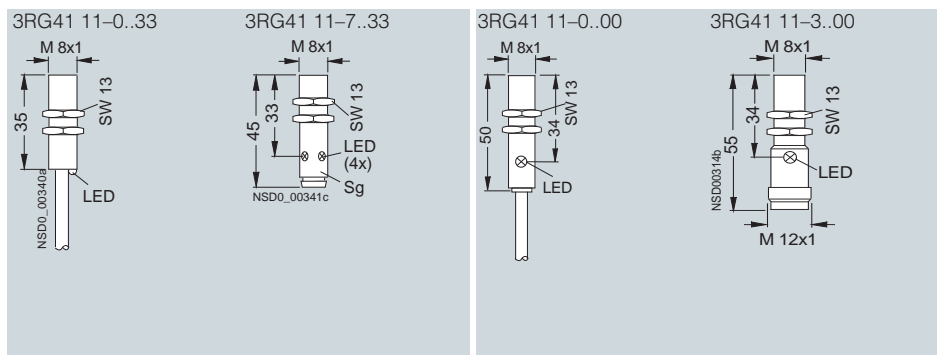
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 2.5 mm

Technical specifications

Class		Extra duty (65 V DC)	Extra duty (AC/DC)
Number of wires		3-wire	2-wire
Design		M14	M14
Installation in metal		Flush	Flush
Rated operating distance s_n		2.5 mm	2.5 mm
Enclosure material		Molded plastic	Molded plastic
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 10	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	200
• 20 ms	mA	–	1200
Minimum load current	mA	–	5
Switching frequency f	Hz	800	25/1000 (AC/DC)
Repeat accuracy R	mm	0.05	0.04
Power-up delay t_v	ms	40	100
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression	•		•
• Short-circuit-proof/overload-proof	•		–
• Reverse-polarity protection	•		•
• Wire-break protection	•		•
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$	$2 \times 0.25 \text{ mm}^2$
NO contact, pnp	11	▶ B	3RG40 72-0AB00	–
NC contact, pnp	12	B	3RG40 72-0AA00	–
NO contact	16	–	–	B 3RG40 72-0KB00
NC contact	17	–	–	B 3RG40 72-0KA00
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG40 72-3AB00	–
NO contact	8	E, F	–	B 3RG40 72-3KB00
NC contact	9	F	–	B 3RG40 72-3KA00

1) See page 2/242.

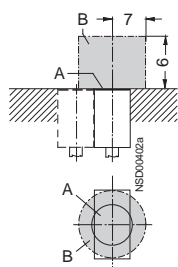
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

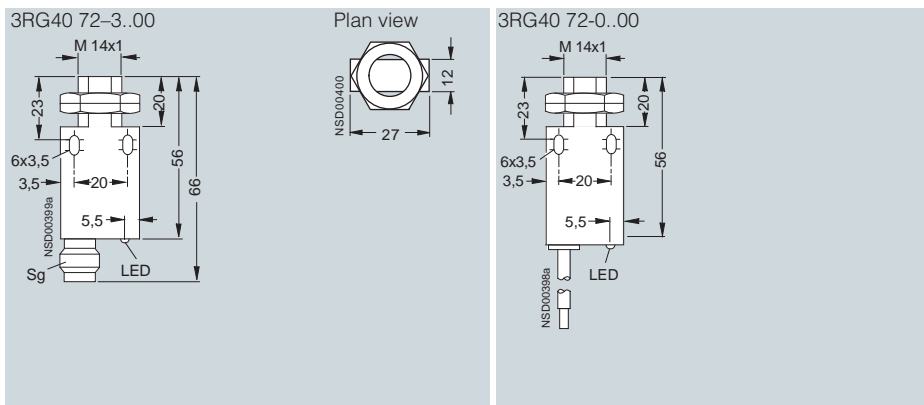
Dimensions

Mounting instructions



A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.



Technical specifications

Class	Increased operating distance (IP68)	
Number of wires	3-wire	3-wire
Design	Ø 6.5 mm	M8
Installation in metal	Flush	Flush
Rated operating distance s_n	2.5 mm	2.5 mm
Enclosure material	Stainless steel	Stainless steel
Operational voltage (DC) V	10 ... 30	10 ... 30
No-load supply current I_0 mA	≤ 10	≤ 10
Rated operational current I_e mA	200	200
Switching frequency f Hz	1000	1000
Repeat accuracy R mm	0.15	0.15
Power-up delay t_v ms	50	50
Switching status display	–	–
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68	IP68

Selection and Ordering data

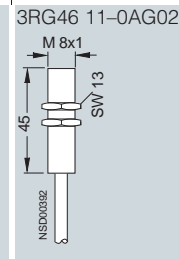
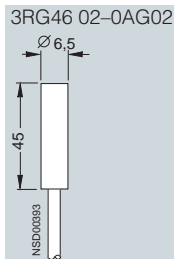
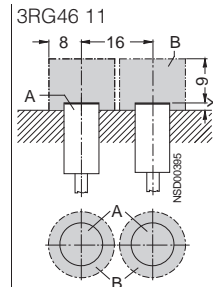
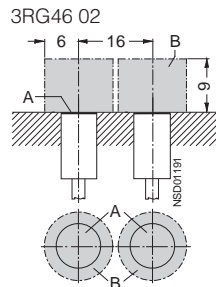
Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With 2 m cable, PUR		3 × 0.14 mm ²	3 × 0.14 mm ²
NO contact, pnp	11	▶ 3RG46 02-0AG02	▶ 3RG46 11-0AG02

1) See page 2/242.
▶ Preferred type, available from stock.

Dimensions

Mounting instructions

A = active surface
B = metal-free area
X ≥ 1.6 mm when mounted in steel,
X ≥ 0.8 mm when mounted in other metal



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 3 mm

Technical specifications

Class	Increased operating distance		Increased operating distance
Number of wires	3-wire		3-wire
Design	Ø 6.5 mm		M8
Installation in metal	Almost flush		Almost flush
Rated operating distance s_n	3 mm		3 mm
Enclosure material	Brass, nickel-plated		Brass, nickel-plated
Operating voltage (DC)	V	10 ... 30	10 ... 30
No-load supply current I_0	mA	≤ 10	≤ 10
Rated operational current I_e	mA	200	200
Switching frequency f	Hz	1000	1000
Repeat accuracy R	mm	0.15	0.15
Power-up delay t_v	ms	50	50
Switching status display	Yellow LED		Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 		<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP67		IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶ B	3RG43 02-0AG01	▶ B 3RG43 11-0AG01
NO contact, npn	13	–	–	B 3RG43 11-0GB01
With 8 mm combination plug				
NO contact, pnp	2	A	▶ B 3RG43 02-7AG01	▶ B 3RG43 11-7AG01
With M12 connector				
NO contact, pnp	2	E, F	–	▶ B 3RG43 11-3AG01
NC contact, pnp	3	F	–	B 3RG43 11-3AF01
NO contact, npn	4	E, F	–	B 3RG43 11-3GB01

1) See page 2/242.

2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

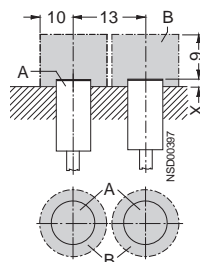
Dimensions

Mounting instructions

Dimension depending on form

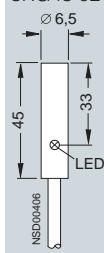
A = active surface

B = metal-free area

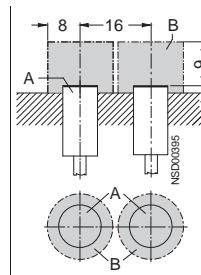
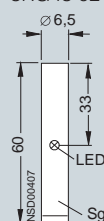


$X \geq 1.3$ mm when mounted in steel,
 $X \geq 0.65$ mm when mounted in other metal

3RG43 02-0AG01

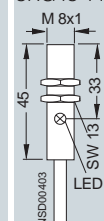


3RG43 02-7AG01

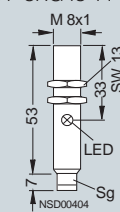


$X \geq 1.6$ mm when mounted in steel,
 $X \geq 0.8$ mm when mounted in other metal

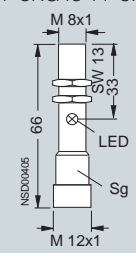
3RG43 11-0..01



3RG43 11-7..01



3RG43 11-3..01



Technical specifications

Class	Increased operating distance	
Number of wires	3-wire	
Design	8 mm × 8 mm	
Installation in metal	Almost flush	
Rated operating distance s_n	3 mm	
Enclosure material	Brass, nickel-plated	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 10
Rated operational current I_e	mA	200
Switching frequency f	Hz	1000
Repeat accuracy R	mm	0.15
Power-up delay t_v	ms	50
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • • Short-circuit-proof/overload-proof • • Reverse-polarity protection • • Wire-break protection – • Inductive interference protection • • Radio interference protection • 	
Degree of protection	IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.14 \text{ mm}^2$
NO contact, pnp	11	▶ B	3RG43 37-0AG01
NO contact, npn	13		3RG43 37-0GB01
With 8 mm combination plug			
NO contact, pnp	2	A ▶ B	3RG43 37-7AG01
NO contact, npn	4	A B	3RG43 37-7GB01

1) See page 2/242.

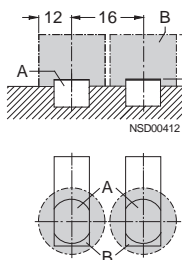
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

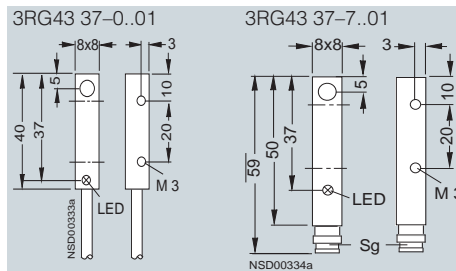
Mounting instructions



A = active surface
B = metal-free area

$X \geq 2,4 \text{ mm}$ when mounted in steel,

$X \geq 1,2 \text{ mm}$ when mounted in other metal



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 4 mm

Technical specifications

Class	Extra duty (65 V DC)		Extra duty (AC/DC)	
Number of wires	3-wire		2-wire	
Design	M12		M12	
Installation in metal	Not flush		Not flush	
Rated operating distance s_n	4 mm		4 mm	
Enclosure material	Brass, nickel-plated		Brass, nickel-plated	
Operating voltage				
• DC	V	10 ... 65	20 ... 320	
• AC	V	–	20 ... 265	
No-load supply current I_0				
• At 24 V DC	mA	≤ 10	1.0	
• At 230 V AC	mA	–	1.5	
Rated operational current I_e				
• Continuous	mA	300	200	
• 20 ms	mA	–	1200	
Minimum load current	mA	–	5	
Switching frequency f	Hz	800	25/900 (AC/DC)	
Repeat accuracy R	mm	0.2	0.12	
Power-up delay t_v	ms	40	100	
Switching status display	Yellow LED		Yellow LED	
Precautions				
• Spurious signal suppression	•		•	
• Short-circuit-proof/overload-proof	•		–	
• Reverse-polarity protection	•		•	
• Wire-break protection	•		•	
• Inductive interference protection	•		•	
• Radio interference protection	•		•	
Degree of protection	IP67		IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶ B	3RG40 22-0AB00	–
NC contact, pnp	12		3RG40 22-0AA00	–
NO contact	16		–	▶ B 3RG40 22-0KB00
NC contact	17		–	B 3RG40 22-0KA00
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG40 22-3AB00	–
NC contact, pnp	3	F	3RG40 22-3AA00	–
NO contact	8	E, F	–	▶ B 3RG40 22-3KB00
NC contact	9	F	–	B 3RG40 22-3KA00

1) See page 2/242.

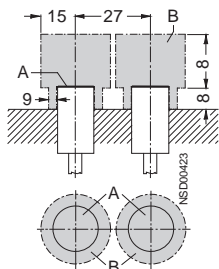
2) See from page 2/268.

▶ Preferred type, available from stock.

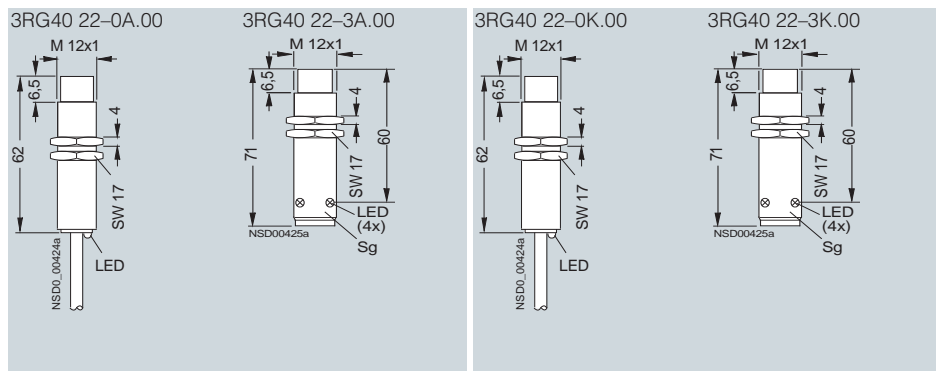
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 4 mm
Technical specifications

Class	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K
Number of wires	3-wire	3-wire	3-wire
Design	Ø 12 mm	M12	M12
Installation in metal	Not flush	Not flush	Not flush
Rated operating distance s_n	4 mm	4 mm	4 mm
Enclosure material	Molded plastic	Molded plastic	Brass, nickel-plated
Operating voltage (DC)	V 15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA ≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 800	800	800
Repeat accuracy R	mm 0.2	0.2	0.2
Power-up delay t_v	ms 40	40	40
Switching status display	Yellow LED	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K

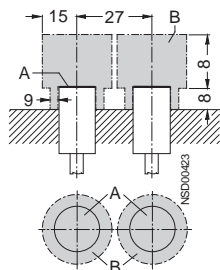
Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable			PUR, 3 × 0.25 mm ²	PUR, 3 × 0.25 mm ²	PVC, 3 × 0.25 mm ²
NO contact, pnp	11	B	3RG40 62-0AG30	B 3RG40 22-0AG30	B 3RG40 22-0AG31
NC contact, pnp	12	B	3RG40 62-0AF30	B 3RG40 22-0AF30	—
NO contact, npn	13	B	3RG40 62-0GB30	B 3RG40 22-0GB30	B 3RG40 22-0GB31
NC contact, npn	14	B	3RG40 62-0GA30	B 3RG40 22-0GA30	—
With M12 connector					
NO contact, pnp	2	E, F	—	—	B 3RG40 22-3AG31

1) See page 2/242.

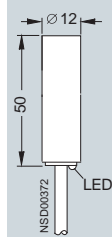
2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99.

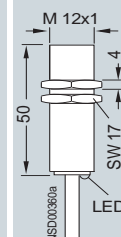
Dimensions
Mounting instructions


A = active surface
B = metal-free area

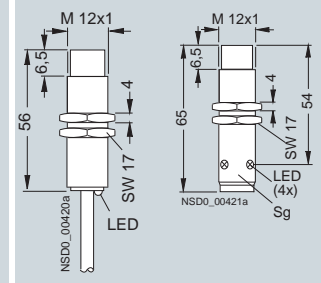
3RG40 62-0..30



3RG40 22-0..30



3RG40 22-0..31 3RG40 22-3..31



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 4 mm

Technical specifications

Class	IP68 / 69 K (DC 65 V)		IP68 / 69 K (AC/DC)
Number of wires	3-wire		2-wire
Design	M12		M12
Installation in metal	Not flush		Not flush
Rated operating distance s_n	4 mm		4 mm
Enclosure material	Molded plastic		Molded plastic
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 10	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	200
• 20 ms	mA	–	1200
Minimum load current	mA	–	5
Switching frequency f	Hz	800	25/900 (AC/DC)
Repeat accuracy R	mm	0.2	0.12
Power-up delay t_v	ms	40	100
Switching status display	Yellow LED		Yellow LED
Precautions			
• Spurious signal suppression	•		•
• Short-circuit-proof/overload-proof	•		–
• Reverse-polarity protection	•		•
• Wire-break protection	•		•
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection	IP68 / 69 K		IP68 / 69 K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶ B	3RG40 22-0AB30	–
NC contact, pnp	12		3RG40 22-0AA30	–
NO contact	16	E, F	–	B 3RG40 22-0KB30
NC contact	17		–	3RG40 22-3KA30
With M12 connector				
NO contact, pnp	2	E, F	B 3RG40 22-3AB30	–
NO contact	8	E, F	–	B 3RG40 22-3KB30

1) See page 2/242.

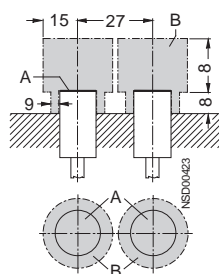
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

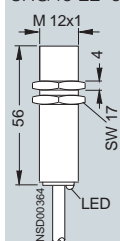
Dimensions

Mounting instructions

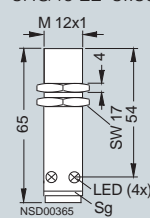


A = active surface
B = metal-free area

3RG40 22-0..30



3RG40 22-3..30



Technical specifications

Class	Increased operating distance		Increased operating distance	
Number of wires	3-wire		3-wire	
Design	M12, Shorty		M12	
Installation in metal	Flush		Flush	
Rated operating distance s_n	4 mm		4 mm	
Enclosure material	Brass, nickel-plated		Brass, nickel-plated	
Operating voltage (DC)	V	10 ... 34	10 ... 34	
No-load supply current I_0	mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	
Switching frequency f	Hz	400	400	
Repeat accuracy R	mm	0.2	0.2	
Power-up delay t_v	ms	40	40	
Switching status display	Yellow LED		Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 		<ul style="list-style-type: none"> • • • • • • 	
Degree of protection	IP67		IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$	$3 \times 0.25 \text{ mm}^2$
NO contact, pnp	11	B	3RG41 12-0AG33	▶ B 3RG41 12-0AG01
NC contact, pnp	12	–	–	B 3RG41 12-0AF01
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG41 12-3AG33	▶ B 3RG41 12-3AG01
NC contact, pnp	3	F	3RG41 12-3AF33	B 3RG41 12-3AF01

1) See page 2/242.

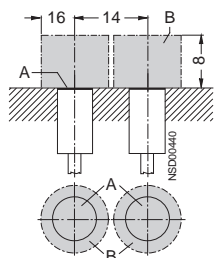
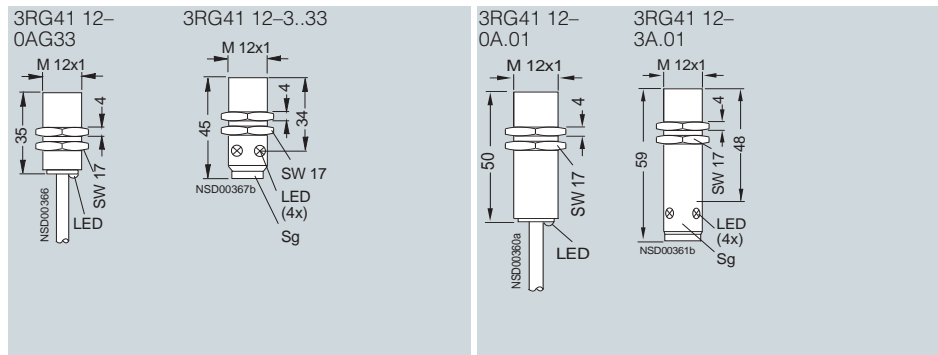
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions

A = active surface
B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 5 mm

Technical specifications

Class	Extra duty (65 V DC)		Extra duty (AC/DC)
Number of wires	3-wire		2-wire
Design	M18		M18
Installation in metal	Flush		Flush
Rated operating distance s_n	5 mm		5 mm
Enclosure material	Brass, nickel-plated		Brass, nickel-plated
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 10	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	300
• 20 ms	mA	–	1800
Minimum load current	mA	–	5
Switching frequency f	Hz	800 (NO contact), 4000 (NC contact)	25/490 (AC/DC)
Repeat accuracy R	mm	0.15	0.15
Power-up delay t_v	ms	40	100
Switching status display	Yellow LED		Yellow LED
Precautions			
• Spurious signal suppression	•		•
• Short-circuit-proof/overload-proof	•		–
• Reverse-polarity protection	•		•
• Wire-break protection	•		•
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection	IP67		IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶ B	3RG40 13-0AB00	–
NC contact, pnp	12	▶ B	3RG40 13-0AA00	–
NO contact	16	–	–	▶ B 3RG40 13-0KB00
NC contact	17	–	–	▶ B 3RG40 13-0KA00
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG40 13-3AB00	–
NC contact, pnp	3	F	B 3RG40 13-3AA00	–
NO contact	8	E, F	–	▶ B 3RG40 13-3KB00
NC contact	9	F	–	B 3RG40 13-3KA00

1) See page 2/242.

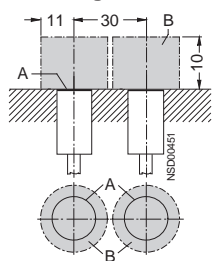
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

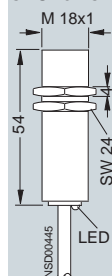
Dimensions

Mounting instructions

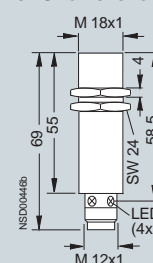


A = active surface
B = metal-free area

3RG40 13-0...00
3RG40 13-0...01



3RG40 13-3...00
3RG40 13-3...01



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 5 mm

Technical specifications

Class	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K
Number of wires	3-wire	3-wire	3-wire
Design	Ø 18 mm	M18	M18
Installation in metal	Flush	Flush	Flush
Rated operating distance s_n	5 mm	5 mm	5 mm
Enclosure material	Molded plastic	Molded plastic	Brass, nickel-plated
Operating voltage (DC)	V 15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0	mA ≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 800	800	800
Repeat accuracy R	mm 0.15	0.15	0.15
Power-up delay t_v	ms 40	40	40
Switching status display	Yellow LED	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR			PUR, 3 × 0.25 mm ²	PUR, 3 × 0.25 mm ²	PVC, 3 × 0.25 mm ²
NO contact, pnp	11	B	3RG40 53-0AG30	B 3RG40 13-0AG30	B 3RG40 13-0AG31
NC contact, pnp	12	B	3RG40 53-0AF30	B 3RG40 13-0AF30	—
NO contact, npn	13	B	3RG40 53-0GB30	B 3RG40 13-0GB30	B 3RG40 13-0GB31
NC contact, npn	14	B	3RG40 53-0GA30	B 3RG40 13-0GA30	—
With M12 connector			—	—	B 3RG40 13-3AG31
NO contact, pnp	2	E, F	—	—	B 3RG40 13-3AG31

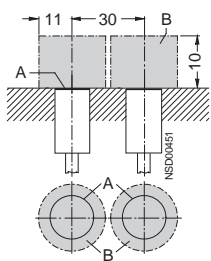
1) See page 2/242.

2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99.

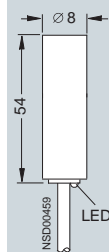
Dimensions

Mounting instructions

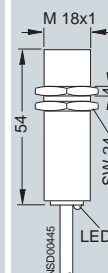


A = active surface
B = metal-free area

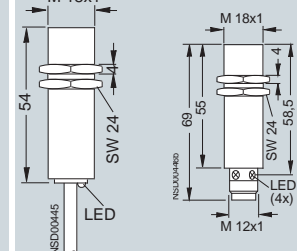
3RG40 53-0..30



3RG40 13-0..30



3RG40 13-0..31 3RG40 13-3AG31



Technical specifications

Class	Increased operating distance		Increased operating distance	
Number of wires	3-wire		3-wire	
Design	M8		M12	
Installation in metal	Not flush		Almost flush	
Rated operating distance s_n	6 mm		6 mm	
Enclosure material	Brass, nickel-plated		Brass, nickel-plated	
Operating voltage (DC)	V	10 ... 30	V	10 ... 30
No-load supply current I_0	mA	≤ 10	mA	≤ 10
Rated operational current I_e	mA	200	mA	200
Switching frequency f	Hz	500	Hz	800
Repeat accuracy R	mm	0.15	mm	0.15
Power-up delay t_v	ms	15	ms	15
Switching status display	Yellow LED		Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 		<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	
Degree of protection	IP67		IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.14 mm ²	3 × 0.34 mm ²
NO contact, pnp	11	▶ B	3RG43 21-0AG01	▶ B 3RG43 12-0AG01
NC contact, pnp	12	B	3RG43 21-0AF01	3RG43 12-0AF01
NO contact, npn	13	B	3RG43 21-0GB01	B 3RG43 12-0GB01
NC contact, npn	14	B	3RG43 21-0GA01	—
With 8 mm combination plug				
NO contact, pnp	2	A	▶ B 3RG43 21-7AG01	—
NC contact, pnp	3	A	B 3RG43 21-7AF01	—
NO contact, npn	4	A	B 3RG43 21-7GB01	—
NC contact, npn	5	A	B 3RG43 21-7GA01	—
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG43 21-3AG01	▶ B 3RG43 12-3AG01
NC contact, pnp	3	F	B 3RG43 21-3AF01	3RG43 12-3AF01
NO contact, npn	4	E, F	B 3RG43 21-3GB01	B 3RG43 12-3GB01
NC contact, npn	5	F	B 3RG43 21-3GA01	—

1) See page 2/242.

2) See from page 2/268.

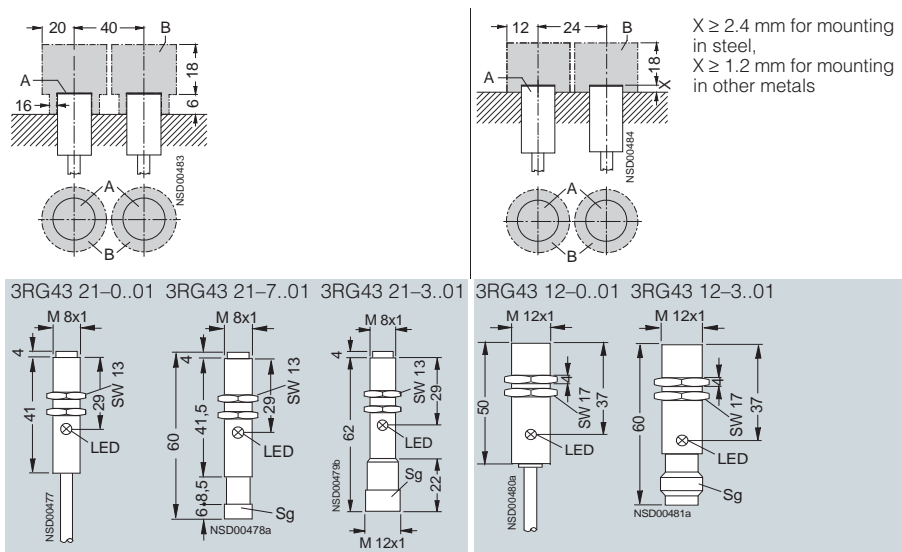
▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions

Dimension depending on form

A = active surface
B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 8 mm

Technical specifications

Class		Extra duty (65 V DC)	Extra duty (AC/DC)
Number of wires		3-wire	2-wire
Design		M18	M18
Installation in metal		Not flush	Not flush
Rated operating distance s_n		8 mm	8 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 10	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	300
• 20 ms	mA	–	1800
Minimum load current	mA	–	5
Switching frequency f	Hz	500	25/340 (AC/DC)
Repeat accuracy R	mm	0.2	0.2
Power-up delay t_v	ms	40	100
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression	•	•	•
• Short-circuit-proof/overload-proof	•	•	•
• Reverse-polarity protection	•	•	•
• Wire-break protection	•	•	•
• Inductive interference protection	•	•	•
• Radio interference protection	•	•	•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶ B	3RG40 23-0AB00	–
NC contact, pnp	12	▶ B	3RG40 23-0AA00	–
NO contact	16	–	–	▶ B 3RG40 23-0KB00
NC contact	17	–	–	B 3RG40 23-0KA00
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG40 23-3AB00	–
NC contact, pnp	3	F	B 3RG40 23-3AA00	–
NO contact	8	E, F	–	▶ B 3RG40 23-3KB00
NC contact	9	F	–	B 3RG40 23-3KA00

1) See page 2/242.

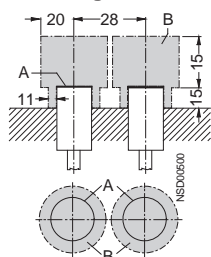
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

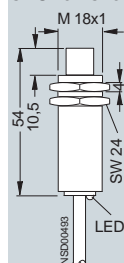
Dimensions

Mounting instructions

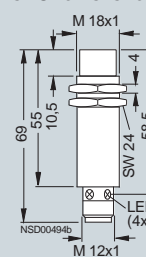


A = active surface
B = metal-free area

3RG40 23-0..00
3RG40 23-0..01



3RG40 23-3..00
3RG40 23-3..01



Technical specifications

Class	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K
Number of wires	3-wire	3-wire	3-wire
Design	Ø 18 mm	M18	M18
Installation in metal	Not flush	Not flush	Not flush
Rated operating distance s_n	8 mm	8 mm	8 mm
Enclosure material	Molded plastic	Molded plastic	Brass, nickel-plated
Operating voltage (DC)	V 15 ... 34	V 15 ... 34	V 15 ... 34
No-load supply current I_0	mA ≤ 17 (24 V); ≤ 30 (34 V)	mA ≤ 17 (24 V); ≤ 30 (34 V)	mA ≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	mA 200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 300	Hz 300	Hz 300
Repeat accuracy R	mm 0.2	mm 0.2	mm 0.2
Power-up delay t_v	ms 40	ms 40	ms 40
Switching status display	Yellow LED	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable			PUR, 3 × 0.25 mm ²	PUR, 3 × 0.25 mm ²	PVC, 3 × 0.25 mm ²
NO contact, pnp	11	B	3RG40 63-0AG30	B 3RG40 23-0AG30	B 3RG40 23-0AG31
NC contact, pnp	12	B	3RG40 63-0AF30	B 3RG40 23-0AF30	—
NO contact, npn	13	B	3RG40 63-0GB30	B 3RG40 23-0GB30	B 3RG40 23-0GB31
NC contact, npn	14	B	3RG40 63-0GA30	B 3RG40 23-0GA30	—
With M12 connector			—	—	B 3RG40 23-3AG31
NO contact, pnp	2	E, F	—	—	B 3RG40 23-3AG31

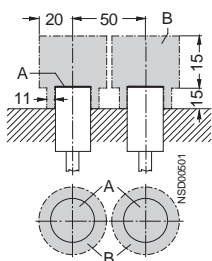
1) See page 2/242.

2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99.

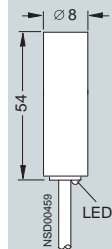
Dimensions

Mounting instructions

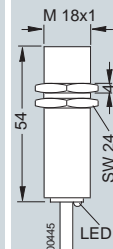


A = active surface
B = metal-free area

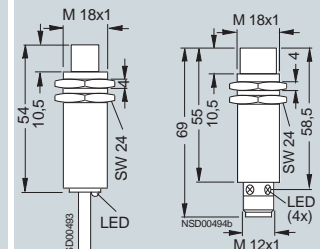
3RG40 63-0..30



3RG40 23-0..30



3RG40 23-0..31 3RG40 23-3..31



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 8 mm

Technical specifications

Class	IP68 / 69 K (65 V DC)	IP68 / 69 K (AC/DC)
Number of wires	3-wire	2-wire
Design	M18	M18
Installation in metal	Not flush	Not flush
Rated operating distance s_n	8 mm	8 mm
Enclosure material	Molded plastic	Molded plastic
Operating voltage		
• DC	V 10 ... 65	20 ... 320
• AC	V –	20 ... 265
No-load supply current I_0		
• At 24 V DC	mA ≤ 10	1.0
• At 230 V AC	mA –	1.5
Rated operational current I_e		
• Continuous	mA 300	300
• 20 ms	mA –	1800
Minimum load current	mA –	5
Switching frequency f	Hz 500	25/340 (AC/DC)
Repeat accuracy R	mm 0.2	0.2
Power-up delay t_v	ms 40	100
Switching status display	Yellow LED	Yellow LED
Precautions		
• Spurious signal suppression	•	•
• Short-circuit-proof/overload-proof	•	–
• Reverse-polarity protection	•	•
• Wire-break protection	•	•
• Inductive interference protection	•	•
• Radio interference protection	•	•
Degree of protection	IP68 / 69 K	IP68 / 69 K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	2 × 0.25 mm ²
NO contact, pnp	11	B	3RG40 23-0AB30	–
NC contact, pnp	12	B	3RG40 23-0AA30	–
NO contact	16	–	–	▶ B 3RG40 23-0KB30
NC contact	17	–	–	B 3RG40 23-0KA30
With M12 connector				
NO contact, pnp	2	E, F	B 3RG40 23-3AB30	–
NC contact, pnp	3	F	B 3RG40 23-3AA30	–
NO contact	8	E, F	–	B 3RG40 23-3KB30
NC contact	9	F	–	3RG40 23-3KA30

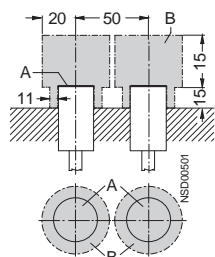
1) See page 2/242.

2) See from page 2/268.

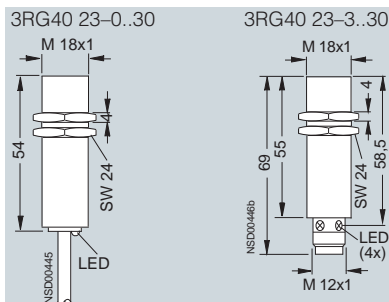
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class	Increased operating distance	
Number of wires	3-wire	3-wire
Design	M18, Shorty	M18
Installation in metal	Flush	Flush
Rated operating distance s_n	8 mm	8 mm
Enclosure material	Brass, nickel-plated	Brass, nickel-plated
Operating voltage (DC)	V 10 ... 34	10 ... 34
No-load supply current I_0	mA ≤ 10	≤ 10
Rated operational current I_e	mA 200	200
Switching frequency f	Hz 500	500
Repeat accuracy R	mm 0.2	0.2
Power-up delay t_v	ms 3	3
Switching status display	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	
NO contact, pnp	11		B 3RG41 13-0AG33	—
With 3 m cable, PUR				3 × 0.25 mm ²
NO contact, pnp	11		—	B 3RG41 13-0AG01
With M12 connector				
NO contact, pnp	2	E, F	B 3RG41 13-3AG33	▶ B 3RG41 13-3AG01

1) See page 2/242.

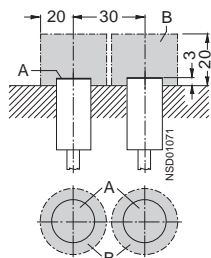
2) See from page 2/268.

▶ Preferred type, available from stock.

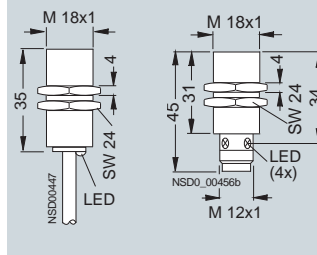
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

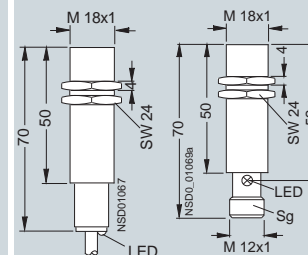
Mounting instructions

A = active surface
B = metal-free area

3RG41 13-0..33 3RG41 13-3..33



3RG41 13-0..01 3RG41 13-3..01



Technical specifications

Class	IP68 / 69 K	IP68 / 69 K
Number of wires	3-wire	3-wire
Design	Ø 30 mm	M30
Installation in metal	Flush	Flush
Rated operating distance s_n	10 mm	10 mm
Enclosure material	Molded plastic	Molded plastic
Operating voltage (DC)	V 15 ... 34	15 ... 34
No-load supply current I_0	mA ≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 300	300
Repeat accuracy R	mm 0.3	0.3
Power-up delay t_v	ms 40	40
Switching status display	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68 / 69 K	IP68 / 69 K

Selection and Ordering data

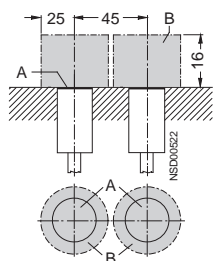
Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With 2 m cable		PUR, 3 × 0.25 mm ²	PUR, 3 × 0.25 mm ²
NO contact, pnp	11	B 3RG40 54-0AG30	B 3RG40 14-0AG30
NC contact, pnp	12	B 3RG40 54-0AF30	B 3RG40 14-0AF30
NO contact, npn	13	B 3RG40 54-0GB30	B 3RG40 14-0GB30
NC contact, npn	14	B 3RG40 54-0GA30	B 3RG40 14-0GA30

1) See page 2/242.

B: Subject to export regulations AL = N and ECCN = EAR99.

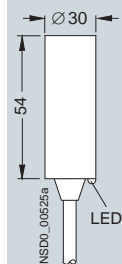
Dimensions

Mounting instructions

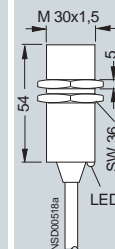


A = active surface
B = metal-free area

3RG40 54-0..30



3RG40 14-0..30



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 10 mm

Technical specifications

Class	IP68 / 69 K	IP68 / 69 K (AC/DC)
Number of wires	3-wire	2-wire
Design	M30	M30
Installation in metal	Flush	Flush
Rated operating distance s_n	10 mm	10 mm
Enclosure material	Brass, nickel-plated	Brass, nickel-plated
Operating voltage		
• DC	V 15 ... 34	20 ... 320
• AC	V -	20 ... 265
No-load supply current I_0		
• At 24 V/34 V DC	mA ≤ 17 (24 V); ≤ 30 (34 V)	1.0
• At 230 V AC	mA -	1.5
Rated operational current I_e		
• Continuous	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	300
• 20 ms	mA -	1800
Switching frequency f	Hz 300	25/200 (AC/DC)
Repeat accuracy R	mm 0.3	0.3
Power-up delay t_v	ms 40	100
Switching status display	Yellow LED	Yellow LED
Precautions		
• Spurious signal suppression	•	•
• Short-circuit-proof/overload-proof	•	-
• Reverse-polarity protection	•	•
• Wire-break protection	•	•
• Inductive interference protection	•	•
• Radio interference protection	•	•
Degree of protection	IP68 / 69 K	IP68 / 69 K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable			PVC, 3 × 0.25 mm ²	PUR, 2 × 0.25 mm ²
NO contact, pnp	11	B	3RG40 14-0AG31	-
NO contact, npn	13	B	3RG40 14-0GB31	-
NO contact	16	-	-	B 3RG40 14-0KB31
NC contact	17	-	-	B 3RG40 14-0KA31
With M12 connector				
NO contact	8	E, F	-	B 3RG40 14-3KB31
NC contact	9	F	-	B 3RG40 14-3KA31

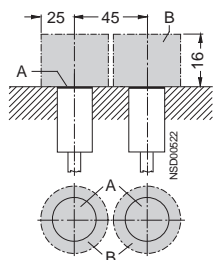
1) See page 2/242.

2) See from page 2/268.

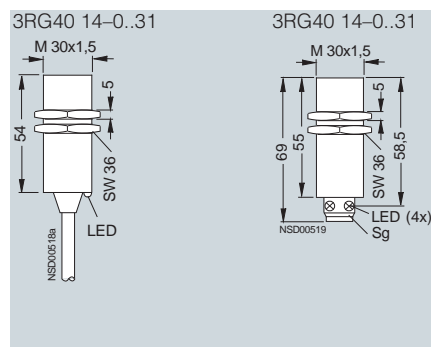
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Operating distance 10 mm
Operating distance 12 mm

2

Technical specifications

Class	Increased operating distance		Increased operating distance
Number of wires	3-wire		3-wire
Design	M12		M18
Installation in metal	Not flush		Almost flush
Rated operating distance s_n	10 mm		12 mm
Enclosure material	Brass, nickel-plated		Brass, nickel-plated
Operating voltage (DC)	V	10 ... 30	10 ... 30
No-load supply current I_0	mA	10	≤ 10
Rated operational current I_e	mA	200	200
Switching frequency f	Hz	400	500
Repeat accuracy R	mm	0.2	0.6
Power-up delay t_v	ms	15	50
Switching status display	Yellow LED		Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 		<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP67		IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp	11	▶ B	3RG43 22-0AG01	▶ 3RG46 13-1AB01
NO contact, npn	13		–	3RG46 13-0GB00
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG43 22-3AG01	▶ 3RG46 13-3AB01
NC contact, pnp	3	F	B 3RG43 22-3AF01	–
NO contact, npn	4	E, F	–	3RG46 13-3GB01

1) See page 2/242.

2) See from page 2/268.

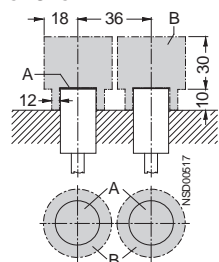
▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

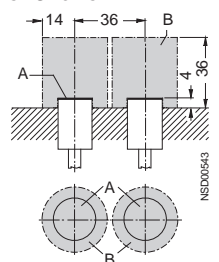
Dimensions

Mounting instructions

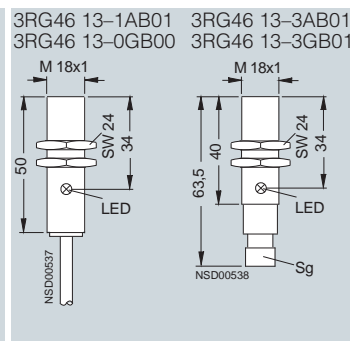
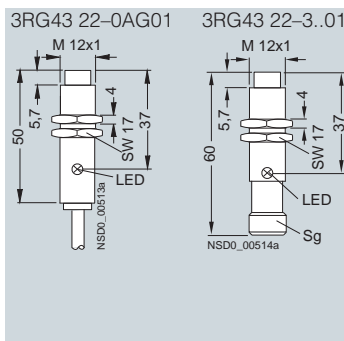
3RG43 22



3RG46 13



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 15 mm

Technical specifications

Class		Extra duty (65 V DC)	Extra duty (AC/DC)
Number of wires		3-wire	2-wire
Design		M30	M30
Installation in metal		Not flush	Not flush
Rated operating distance s_n		15 mm	15 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 10	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	300
• 20 ms	mA	–	1800
Minimum load current	mA	–	5
Switching frequency f	Hz	300	25/220 (AC/DC)
Repeat accuracy R	mm	0.4	0.4
Power-up delay t_v	ms	40	100
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression	•	•	•
• Short-circuit-proof/overload-proof	•	•	•
• Reverse-polarity protection	•	•	•
• Wire-break protection	•	•	•
• Inductive interference protection	•	•	•
• Radio interference protection	•	•	•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	2 × 0.25 mm ²
NO contact, pnp	11	B	3RG40 24-0AB00	–
NC contact, pnp	12	B	3RG40 24-0AA00	–
NO contact	16	–	–	▶ B 3RG40 24-0KB00
NC contact	17	–	–	▶ B 3RG40 24-0KA00
With M12 connector				
NO contact, pnp	2	E, F	▶ B 3RG40 24-3AB00	–
NC contact, pnp	3	F	B 3RG40 24-3AA00	–
NO contact	8	E, F	–	▶ B 3RG40 24-3KB00
NC contact	9	F	–	B 3RG40 24-3KA00

1) See page 2/242.

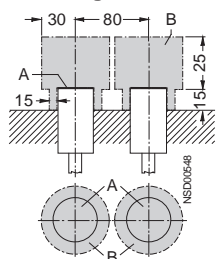
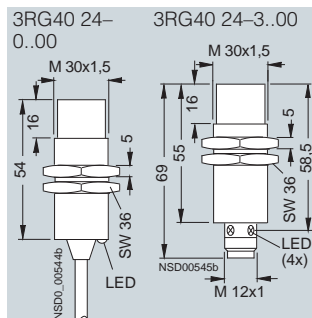
2) See from page 2/268.

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions

A = active surface
B = metal-free area

Technical specifications

Class		Extra duty (65 V DC)	Extra duty (AC/DC)
Number of wires		3-wire	2-wire
Design		Cubic 40 mm x 40 mm	Cubic 40 mm x 40 mm
Installation in metal		Flush	Flush
Rated operating distance s_n		15 mm	15 mm
Enclosure material		Molded plastic	Molded plastic
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 20	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	300
• 20 ms	mA	–	1800
Minimum load current		mA	5
Switching frequency f		Hz	25/150 (AC/DC)
Repeat accuracy R		mm	0.75
Power-up delay t_v		ms	100
LEDs			
• Switching status		Yellow LED	Yellow LED
• Supply voltage		Green LED	–
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	–
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP65	IP65

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With terminal box		0.5 ... 2.5 mm ²	0.5 ... 2.5 mm ²
NO contact or NC contact repositionable, prnp	23	▶ B 3RG40 31-6AD00	–
NO contact or NC contact repositionable	24	–	▶ B 3RG40 31-6KD00

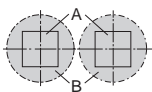
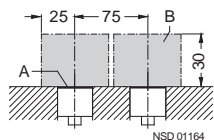
1) See page 2/242.

▶ Preferred type, available from stock.

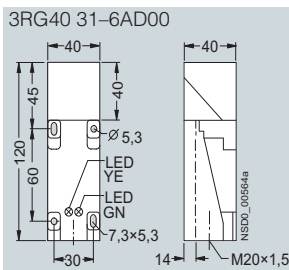
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

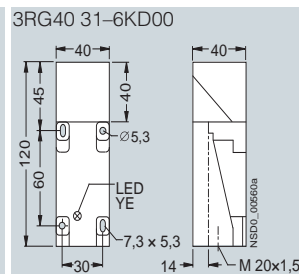
Mounting instructions



A = active surface
B = metal-free area



The active surface can be adjusted in 5 directions.



The active surface can be adjusted in 5 directions.

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 15 mm

Technical specifications

Class	Extra duty (AC/DC)		Increased operating distance
Number of wires	2-wire		3-wire
Design	Cubic 40 mm x 40 mm		M30
Installation in metal	Flush		Flush
Rated operating distance s_n	15 mm		15 mm
Enclosure material	Molded plastic		Brass, nickel-plated
Operating voltage			
• DC	V	20 ... 320	15 ... 34
• AC	V	20 ... 265	–
No-load supply current I_0			
• At 24 V DC	mA	1.5	≤ 17 (24 V); ≤ 30 (34 V)
• At 230 V AC	mA	≤ 2.0	–
Rated operational current I_e			
• Continuous	mA	300	200 (≤ 50 °C); 150 (≤ 85 °C)
• 20 ms	mA	–	–
Minimum load current	mA	≤ 2	–
Switching frequency f	Hz	25/50 (AC/DC)	300
Repeat accuracy R	mm	0.75	0.4
Hysteresis	mm	0.04 ... 3.3	–
Power-up delay t_v	ms	100	40
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression	•	–	•
• Short-circuit-proof/overload-proof	–	–	•
• Reverse-polarity protection	•	–	•
• Wire-break protection	–	–	•
• Inductive interference protection	•	–	•
• Radio interference protection	•	–	•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 3 m cable, PUR				
NO contact, pnp	11	–	–	3 × 0.25 mm ² B 3RG41 14-0AG01
With M12 connector				
NO contact, pnp	2	E, F	–	B 3RG41 14-3AG01
With M12 connector, rotatable				
NO contact	8	E, F	B 3RG40 38-3KB00	–

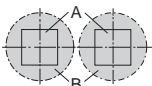
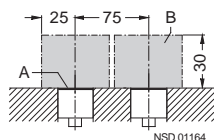
1) See page 2/242.

2) See from page 2/268.

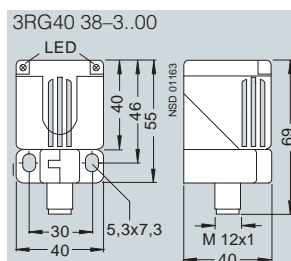
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

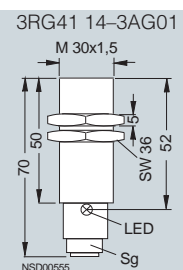
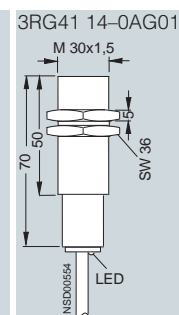
Mounting instructions



A = active surface
B = metal-free area



The active surface can be adjusted in 5 directions.
With rotatable connector..



Operating distance 15 mm

2

Technical specifications

Class	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K
Number of wires	3-wire	3-wire	3-wire
Design	Ø 30 mm	M30	M30
Installation in metal	Not flush	Not flush	Not flush
Rated operating distance s_n	15 mm	15 mm	15 mm
Enclosure material	Molded plastic	Molded plastic	Brass, nickel-plated
Operating voltage (DC) V	15 ... 34	15 ... 34	15 ... 34
No-load supply current I_0 mA	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)	≤ 17 (24 V); ≤ 30 (34 V)
Rated operational current I_e mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f Hz	300	300	300
Repeat accuracy R mm	0.4	0.4	0.4
Power-up delay t_v ms	40	40	40
Switching status display	Yellow LED	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K

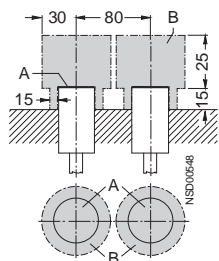
Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable			PUR, 3 × 0.25 mm ²	PUR, 3 × 0.25 mm ²	PVC, 3 × 0.25 mm ²
NO contact, pnp	11	B	3RG40 64-0AG30	B 3RG40 24-0AG30	B 3RG40 24-0AG31
NC contact, pnp	12	B	3RG40 64-0AF30	B 3RG40 24-0AF30	—
NO contact, npn	13	B	3RG40 64-0GB30	B 3RG40 24-0GB30	B 3RG40 24-0GB31
NC contact, npn	14	B	3RG40 64-0GA30	B 3RG40 24-0GA30	—
With M12 connector			—	B 3RG40 24-3AG30	B 3RG40 24-3AG31
NO contact, pnp	8	E, F	—	B 3RG40 24-3AF30	—
NC contact, pnp	9	F	—	—	—

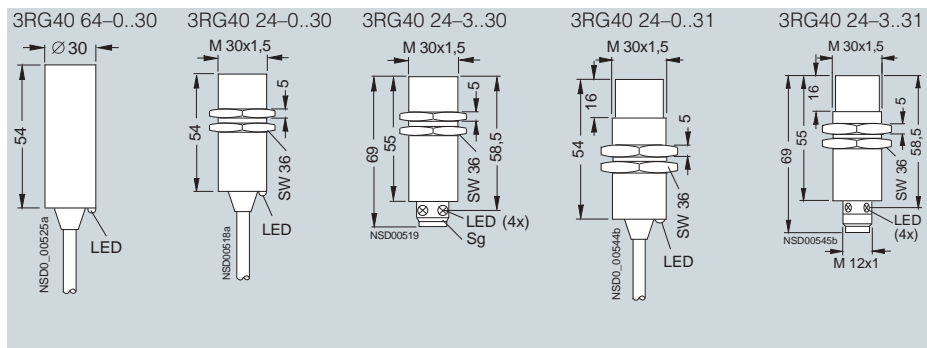
1) See page 2/242.
 2) See from page 2/268.
 B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
 B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 15 mm

Technical specifications

Class	IP68 / 69 K	IP68 / 69 K (65 V DC)	IP68 / 69 K (AC/DC)
Number of wires	4-wire	3-wire	2-wire
Design	Cubic 40 mm x 40 mm	Cubic 40 mm x 40 mm	Cubic 40 mm x 40 mm
Installation in metal	Flush	Flush	Flush
Rated operating distance s_n	15 mm	15 mm	15 mm
Enclosure material	Molded plastic	Molded plastic	Molded plastic
Operating voltage			
• DC	V 15 ... 34	10 ... 65	20 ... 320
• AC	V –	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA ≤ 25 (24 V); ≤ 40 (34 V)	≤ 20	≤ 1.0
• At 230 V AC	mA –	–	≤ 1.5
Rated operational current I_e			
• Continuous	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	300	300
• 20 ms	mA –	–	1800
Minimum load current	mA –	–	5
Switching frequency f	Hz 100	100	25/150 (AC/DC)
Repeat accuracy R	mm 0.75	0.75	0.75
Power-up delay t_v	ms 100	100	100
Switching status display	Yellow LED	Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression	•	•	•
• Short-circuit-proof/overload-proof	•	•	–
• Reverse-polarity protection	•	•	•
• Wire-break protection	•	•	•
• Inductive interference protection	•	•	•
• Radio interference protection	•	•	•
Degree of protection	IP68 / 69 K	IP68 / 69 K	IP68 / 69 K

Selection and Ordering data

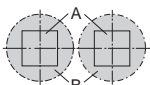
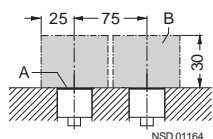
Switching output	Circuit diagram number ¹⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR		4 x 0.14 mm ²	3 x 0.25 mm ²	2 x 0.25 mm ²
Sensor in longitudinal axis				
NO contact, pnp	11	–	B 3RG40 30-0AB00	–
NC contact, pnp	12	–	B 3RG40 30-0AA00	–
NO contact and NC contact, pnp	10	B 3RG40 30-0CD00	–	–
NO contact	16	–	–	B 3RG40 30-0KB00
NC contact	17	–	–	B 3RG40 30-0KA00
Sensor 90° to longitudinal axis				
NO contact, pnp	11	–	B 3RG40 30-0AB01	–
NO contact and NC contact, pnp	10	B 3RG40 30-0CD01	–	–
NO contact	16	–	–	B 3RG40 30-0KB01
NC contact	17	–	–	B 3RG40 30-0KA01

1) See page 2/242.

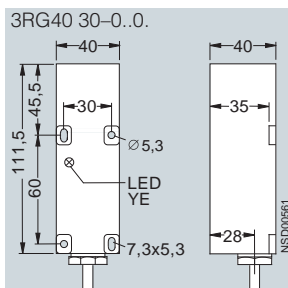
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 20 mm

Technical specifications

Class		Extra duty (65 V DC)	Extra duty (AC/DC)
Number of wires		3-wire	2-wire
Design		Cubic 40 mm x 40 mm	Cubic 40 mm x 40 mm
Installation in metal		Not flush	Not flush
Rated operating distance s_n		20 mm	20 mm
Enclosure material		Molded plastic	Molded plastic
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 20	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	300
• 20 ms	mA	–	1800
Minimum load current	mA	–	5
Switching frequency f	Hz	75	25/100 (AC/DC)
Repeat accuracy R	mm	0.75	1.0
Power-up delay t_v	ms	100	20
LEDs			
• Switching status		Yellow LED	Yellow LED
• Supply voltage		Green LED	–
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	–
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP65	IP65

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With terminal box		0.5 ... 2.5 mm ²	0.5 ... 2.5 mm ²
NO contact or NC contact repositionable, prnp	23	▶ B 3RG40 41-6AD00	–
NO contact or NC contact repositionable	24	–	▶ B 3RG40 41-6KD00

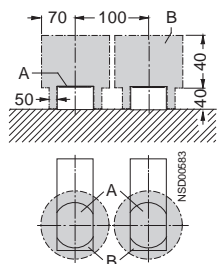
1) See page 2/242.

▶ Preferred type, available from stock.

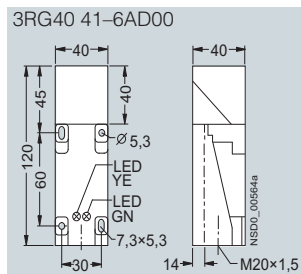
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

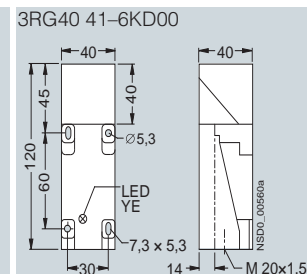
Mounting instructions



A = active surface;
B = metal-free area



The active surface can be adjusted in 5 directions.



The active surface can be adjusted in 5 directions.

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 20 mm

2

Technical specifications

Class	Increased operating distance	
Number of wires	3-wire	4-wire
Design	M18	Cubic 40 mm × 40 mm
Installation in metal	Not flush	Flush
Rated operating distance s_n	20 mm	20 mm
Enclosure material	Brass, nickel-plated	Molded plastic
Operational voltage (DC)	V	15 ... 34
No-load supply current I_0	mA	≤ 30 (24 V); ≤ 50 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	200
Repeat accuracy R	mm	1.0
Power-up delay t_v	ms	100
LEDs		
• Switching status	Yellow LED	Yellow LED
• Supply voltage	–	Green LED
Precautions		
• Spurious signal suppression	•	•
• Short-circuit-proof/overload-proof	•	•
• Reverse-polarity protection	•	•
• Wire-break protection	•	•
• Inductive interference protection	•	•
• Radio interference protection	•	•
Degree of protection	IP67	IP65

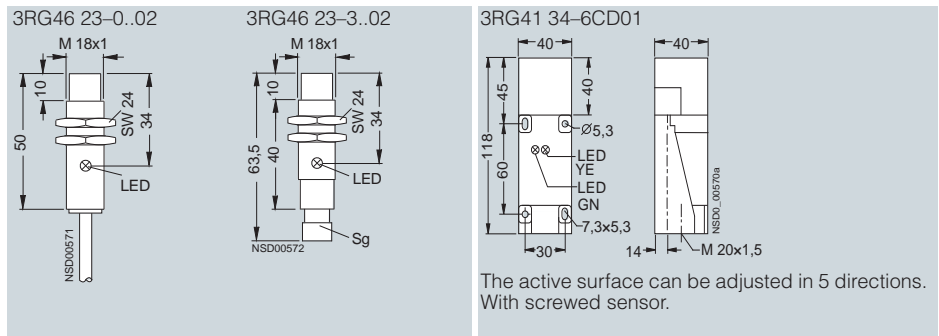
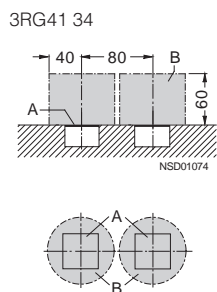
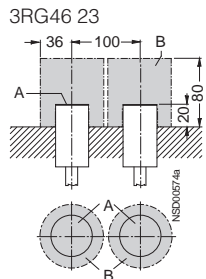
Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.34 mm ²	
NO contact, pnp	11	▶	3RG46 23-0AB02	–
NO contact, npn	13		3RG46 23-0GB02	–
With M12 connector				
NO contact, pnp	2	E, F ▶	3RG46 23-3AB02	–
NO contact, npn	4	E, F	3RG46 23-3GB02	–
With terminal box				0.5 ... 2.5 mm ²
NO contact and NC contact, pnp	18	–	–	B 3RG41 34-6CD01

- 1) See page 2/242.
- 2) See from page 2/268.
- ▶ Preferred type, available from stock.
- B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 20 mm

Technical specifications

Class	Increased operating distance		Increased operating distance (AC/DC)
Number of wires	4-wire		2-wire
Design	Cubic 40 mm x 40 mm		Cubic 40 mm x 40 mm
Installation in metal	Flush		Flush
Rated operating distance s_n	20 mm		20 mm
Enclosure material	Molded plastic		Molded plastic
Operating voltage			
• DC	V	15 ... 34	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 30 (24 V); ≤ 40 (34 V)	1.5
• At 230 V AC	mA	–	≤ 2.0
Rated operational current I_e			
• Continuous	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200
• 20 ms	mA	–	–
Minimum load current	mA	–	< 2
Switching frequency f	Hz	30	25/30 (AC/DC)
Repeat accuracy R	mm	0.75	0.75
Hysteresis H	mm	0.05 ... 3.3	0.05 ... 3.3
Power-up delay t_v	ms	100	100
LEDs			
• Switching status	Yellow LED		Yellow LED
• Supply voltage	Green LED		–
Precautions			
• Spurious signal suppression	•		•
• Short-circuit-proof/overload-proof	•		–
• Reverse-polarity protection	•		•
• Wire-break protection	•		–
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection	IP67		IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With M12 connector				
NO contact and NC contact, pnp	1	F	▶ B 3RG41 38-3CD00	–
NO contact and NC contact, npn	–	F	B 3RG41 38-3GD00	–
NO contact	8	F	–	B 3RG41 38-3KB00

1) See page 2/242.

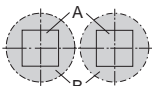
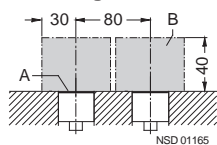
2) See from page 2/268.

▶ Preferred type, available from stock.

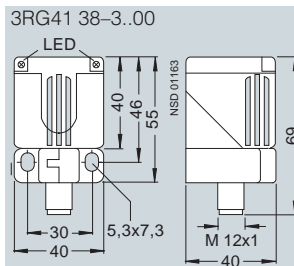
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



The active surface can be adjusted in 5 directions.
With rotatable connector.

Technical specifications

Class	Increased operating distance	
Number of wires	3-wire	
Design	M30	
Installation in metal	Almost flush	
Rated operating distance s_n	22 mm	
Enclosure material	Brass, nickel-plated	
Operational voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 10
Rated operational current I_e	mA	200
Switching frequency f	Hz	100
Repeat accuracy R	mm	1.1
Power-up delay t_v	ms	200
LEDs		
• Switching status	Yellow LED	
• Supply voltage	–	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	•	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.34 \text{ mm}^2$
NO contact, pnp	11	▶	3RG46 14-0AB00
NO contact, npn	13		3RG46 14-0GB00
With M12 connector			
NO contact, pnp	2	E, F ▶	3RG46 14-3AB00
NO contact, npn	4	E, F	3RG46 14-3GB00

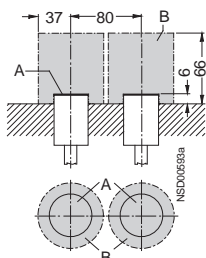
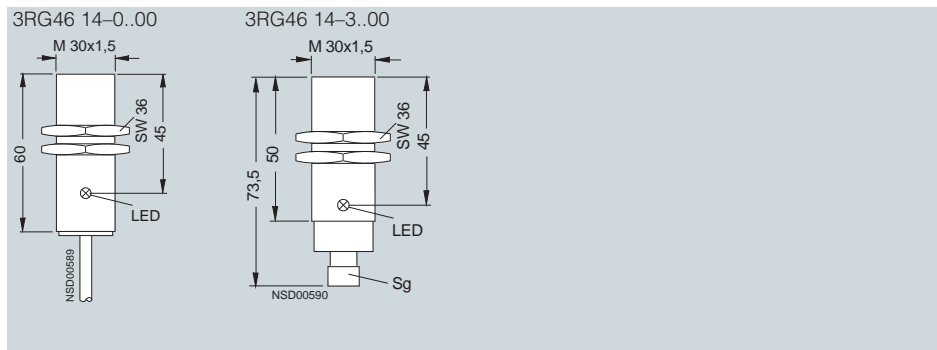
1) See page 2/242.

2) See from page 2/268.

▶ Preferred type, available from stock.

Dimensions

Mounting instructions

A = active surface
B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 25 mm

Technical specifications

Class	Increased operating distance (65 V DC)	
Number of wires	3-wire	
Design	Cubic 40 mm x 40 mm	
Installation in metal	Almost flush	
Rated operating distance s_n	25 mm	
Enclosure material	Molded plastic	
Operating voltage (DC)	V	10 ... 65
No-load supply current I_0	mA	20
Rated operational current I_e	mA	300
Switching frequency f	Hz	50
Repeat accuracy R	mm	1.5
Power-up delay t_v	ms	100
LEDs		
• Switching status	Yellow LED	
• Supply voltage	Green LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	•	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP65	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.
With terminal box		0.5 ... 2.5 mm ²
NO contact or NC contact repositionable, prnp	23	▶ B 3RG41 31-6AD00

1) See page 2/242.

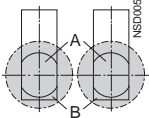
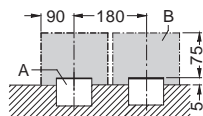
▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

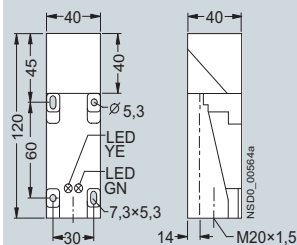
Mounting instructions

3RG41 31



A = active surface
B = metal-free area

3RG41 31-6AD0.



The active surface can be adjusted in 5 directions.

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 30 mm

2

Technical specifications

Class		Extra duty (65 V DC)	Extra duty (AC/DC)
Number of wires		3-wire	2-wire
Design		Cubic 60 mm x 80 mm	Cubic 60 mm x 80 mm
Installation in metal		Not flush	Not flush
Rated operating distance s_n		30 mm	30 mm
Enclosure material		Molded plastic	Molded plastic
Operating voltage			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 40	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	300
• 20 ms	mA	–	1800
Minimum load current		mA	5
Switching frequency f		Hz	25/60 (AC/DC)
Repeat accuracy R		mm	1.0
Power-up delay t_v		ms	100
LEDs			
• Switching status		Yellow LED	Yellow LED
• Supply voltage		Green LED	–
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	–
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP65	IP65

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With terminal box		0.5 ... 2.5 mm ²	0.5 ... 2.5 mm ²
NO contact or NC contact repositionable, prnp	23	▶ B 3RG40 42-6AD00	–
NO contact or NC contact repositionable	24	–	▶ B 3RG40 42-6KD00

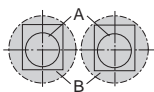
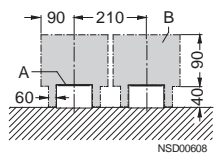
1) See page 2/242.

▶ Preferred type, available from stock.

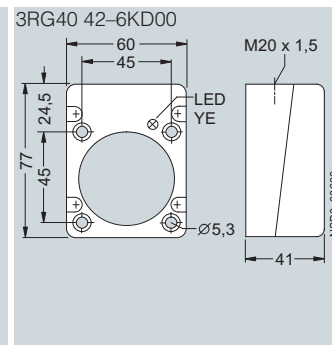
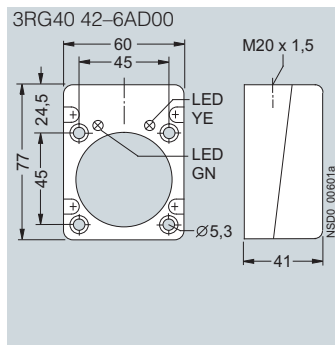
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 30 mm

Technical specifications

Class	Increased operating distance	
Number of wires	4-wire	
Design	Cubic 40 mm x 40 mm	
Installation in metal	Not flush	
Rated operating distance s_n	30 mm	
Enclosure material	Molded plastic	
Operating voltage	V	15 ... 34
No-load supply current I_0	mA	≤ 30 (24 V); ≤ 50 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	30
Repeat accuracy R	mm	1.5
Power-up delay t_v	ms	100
LEDs		
• Switching status	Yellow LED	
• Supply voltage	Green LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	•	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP65	

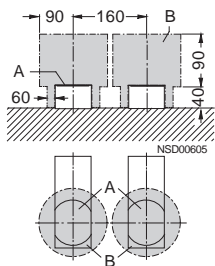
Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.
With terminal box		0.5 ... 2.5 mm ²
NO contact and NC contact, pnp	18	3RG41 44-6CD01

1) See page 2/242.

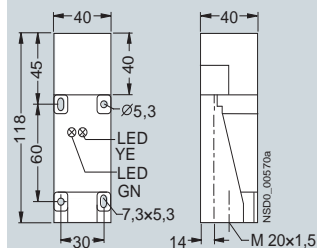
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG41 44-6CD01



The active surface can be adjusted in 5 directions.
With screwed sensor.

Technical specifications

Class		Increased operating distance		Increased operating distance (AC/DC)	
Number of wires		4-wire		2-wire	
Design		Cubic 40 mm x 40 mm		Cubic 40 mm x 40 mm	
Installation in metal		Not flush		Not flush	
Rated operating distance s_n		35 mm		35 mm	
Enclosure material		Molded plastic		Molded plastic	
Operating voltage U_B					
• DC	V	15 ... 34		20 ... 320	
• AC	V	–		20 ... 265	
No-load supply current I_0					
• At 24 V DC	mA	≤ 30 (24 V); ≤ 40 (34 V)		1.5	
• At $U_{B \max}$	mA	–		≤ 2.0	
Rated operational current I_e					
• Continuous	mA	200 (≤ 50 °C); 150 (≤ 85 °C)		300	
• 20 ms	mA	–		–	
Minimum load current		mA		–	
		–		< 2	
Switching frequency f		Hz		30	
Repeat accuracy R		mm		0.75	
Hysteresis H		mm		0.05 ... 7.7	
Power-up delay t_v		ms		100	
LEDs					
• Switching status		Yellow LED		Yellow LED	
• Supply voltage		Green LED		–	
Precautions					
• Spurious signal suppression		•		•	
• Short-circuit-proof/overload-proof		•		–	
• Reverse-polarity protection		•		–	
• Wire-break protection		•		–	
• Inductive interference protection		•		•	
• Radio interference protection		•		•	
Degree of protection		IP67		IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With M12 connector				
NO contact and NC contact, pnp	1	F	▶ B 3RG41 48-3CD00	–
NO contact and NC contact, npn	–	F	B 3RG41 48-3GD00	–
NO contact	8	F	–	B 3RG41 48-3KB00

1) See page 2/242.

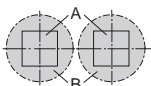
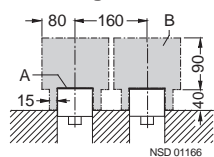
2) See from page 2/268.

▶ Preferred type, available from stock.

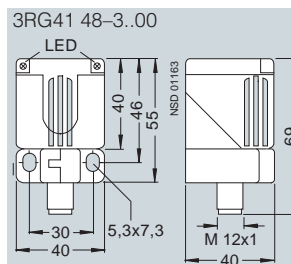
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



The active surface can be adjusted in 5 directions.
With rotatable connector.

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 40 mm

Technical specifications

Class		Extra duty (65 V DC)	Extra duty (AC/DC)
Number of wires		3-wire	2-wire
Design		Cubic 80 mm x 100 mm	Cubic 80 mm x 100 mm
Installation in metal		Not flush	Not flush
Rated operating distance s_n		40 mm	40 mm
Enclosure material		Molded plastic	Molded plastic
Operating voltage U_B			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 40	1.0
• At 230 V AC	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	300
• 20 ms	mA	–	1800
Minimum load current	mA	–	5
Switching frequency	Hz	10	25/60 (AC/DC)
Repeat accuracy R	mm	1.0	1.0
Power-up delay t_v	ms	200	100
LEDs			
• Switching status		Yellow LED	Yellow LED
• Supply voltage		Green LED	–
Precautions			
• Spurious signal suppression	•	•	•
• Short-circuit-proof/overload-proof	•	•	•
• Reverse-polarity protection	•	•	•
• Wire-break protection	•	•	•
• Inductive interference protection	•	•	•
• Radio interference protection	•	•	•
Degree of protection		IP65	IP65

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With terminal box		0.5 ... 2.5 mm ²	0.5 ... 2.5 mm ²
NO contact or NC contact repositionable, pnp	23	▶ B 3RG40 43-6AD00	–
NO contact or NC contact repositionable	24	–	▶ B 3RG40 43-6KD00

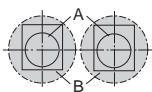
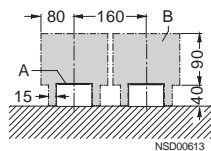
1) See page 2/242.

▶ Preferred type, available from stock.

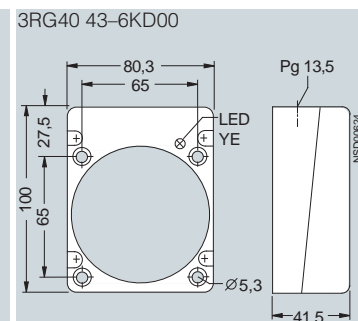
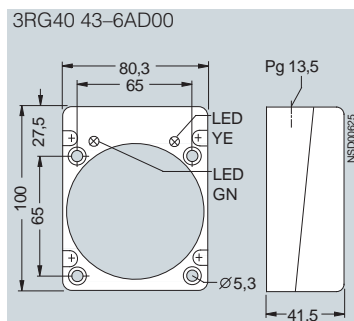
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class	Extra duty (65 V DC)		Extra duty (AC/DC)
Number of wires	3-wire		2-wire
Design	Cubic 80 mm × 100 mm		Cubic 80 mm × 100 mm
Installation in metal	Not flush / flush		Not flush / flush
Rated operating distance s_n	30 mm / 40 mm		30 mm / 40 mm
Enclosure material	Molded plastic		Molded plastic
Operating voltage U_B			
• DC	V	10 ... 65	20 ... 320
• AC	V	–	20 ... 265
No-load supply current I_0			
• At 24 V DC	mA	≤ 40	1.0
• At U_{max}	mA	–	1.5
Rated operational current I_e			
• Continuous	mA	300	300
• 20 ms	mA	–	1800
Minimum load current	mA	–	5
Switching frequency f	Hz	10	25/60 (AC/DC)
Repeat accuracy R	mm	2	2
Power-up delay t_v	ms	200	100
LEDs			
• Switching status	Yellow LED		Yellow LED
• Supply voltage	Green LED		–
Precautions			
• Spurious signal suppression	•		•
• Short-circuit-proof/overload-proof	•		–
• Reverse-polarity protection	•		•
• Wire-break protection	•		•
• Inductive interference protection	•		•
• Radio interference protection	•		•
Degree of protection	IP65		IP65

Selection and Ordering data

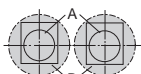
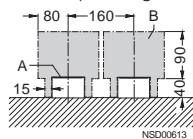
Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With terminal box		0.5 ... 2.5 mm ²	0.5 ... 2.5 mm ²
NO contact or NC contact repositionable, pnp	23	▶ B 3RG40 33-6AD01	–
NO contact or NC contact repositionable	24	–	B 3RG40 33-6KD01

1) See page 2/242. ▶ Preferred type, available from stock.
 B: Subject to export regulations AL = N and ECCN = EAR99.

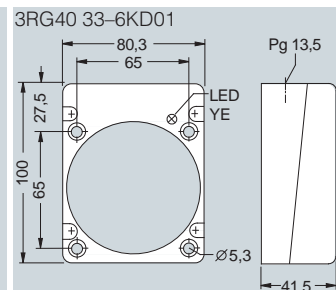
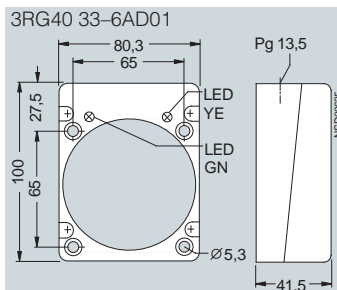
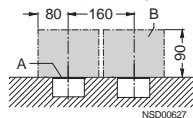
Dimensions

Mounting instructions

Rated operating distance 30 mm



Rated operating distance 40 mm



A = active surface
 B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 40 mm

Technical specifications

Class	Increased operating distance	
Number of wires	3-wire	
Design	M30	
Installation in metal	Not flush	
Rated operating distance s_n	40 mm	
Enclosure material	Brass, nickel-plated	
Operating voltage U_B	V	10 ... 30
No-load supply current I_0	mA	≤ 10
Rated operational current I_e	mA	200
Switching frequency f	Hz	100
Repeat accuracy R	mm	1.1
Power-up delay t_v	ms	200
LEDs		
• Switching status	Yellow LED	
• Supply voltage	–	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	•	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP67 (not suitable for use under continuous wet conditions or outdoors)	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.34 \text{ mm}^2$
NO contact, pnp	11	▶	3RG46 24-0AB02
NO contact, npn	13	▶	3RG46 24-0GB02
With M12 connector			
NO contact, pnp	2	E, F ▶	3RG46 24-3AB02
NO contact, npn	4	E, F ▶	3RG46 24-3GB02

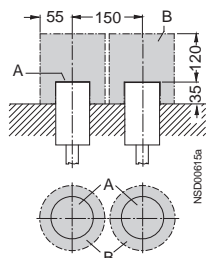
1) See page 2/242.

2) See from page 2/268.

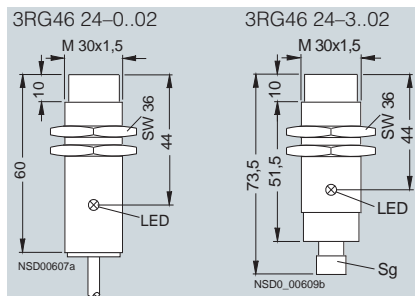
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class	Increased operating distance (65 V DC)	
Number of wires	3-wire	
Design	Cubic 40 mm x 40 mm	
Installation in metal	Not flush	
Rated operating distance s_n	40 mm	
Enclosure material	Molded plastic	
Operational voltage (DC)	V	10 ... 65
No-load supply current I_0	mA	20
Rated operational current I_e	mA	300
Switching frequency f	Hz	20
Repeat accuracy R	mm	1.5
Power-up delay t_v	ms	100
LEDs		
• Switching status	Yellow LED	
• Supply voltage	Green LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	•	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	•	
• Radio interference protection	•	
Degree of protection	IP65	

Selection and Ordering data

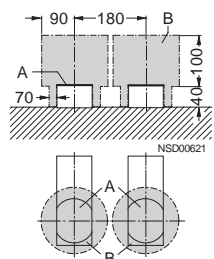
Switching output	Circuit diagram number ¹⁾	Order No.
With terminal box		0.5 ... 2.5 mm ²
NO contact, pnp	19	B 3RG41 41-6AB03
NO contact or NC contact repositionable, pnp	23	B 3RG41 41-6AD00

1) See page 2/242.

B: Subject to export regulations AL = N and ECCN = EAR99.

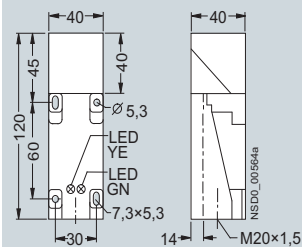
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG41 41-6A.0.



The active surface can be adjusted in 5 directions.

SIMATIC PXI inductive proximity switches

SIMATIC PXI300

Operating distance 25 mm or 40 mm

Technical specifications

Class	Increased operating distance (65 V DC)	
Number of wires	3-wire	
Design	Cubic 40 mm x 40 mm	
Installation in metal	Not flush	
Rated operating distance s_n	25 mm or 40 mm, selectable	
Enclosure material	Molded plastic	
Operational voltage (DC)	V	10 ... 65
No-load supply current I_0	mA	20
Rated operational current I_e	mA	300
Switching frequency f	Hz	20
Repeat accuracy R	mm	1.5
Power-up delay t_v	ms	100
LEDs	<ul style="list-style-type: none"> • Switching status: Yellow LED • Supply voltage: Green LED 	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	
Degree of protection	IP67	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With M12 connector			
NO contact, pnp	2	E, F	B 3RG41 41-3AB02
<i>Connector can be offset in steps of 30°</i>			
NO contact, pnp	2	E, F	B 3RG41 41-3AB01

1) See page 2/242.

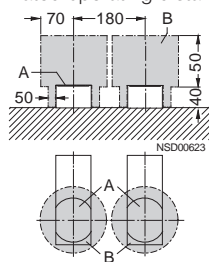
2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99.

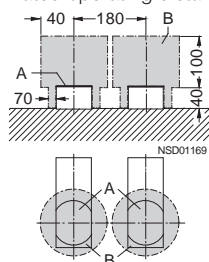
Dimensions

Mounting instructions

Rated operating distance 25 mm

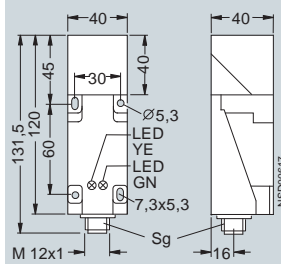


Rated operating distance 40 mm

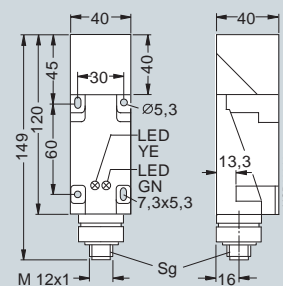


A = active surface
B = metal-free area

3RG41 41-3AB02



3RG41 41-3AB01



The active surface can be adjusted in 5 directions.

The active surface can be adjusted in 5 directions.

Technical specifications

Class	Increased operating distance (65 V DC)		Increased operating distance (65 V DC)	
Number of wires	3-wire		3-wire	
Design	Cubic 60 mm x 80 mm		Cubic 80 mm x 100 mm	
Installation in metal	Not flush		Not flush	
Rated operating distance s_n	50 mm		65 mm	
Enclosure material	Molded plastic		Molded plastic	
Operational voltage (DC)	V	10 ... 65	V	10 ... 65
No-load supply current I_0	mA	20	mA	20
Rated operational current I_e	mA	300	mA	300
Switching frequency f	Hz	20	Hz	10
Repeat accuracy R	mm	1.5	mm	2
Power-up delay t_v	ms	100	ms	100
LEDs				
• Switching status	Yellow LED		Yellow LED	
• Operating voltage	Green LED		Green LED	
Precautions				
• Spurious signal suppression	•		•	
• Short-circuit-proof/overload-proof	•		•	
• Reverse-polarity protection	•		•	
• Wire-break protection	•		•	
• Inductive interference protection	•		•	
• Radio interference protection	•		•	
Degree of protection	IP65		IP65	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Order No.	Order No.
With terminal box		0.5 ... 2.5 mm ²	0.5 ... 2.5 mm ²
NO contact or NC contact repositionable, prnp	23	B 3RG41 42-6AD00	B 3RG41 43-6AD00

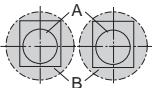
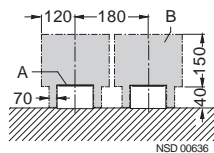
1) See page 2/242.

B: Subject to export regulations AL = N and ECCN = EAR99.

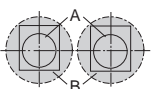
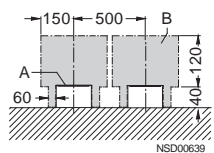
Dimensions

Mounting instructions

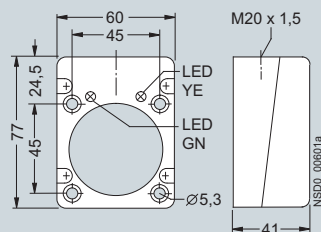
3RG41 42



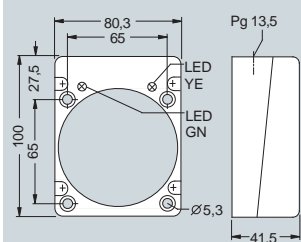
3RG41 43

A = active surface
B = metal-free area

3RG41 42-6AD00



3RG41 43-6AD00



SIMATIC PXI inductive proximity switches

SIMATIC PXI400

Overview

SIMATIC sensors PXI400

Sensors without reduction factor

Selection table

SIMATIC PXI400



Type, Ø	M8	M12	M18	M30	40 mm x 40 mm	80 mm x 80 mm
Operating distance						
• 1 ... 4 mm (PXI.2.)	1.5 mm 4 mm	3 mm				
• 5 ... 10 mm (PXI.3.)		8 mm	5 mm	10 mm		
• 12 ... 22 mm (PXI.4.)			12 mm	20 mm	15 mm	
• 25 ... 40 mm (PXI.5.)					25 mm 35 mm 40 mm	
• 50 ... 75 mm (PXI.6.)						75 mm
Output						
• NO contact/NC contact	■ / —	■ / —	■ / —	■ / —	■ / —	■ / —
• pnp/npn	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■
Number of wires	3	3	3	3	3	3
Operating voltage						
• 10/15 ... 30/35 V DC	■	■	■	■	■	■
Connection						
• M8 connector	■					
• M12 connector	■	■	■	■	■	
• Cable	■	■	■	■		
• Terminal compartment					■	■
Degree of protection						
• IP65 / IP67		— / ■	— / ■	— / ■		— / ■
• IP68 / IP69K	■ / —	■ / —	■ / —	■ / —	■ / —	
See page	from 2/217	from 2/218	from 2/220	from 2/222	from 2/224	2/228

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	M8	
Installation in metal	Flush	
Rated operating distance s_n	1.5 mm	
Enclosure material	Stainless steel	
Operational voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 13
Rated operating current I_e	mA	150
Switching frequency f	Hz	< 2000
Repeat accuracy R	mm	0.16
Power-up delay t_v	ms	≤ 8
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	
Degree of protection	IP68	

2

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$
NO contact, pnp	11		3RG46 11-0AN01
NO contact, npn	13		3RG46 11-0GN01
With 8 mm combination plug			
NO contact, pnp	2	A	3RG46 11-7AN01
NO contact, npn	4	A	3RG46 11-7GN01
With M12 connector			
NO contact, pnp	2	E, F	3RG46 11-3AN01
NO contact, npn	4	E, F	3RG46 11-3GN01

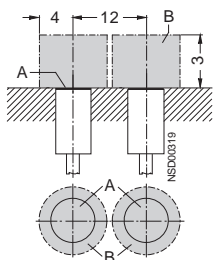
1) See page 2/242.

2) See from page 2/268.

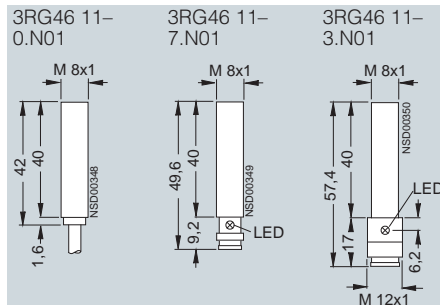
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI400

Operating distance 3 mm

Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	M12	
Installation in metal	Flush	
Rated operating distance s_n	3 mm	
Enclosure material	Brass or stainless steel	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 13
Rated operating current I_e	mA	200
Switching frequency f	Hz	3000
Repeat accuracy R	mm	0.04
Power-up delay t_v	ms	8
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection • Protective insulation 	
Degree of protection	<ul style="list-style-type: none"> • Brass enclosure IP67 • Stainless steel enclosure IP68 	
		Magnetic field resistant up to 160 mT r.m.s.

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.14 \text{ mm}^2$
<i>Brass, chrome-plated</i>			
NO contact, pnp	11	▶	3RG46 12-0AN01
NO contact, npn	13		3RG46 12-0GN01
<i>Stainless steel</i>			
NO contact, pnp	11		3RG46 12-0AN61
NO contact, npn	13		3RG46 12-0GN61
With M12 connector			
<i>Brass, chrome-plated</i>			
NO contact, pnp	2	E, F	3RG46 12-3AN01
NO contact, npn	4	E, F	3RG46 12-3GN01
<i>Brass, teflon-coated</i>			
NO contact, pnp	2	E, F	3RG46 12-3AN05
NO contact, npn	4	E, F	3RG46 12-3GN05
<i>Stainless steel</i>			
NO contact, pnp	2	E, F	▶ 3RG46 12-3AN61
NO contact, npn	2	E, F	▶ 3RG46 12-3GN61

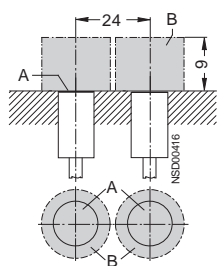
1) See page 2/242.

2) See from page 2/268.

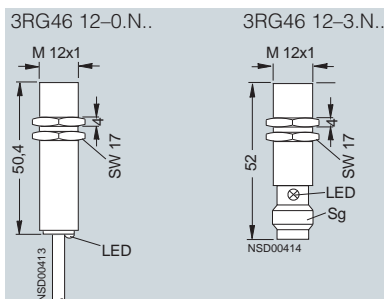
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	M8	
Installation in metal	Not flush	
Rated operating distance s_n	4 mm	
Enclosure material	Stainless steel	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 13
Rated operating current I_e	mA	150
Switching frequency f	Hz	< 2000
Repeat accuracy R	mm	0.16
Power-up delay t_v	ms	≤ 8
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	
Degree of protection	IP68	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$
NO contact, pnp	11	▶	3RG46 21-0AN01
NO contact, npn	13		3RG46 21-0GN01
With 8 mm combination plug			
NO contact, pnp	2	A ▶	3RG46 21-7AN01
NO contact, npn	4	A	3RG46 21-7GN01
With M12 connector			
NO contact, pnp	2	E, F ▶	3RG46 21-3AN01
NO contact, npn	4	E, F	3RG46 21-3GN01

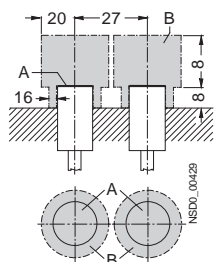
1) See page 2/242.

2) See from page 2/268.

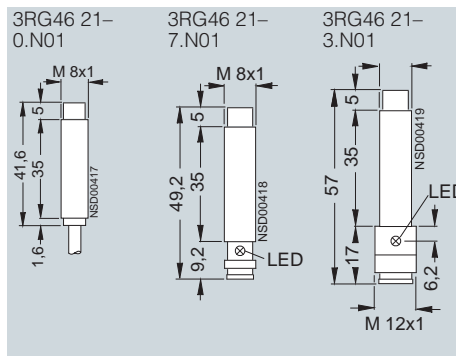
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI400

Operating distance 5 mm

Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	M18	
Installation in metal	Flush	
Rated operating distance s_n	5 mm	
Enclosure material	Brass or stainless steel	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 13
Rated operational current I_e	mA	200
Switching frequency f	Hz	2500
Repeat accuracy R	mm	0.1
Power-up delay t_v	ms	≤ 8
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection • Protective insulation 	
Degree of protection	<ul style="list-style-type: none"> • Brass enclosure • Stainless steel enclosure 	
	IP67	IP68
	Magnetic field resistant up to 160 mT r.m.s.	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.34 \text{ mm}^2$
<i>Brass, chrome-plated</i>			
NO contact, pnp	11		3RG46 13-0AN01
NO contact, npn	13		3RG46 13-0GN01
<i>Stainless steel</i>			
NO contact, pnp	11		3RG46 13-0AN61
NO contact, npn	13		3RG46 13-0GN61
With M12 connector			
<i>Brass, chrome-plated</i>			
NO contact, pnp	2	E, F	3RG46 13-3AN01
NO contact, npn	4	E, F	3RG46 13-3GN01
<i>Brass, teflon-coated</i>			
NO contact, pnp	2	E, F	3RG46 13-3AN05
NO contact, npn	4	E, F	3RG46 13-3GN05
<i>Stainless steel</i>			
NO contact, pnp	2	E, F	3RG46 13-3AN61
NO contact, npn	2	E, F	3RG46 13-3GN61

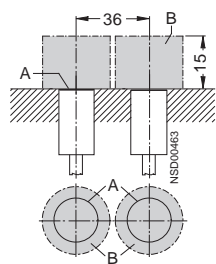
1) See page 2/242.

2) See from page 2/268.

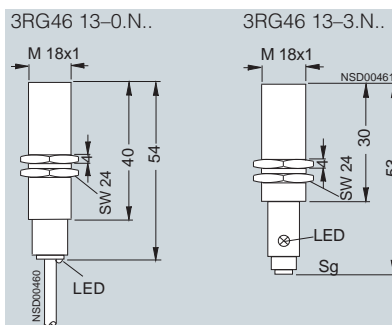
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	M12	
Installation in metal	Not flush	
Rated operating distance s_n	8 mm	
Enclosure material	Brass or stainless steel	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 12
Rated operating current I_e	mA	200
Switching frequency f	Hz	2000
Repeat accuracy R	mm	0.16
Power-up delay t_v	ms	≤ 8
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection • Protective insulation 	
Degree of protection	<ul style="list-style-type: none"> • Brass enclosure • Stainless steel enclosure 	
	IP67	IP68
		Magnetic field resistant up to 160 mT r.m.s.

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			3 × 0.34 mm ²
<i>Brass, chrome-plated</i>			
NO contact, pnp	11	▶	3RG46 22-0AN01
NO contact, npn	13		3RG46 22-0GN01
<i>Stainless steel</i>			
NO contact, pnp	11		3RG46 22-0AN61
NO contact, npn	13		3RG46 22-0GN61
With M12 connector			
<i>Brass, chrome-plated</i>			
NO contact, pnp	2	E, F ▶	3RG46 22-3AN01
NO contact, npn	4	E, F	3RG46 22-3GN01
<i>Brass, teflon-coated</i>			
NO contact, pnp	2	E, F	3RG46 22-3AN05
NO contact, npn	4	E, F	3RG46 22-3GN05
<i>Stainless steel</i>			
NO contact, pnp	2	E, F ▶	3RG46 22-3AN61
NO contact, npn	2	E, F	3RG46 22-3GN61

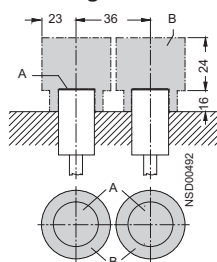
1) See page 2/242.

2) See from page 2/268.

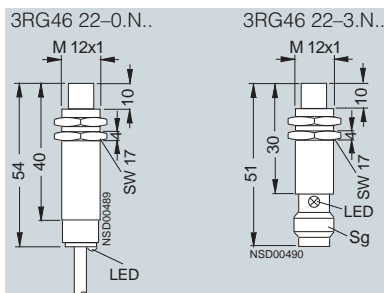
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI400

Operating distance 10 mm

Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	M30	
Installation in metal	Flush	
Rated operating distance s_n	10 mm	
Enclosure material	Brass or stainless steel	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 13
Rated operating current I_e	mA	200
Switching frequency f	Hz	2000
Repeat accuracy R	mm	0.2
Power-up delay t_v	ms	≤ 8
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection • Protective insulation 	
Degree of protection	<ul style="list-style-type: none"> • Brass enclosure • Stainless steel enclosure 	
	IP67	IP68

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.34 \text{ mm}^2$
<i>Brass, chrome-plated</i>			
NO contact, pnp	11		3RG46 14-0AN01
NO contact, npn	13		3RG46 14-0GN01
<i>Stainless steel</i>			
NO contact, pnp	11		3RG46 14-0AN61
NO contact, npn	13		3RG46 14-0GN61
With M12 connector			
<i>Brass, chrome-plated</i>			
NO contact, pnp	2	E, F	3RG46 14-3AN01
NO contact, npn	4	E, F	3RG46 14-3GN01
<i>Brass, teflon-coated</i>			
NO contact, pnp	2	E, F	3RG46 14-3AN05
NO contact, npn	4	E, F	3RG46 14-3GN05
<i>Stainless steel</i>			
NO contact, pnp	2	E, F	3RG46 14-3AN61
NO contact, npn	2	E, F	3RG46 14-3GN61

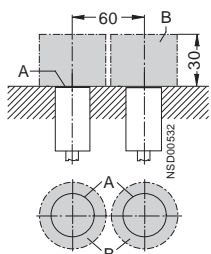
1) See page 2/242.

2) See from page 2/268.

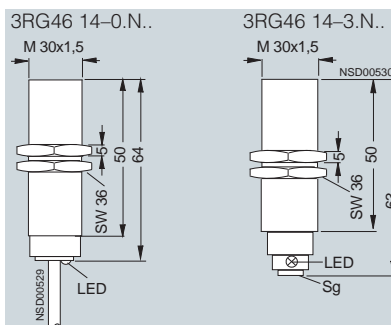
► Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	M18	
Installation in metal	Not flush	
Rated operating distance s_n	12 mm	
Enclosure material	Brass or stainless steel	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 12
Rated operating current I_e	mA	200
Switching frequency f	Hz	2000
Repeat accuracy R	mm	0.24
Power-up delay t_v	ms	≤ 8
Switching status display	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection • Protective insulation 	
Degree of protection	<ul style="list-style-type: none"> • Brass enclosure • Stainless steel enclosure 	
	IP67	IP68

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.34 \text{ mm}^2$
<i>Brass, chrome-plated</i>			
NO contact, pnp	11	▶	3RG46 23-0AN01
NO contact, npn	13		3RG46 23-0GN01
<i>Stainless steel</i>			
NO contact, pnp	11		3RG46 23-0AN61
NO contact, npn	13		3RG46 23-0GN61
With M12 connector			
<i>Brass, chrome-plated</i>			
NO contact, pnp	2	E, F	▶ 3RG46 23-3AN01
NO contact, npn	4	E, F	3RG46 23-3GN01
<i>Brass, teflon-coated</i>			
NO contact, pnp	2	E, F	3RG46 23-3AN05
NO contact, npn	4	E, F	3RG46 23-3GN05
<i>Stainless steel</i>			
NO contact, pnp	2	E, F	3RG46 23-3AN61
NO contact, npn	2	E, F	3RG46 23-3GN61

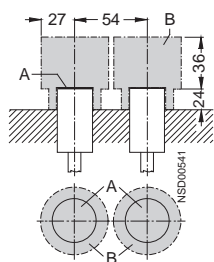
1) See page 2/242.

2) See from page 2/268.

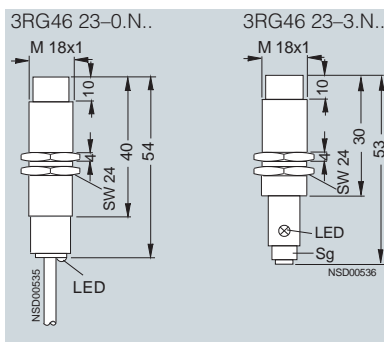
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI400

Operating distance 15 mm

Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	Cubic 40 mm x 40 mm	
Installation in metal	Flush	
Rated operating distance s_n	15 mm	
Enclosure material	Molded plastic	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 15
Rated operating current I_e	mA	200
Switching frequency f	Hz	250
Repeat accuracy R	mm	0.3
Power-up delay t_v	ms	≤ 8
LEDs		
• Switching status	Yellow LED	
• Supply voltage	Green LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	•	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	Magnetic field resistant up to 160 mT r.m.s.	
• Radio interference protection	•	
• Protective insulation	•	
Degree of protection	IP68	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With M12 connector				
NO contact, pnp	2	E, F	▶ 3RG46 38-3AN01	-
NO contact, npn	4	E, F	3RG46 38-3GN01	-
With terminal box				
NO contact, pnp	28	-	-	0.5 ... 2.5 mm ²
NO contact, npn	29	-	-	3RG46 34-6AN01 3RG46 34-6GN01

1) See page 2/242.

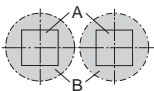
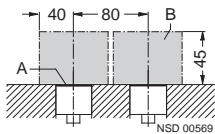
2) See from page 2/268.

▶ Preferred type, available from stock.

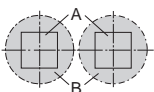
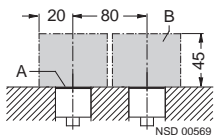
Dimensions

Mounting instructions

3RG46 38

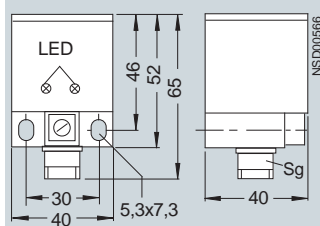


3RG46 34

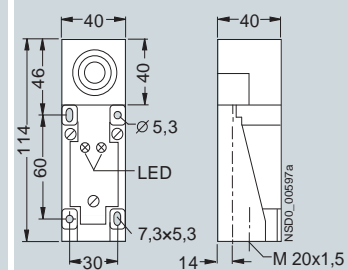


A = active surface
B = metal-free area

3RG46 38-3.N01



3RG46 34-6.N01



The active surface can be adjusted in 5 directions.

Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	M30	
Installation in metal	Not flush	
Rated operating distance s_n	20 mm	
Enclosure material	Brass or stainless steel	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 13
Rated operating current I_e	mA	200
Switching frequency f	Hz	1500
Repeat accuracy R	mm	0.4
Power-up delay t_v	ms	≤ 8
Switching status indication	Yellow LED	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection • Protective insulation 	
Degree of protection	<ul style="list-style-type: none"> • Brass enclosure IP67 • Stainless steel enclosure IP68 	
		Magnetic field resistant up to 160 mT r.m.s.

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			3 × 0.34 mm ²
<i>Brass, chrome-plated</i>			
NO contact, pnp	11	▶	3RG46 24-0AN01
NO contact, npn	13		3RG46 24-0GN01
<i>Stainless steel</i>			
NO contact, pnp	11	▶	3RG46 24-0AN61
NO contact, npn	13		3RG46 24-0GN61
With M12 connector			
<i>Brass, chrome-plated</i>			
NO contact, pnp	2	E, F	▶ 3RG46 24-3AN01
NO contact, npn	4	E, F	3RG46 24-3GN01
<i>Brass, teflon-coated</i>			
NO contact, pnp	2	E, F	3RG46 24-3AN05
NO contact, npn	4	E, F	3RG46 24-3GN05
<i>Stainless steel</i>			
NO contact, pnp	2	E, F	3RG46 24-3AN61
NO contact, npn	2	E, F	3RG46 24-3GN61

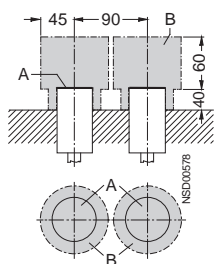
1) See page 2/242.

2) See from page 2/268.

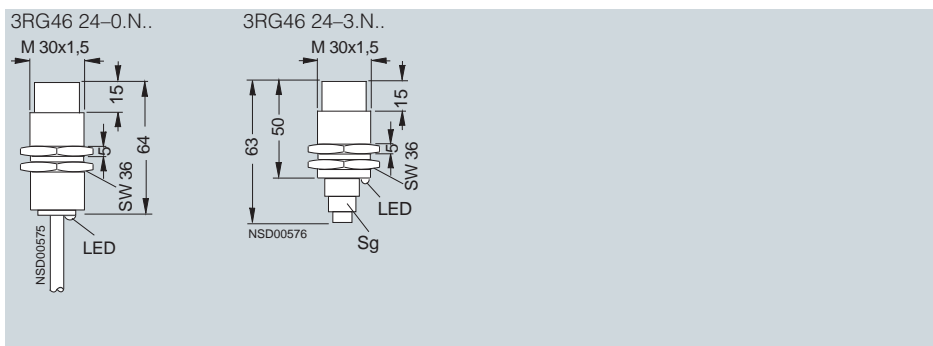
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI400

Operating distance 25 mm

Technical specifications

Class	Reduction factor 1	
Number of wires	3-wire	
Design	Cubic 40 mm x 40 mm	
Installation in metal	Not flush	
Rated operating distance s_n	25 mm	
Enclosure material	Molded plastic	
Operating voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 15
Rated operating current I_e	mA	200
Switching frequency f	Hz	250
Repeat accuracy R	mm	0.5
Power-up delay t_v	ms	≤ 8
LEDs		
• Switching status	Yellow LED	
• Supply voltage	Green LED	
Precautions		
• Spurious signal suppression	•	
• Short-circuit-proof/overload-proof	•	
• Reverse-polarity protection	•	
• Wire-break protection	•	
• Inductive interference protection	Magnetic field resistant up to 140 mT r.m.s.	
• Radio interference protection	•	
• Protective insulation	•	
Degree of protection	IP68	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With M12 connector				
NO contact, pnp	2	E, F	▶ 3RG46 48-3AN01	—
NO contact, npn	4	E, F	3RG46 48-3GN01	—
With terminal box				
NO contact, pnp	28	—	—	0.5 ... 2.5 mm ²
NO contact, npn	29	—	—	3RG46 44-6AN02
				3RG46 44-6GN02

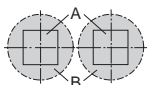
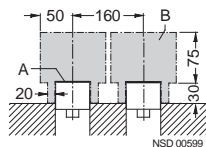
1) See page 2/242.

2) See from page 2/268.

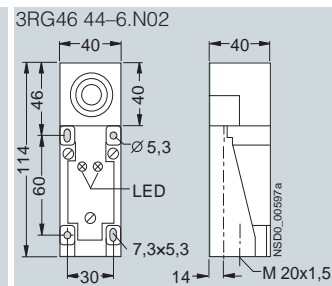
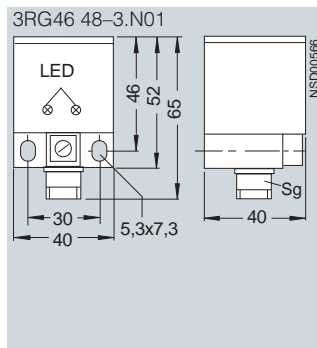
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



The active surface can be adjusted in 5 directions.

Technical specifications

Class		Reduction factor 1	Reduction factor 1
Number of wires		3-wire	3-wire
Design		Cubic 40 mm x 40 mm	Cubic 40 mm x 40 mm
Installation in metal		Not flush	Not flush
Rated operating distance s_n		35 mm	40 mm
Enclosure material		Molded plastic	Molded plastic
Operating voltage (DC)	V	10 ... 30	10 ... 30
No-load supply current I_0	mA	≤ 15	≤ 15
Rated operating current I_e	mA	200	200
Switching frequency f	Hz	250	250
Repeat accuracy R	mm	0.7	0.8
Power-up delay t_v	ms	≤ 8	≤ 8
LEDs			
• Switching status		Yellow LED	Yellow LED
• Supply voltage		Green LED	Green LED
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		Magnetic field resistant up to 140 mT r.m.s.	Magnetic field resistant up to 140 mT r.m.s.
• Radio interference protection		•	•
• Totally insulated		•	•
Degree of protection		IP68	IP68

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With M12 connector				
NO contact, pnp	2	E, F	▶ 3RG46 48-3AN11	—
NO contact, npn	4	E, F	3RG46 48-3GN11	—
With terminal box				
NO contact, pnp	28	—	—	▶ 0.5 ... 2.5 mm ² 3RG46 44-6AN01
NO contact, npn	29	—	—	3RG46 44-6GN01

1) See page 2/242.

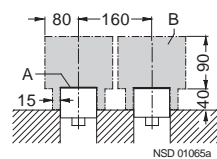
2) See from page 2/268.

▶ Preferred type, available from stock.

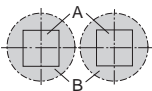
Dimensions

Mounting instructions

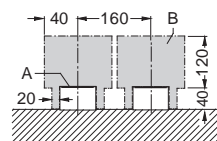
3RG46 48-3.N11



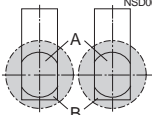
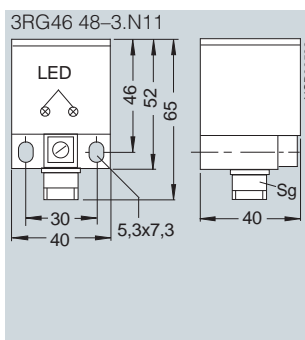
NSD 01065a



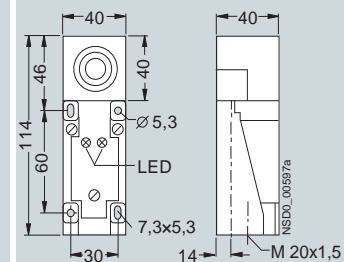
3RG46 44-6.N01



NSD00631

A = active surface
B = metal-free area

3RG46 44-6.N01



The active surface can be adjusted in 5 directions.

SIMATIC PXI inductive proximity switches

SIMATIC PXI400

Operating distance 75 mm

Technical specifications

Class		Reduction factor 1
Number of wires		3-wire
Design		Cubic 80 mm x 80 mm
Installation in metal		Not flush
Rated operating distance s_n		75 mm
Enclosure material		Molded plastic
Operational voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 15
Rated operational current I_e	mA	200
Switching frequency f	Hz	250
Repeat accuracy R	mm	1.5
Power-up delay t_V	ms	≤ 8
Switching status display		Yellow LED
Precautions		
<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection • Totally insulated 	<ul style="list-style-type: none"> • • • • 	Magnetic field resistant up to 75 mT r.m.s.
Degree of protection		IP67

Selection and Ordering data

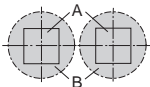
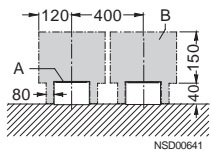
Switching output	Circuit diagram number ¹⁾	Order No.
With terminal box		0.5 ... 2.5 mm ²
NO contact, pnp	28	3RG46 43-6AN01
NO contact, npn	29	3RG46 43-6GN01

1) See page 2/242.

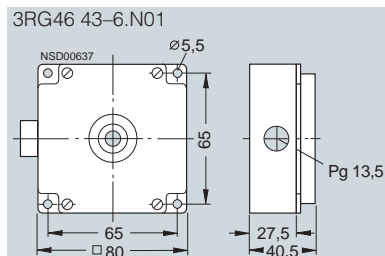
▶ Preferred type, available from stock.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI600

Overview

SIMATIC sensors PXI600

Sensors with special approvals:

- ATEX proximity switches for hazardous areas, Zone 2
- Devices with e1 type approval

Selection table

	SIMATIC PXI600 ATEX				SIMATIC PXI600 e1		
Type, Ø	M12	M18	M30	40 mm x 40 mm	M12	M18	M30
Operating distance							
• 1 ... 4 mm (PXI.2.)	2 mm 4 mm				2 mm 4 mm		
• 5 ... 10 mm (PXI.3.)		5 mm 8 mm	10 mm			5 mm 8 mm	10 mm
• 12 ... 22 mm (PXI.4.)			15 mm	15 mm			15 mm
• 25 ... 40 mm (PXI.5.)				35 mm			
Output							
• NO contact/NC contact	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■	■ / ■
• pnp/npn	■ / —	■ / —	■ / —	■ / —	■ / —	■ / —	■ / —
Number of wires	4	4	4	4	3	3	3
Operating voltage							
• 10/15 ... 30/35 V DC	■	■	■	■			
• 10 ... 65 V DC					■	■	■
Connection							
• M12 connector	■	■	■	■	■	■	■
• Cable	■	■	■		■	■	■
Degree of protection							
• IP65/IP67	— / ■	— / ■	— / ■	— / ■			
• IP68/IP69K					■ / ■	■ / ■	■ / ■
Approvals							
• Hazardous area, Zone 2/22	■	■	■	■			
• e1					■	■	■
See page	2/230	2/231	2/232	2/233	2/234	2/235	2/237

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXI inductive proximity switches

SIMATIC PXI600

ATEX, operating distance 2 mm
ATEX, operating distance 4 mm

Technical specifications

Class		EX Zone 2	EX Zone 2
Number of wires		4-wire	4-wire
Design		M12	M12
Installation in metal		Flush	Not flush
Rated operating distance s_n		2 mm	4 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated
Operating voltage (DC)	V	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 25 (24 V); ≤ 40 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	1200	800
Repeat accuracy R	mm	0.1	0.2
Power-up delay t_v	ms	40	40
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact and NC contact, pnp			4 × 0.14 mm ²	4 × 0.14 mm ²
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	10	B	3RG40 12-0CD00-0XA0	B 3RG40 22-0CD00-0XA0
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	10	B	3RG40 12-0CD00-0XB0	B 3RG40 22-0CD00-0XB0
With M12 connector				
NO contact and NC contact, pnp				
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	1	F	B 3RG40 12-3CD00-0XA0	B 3RG40 22-3CD00-0XA0
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	1	F	B 3RG40 12-3CD00-0XB0	B 3RG40 22-3CD00-0XB0

1) See page 2/242.

2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99.

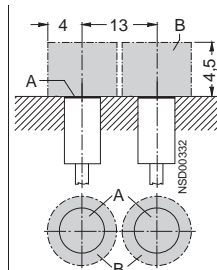
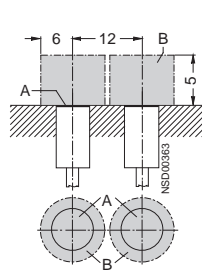
Dimensions

Mounting instructions

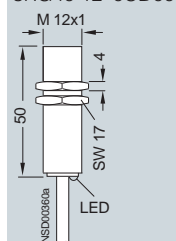
Dimension depending on form

A = active surface

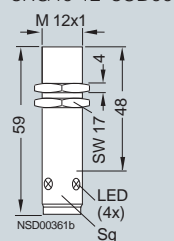
B = metal-free area



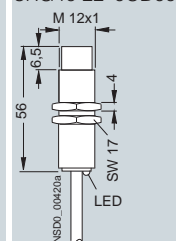
3RG40 12-0CD00



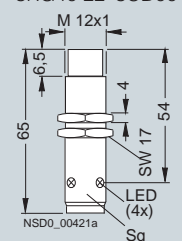
3RG40 12-3CD00



3RG40 22-0CD00



3RG40 22-3CD00



ATEX, operating distance 5 mm
ATEX, operating distance 8 mm

Technical specifications

Class	EX Zone 2	EX Zone 2
Number of wires	4-wire	4-wire
Design	M18	M18
Installation in metal	Flush	Not flush
Rated operating distance s_n	5 mm	8 mm
Enclosure material	Brass, nickel-plated	Brass, nickel-plated
Operating voltage (DC)	V 15 ... 34	15 ... 34
No-load supply current I_0	mA ≤ 25 (24 V); ≤ 40 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 800	500
Repeat accuracy R	mm 0.15	0.2
Power-up delay t_v	ms 40	40
Switching status display	Yellow LED	Yellow LED
Precautions		
• Spurious signal suppression	•	•
• Short-circuit-proof/overload-proof	•	•
• Reverse-polarity protection	•	•
• Wire-break protection	•	•
• Inductive interference protection	•	•
• Radio interference protection	•	•
Degree of protection	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact and NC contact, pnp			4 x 0.14 mm ²	4 x 0.14 mm ²
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	10	B	3RG40 13-0CD00-0XA0	B 3RG40 23-0CD00-0XA0
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	10	B	3RG40 13-0CD00-0XB0	B 3RG40 23-0CD00-0XB0
With M12 connector				
NO contact and NC contact, pnp				
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	1	F	3RG40 13-3CD00-0XA0	B 3RG40 23-3CD00-0XA0
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	1	F	3RG40 13-3CD00-0XB0	B 3RG40 23-3CD00-0XB0

1) See page 2/242.

2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99.

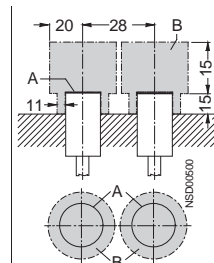
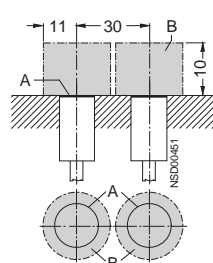
Dimensions

Mounting instructions

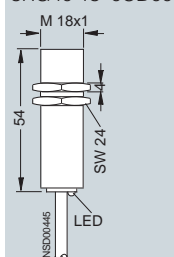
Dimension depending on form

A = active surface

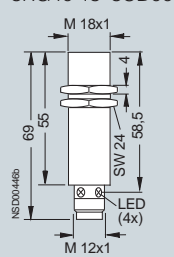
B = metal-free area



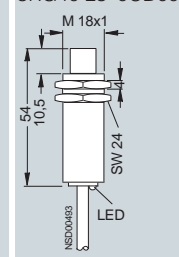
3RG40 13-0CD00



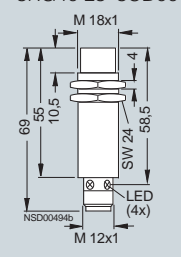
3RG40 13-3CD00



3RG40 23-0CD00



3RG40 23-3CD00



SIMATIC PXI inductive proximity switches

SIMATIC PXI600

ATEX, operating distance 10 mm
ATEX, operating distance 15 mm

Technical specifications

Class		EX Zone 2	EX Zone 2
Number of wires		4-wire	4-wire
Design		M30	M30
Installation in metal		Flush	Not flush
Rated operating distance s_n		10 mm	15 mm
Enclosure material		Brass, nickel-plated	Brass, nickel-plated
Operating voltage (DC)	V	15 ... 34	15 ... 34
No-load supply current I_0	mA	≤ 25 (24 V); ≤ 40 (34 V)	≤ 25 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA	200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	300	300
Repeat accuracy R	mm	0.3	0.4
Power-up delay t_v	ms	40	40
Switching status display		Yellow LED	Yellow LED
Precautions			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact and NC contact, pnp			4 × 0.14 mm ²	4 × 0.14 mm ²
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	10	B	3RG40 14-0CD00-0XA0	3RG40 24-0CD00-0XA0
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	10	B	3RG40 14-0CD00-0XB0	3RG40 24-0CD00-0XB0
With M12 connector				
NO contact and NC contact, pnp				
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	1	F	3RG40 14-3CD00-0XA0	3RG40 24-3CD00-0XA0
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	1	F	3RG40 14-3CD00-0XB0	3RG40 24-3CD00-0XB0

1) See page 2/242.

2) See from page 2/268.

B Subject to export regulations AL = N and ECCN = EAR99

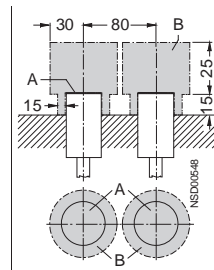
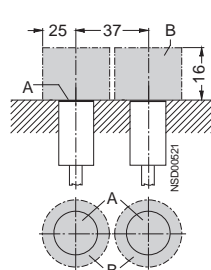
Dimensions

Mounting instructions

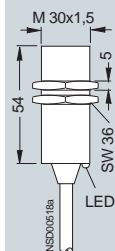
Dimension depending on form

A = active surface

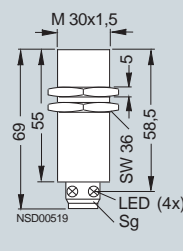
B = metal-free area



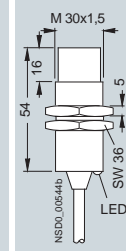
3RG40 14-0CD00



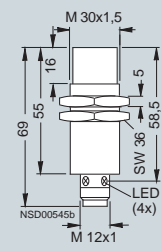
3RG40 14-3CD00



3RG40 24-0CD00



3RG40 24-3CD00



Technical specifications

Class	Ex Zone 2	
Number of wires	4-wire	4-wire
Design	Cubic 40 mm x 40 mm	Cubic 40 mm x 40 mm
Installation in metal	Flush	Not flush
Rated operating distance s_n	15 mm	35 mm
Enclosure material	Molded plastic	Molded plastic
Operating voltage (DC)	V 15 ... 34	15 ... 34
No-load supply current I_0	mA ≤ 30 (24 V); ≤ 40 (34 V)	≤ 230 (24 V); ≤ 40 (34 V)
Rated operational current I_e	mA 200 (≤ 50 °C); 150 (≤ 85 °C)	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz 50	30
Repeat accuracy R	mm 0.75	0.75
Hysteresis H	mm -	0.05 ... 7.7
Power-up delay t_v	ms 100	100
Switching status display	Yellow LED	Yellow LED
Supply voltage	Green LED	Green LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP67	IP67

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With M12 connector				
NO contact and NC contact, pnp				
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	1	F	B 3RG40 38-3CD00-0XA0	B 3RG41 48-3CD00-0XA0
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	1	F	B 3RG40 38-3CD00-0XB0	B 3RG41 48-3CD00-0XB0

1) See page 2/242.

2) See from page 2/268.

B: Subject to export regulations AL = N and ECCN = EAR99.

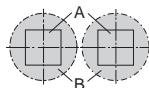
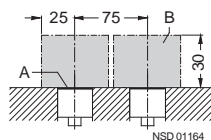
Dimensions

Mounting instructions

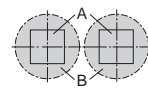
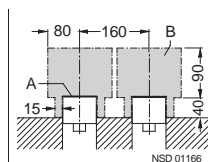
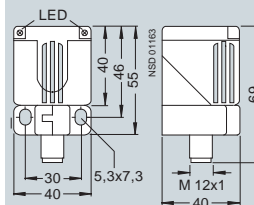
Dimension depending on form

A = active surface

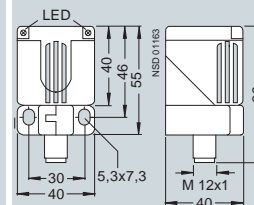
B = metal-free area



3RG40 38-3CD00



3RG41 48-3CD00



SIMATIC PXI inductive proximity switches

SIMATIC PXI600

e1, operating distance 2 mm
e1, operating distance 4 mm

Technical specifications

Class	e1	e1	e1
Number of wires	3-wire	3-wire	3-wire
Design	M12	M12	M12
Installation in metal	Flush	Not flush	Not flush
Rated operating distance s_n	2 mm	4 mm	4 mm
Enclosure material	Brass, nickel-plated	Brass, nickel-plated	Molded plastic
Operating voltage (DC)	V 10 ... 65	10 ... 65	10 ... 65
No-load supply current I_0	mA ≤ 10	≤ 10	≤ 10
Rated operational current I_e	mA 300	300	300
Switching frequency f	Hz 4000	800	800
Repeat accuracy R	mm 0.1	0.2	0.2
Power-up delay t_v	ms 40	40	40
Switching status display	Yellow LED	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68/69K	IP68/69K	IP68/69K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	3 × 0.25 mm ²	3 × 0.25 mm ²
NO contact, pnp, e1	11	A	3RG40 12-0AB31-4AA0	A 3RG40 22-0AB31-4AA0	A 3RG40 22-0AB30-4AA0
NC contact, pnp, e1	12	A	3RG40 12-0AA31-4AA0	A 3RG40 22-0AA31-4AA0	A 3RG40 22-0AA30-4AA0
With M12 connector					
NO contact, pnp, e1	2	E, F	A 3RG40 12-3AB31-4AA0	A 3RG40 22-3AB31-4AA0	—
NC contact, pnp, e1	3	F	A 3RG40 12-3AA31-4AA0	A 3RG40 22-3AA31-4AA0	—

1) See page 2/242.

A: Subject to export regulations AL = N and ECCN = EAR99H

2) See from page 2/268.

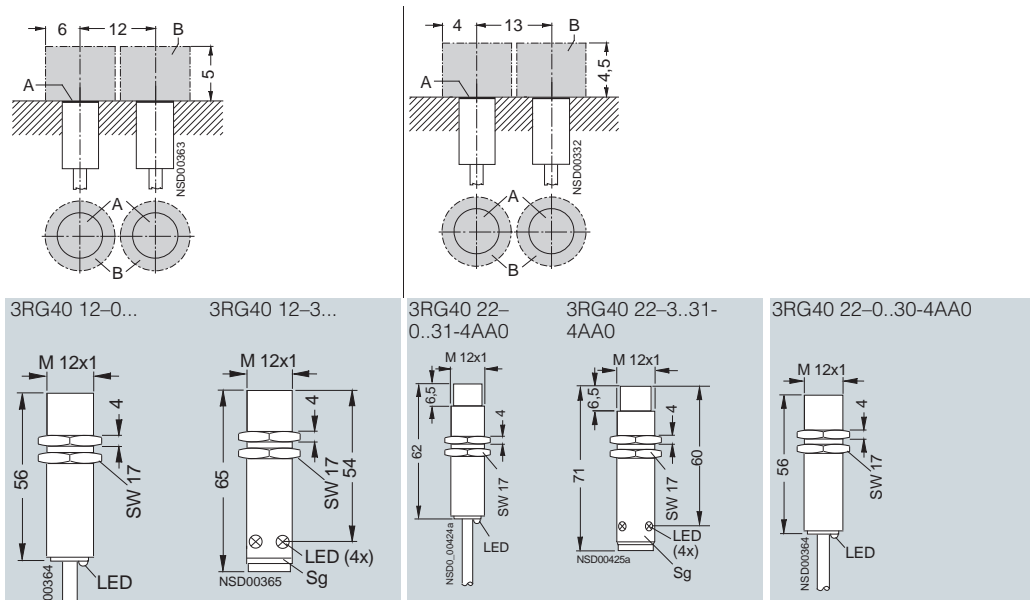
Dimensions

Mounting instructions

Dimension depending on form

A = active surface

B = metal-free area



Technical specifications

Class	e1	e1
Number of wires	3-wire	3-wire
Design	M18	M18
Installation in metal	Flush	Flush
Rated operating distance s_n	5 mm	5 mm
Enclosure material	Brass, nickel-plated	Molded plastic
Operating voltage (DC)	V 10 ... 65	10 ... 65
No-load supply current I_0	mA ≤ 10	≤ 10
Rated operational current I_e	mA 300	300
Switching frequency f	Hz 800	500
Repeat accuracy R	mm 0.15	0.15
Power-up delay t_v	ms 40	40
Switching status display	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68/69K	IP68/69K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$	$3 \times 0.25 \text{ mm}^2$
NO contact, pnp, e1 11			A 3RG40 13-0AB31-4AA0	A 3RG40 13-0AB30-4AA0
NC contact, pnp, e1 12			A 3RG40 13-0AA31-4AA0	-
With M12 connector				
NO contact, pnp, e1 2		E, F	A 3RG40 13-3AB31-4AA0	-
NC contact, pnp, e1 3		F	A 3RG40 13-3AA31-4AA0	-

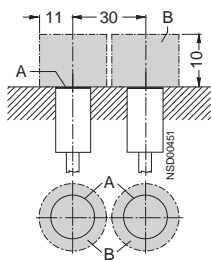
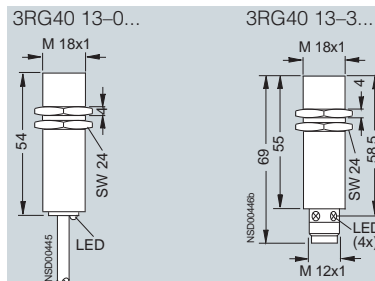
1) See page 2/242.

2) See from page 2/268.

A: Subject to export regulations AL = N and ECCN = EAR99H.

Dimensions

Mounting instructions

A = active surface
B = metal-free area

SIMATIC PXI inductive proximity switches

SIMATIC PXI600

e1, operating distance 8 mm

Technical specifications

Class	e1	e1
Number of wires	3-wire	3-wire
Design	M18	M18
Installation in metal	Not flush	Not flush
Rated operating distance s_n	8 mm	8 mm
Enclosure material	Brass, nickel-plated	Molded plastic
Operating voltage (DC)	V 10 ... 65	10 ... 65
No-load supply current I_0	mA ≤ 10	≤ 10
Rated operational current I_e	mA 300	300
Switching frequency f	Hz 500	500
Repeat accuracy R	mm 0.2	0.2
Power-up delay t_v	ms 40	40
Switching status display	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68/69K	IP68/69K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			$3 \times 0.25 \text{ mm}^2$	$3 \times 0.25 \text{ mm}^2$
NO contact, pnp, e1	11		A 3RG40 23-0AB31-4AA0	A 3RG40 23-0AB30-4AA0
NC contact, pnp, e1	12		A 3RG40 23-0AA31-4AA0	A 3RG40 23-0AA30-4AA0
With M12 connector				
NO contact, pnp, e1	2	E, F	A 3RG40 23-3AB31-4AA0	-
NC contact, pnp, e1	3	F	A 3RG40 23-3AA31-4AA0	-

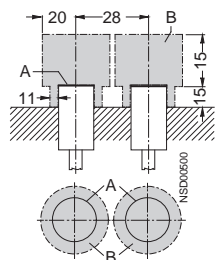
1) See page 2/242.

2) See from page 2/268.

A: Subject to export regulations AL = N and ECCN = EAR99H.

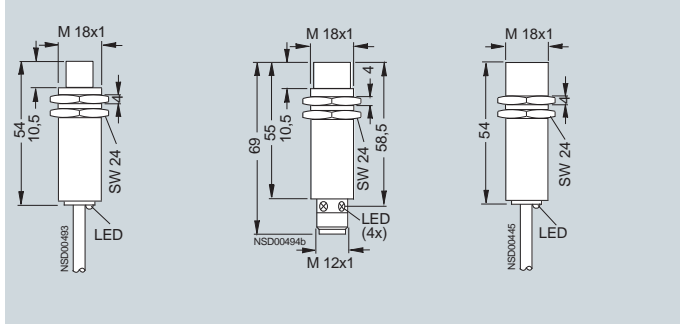
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG40 23-0..31-4AA0 3RG40 23-3..31-4AA0 3RG40 23-0..30-4AA0



Technical specifications

Class	e1	e1
Number of wires	3-wire	3-wire
Design	M30	M30
Installation in metal	Flush	Flush
Rated operating distance s_n	10 mm	10 mm
Enclosure material	Brass, nickel-plated	Molded plastic
Operating voltage (DC)	V 10 ... 65	10 ... 65
No-load supply current I_0	mA ≤ 10	≤ 10
Rated operational current I_e	mA 300	300
Switching frequency f	Hz 300	300
Repeat accuracy R	mm 0.3	0.3
Power-up delay t_v	ms 40	40
Switching status display	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68/69K	IP68/69K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm ²	3 × 0.25 mm ²
NO contact, pnp, e1	11		A 3RG40 14-0AB31-4AA0	A 3RG40 14-0AB30-4AA0
NC contact, pnp, e1	12		A 3RG40 14-0AA31-4AA0	A 3RG40 14-0AA30-4AA0
With M12 connector				
NO contact, pnp, e1	2	E, F	A 3RG40 14-3AB31-4AA0	—
NC contact, pnp, e1	3	F	A 3RG40 14-3AA31-4AA0	—

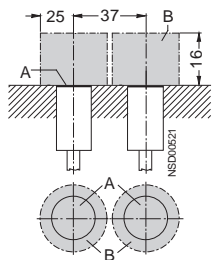
1) See page 2/242.

2) See from page 2/268.

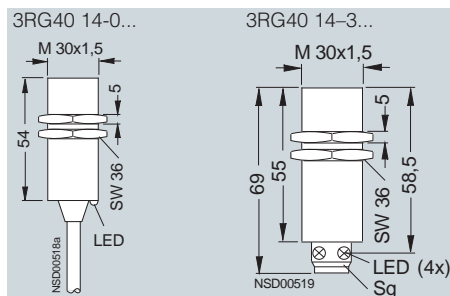
A: Subject to export regulations AL = N and ECCN = EAR99H.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



SIMATIC PXI inductive proximity switches

SIMATIC PXI600

e1, operating distance 15 mm

Technical specifications

Class	e1	e1
Number of wires	3-wire	3-wire
Design	M30	M30
Installation in metal	Not flush	Not flush
Rated operating distance s_n	15 mm	15 mm
Enclosure material	Brass, nickel-plated	Molded plastic
Operating voltage (DC)	V 10 ... 65	10 ... 65
No-load supply current I_0	mA ≤ 10	≤ 10
Rated operational current I_e	mA 300	300
Switching frequency f	Hz 300	300
Repeat accuracy R	mm 0.4	0.4
Power-up delay t_v	ms 40	40
Switching status display	Yellow LED	Yellow LED
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	<ul style="list-style-type: none"> • • • • • •
Degree of protection	IP68/69K	IP68/69K

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.	Order No.
With 2 m cable, PUR				
NO contact, pnp, e1	11		A 3RG40 24-0AB31-4AA0	A 3RG40 24-0AB30-4AA0
NC contact, pnp, e1	12		A 3RG40 24-0AA31-4AA0	A 3RG40 24-0AA30-4AA0
With M12 connector				
NO contact, pnp, e1	2	E, F	A 3RG40 24-3AB31-4AA0	-
NC contact, pnp, e1	3	F	A 3RG40 24-3AA31-4AA0	-

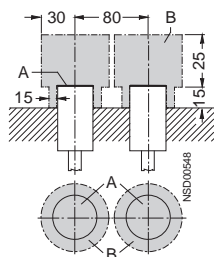
1) See page 2/242.

2) See from page 2/268.

A: Subject to export regulations AL = N and ECCN = EAR99H.

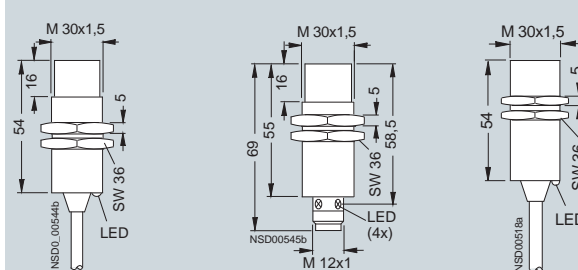
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG40 24-0..31-4AA0 3RG40 24-3..31-4AA0 3RG40 24-0..30-4AA0



SIMATIC PXI inductive proximity switches

SIMATIC PXI900

Overview

SIMATIC sensors PXI900

- Pressure-resistant sensors up to 500 bar
- Sensors with analog output

Selection table

SIMATIC PXI900



Type, Ø	M14 Pressure resistant	M12 Analog
Operating distance		
• 1 ... 4 mm (PXI.2.)	3 mm	
• 5 ... 10 mm (PXI.3.)		0 ... 6 mm
Output		
• NO contact/NC contact	■ / ■	
• pnp/npn	■ / ■	
• Analog		■
Number of wires	3	4
Operating voltage		
• 10/15 ... 30/35 V DC	■	■
Connection		
• M12 connector	■	■
• Cable	■	■
Degree of protection		
• IP65 / IP67		— / ■
• IP68 / IP69K	■ / —	
See page	2/240	2/241

A configurator for fast product selection and ordering in the Internet can be found at www.siemens.com/simatic-sensors/px

SIMATIC PXI inductive proximity switches

SIMATIC PXI900

Operating distance 3 mm,
pressure resistant to 500 bar

Technical specifications

Class	Pressure resistant up to 500 bar	
Number of wires	3-wire	
Design	M14	
Installation in metal	Almost flush	
Rated operating distance s_n	3 mm	
Enclosure material	Stainless steel, sensor surface aluminum oxide ceramic	
Operational voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	≤ 10
Rated operational current I_e	mA	200
Switching frequency f	Hz	500
Repeat accuracy R	mm	0.1
Power-up delay t_v	ms	10
Switching status display	–	
Precautions	<ul style="list-style-type: none"> • Spurious signal suppression • Short-circuit-proof/overload-proof • Reverse-polarity protection • Wire-break protection • Inductive interference protection • Radio interference protection 	
Degree of protection	IP68	

Selection and Ordering data

Switching output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			$3 \times 0.34 \text{ mm}^2$
NO contact, pnp	11	▶	3RG46 52-0PG00
NC contact, pnp	12		3RG46 52-0PF00
NO contact, npn	13		3RG46 52-0PB00
NC contact, npn	14		3RG46 52-0PA00
With M12 connector			
NO contact, pnp	2	E, F	3RG46 52-3PG00
NC contact, pnp	3	F	3RG46 52-3PF00
NO contact, npn	4	E, F	3RG46 52-3PB00
NC contact, npn	5	F	3RG46 52-3PA00

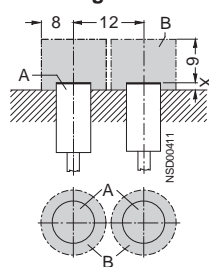
1) See page 2/242.

2) See from page 2/268.

▶ Preferred type, available from stock.

Dimensions

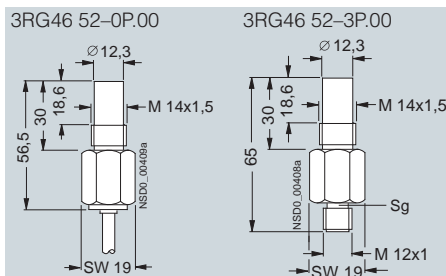
Mounting instructions



A = active surface
B = metal-free area

$X \geq 2.4 \text{ mm}$ for mounting in steel,

$X \geq 1.2 \text{ mm}$ for mounting in other metals



Technical specifications

Class	Analog output	
Number of wires	4-wire	
Design	M12	
Installation in metal	Almost flush	
Rated operating distance s_n	0 ... 6 mm	
Enclosure material	Brass, nickel-plated	
Operational voltage (DC)	V	10 ... 30
No-load supply current I_0	mA	10
Switching frequency f	Hz	1000
Repeat accuracy R	mm	0.3
Power-up delay t_v	ms	50
Output voltage (A1) at 25 °C		
• With $s = 0$ mm	V	0 (–0 ... +0.2 V)
• With $s = 3$ mm	V	+2.7 (±0.2 V)
• With $s = 6$ mm	V	+5.0 (±0.2 V)
Load current at voltage output	max. 10 mA	
Output current (A2) at 25 °C		
• With $s = 0$ mm	mA	1.0 (±0.2 mA)
• With $s = 6$ mm	mA	5.0 (±0.2 mA)
Max. resistive load at current output		
• With $U_B = 10$ V	kΩ	1
• With $U_B = 30$ V	kΩ	5
Switching status display	–	
Precautions		
• Spurious signal suppression	–	
• Short-circuit-proof/overload-proof	•	
• Reverse-polarity protection	•	
• Wire-break protection	–	
• Inductive interference protection	•	
• Radio interference protection	–	
Degree of protection	IP67	

Selection and Ordering data

Analog output	Circuit diagram number ¹⁾	Connector type ²⁾	Order No.
With 2 m cable, PUR			4 × 0.25 mm ²
Voltage + current	30	▶	3RG46 12-0NB00
With M12 connector			
Voltage + current	30	F ▶	3RG46 12-3NB00

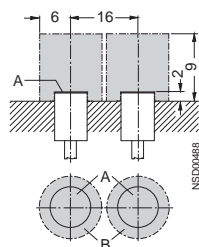
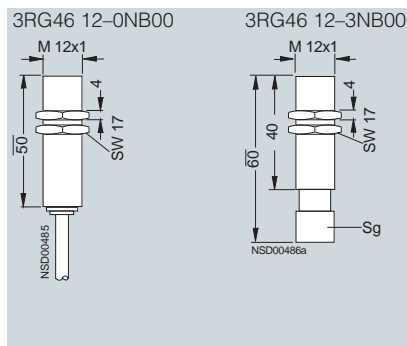
1) See page 2/242.

2) See from page 2/268.

▶ Preferred type, available from stock.

Dimensions

Mounting instructions

A = active surface
B = metal-free area

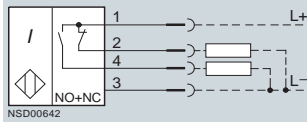
SIMATIC PXI inductive proximity switches

Schematics

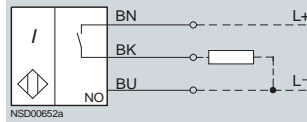
2

Schematics

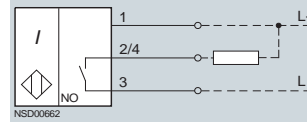
Circuit diagram 1



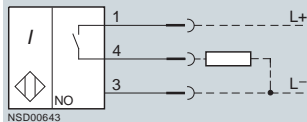
Circuit diagram 11



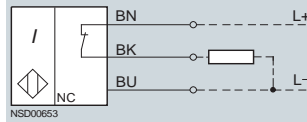
Circuit diagram 21



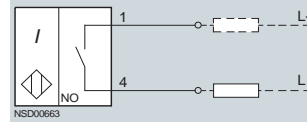
Circuit diagram 2



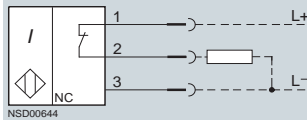
Circuit diagram 12



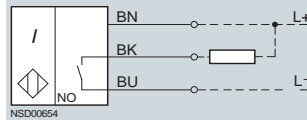
Circuit diagram 22



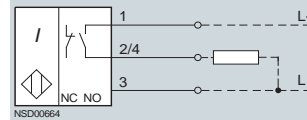
Circuit diagram 3



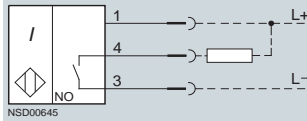
Circuit diagram 13



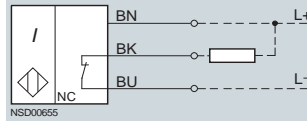
Circuit diagram 23



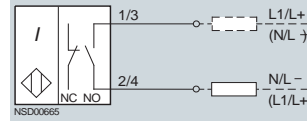
Circuit diagram 4



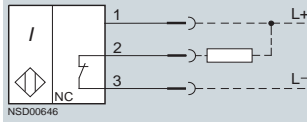
Circuit diagram 14



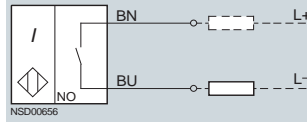
Circuit diagram 24



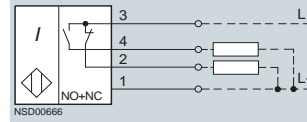
Circuit diagram 5



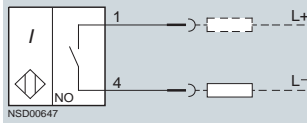
Circuit diagram 15



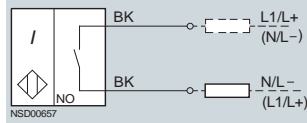
Circuit diagram 25



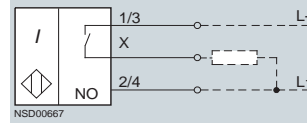
Circuit diagram 6



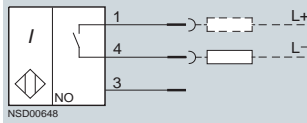
Circuit diagram 16



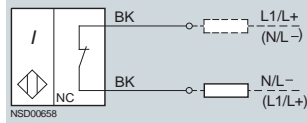
Circuit diagram 26



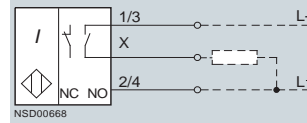
Circuit diagram 7



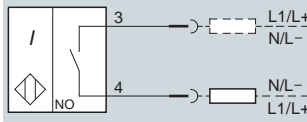
Circuit diagram 17



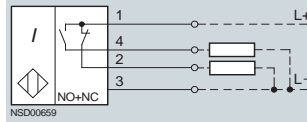
Circuit diagram 27



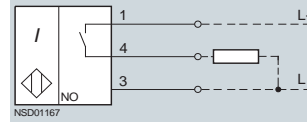
Circuit diagram 8



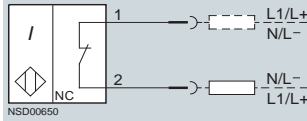
Circuit diagram 18



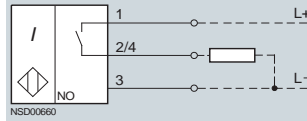
Circuit diagram 28



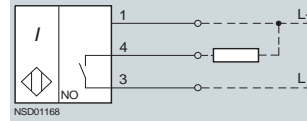
Circuit diagram 9



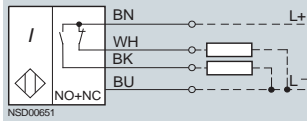
Circuit diagram 19



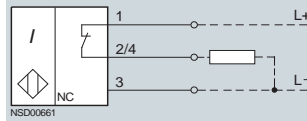
Circuit diagram 29



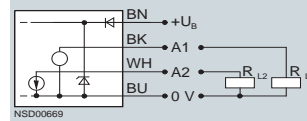
Circuit diagram 10



Circuit diagram 20



Circuit diagram 30



Abbreviations for color identification of the connection cables according to IEC 60757:

BK = Black BN = Brown
 BU = Blue WH = White

Examples of connections

Parallel connection

DC voltage version

2-wire proximity switches, for PLC

Not possible since the total of all proximity switch residual currents must be smaller than the holding current of the load

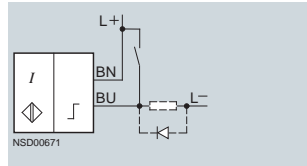
Series connection ¹⁾

Not possible, as

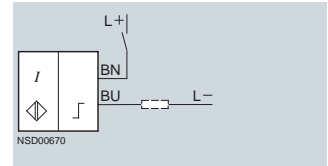
$$n \leq \frac{U_b - 15 V}{8 V}$$

$$U_b \text{ PLC: } 24 V$$

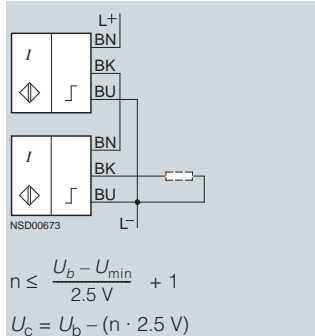
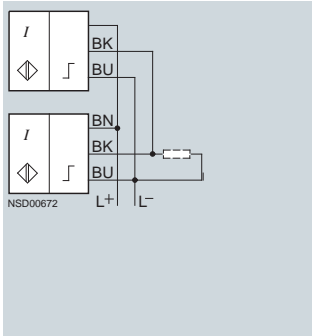
Parallel circuit with 1 contact (NO or NC)



Series connection with 1 contact (NO or NC) ¹⁾

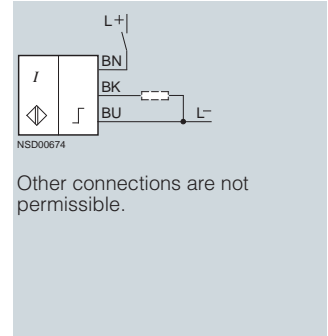
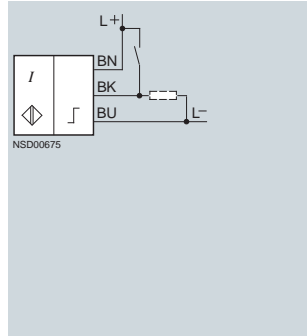


3-wire proximity switches, pnp

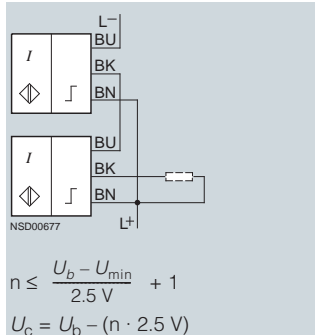
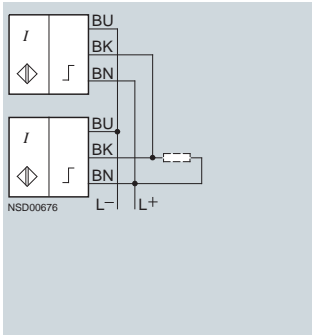


$$n \leq \frac{U_b - U_{min}}{2.5 V} + 1$$

$$U_c = U_b - (n \cdot 2.5 V)$$

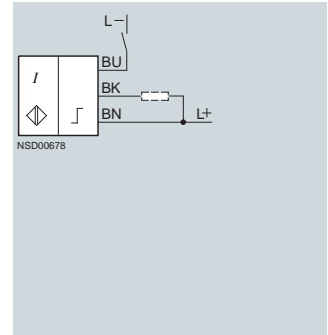
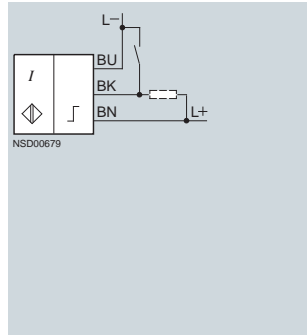


3-wire proximity switches, npn

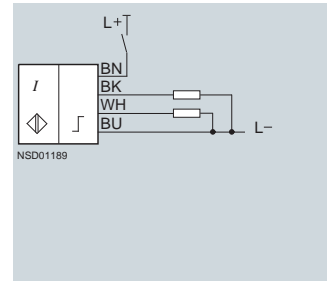
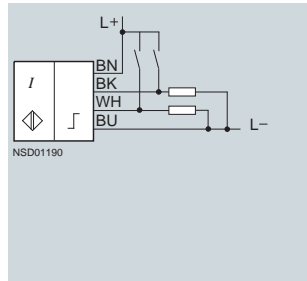
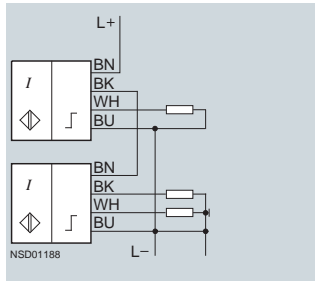
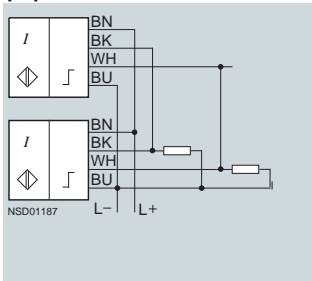


$$n \leq \frac{U_b - U_{min}}{2.5 V} + 1$$

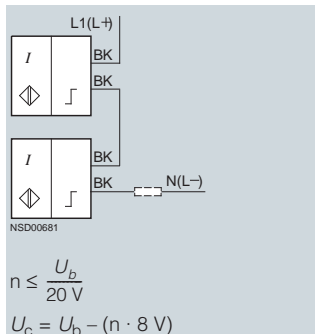
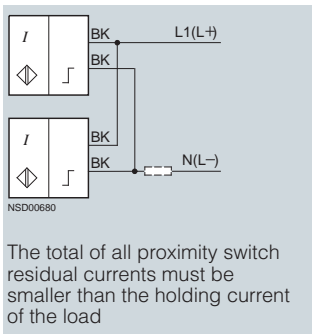
$$U_c = U_b - (n \cdot 2.5 V)$$



4-wire proximity switches, pnp

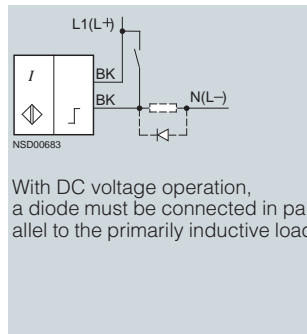


AC/DC version

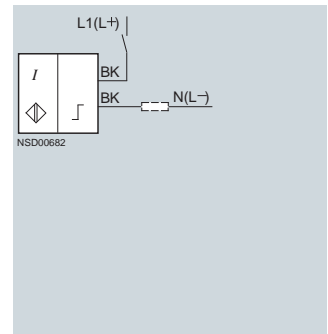


$$n \leq \frac{U_b}{20 V}$$

$$U_c = U_b - (n \cdot 8 V)$$



With DC voltage operation, a diode must be connected in parallel to the primarily inductive load.



SIMATIC PXI inductive proximity switches

Schematics

U_b = operating voltage

U_c = minimum operating voltage of load

n = number of proximity switches

U_{min} = minimum permissible operating voltage

1) The power-up delay of the sensors must be considered when determining the switching times.

Abbreviations for color identification of the connection cables according to IEC 60 757:

BK = Black BN = Brown
BU = Blue WH = White

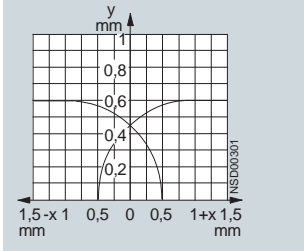
2

Characteristic curves

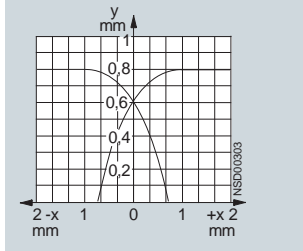
Response curves

The response curves are determined using standard targets according to EN 60947-5-2.

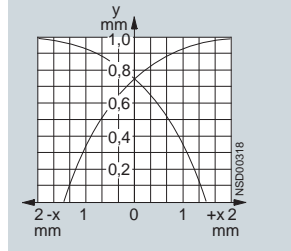
Operating distance 0.6 mm (normal)
3RG46 03, 3RG46 00, 3RG4610



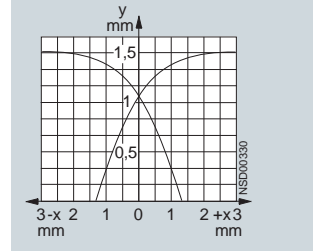
Operating distance 0.8 mm (normal)
3RG 46 .0, 3RG 46 36



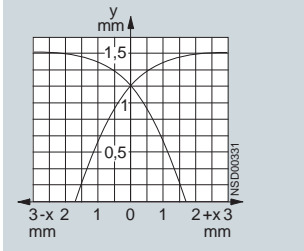
Operating distance 1 mm (normal)
3RG40 11



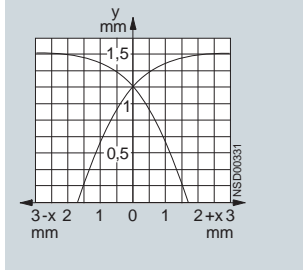
Operating distance 1.5 mm (normal)
3RG40 ...33 (shorty)



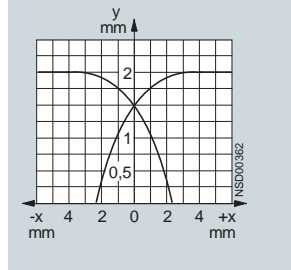
Operating distance 1.5 mm (normal)
3RG40 ...05, 3RG46 01,
3RG46 11, 3RG46 37



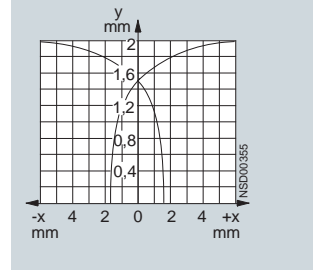
Operating distance 1.5 mm
(PXI400) 3RG46 11



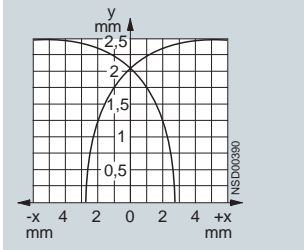
Operating distance 2 mm (normal)
3RG40 12, 3RG40 52, 3RG40 7.



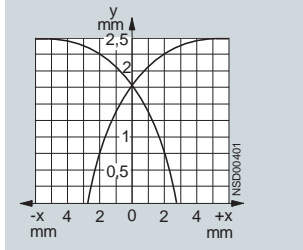
Operating distance 2 mm
(extra duty) 3RG41 11



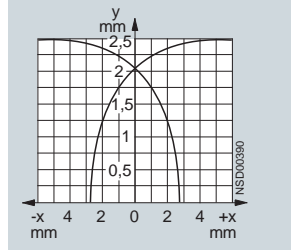
Operating distance 2.5 mm (normal)
3RG40 21, 3RG40 60



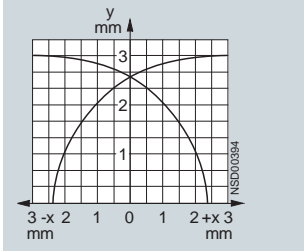
Operating distance 2.5 mm
(normal) 3RG40 72



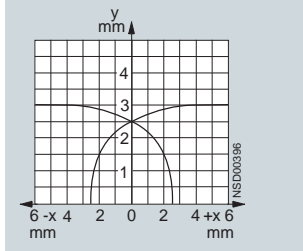
Operating distance 2.5 mm
(extra duty) 3RG46 02, 3RG46 11



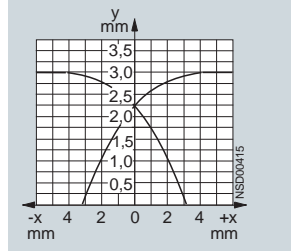
Operating distance 3 mm (extra duty)
3RG46 11



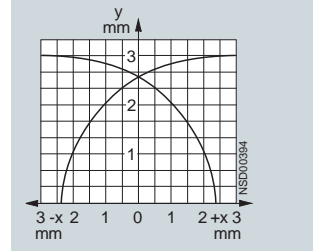
Operating distance 3 mm (extra duty)
3RG46 02, 3RG46 37



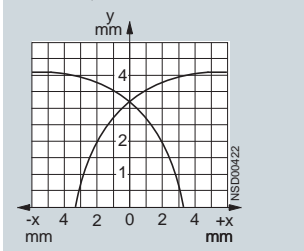
Operating distance 3 mm (PXI400)
3RG46 12



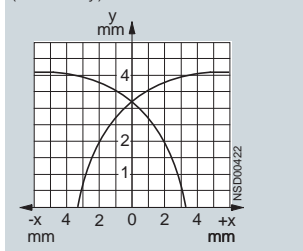
Operating distance 3 mm
(pressure-resistant) 3RG46 52



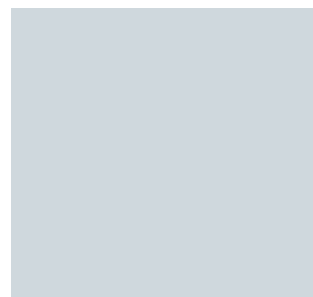
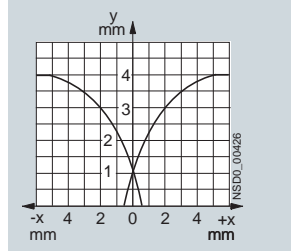
Operating distance 4 mm (normal)
3RG40 22, 3RG40 62



Operating distance 4 mm
(extra duty) 3RG41 12



Operating distance 4 mm (PXI400)
3RG46 21

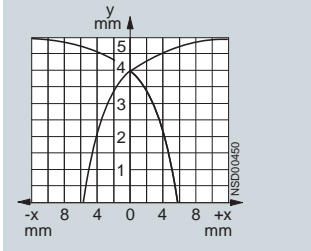


SIMATIC PXI inductive proximity switches

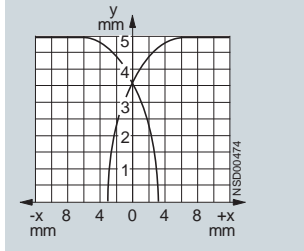
Characteristic curves

2

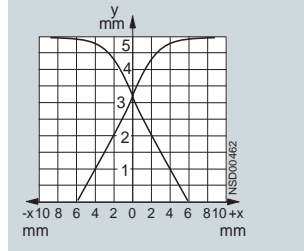
Operating distance 5 mm (normal)
3RG40 13, 3RG40 53



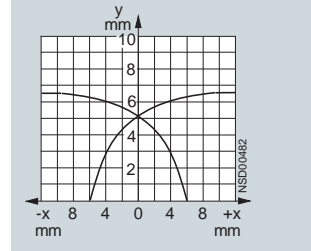
Operating distance 5 mm (normal)
3RG40 82



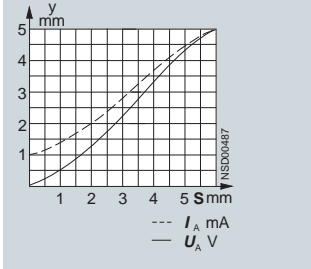
Operating distance 5 mm (PXI400)
3RG46 13



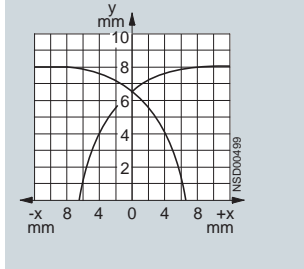
Operating distance 6 mm (extra duty)
3RG46 21, 3RG46 12



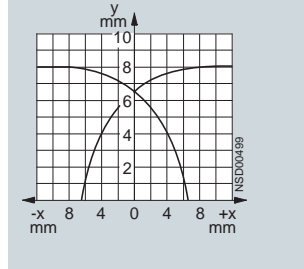
Operating distance 0 ... 6 mm (analog)
3RG46 12



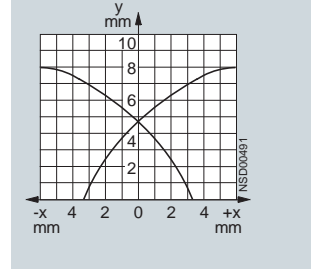
Operating distance 8 mm (normal)
3RG40 23, 3RG40 63



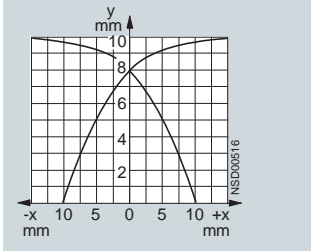
Operating distance 8 mm (extra duty)
3RG41 13



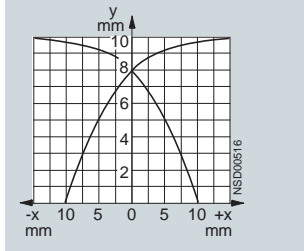
Operating distance 8 mm (PXI400)
3RG46 22



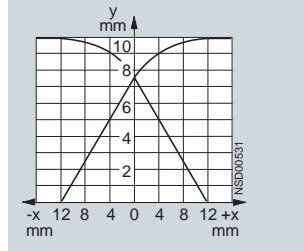
Operating distance 10 mm (normal)
3RG40 14, 3RG40 54, 3RG46 25.



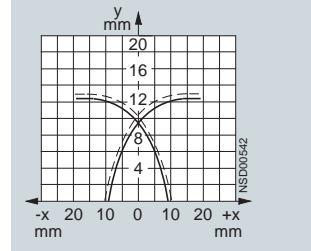
Operating distance 10 mm (extra duty)
3RG46 22



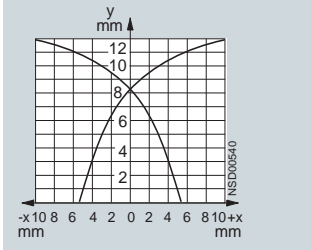
Operating distance 10 mm (PXI400)
3RG46 14



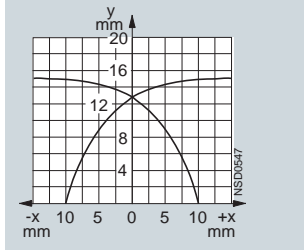
Operating distance 12 mm (extra duty)
3RG46 13



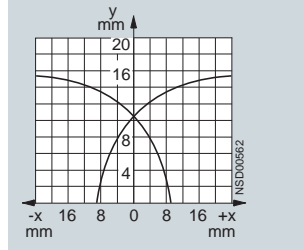
Operating distance 12 mm (PXI400)
3RG46 23



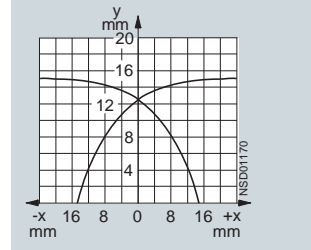
Operating distance 15 mm (normal)
3RG40 24, 3RG40 31, 3RG 40 64.



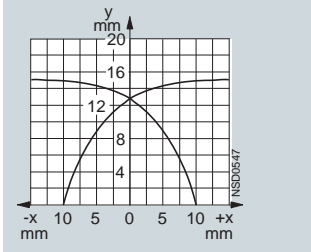
Operating distance 15 mm (normal)
3RG40 30, 3RG40 34



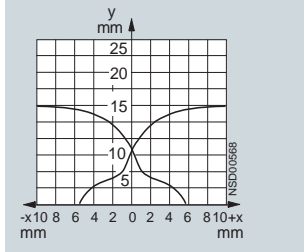
Operating distance 15 mm (normal)
3RG40 38



Operating distance 15 mm (extra duty)
3RG46 12



Operating distance 15 mm (PXI400)
3RG46 34, 3RG46 38

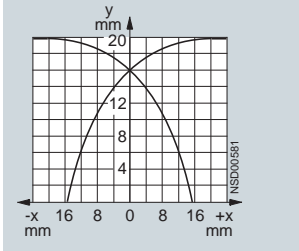


SIMATIC PXI inductive proximity switches

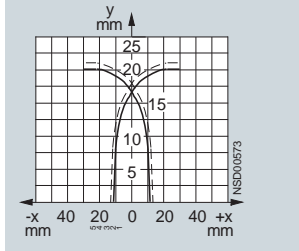
Characteristic curves



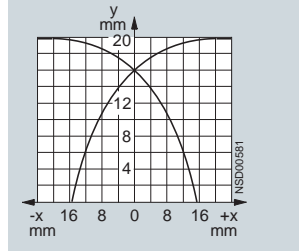
Operating distance 20 mm (normal)
3RG40 41, 3RG46 26



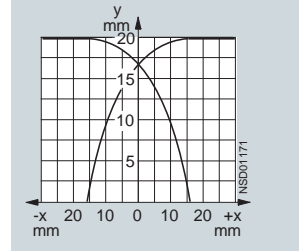
Operating distance 20 mm
(extra duty) 3RG46 23



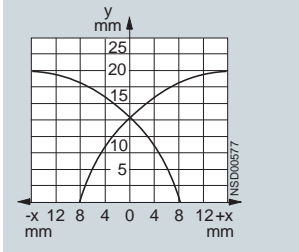
Operating distance 20 mm
(extra duty) 3RG 41 34, 3RG46 38



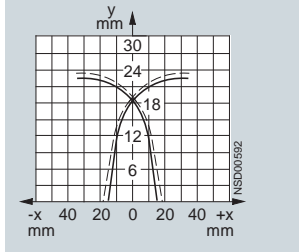
Operating distance 20 mm
(extra duty) 3RG41 38



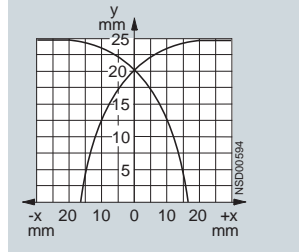
Operating distance 20 mm (PXI400)
3RG46 12



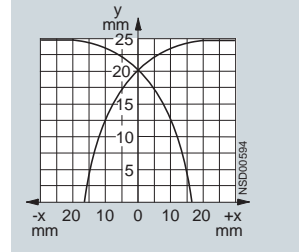
Operating distance 22 mm
(extra duty) 3RG46 14



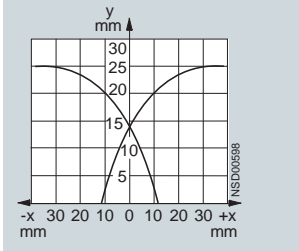
Operating distance 25 mm (normal)
3RG40 32



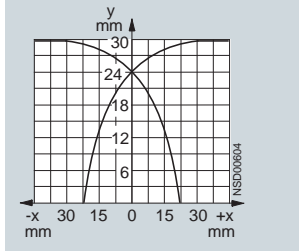
Operating distance 25 mm
(extra duty) 3RG41 31, 3RG41 41



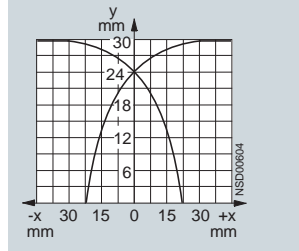
Operating distance 25 mm (PXI400)
3RG46 44, 3RG46 48



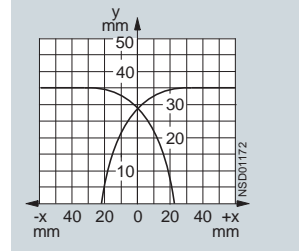
Operating distance 30 mm (normal)
3RG 40 33, 3RG40 42



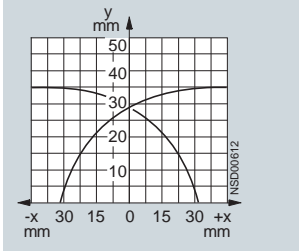
Operating distance 30 mm
(extra duty) 3RG41 44



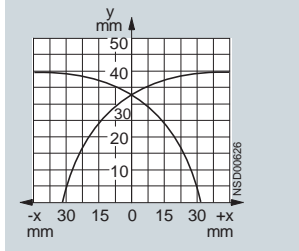
Operating distance 35 mm
(extra duty) 3RG41 48



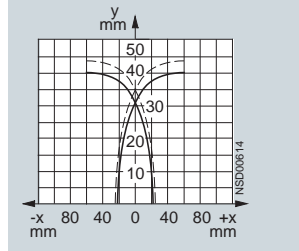
Operating distance 35 mm (PXI400)
3RG46 48



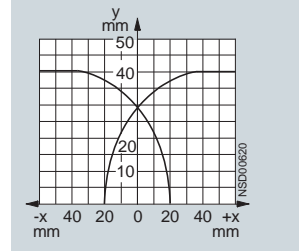
Operating distance 40 mm (normal)
3RG 40 33, 3RG40 43



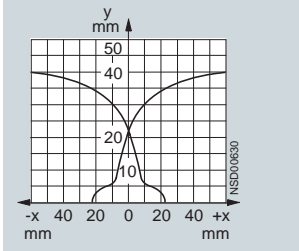
Operating distance 40 mm
(extra duty) 3RG46 24



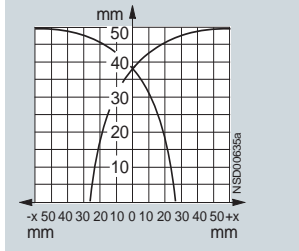
Operating distance 40 mm
(extra duty) 3RG41 41



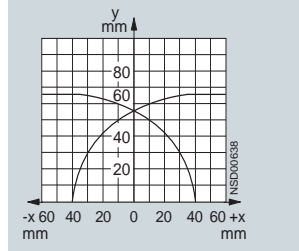
Operating distance 40 mm (PXI400)
3RG46 44



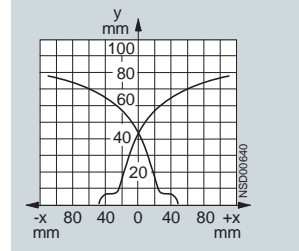
Operating distance 50 mm
(extra duty) 3RG41 42



Operating distance 65 mm
(extra duty) 3RG41 43



Operating distance 75 mm
(PXI400) 3RG46 43



SIMATIC PXI inductive proximity switches

Glossary for proximity switches

More information

Terms associated with the technology of proximity switches are explained below. Some of the terms are defined in IEC 60947-5-2.

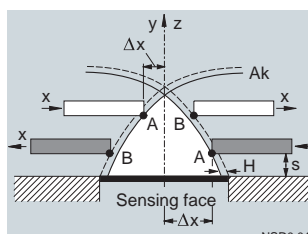
Sensing area

The sensing area of an inductive proximity switch is the area through which an electromagnetic field is emitted.

The corresponding activation element (target) is moved toward this area to trigger a switching process.

Response curve

The line on which all response points A for a proximity switch can be found. The curve has been determined using the standard target. The sensor-related characteristics can be obtained from it. The proximity switch axis z coincides with the y axis.



Ak	Response curve
A	Point of response
B	Release point
H	Hysteresis
s	Operating distance
x	Direction of movement
Δx	Axial distance to target
y	Distance from proximity switch
z	Reference axis

Response point A

The position of the actuating element when the signal is output. The reference point is the bottom front edge of the actuating element.

Response delay t_A

The response delay is the time required by the switching element to respond when the target enters or leaves the sensing range (IEC).

The value is measured at $s = 0.5 \times s_n$.

Non-equivalence

The 4-wire proximity switches have two outputs:

- A₁ with NO function and
- A₂ with NC function.

Indicators (LED)

Most proximity switches are equipped with one or two LEDs.

The yellow LED indicates the switching status:

- in the case of proximity switches with NO function: Proximity switch attenuated = LED on,
- in the case of proximity switches with NC function: Proximity switch not attenuated = LED on,
- in the case of proximity switches with NO and NC function: Proximity switches attenuated = LED on,

The green LED indicates the presence of the operating voltage. This function is only integrated in some of the devices.

Tightening torque

Excessive tightening of the nuts could cause mechanical damage to the proximity switches. The maximum permissible torques are specified in the Technical specifications.

Operating distance s_a

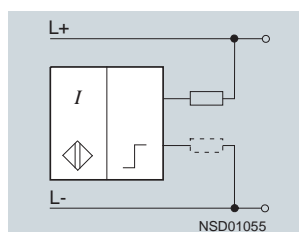
See operating distances

Axial distance to target Δx

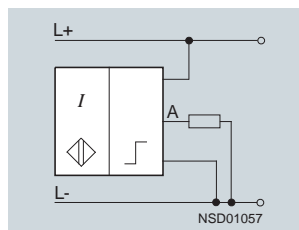
Distance between the actuating element and the proximity switch axis z at the response point A.

Output

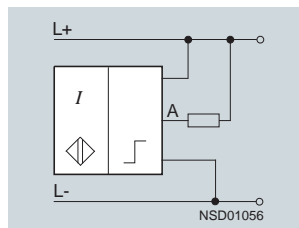
The proximity switches are available with different output connections.



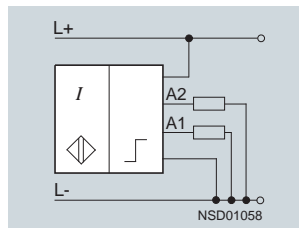
2-wire, DC or AC/DC, load connected in series with proximity switch



3-wire, DC, pnp, load connected between A and L-



3-wire, DC, npn, load connected between A and L+



4-wire, antivalent, DC, load connected between A₁, A₂ and L-

Output resistance

The proximity switches have a built-in output resistance so that the output voltage can follow the switching status even without an external load. A load resistance must be connected when operating with high switching frequencies (to reduce the electric time constant).

Axial approach

Axial approaching of the target is where its center point is located in the reference axis.

Rated operating current I_e (output current)

The sensors are designed for a specific maximum output current. If this current is exceeded, even briefly, the built-in overload protection will be activated. Incandescent lamps, capacitors and other strongly capacitive loads (e.g. long leads) have effects similar to an overload.

Time delay before availability t_v

Time between switching on the power supply and commencement of the proximity switch's operational readiness. See also spurious switch-on pulse.

Operating voltage

The operating voltage is specified including 10% residual ripple.

Operating temperature

The specified operating temperature range must not be exceeded. The proximity switch could then be damaged, and the operating response is undefined.

Reference axis z

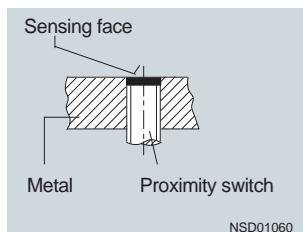
Axis running perpendicular to the active surface and through its center. See also mounting instructions.

Mounting

Shielded proximity switches

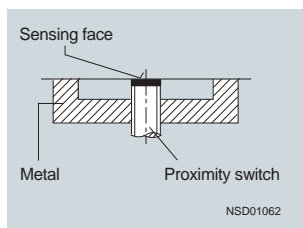
A proximity switch can be shielded if any attenuating material (metal) can be attached around the active surface without influencing the characteristic features.

To ensure perfect functioning, a gap should be left in front of the active surface.



Unshielded proximity switches

A proximity switch cannot be shielded if a certain free zone is required around its active surface in order to retain the characteristic features (IEC).



Semi-shielded proximity switches

A proximity switch that is semi-shielded also requires a certain free zone. However, flush mounting is permissible in non-attenuating materials.

Installed protective measures

The protective circuits fitted in most proximity switches (see selection tables) enable them to be operated easily and protect the devices from damage.

It is possible to protect against

- Spurious signals,
- Short-circuit and overload (DC),
- Interchanging of all connections,
- Wire break (connection L– or L+),
- Transient overvoltage,
- Radio interference.

Spurious signal suppression

When applying the operating voltage, the status "attenuated" is simulated because of the transient status of the sensor coil – even if no actuating element is present. The spurious signal suppression prevents the output being activated during this period.

Short-circuit and overload

All DC voltage devices with 3- and 4-wire connection are equipped with a short-circuit and overload protection. Short-circuits between the output and the operating voltage connections do not damage the proximity switches and are permissible on a continuous bases; even unlimited overload is permitted. During the short-circuit the LEDs do not function.

Reverse polarity protection

All DC voltage devices with 3- and 4-wire connection are protected against polarity reversal of any connections.

Wire break protection

The DC version is designed in such a way that the proximity switch does not emit a fault signal if there is a wire break at any terminal (not applicable to 3RG46 and all 4-wire proximity switches). A fault signal is any signal other than 0 which is present for more than 2 ms and whose current is greater than the residual current.

Inductive interference protection

When switching off inductive loads, the output voltage rises (without a protective circuit) to high values which can destroy the output transistor. For this reason, the proximity switches at the output are given a Zener diode which limits the cutoff voltage to a safe value (3-wire proximity switches).

When connecting inductive loads with a current >100 mA and simultaneously a switching frequency >10 Hz it is recommended that a freewheeling diode is mounted directly on the load (due to the power loss in the installed Zener diode).

Protection against radio interference.

The high-frequency sensitivity is reduced to the extent that regulation IEC 61000-4-3, Level 3 (testing level 10 V/m) is satisfied.

Protection against electrostatic charges

The devices are designed in such a way that electrostatic charges, as specified in IEC 61000-4-3, Level 3 (8 kV), do not destroy the devices.

SIMATIC PXI inductive proximity switches

Glossary for proximity switches

Electromagnetic compatibility (EMC)

All inductive proximity switches meet the protection requirements of the EMC guideline No. 89/336/EEG. This is verified by application of the EN 60 947-5-2 standard.

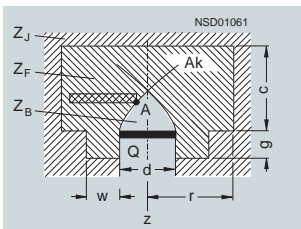
For the individual checks the following EMC standards apply:

- EN 55011, IEC-CISPR 11,
- IEC 61000-4-2, Level 3,
- IEC 61000-4-3, Level 3,
- IEC 61000-4-4, Level 3,
- IEC 61000-4-6

Free zone

Range around the proximity switch which must be kept free of materials which interfere with the characteristic features of the switch.

The volume of the free zone is defined by the dimensions r , c and w , g (see diagram).

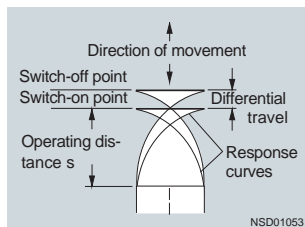


Ak	Response curve
A	Point of response
c, g	Partial heights of transition region
d	Diameter of the proximity switch
Q	Sensing area
r	Radius of free zone
w	Mounting condition
z	Reference axis
ZB	Attenuation zone
ZF	Free zone
ZJ	Inactive zone

Hysteresis H

Distance between the switching points when the target approaches or is removed from the proximity switch.

The hysteresis causes a defined switching response for the devices. The switching distance always refers to the switch-on point.



Smallest operating current I_m (minimum load current)

The current required to retain the conductivity of the switching elements in the ON state. This applies to 2-wire proximity switches.

Magnetic fields

Permanent magnetic fields and low-frequency alternating fields do not generally influence the function of the proximity switches. Strong fields may saturate the ferrite core of the switch and thus increase the operating distance or switch the device. On the other hand, damage is not probable.

High-frequency fields with frequencies of several hundred kHz can considerably interfere with the function (operating frequency of the sensors). Shielding is recommended in the event of difficulties with interference fields.

Target (actuating element)

Parts made of metal with which proximity switches are actuated in service.

Form, material and dimensions influence the response characteristic of the proximity switch (see reduction factors).

The specified rated operating distances s_n were determined using the minimum surface defined in the standard (see characteristic). The usable operating distance s_u is reduced if the surface is less than the minimum.

Power supply units

Single-phase power supply units must be smoothed with at least 1000 $\mu\text{F}/\text{A}$. For noise suppression reasons, this measure is also necessary with three-phase power supply units.

Standard target

The standard target is a defined part used for comparison measurements of the operating distances and sensing ranges.

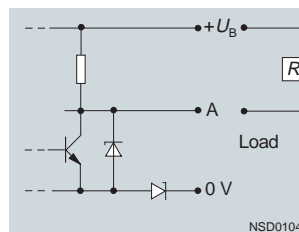
Material of standard target: St 37, 1 mm thick

Dimensions of square standard target: the side length is equal to

- the diameter of the inscribed circle on the active surface of the proximity switch or
- three times the rated operating distance s_n if $3 \times s_n$ is greater than the diameter of the inscribed circle.

npn connection

The output stage contains an npn transistor which connects the load to the negative operating voltage (0 V). The load is connected between the output and the positive operating voltage ($+U_B$).



Resistance to oil

The proximity switches with degree of protection IP67 are not suitable for permanent operation in an environment containing oil. The following must therefore be observed:

Lubricating oils

Usually present no problem.

Hydraulic oils, cutting oils

These attack most plastics. In particular, the PVC lines become discolored and brittle.

Measures: avoid contact with these liquids if possible, especially on the active surface.

Parallel connection

Parallel connection of proximity switches to implement logical functions is possible with 3-wire and 4-wire proximity switches without problem, but not with 2-wire proximity switches.

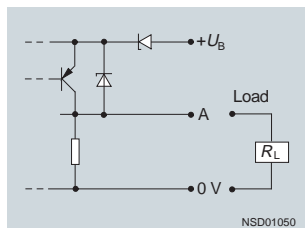
Please note:

- The power consumption increases.
- Leakage currents add up so that an impermissible voltage drop may occur at the load even in the off state.

See diagrams on page 2/243.

pnp connection

The output stage contains a pnp transistor which connects the load to the positive operating voltage (+U_B). The load is connected between the output and the negative operating voltage (0 V).



Programming

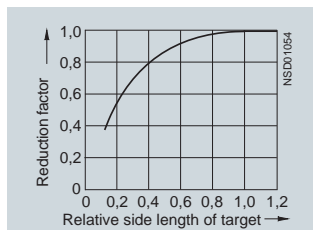
Selection of NO or NC function using slide switch in bottom part of enclosure or plug-in jumper in the electronics base. Only with certain cubic proximity switches.

Reduction factors

The specified operating distance *s* refers to exactly defined measuring conditions (see operating distance). Other arrangements generally result in reduced operating distances. The reduction factors (see Technical specifications) are only approximate values. Deviations may result depending on different alloys and the type.

Influence of geometry

If a smaller target is used than the standard target defined in IEC 60947-5-2, the operating distance must be corrected by a reduction factor.



Series connection

See diagrams on page 2/243.

Residual voltage

The residual voltage is the voltage measured across the load with the output disabled.

Residual current *i_r*

The residual current is the current which flows in the load circuit of the proximity switch in the disabled condition.

It is used to retain the function, and must primarily be observed with parallel connections.

Residual ripple σ

The maximum value of the residual ripple from peak to peak must not exceed 10% of the rated voltage *U_n*. The switching response may be undefined if the residual ripple is large. Correction is possible using a larger smoothing capacitor or a regulated power supply.

Release point B

The position, e.g. in the attenuation zone, at which the bottom rear edge of the actuating element is located at the moment the signal changes when removing.

Operating distance

The operating distance is the distance at which a change in signal is caused at the output when the target approaches the active surface along the reference axis. Measurement of the operating distance is carried out according to IEC 60947-5-2 using a standard target and axial approach.

Rated operating distance *s_n*

The rated operating distance is a conventional variable for defining the operating distances. Neither specimen scatter nor changes resulting from external influences such as voltage or temperature are taken into account.

This operating distance applies when using the standard target according to IEC 60947-5-2. Reduction factors must be considered if the material and/or size of the target differ from those of the standard target.

Real operating distance *s_r*

Operating distance of a particular proximity switch measured at defined temperature, voltage and mounting conditions. This is the operating distance for a particular switch measured according to IEC 60947-5-2. The manufacturing tolerance is 10%:

$$0.9 s_n < s_r < 1.1 s_n$$

Usable operating distance *s_u*

Operating distance of a particular proximity switch measured under defined conditions.

This includes the additionally expected deviations caused by the variations in temperature and operating voltage within the specified ranges.

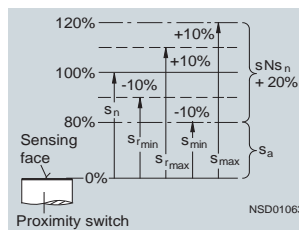
The usable operating distance is between 90% and 110% of the real operating distance. This results in the following for a reliable design: $0.81 s_n < s_u < 1.21 s_n$

Ensured operating distance (actuation distance) *s_a*

Distance from the active surface at which actuation of the proximity switch is ensured under defined conditions.

The ensured operating distance is between zero and the bottom value of the useful operating distance:

$$0 < s_a < 0.81 s_n$$



- s_a* Operating distance
- s_n* Rated operating distance
- s_r* Real operating distance
- s_{r min}* min. usable operating distance *s_u* (= operating distance *s_a*)
- s_{r max}* max. usable operating distance *s_u*

Glossary for proximity switches

Switching element function

NO function

An NO function results in a flow of load current when the target is sensed, and no flow of the load current when the target is not sensed.

NC function

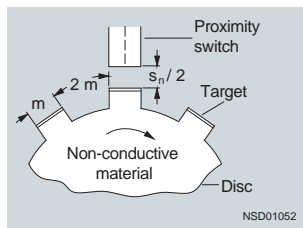
An NC function results in no flow of load current when the target is sensed, and a flow of load current when the target is not sensed.

Switching frequency f

Number of switching operations of a proximity switch within a defined time interval.

The switching frequency is the maximum possible switching rate between the damped and non-damped statuses at which the output circuit still delivers a defined signal sequence corresponding to the activation.

It specifies the maximum permissible number of pulses per second at a constant pulse : Pause = 1 : 2 and half the rated operating distance s_n . The measurement is carried out according to IEC 60947-5-2.



Degree of protection

IP67

Protection against the ingress of dust. Complete touch protection against electric shock.

Protection against water when the enclosure is immersed in water under given pressure and time conditions. Water must not penetrate in amounts that would damage the device.

Test conditions – Sensor is immersed for 30 minutes in tap water at a depth of 1 meter. If a sensor is to be submersed for a longer period, or subjected to higher water pressure or humidity, devices with a higher degree of protection must be selected.

IP68

Protection against the ingress of dust. Complete touch protection against electric shock.

Protection against water when submersed.

The testing of water-tightness is based on IEC 60068-2-17, Test q1. Contrary to the standard, the test object is stored in steam and not in water since greater stress exists with this type of storage.

Parameters:

- Initial conditions: Operating distance at $T_u = 25\text{ °C} \pm 5\text{ °C}$
- Test fluid: Tap water,
- Temperature of test fluid: $105\text{ °C} - 5\text{ °C}$,
- Test pressure: 12 N/cm (1.2 bar)
- Duration of exposure to stress: 5 days
- Post-treatment: Drying at room temperature and cooling. The final measurement is made as soon as the device under test has reached room temperature
- Final measurement: Operating distance at $T_u = 25\text{ °C} \pm 5\text{ °C}$. The permissible change is $\pm 10\%$ of the initial state.

IP69K

Protection against the ingress of dust. Complete touch protection against electric shock.

Protection against ingress of water during high-pressure jet cleaning. (i.e.: Water that is directed toward the enclosure at high pressure from any angle must not cause any damage to the device.)

Welding-resistant

Sensors which can be used in strong magnetic fields, e.g. during arc welding, or in fields of electrolysis plants.

The maximum permissible value is specified for specially selected sensors, e.g. PXI400.

Lateral approach

Lateral approach of the target is at right angles to the reference axis.

Voltage drop

A voltage drop (dependent on the current) occurs across the output transistor in the conductive state; the output voltage does not quite reach the associated operating voltage (to be particularly observed with a series connection and electronic inputs).

Current consumption

The current input is understood to be the current consumption of the proximity switch required to operate the oscillator, amplifier etc. It does not include the current flowing through the load.

The no-load current I_0 is the current drawn from the power supply without a load being connected.

Temperature drift

The specified operating distances refer to an ambient temperature of 20 °C. Within the permissible temperature range of -25 °C to $+70\text{ °C}$, the operating distance varies by max. $\pm 10\%$ compared to the value at 20 °C.

The temperature of the target alone has practically no influence on the operating distance.

Repeat accuracy R

The repeat accuracy is the change in the real operating distance s_r at defined conditions.

The repeat accuracy is measured over a period of 8 hours at an ambient temperature of $23\text{ °C} (\pm 5\text{ °C})$, any relative humidity within the specified range, and a defined supply voltage.

The difference between any two measurements must not exceed 10% of the real operating distance s_r . The repeat accuracy is usually far better in the case of measurements immediately following one another.

SIMATIC PXI inductive proximity switches



Notes

2

SIMATIC PXC capacitive proximity switches

Introduction

Capacitive proximity switches – Monitoring fill levels and more



Capacitive proximity switches are also non-contact sensors and respond to the same degree almost instinctively when conducting and non-conducting materials in solid, powder or liquid state are to be measured. They impress customers especially in the case of fill level monitoring through non-metallic materials such as plastic or glass and through various materials in the case of counting objects.

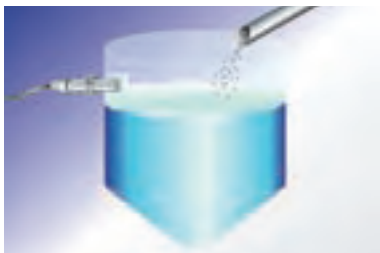
Highlights

- Detection of all materials (e.g. plastics, wood, paper)
- Measurement of liquids through plastic tubes or glass pipes
- Measurement of aggressive chemicals
- Adjustable compensation of operating distance on the object

Application examples



Recognition of milk in cartons



Level control for bulk material in vessel

Standards

The same standards are applicable as for the inductive proximity switches.

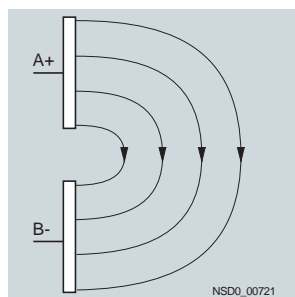
Type

The devices are available in DC or AC versions:

- The DC versions can activate electronic controllers (SIMATIC) or relays directly.
- With the AC version, the load (contactor relay, solenoid valve) is connected directly to the AC supply network (preferably 230 V, 50 Hz) in series with the proximity switches.

Function

The sensing face of a capacitive sensor is formed by two concentrically arranged metal electrodes that are equivalent to the electrodes of an unwound capacitor. The electrode surfaces A and B are connected into the feedback branch of a high-frequency oscillator that is tuned such that it does not oscillate when the surface is free.



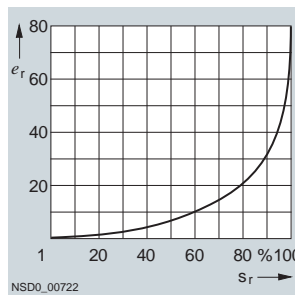
When an object approaches the active face of the sensor, it enters the electric field in front of the electrode surfaces and causes a change in the coupling capacitance. The oscillator starts to oscillate; the amplitude is recorded by an evaluation circuit and converted into a switching command.

Switching rate

The build-up characteristics specific to other pulse/interval conditions may result in higher switching frequencies than those specified.

Operating distance

The stated values are applicable to a target of metal which is grounded and whose area corresponds to the sensing face of the proximity switch. The real operating distance s_r for non-conductive targets is dependent on the relative dielectric constant ϵ_r and the characteristic value (see characteristic curve).



Dielectric constants ϵ_r of various materials

Material	ϵ_r	Material	ϵ_r
Alcohol	25.8	Polyethylene	2.3
Araldite	3.6	Polypropylene	2.3
Bakelite	3.6	Polystyrene	3
Glass	5	Polyvinylchloride	2.9
Mica	6	Porcelain	4.4
Vulcanized rubber	4	Pressboard	4
Hard paper	4.5	Quartz glass	3.7
Wood	2 ... 7	Quartz sand	4.5
Cable insulating compound	2.5	Silicone rubber	2.8
Air, vacuum	1	Teflon	2
Marble	8	Turpentine oil	2.2
Oiled paper	4	Transformer oil	2.2
Paper	2.3	Vacuum, air	1
Paraffin	2.2	Water	80
Petroleum	2.2	Soft rubber	2.5
Plexiglas	3.2	Celluloid	3
Polyamide	5		

Built-in protection

The protective circuits built into the DC versions make them easy to handle and protect the devices from damage.

- Spurious signal suppression
- Short-circuit and overload protection
- Reverse polarity protection of connections
- Inductive interference protection

Technical specifications

Type	DC	AC
Operational voltage	10 ... 65 (30) V	20 ... 250 V
• Residual ripple	Max. 10%	–
No-load supply current I_0	6 ... 12 mA	max. 1.7 mA
Switching frequency f	100 Hz	20 Hz
Repeat accuracy R	Max. 2%	
Hysteresis H	0.02 ... 0.2 × 0.02 to 0.2 s_r	
Outputs		
Rated operational current I_e		
• For DC	200 mA	–
• For 230 V AC (contactor up to size S3)	–	
- Continuous		500 mA
- Momentary up to 20 ms		5 A
Smallest operating current I_m	–	
• Mainly inductive load		10 mA
• Mainly resistive load		5 mA
Residual current I_r	6 ... 12 mA	max. 1.7 mA
Voltage drop	Max. 1.8 V	Max. 7 V
Lead length, max. permissible	300 m	
Degree of protection	IP67	
Ambient temperature		
• Operation	–20 ... +70 °C	
• Bearings	–40 ... +85 °C	
Shock resistance	30 × g, 11 ms duration	
Resistance to vibration	10 ... 55 Hz, 1 mm amplitude	

Schematics

DC

Fig. 1

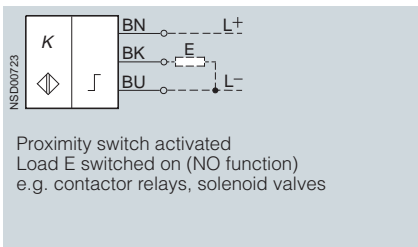


Fig. 2

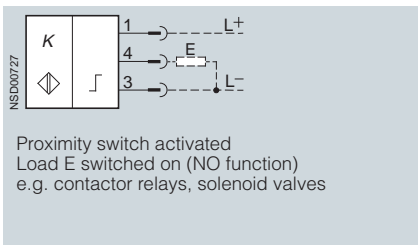


Fig. 3

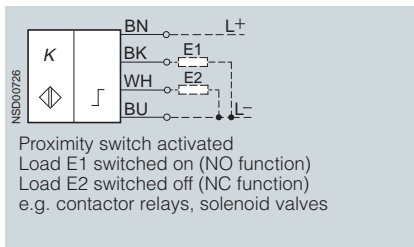
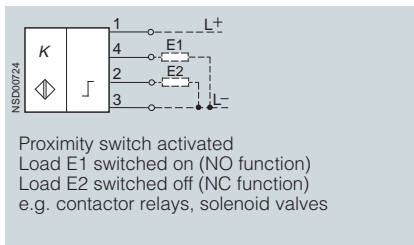


Fig. 4



AC

Fig. 5

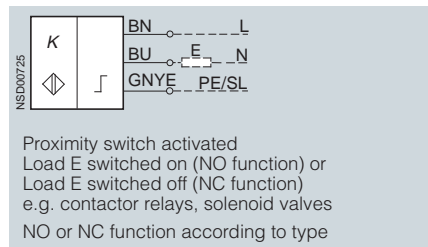
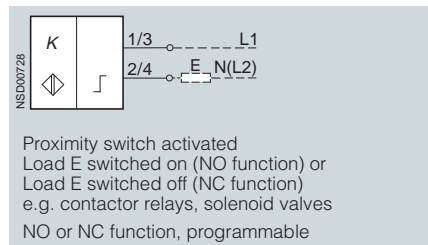


Fig. 6



SIMATIC PXC capacitive proximity switches

SIMATIC PXC200

Overview

SIMATIC sensors PXC200

- 10 ... 65 V DC
- 20 ... 250 V AC

Selection table

SIMATIC PXC200



	M18	M30	Ø 40 mm	20 mm x 32 mm	40 mm x 40 mm
Operating distance					
• 5 mm	■			■	
• 10 mm		■			
• 20 mm			■		■
Operating voltage					
• 10 ... 30 V DC				■	
• 10 ... 65 V DC	■	■	■		■
• 20 ... 250 V AC		■	■		■
Number of wires					
• 2 wires		■	■		■
• 3 wires	■			■	
• 4 wires		■	■		■
Output					
• pnp	■	■	■	■	■
• NO contact	■	■		■	
• NC contact		■			
• NO contact and NC contact		■	■		■
• NO contact or NC contact		■	■		■
Mounting					
• flush	■	■	■	■	■
Connection					
• Plug, Ø 8 mm				■	
• Cable	■	■		■	
• Terminal compartment		■	■		■
Degree of protection					
• IP67	■	■	■	■	■
See page	2/257	2/257, 2/258	2/258	2/257	2/258

SIMATIC PXC capacitive proximity switch

SIMATIC PXC200

10 ... 65 V DC

Technical specifications

Number of wires	3	3	4
Design	M18	Cubic 20 mm × 32 mm	M30
Installation in metal	Flush	Flush	Flush
Rated operating distance s_n	1) 5 mm	5 mm	10 mm
Effective operating distance s_r	2) Adjustable	Fixed comparison	Adjustable
Enclosure material	Molded plastic	Metal	Metal with molded-plastic head
Operational voltage (DC)	V 10 ... 65	10 ... 30	10 ... 65
Rated operational current I_e	mA 200	200	200
Displays			
• Operating distance	Red LED	Yellow LED	Red LED
• Operational voltage	–	Green LED	–
Degree of protection	IP67	IP67	IP67
Type	3RG16 13-0AB00	3RG16 73-0AG00 3RG16 73-7AG00	3RG16 14-0AC00

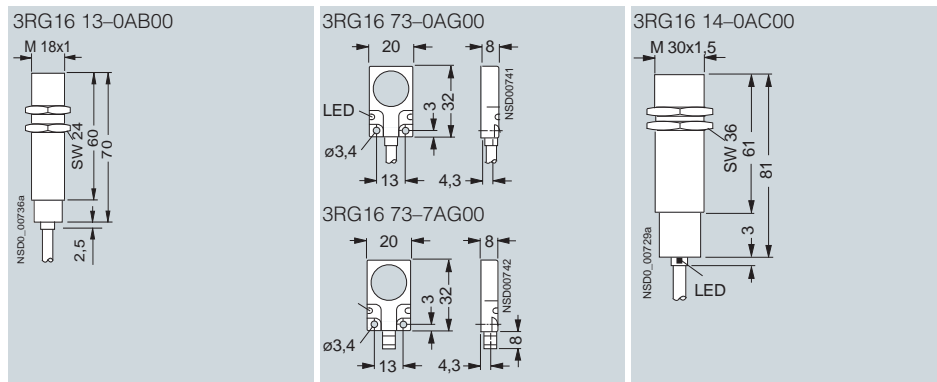
1) For operation with grounded metal.

2) With an alignment $s_r > s_n$, the hysteresis can increase significantly.

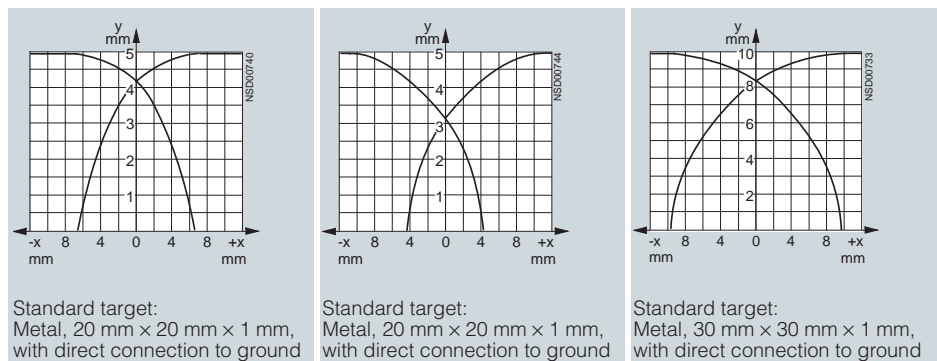
Selection and Ordering data

Switching output	Circuit diagram number	Connector type	Order No.	Order No.	Order No.
With LiYY cable, 2 m			3 × 0.5 mm ²	3 × 0.25 mm ²	4 × 0.34 mm ²
NO contact, pnp	1	▶	3RG16 13-0AB00	▶	3RG16 73-0AG00
NO contact and NC contact, pnp (antivalent)	3		–	▶	3RG16 14-0AC00
With connector, Ø 8 mm					
NO contact, pnp	2	A, C	–	▶	3RG16 73-7AG00
▶ Preferred type, available from stock.					

Dimensions



Characteristic curves



SIMATIC PXC capacitive proximity switch

SIMATIC PXC200

10 ... 65 V DC

Technical specifications

Number of wires	4	4	4
Design	M30	Ø 40 mm	Cubic 40 mm × 40 mm
Installation in metal	Flush	Flush	Flush
Rated operating distance s_n	1) 10 mm	20 mm	20 mm
Effective operating distance s_r	2) Adjustable	Adjustable	Adjustable
Enclosure material	Molded plastic	Molded plastic	Molded plastic
Operational voltage (DC)	V 10 ... 65	10 ... 65	10 ... 65
Rated operational current I_e	mA 200	200	200
Displays			
• Operating distance	Yellow LED	Yellow LED	Yellow LED
• Operational voltage	Green LED	Green LED	Green LED
Degree of protection	IP67	IP67	IP67
Type	3RG16 14-6AC00	3RG16 55-6AC00	3RG16 30-6AC00

1) For operation with grounded metal.

2) With an alignment $s_r > s_n$, the hysteresis can increase significantly.

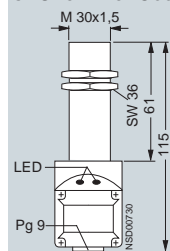
Selection and Ordering data

Switching output	Circuit diagram number	Connector type	Order No.	Order No.	Order No.
With terminal box			to 2.5 mm ²	to 2.5 mm ²	to 2.5 mm ²
NO contact and NC contact, pnp (antivalent)	4	▶	3RG16 14-6AC00	▶	3RG16 55-6AC00
				▶	3RG16 30-6AC00

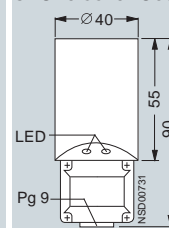
▶ Preferred type, available from stock.

Dimensions

3RG16 14-6AC00

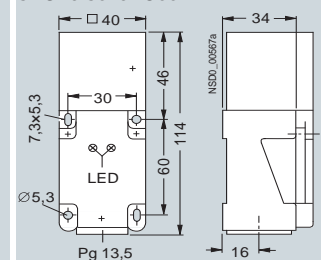


3RG16 55-6AC00

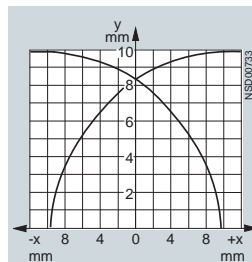


Fixing clamp, Ø 40 mm, included in scope of supply.

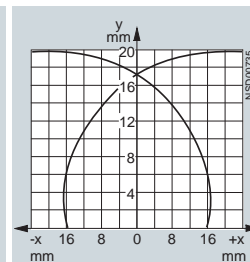
3RG16 30-6AC00



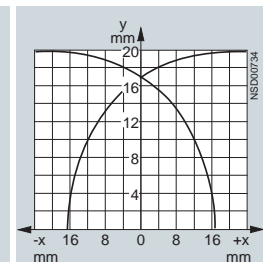
Characteristic curves



Standard target:
Metal, 30 mm × 30 mm × 1 mm,
with direct connection to ground



Standard target:
Metal, 60 mm × 60 mm × 1 mm,
with direct connection to ground



Standard target:
Metal, 60 mm × 60 mm × 1 mm,
with direct connection to ground

SIMATIC PXC capacitive proximity switch

SIMATIC PXC200

20 ... 250 V AC

Technical specifications

Number of wires	2 + PE	2	2	2
Design	M30		Ø 40 mm	Cubic 40 mm x 40 mm
Installation in metal	Flush		Flush	Flush
Rated operating distance s_n ¹⁾	10 mm		20 mm	20 mm
Effective operating distance s_r ²⁾	Adjustable		Adjustable	Adjustable
Enclosure material	Metal with molded-plastic head	Molded plastic	Molded plastic	Molded plastic
Operational voltage (AC) V	20 ... 250		20 ... 250	20 ... 250
Rated operational current I_e mA	500		500	500
LEDs				
• Operating distance	Red LED	Red LED	Red LED	Red LED
• Operational voltage	–	Green LED	Green LED	Green LED
Degree of protection	IP67		IP67	IP67
Type	3RG16 14-0LB00, 3RG16 14-0LA00	3RG16 14-6LD00	3RG16 55-6LD00	3RG16 30-6LD00

1) For operation with grounded metal.

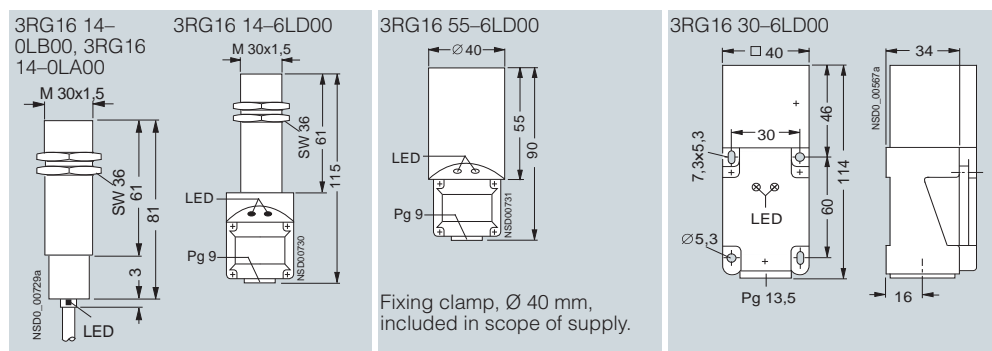
2) With an alignment $s_r > s_n$, the hysteresis can increase significantly.

Selection and Ordering data

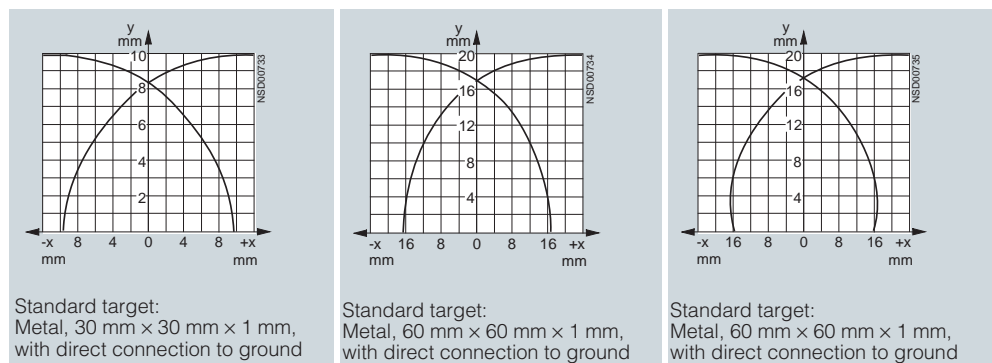
Switching output	Circuit diagram number	Connector type	Order No.	Order No.	Order No.
With LiYY cable, 2 m			3 × 0.5 mm ²		
NO contact	5	▶	3RG16 14-0LB00	–	–
NC contact	5	▶	3RG16 14-0LA00	–	–
With terminal box			to 2.5 mm ²	to 2.5 mm ²	to 2.5 mm ²
NO contact or NC contact programmable	6	▶	3RG16 14-6LD00	▶ 3RG16 55-6LD00	▶ 3RG16 30-6LD00

▶ Preferred type, available from stock.

Dimensions



Characteristic curves



Proximity switches

Accessories

SONPROG programming device for SIMATIC PXS

Overview



PC with SONPROG programming device and Sonar proximity switch

SONPROG

Using the SONPROG 3RX4 000 PC programming device and the relevant software, the following Sonar proximity switches can be individually adapted to the respective application requirements:

- M30 K1 and M30 K3 compact ranges
- M18 compact range
- K65 compact form

Scope of supply

- PC-Interface,
- Plug-in power supply
- Connecting leads to the PC and Sonar proximity switch
- SONPROG software for Windows.

Function

The SONPROG 3RX4 000 programming device allows the user to program several Sonar proximity switches simultaneously. The lower and upper limit of the operating range can be saved at the click of a button for copying to other Sonar proximity switches.

For each Sonar proximity switch, the following parameters can be set:

- Lower and upper limit of the operating range
- Hysteresis
- Switching function NO or NC
- Switching frequency
- Lower and upper limit of the analog characteristic
- Analog characteristic, rising or falling
- End of close range
- End of sensing range
- Mean value generation
- Attenuation.

The function can also be set for the device:

- Multiplex function
- Temperature compensation
- Function as diffuse or reflex sensor
- Fill level mode

The programmed values are saved in the Sonar proximity switch and are retained even without interface or after the supply voltage has been disconnected.

The programmed values can be printed out and recorded. They will then be immediately available, for example for series applications or for replacement of the Sonar proximity switch.

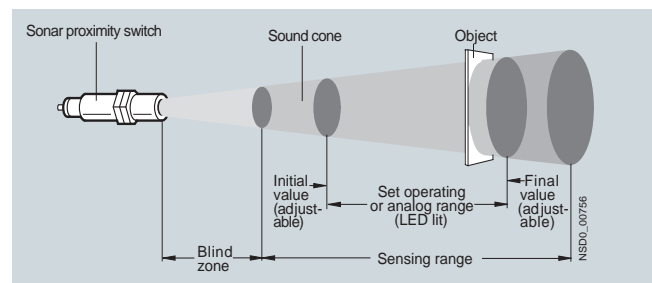
Parameters

Operating range

The commands "Lower limit of operating range" and "Upper limit of operating range" are used to define a window within the sensing range of the Sonar proximity switch.

If an object enters the operating range, the switching output is active (with NO contact). If an object is outside the operating range, the switching output is not active.

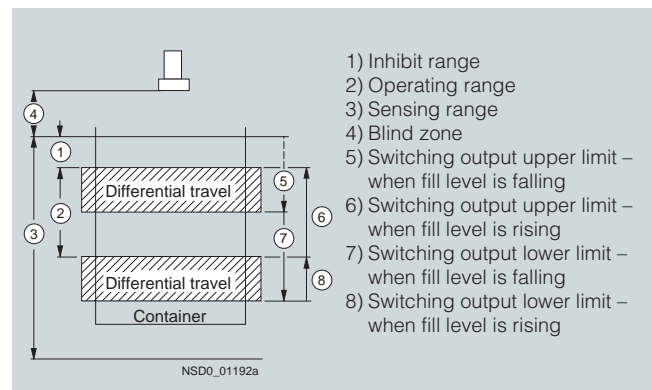
In the case of Sonar proximity switch of M30 K2 compact range with two switching outputs, the second switching output is active when an object is located between the blind zone and the operating range.



Sound cone

Hysteresis

The hysteresis can be adjusted to move the switch-on point and the switch-off point at the limits of the operating range away from each other. This prevents output flutter and level control tasks can be solved elegantly.



Example: Fill level monitoring with adjustable hysteresis

Switching element function

The function of the switching output that was set at the factory can be changed, e.g. from NO to NC.

The assignment of the connections does not change as a result. This means that when a device with NO function is changed to NC, the switching output remains assigned to pin 4.

Switching rate

The Sonar proximity switch can be switched over from standard switching frequency (in accordance with the technical specifications) and rapid switching frequency (3 times the standard value).

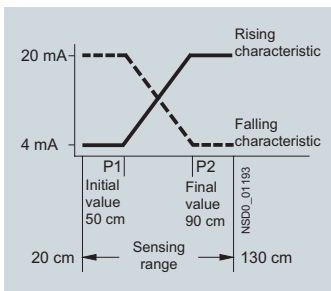


Note:

A Sonar proximity switch with a rapid switching frequency is more sensitive to disturbance.

Analog distance measurement

Proximity switches with an analog output can detect the distance to an object. This distance is converted into a proportional analog output signal (0 to 10 V, 0 to 20 mA or 4 to 20 mA). The resolution of the analog output is at least 1 mm within the preset limits.



Example

Blind zone

A value must not be set for the blind zone that is less than the minimum value. This is the time that the Sonar proximity switch requires to switch over from send to receive mode.

The blind zone can be moved away from the Sonar proximity switch (i.e. increased) to permit interfering objects in the foreground to be ignored. The interfering echo resulting from such an object is suppressed by extending the blind zone, and detection of the desired object is possible again. The range of the Sonar proximity switch can be reduced in this case because part of the echo from the object to be detected is suppressed. However, objects are still not permitted within the original blind zone.

It is important to ensure with this setting the object does not reflect ultrasound so well that double or triple echoes arise that give the impression of a more distant object. (a fault of this kind cannot occur during normal operation because only the first echo is accepted as valid).

Sensing range

Reducing the sensing range can enhance the resolution of the Sonar proximity switch. With large sensing ranges, it is not possible to adjust some values in steps of one millimeter. The minimum resolution of a Sonar proximity switch is 1 mm.

Mean value generation

Unfortunate reflective conditions or moving surfaces (e.g. in the case of moving liquids and bulk material on conveyors) can cause the measured values to change continuously, which results in constant switching. The Sonar proximity switch allows a mean value to be generated from up to 255 measurements.

Failed signals (when no object is in the sensing range) are ignored on mean-value generation. After each measurement, a mean value is generated immediately from the new measured value and the stored number of old values. The response time of the Sonar proximity switch is, therefore, not extended. A delay only occurs at the end of a measurement if the object is removed from the sensing range. This delay corresponds to the measurement cycle time multiplied by the saved number of mean values.

SONPROG programming device for SIMATIC PXS

Attenuation (see sound cones)

The susceptibility of the receive amplifier is reduced here. Weakly reflecting objects at the edge of the sound cone are suppressed. It is also possible to reduce the size of the sound cone here electronically. The permitted values are 0 (maximum sensitivity) to 7 (minimum sensitivity).

Technical specifications

Type	3RX4 000
Required hardware	PC with VGA graphics card, serial interface COM1 or COM2
Required software	MS-DOS Version 3.1 and higher, Windows 3.X, Windows 95, 98, Windows NT
Operational voltage	100 ... 240 V AC, 24 V DC

Software update on the Internet:

www.siemens.com/simatic-sensors/px

Selection and Ordering data

Order No.

SONPROG programming device

3RX4 000

▶ Preferred type, available from stock.

Proximity switches

Accessories

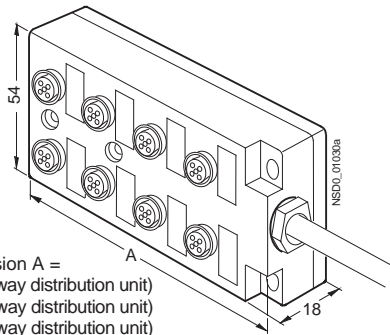
Distributors

Technical specifications

Type	3RX8 000-0JA	
Operational voltage	V DC	24
Max. current per switching output	A	2
Connections	M12 connector-in connections (socket in distribution unit)	
Core identification, PUR cable	in color	
Display	<ul style="list-style-type: none"> • Per output Yellow LED • Operational voltage Green LED 	
Enclosure material	Molded plastic	
Degree of protection	IP65, in inserted and locked state	
Operating temperature	°C	-15 ... +80

Selection and Ordering data

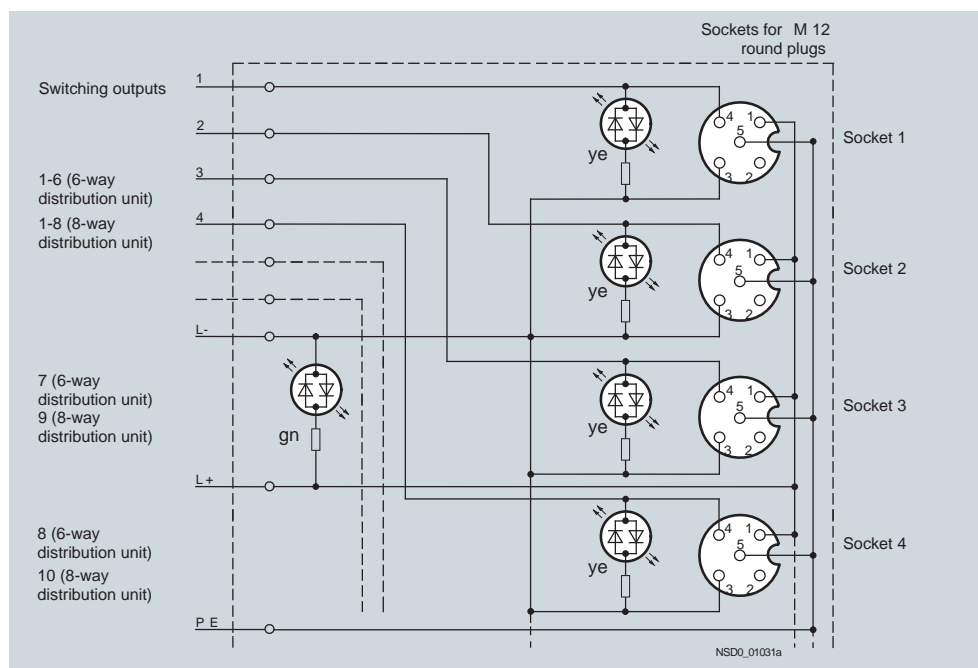
Type	Order No.
Distribution units, quadruple <ul style="list-style-type: none"> • 5 m PUR line ▶ • 10 m PUR line ▶ 	3RX8 000-0JA40-1AF0 3RX8 000-0JA40-1AL0
Distribution units, 6x <ul style="list-style-type: none"> • 5 m PUR line ▶ • 10 m PUR line ▶ 	3RX8 000-0JA60-1AF0 3RX8 000-0JA60-1AL0
Distribution units, 8x <ul style="list-style-type: none"> • 5 m PUR line ▶ • 10 m PUR line ▶ 	3RX8 000-0JA80-1AF0 3RX8 000-0JA80-1AL0
Distributors ▶	3RX8 000-0JA80
Preassembly possible, with connecting hood	



Dimension A =
 82 (4-way distribution unit)
 100 (6-way distribution unit)
 127 (8-way distribution unit)

▶ Preferred type, available from stock.

Schematics



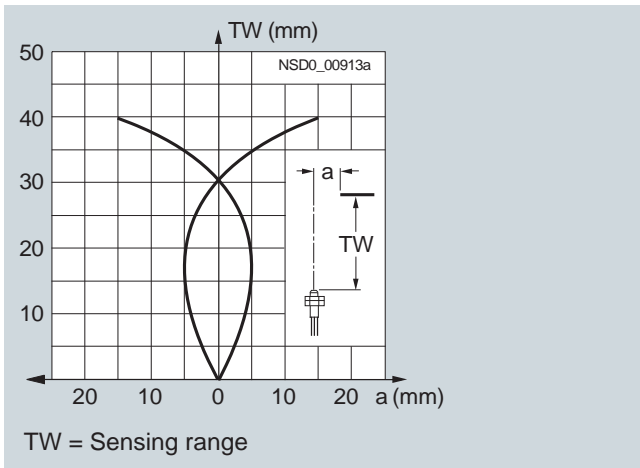
Overview

The plastic fiber-optic cables are used in combination with the photoelectric proximity switches of the LV70, K30 and K31 types.

The sensing range of the plastic fiber-optic wires depends on the type of photoelectric proximity switch used.

The main advantages are:

- Extremely small dimensions
- Small bending radii
- For cutting to length
- Visible light
- Wide range of types
- Attractively priced.



Typical shape of switching zone

Technical specifications

Attenuation at 660 nm, max.	dB/m	0.4
Angle of incidence, max.		$\pm 56^\circ$
Standard length	m	2 ± 0.1
Bending radius, min.	mm	25
Tensile load, max.	N	30
Sleeve material		Polyethylene
Degree of protection		
• Sensor head		IP67
• Sensor		IP65
Temperature range	$^\circ\text{C}$	$-40 \dots +75$
Solvent resistance		Not resistant

Proximity switches

Accessories

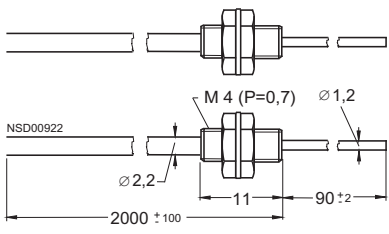
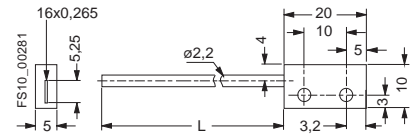
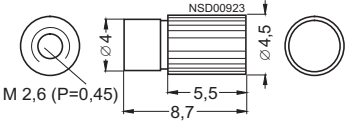
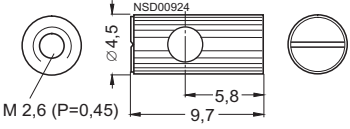
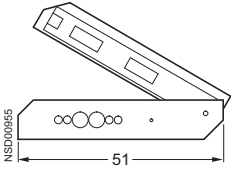
Plastic fiber-optic conductor for SIMATIC PXO

Selection and Ordering data

Type	Sensing range	For photoelectric proximity switch	Order No.
Plastic fiber-optic wire for diffuse sensor			
	2 single fibers, Ø 1 mm, for cutting Adapter sleeves to Ø 2.2 mm included in scope of supply. 20 mm 40 mm 35 mm	K31 design K30 design LV70 design	3RX7 001
	2 single fibers, Ø 2.2 mm, for cutting mono/axial 60 mm 120 mm 155 mm	K31 design K30 design LV70 design	3RX7 002
	2 single fibers, Ø 2.2 mm, for cutting coaxial 60 mm 120 mm 150 mm	K31 design K30 design LV70 design	3RX7 003
	2 single fibers, Ø 1 mm, for cutting Adapter sleeves to Ø 2.2 mm included in scope of supply. 20 mm 40 mm 60 mm	K31 design K30 design LV70 design	3RX7 004
	2 single fibers, Ø 2.2 mm, for cutting 60 mm 120 mm 140 mm	K31 design K30 design LV70 design	3RX7 005
Plastic fiber-optic wire for thru-beam sensors			
	2 single fibers Ø 2.2 mm, for cutting (fine internal fiber) 60 mm 120 mm 150 mm	K31 design K30 design LV70 design	3RX7 006
	2 single fibers, Ø 2.2 mm, for cutting 200 mm 400 mm 350 mm	K31 design K30 design LV70 design	3RX7 007
	2 single fibers Ø 2.2 mm, for cutting (fine internal fiber) 60 mm 120 mm 120 mm	K31 design K30 design LV70 design	3RX7 008

► Preferred type, available from stock.

Plastic fiber-optic conductor for SIMATIC PXO

Type	Sensing range	For photoelectric proximity switch	Order No.
 <p>NSD00922</p> <p>2 single fibers, \varnothing 2.2 mm, for cutting</p> <p>M 4 (P=0,7) \varnothing 1,2</p> <p>\varnothing 2,2</p> <p>2000 \pm 100</p>	<p>200 mm</p> <p>400 mm</p> <p>350 mm</p>	<p>K31 design</p> <p>K30 design</p> <p>LV70 design</p>	3RX7 010
 <p>16x0,265</p> <p>FS10_00281</p> <p>5,25</p> <p>5</p> <p>\varnothing 2,2</p> <p>4</p> <p>20</p> <p>10</p> <p>3,2</p> <p>3</p> <p>10</p> <p>L</p> <p>L=2000 mm</p>	<p>250 mm</p>	<p>LV70 design</p>	3RX7 012
Front lenses			
 <p>NSD00923</p> <p>\varnothing 4,5</p> <p>4</p> <p>M 2,6 (P=0,45)</p> <p>5,5</p> <p>8,7</p>	<p>1500 mm</p> <p>3000 mm</p>	<p>K31 design</p> <p>K30 design</p>	3RX7 901
 <p>NSD00924</p> <p>\varnothing 4,5</p> <p>4,5</p> <p>M 2,6 (P=0,45)</p> <p>5,8</p> <p>9,7</p>	<p>250 mm</p> <p>500 mm</p>	<p>K31 design</p> <p>K30 design</p>	3RX7 902
Cutting tool for fiber-optic cable			
 <p>NSD00985</p> <p>51</p>	<p>51</p>	<p>Cutting tool for plastic fibers</p>	3RX7 918

► Preferred type, available from stock.

Proximity switches

Accessories

Reflectors for SIMATIC PXO

Selection and Ordering data

	Version	Standard for form	Order No.
<p>FS10_00244 $\varnothing 23$ $\varnothing 26,2$ 5,5</p>	D25 Typical range approx. 40 %, referred to D84 design		3RX7 914-0AA01
<p>FS10_00245 $\varnothing 37$ $\varnothing 40,2$ 5,5</p>	D40 Typical range approx. 60%, referred to D84 design		3RX7 915-0AA01
<p>FS10_00246 $\varnothing 78,3$ $\varnothing 82,1$ $\varnothing 4,6$ $\varnothing 7,5$ 2,5 8,5</p>	D84 Typical range approx. 60%, referred to D84 design	M12, M18, K30, K31, C40, K80	3RX7 916-0AA01
<p>FS10_00248 86 74 48 $\varnothing 63$ $\varnothing 4,6$ 4,6 8,5</p>	S48 Typical range approx. 50%, referred to D84 design	M18P	3RX7 922-0AA01
<p>FS10_00249 48 61 71 36 48 51,15 $\varnothing 4,6$ 4,6 8,5</p>	R45 Typical range approx. 60%, referred to D84 design	light grid	3RX7 924-0AA01

	Version	Standard for form	Order No.
	R60 Typical range approx. 40 ... 50%, referred to D84 design	K20, K21	▶ 3RX7 305-0AA01
	R70 Typical range approx. 30%, referred to D84 design		▶ 3RX7 920-0AA01
	R84 High degree of reflection for long range		▶ 3RX7 306-0AA01
	RL50 Reflector for laser light	L50	▶ 3RX7 307-0AA01
	Reflecting foil 100 mm x 100 mm, range 50 ... 60 %, referred to D84 design		▶ 3RX7 917-0AA01
	Reflecting foil 250 x 250 mm Standard for L90L design		3RX7 332

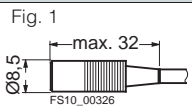
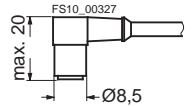
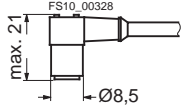
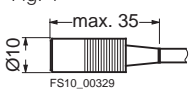
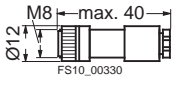
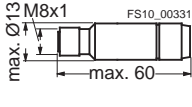
▶ Preferred type, available from stock.

Proximity switches

Accessories

Plug-in connections

Selection and Ordering data

Fig.	Type ¹⁾	Cable ²⁾	Length m	Color	Order No.	
8 mm cable sockets (female) for snap-on mounting, degree of protection IP65						
3-pole, 3 × 0.34 mm ²						
Fig. 1 	1	A	PUR	5	Black	▶ 3RX8 000-0BH32-1AF0
	1	A	PUR	10	Black	▶ 3RX8 000-0BH32-1AL0
4-pole, 4 × 0.34 mm ²						
Fig. 2 	1	B	PUR	5	Black	▶ 3RX8 000-0BH42-1AF0
	1	B	PUR	10	Black	▶ 3RX8 000-0BH42-1AL0
8 mm angular cable sockets (female) for snap-on mounting, degree of protection IP65						
3-pole, 3 × 0.34 mm ²						
Fig. 3 	2	A	PUR	5	Black	▶ 3RX8 000-0BJ32-1AF0
	2	A	PUR	10	Black	▶ 3RX8 000-0BJ32-1AL0
4-pole, 4 × 0.34 mm ²						
	2	B	PUR	5	Black	▶ 3RX8 000-0BJ42-1AF0
	2	B	PUR	10	Black	▶ 3RX8 000-0BJ42-1AL0
3-pole, 3 × 0.34 mm ² , with 2 LEDs for pnp proximity switches						
	3	C	PUR	5	Black/clear	▶ 3RX8 000-0BJ34-1AF0
	3	C	PUR	10	Black/clear	▶ 3RX8 000-0BJ34-1AL0
M8 cable sockets (female) for screw mounting, degree of protection IP67						
Fig. 4 	4	A	PUR	5	Black	▶ 3RX8 000-0BB32-1AF0
	4	A	PUR	10	Black	▶ 3RX8 000-0BB32-1AL0
Fig. 5 	5	A	Coupling plug with soldering pins, max. 0.25 mm ²		Black	▶ 3RX8 000-0BB35
	6	A	Coupling plug, can be assembled		Black	▶ 3RX8 000-0BB37
4-pole, 4 × 0.34 mm ²						
	4	B	PUR	5	Black	▶ 3RX8 000-0BB42-1AF0
	4	B	PUR	10	Black	▶ 3RX8 000-0BB42-1AL0
Fig. 6 	5	B	Coupling plug with soldering pins, max. 0.25 mm ²		Black	▶ 3RX8 000-0BB45
	6	B	Coupling plug, can be assembled		Black	▶ 3RX8 000-0BB47

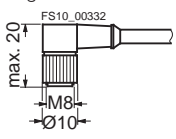
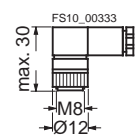
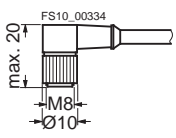
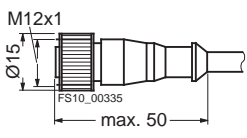
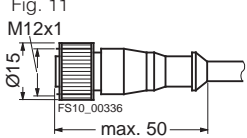
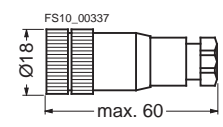
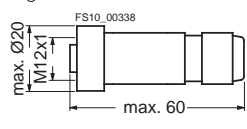
Cable sockets (female) with special lengths available as options:

- Minimum order quantity: 50 units
- Delivery time on request.
- Extra charge per m.

¹⁾ For terminal assignment, see page 2/273.

²⁾ PUR cables suitable for trailing

- ▶ Preferred type, available from stock.

Fig.	Type ¹⁾	Cable ²⁾	Length m	Color	Order No.
M8 angular cable sockets (female) for screw mounting, degree of protection IP67					
Fig. 7 	3-pole, 3 × 0.34 mm ²				
7	A	PUR	5	Black	▶ 3RX8 000-0BC32-1AF0
7	A	PUR	10	Black	▶ 3RX8 000-0BC32-1AL0
8	A	Coupling plug with soldering pins, max. 0.25 mm ²		Black	▶ 3RX8 000-0BC35
3-pole, 3 × 0.34 mm ² , with LEDs					
Fig. 8 	9	C	5 (npn)	Black	▶ 3RX8 000-0BC34-1AF0
	9	C	10	Black	▶ 3RX8 000-0BC34-1AL0
	9	D	5 (npn)	Black	▶ 3RX8 000-0BC30-1AF0
Fig. 9 	9	D	10	Black	▶ 3RX8 000-0BC30-1AL0
4-pole, 4 × 0.34 mm ²					
	7	B	5	Black	▶ 3RX8 000-0BC42-1AF0
	7	B	10	Black	▶ 3RX8 000-0BC42-1AL0
	8	B		Black	▶ 3RX8 000-0BC45
M12 cable sockets (female) for screw mounting, degree of protection IP67					
Fig. 10 	10	E	5	Black	▶ 3RX8 000-0CB32-1AF0
	10	E	10	Black	▶ 3RX8 000-0CB32-1AL0
	11	E	2	Black	▶ 3RX8 000-0CB32-1GC0
	11	E	10	Black	▶ 3RX8 000-0CB32-1GL0
4-pole, 4 × 0.34 mm ²					
Fig. 11 	10	F	5	Black	▶ 3RX8 000-0CB42-1AF0
	10	F	10	Black	▶ 3RX8 000-0CB42-1AL0
	12	F		Black	▶ 3RX8 000-0CB45
	13	F		Black	▶ 3RX8 000-0CB47
5-pole, 5 × 0.34 mm ²					
Fig. 12 	10	G	5	Black	▶ 3RX8 000-0CB52-1AF0
	10	G	10	Black	▶ 3RX8 000-0CB52-1AL0
	11	G	5	Black	▶ 3RX8 000-0CB52-1GF0
	11	G	10	Black	▶ 3RX8 000-0CB52-1GL0
Fig. 13 	12	G		Black	▶ 3RX8 000-0CB55
8-pole, 8 × 0.25 mm ²					
	11	O	5	Black	▶ 3RX8 000-0CB81-1GF0

Cable sockets (female) with special lengths available as options:

- Minimum order quantity: 50 units
- Delivery time on request.
- Extra charge per m.

1) For terminal assignment, see page 2/273.

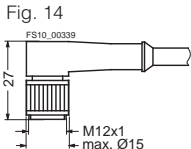
2) PUR cables suitable for trailing.

▶ Preferred type, available from stock.

Proximity switches

Accessories

Plug-in connections

Fig.	Type ¹⁾	Cable ²⁾	Length m	Color	Order No.
					
M12 angular cable sockets (female) for screw mounting, degree of protection IP67					
3-pole, 3 × 0.34 mm ² ,					
14	E	PUR	5	Black	▶ 3RX8 000-0CC32-1AF0
14	E	PUR	10	Black	▶ 3RX8 000-0CC32-1AL0
14	E	PVC	5	Black	▶ 3RX8 000-0CC32-1BF0
14	E	PVC	10	Black	▶ 3RX8 000-0CC32-1BL0
3-pole, 3 × 0.34 mm ² , with LEDs for pnp proximity switches, NO contact only ³⁾					
15	H	PUR	5	Black	▶ 3RX8 000-0CC34-1AF0
15	H	PUR	10	Black	▶ 3RX8 000-0CC34-1AL0
15	H	PVC	5	Black	▶ 3RX8 000-0CC34-1BF0
15	H	PVC	10	Black	▶ 3RX8 000-0CC34-1BL0
16	H	Coupling plug with terminal compartment, preassembly possible		Black	▶ 3RX8 000-0CC36
3-pole, 3 × 0.34 mm ² , with LEDs for pnp proximity switches, NO or NC ³⁾					
15	J	PUR	5	Black	▶ 3RX8 000-0CC38-1AF0
15	J	PUR	10	Black	▶ 3RX8 000-0CC38-1AL0
4-pole, 4 × 0.34 mm ²					
14	F	PUR	5	Black	▶ 3RX8 000-0CC42-1AF0
14	F	PUR	10	Black	▶ 3RX8 000-0CC42-1AL0
16	F	Coupling plug with terminal compartment, preassembly possible		Black	▶ 3RX8 000-0CC45
4-pole, 4 × 0.34 mm ² , with LEDs ³⁾					
15	K	PUR	5	Black	▶ 3RX8 000-0CC44-1AF0
15	K	PUR	10	Black	▶ 3RX8 000-0CC44-1AL0
16	K	With terminal compartment, transparent for LEDs		clear	▶ 3RX8 000-0CC46
		LED insert for angular cable plug, transparent		Black	▶ 3RX8 000-0CA06
5-pole, 5 × 0.34 mm ²					
14	G	PUR	5	Black	▶ 3RX8 000-0CC52-1AF0
14	G	PUR	10	Black	▶ 3RX8 000-0CC52-1AL0
16	G	Coupling plug with terminal compartment, preassembly possible		Black	▶ 3RX8 000-0CC55
M18 angular cable sockets (female) for screw-type mounting, degree of protection IP65, 4-pole					
17	F	Preassembly possible, with terminal compartment		Black	▶ 3RX8 000-0DC45

Cable sockets (female) with special lengths available as options:

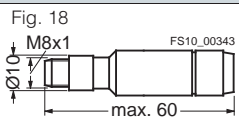
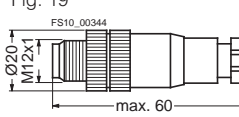
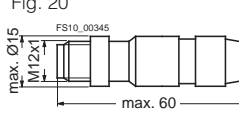
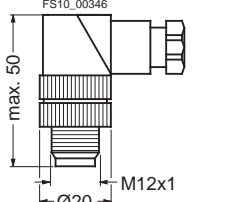
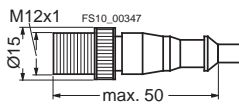
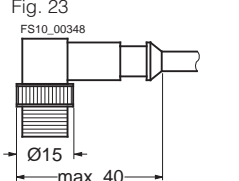
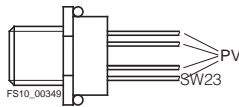
- Minimum order quantity: 50 units
- Delivery time on request.
- Extra charge per m.

1) For terminal assignment, see page 2/273.

2) PUR cables suitable for trailing.

3) Only limited use of sonar proximity switches.

▶ Preferred type, available from stock.

Fig.	Type ¹⁾	Cable ²⁾	Length m	Color	Order No.
Fig. 18 	M8 coupling sockets (female), degree of protection IP67 For extension cable (metal screw cap) can be assembled; max. 0.34 mm ²				
18		3-pole	–	Black	▶ 3RX8 000-0BD37
18		4-pole	–	Black	▶ 3RX8 000-0BD47
Fig. 19 	M12 coupling sockets (female), degree of protection IP67 for extension cable (metal screw cap) with terminal compartment, cable gland max. 6 mm				
19	L	4-pole	–	Black	▶ 3RX8 000-0CD45
19	M	5-pole	–	Black	▶ 3RX8 000-0CD55
20	L	4-pole	Can be assembled; max. 0.34 mm ²	Black	▶ 3RX8 000-0CD47
Fig. 20 	M12 angled coupling sockets (female), degree of protection IP67 for extension cable (metal screw cap) with terminal compartment, cable gland max. 6 mm				
21	L	4-pole	–	Black	▶ 3RX8 000-0CE45
21	M	5-pole	–	Black	▶ 3RX8 000-0CE55
Fig. 21 	For AS-Interface, degree of protection IP67				
M12 cable plugs (male) 4 × 0.34 mm ² (metal screw cap)					
22	L	PUR	5	Black	▶ 3RX8 000-0CD42-1AF0
22	L	PUR	10	Black	▶ 3RX8 000-0CD42-1AL0
Fig. 22 	M12 angular cable plugs (male) 4 × 0.34 mm ² (metal screw cap)				
23	L	PUR	5	Black	▶ 3RX8 000-0CE42-1AF0
23	L	PUR	10	Black	▶ 3RX8 000-0CE42-1AL0
Fig. 23 	Flush-type M12 connector Adapter with single cores, 4-pole with single cores				
24		• Twistable	0.5		▶ 3RX8 000-0CA40-1JA5
24		• Not twistable	0.2		▶ 3RX8 000-0CA40-1JA2
Fig. 24 					

Cable sockets (female) with special lengths available as options:

- Minimum order quantity: 50 units
- Delivery time on request.
- Extra charge per m.

1) For terminal assignment, see page 2/273.

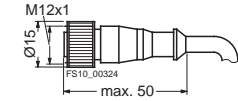
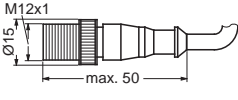
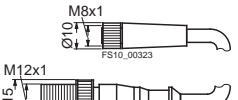
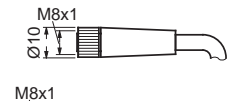
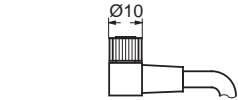
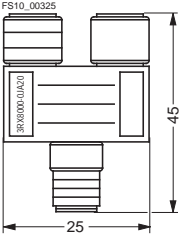
2) Suitable for trailing.

▶ Preferred type, available from stock.

Proximity switches

Accessories

Plug-in connections

	Version	Type ¹⁾	Wire cross-section/color	Length m		Order No.
	Cable with M12 socket (female) and M12 plug (male) Connection to 3RX8 000-0JA0 distributor (metal union nut), PUR cable Caution: Only terminal 4 (NO) is connected.	E, L	3 × 0.34 mm ² , Black	0.6	▶	3RX8 000-0GF32-1AA6
				1	▶	3RX8 000-0GF32-1AB0
				1.5	▶	3RX8 000-0GF32-1AB5
	Cable with M8 socket (female) and M12 plug (male) Connection to 3RX8 000-0JA0 distributor (metal union nut), PUR cable Caution: Only terminal 4 (NO) is connected.	F, L	4 × 0.34 mm ² , Black	0.6	▶	3RX8 000-0GF42-1AA6
				1	▶	3RX8 000-0GF42-1AB0
				1.5	▶	3RX8 000-0GF42-1AB5
	Cable with M8 socket (female) and M12 plug (male) Connection to 3RX8 000-0JA0 distributor (metal union nut), PUR cable Caution: Only terminal 4 (NO) is connected.	A, L	3 × 0.34 mm ² , Black	0.6	▶	3RX8 000-OFF32-1AA6
				1	▶	3RX8 000-OFF32-1AB0
				1.5	▶	3RX8 000-OFF32-1AB5
	Cable with M8 socket (female) and M8 plug (male), PUR cable	A	3 × 0.34 mm ² , Black	1	▶	3RX8 000-OEF32-1AB0
				2	▶	3RX8 000-OEF32-1AC0
	Cable with M8 angular socket (female) and M8 plug (male), PUR cable	A	3 × 0.34 mm ² , Black	1	▶	3RX8 000-OEG32-1AB0
				2	▶	3RX8 000-OEG32-1AC0
Cables, 20 m, black According to the number of cores, the cables can be used for all inductive proximity switches, sonar proximity switches and optical proximity switches.						
			3 × 0.34 mm ²		▶	3RX8 000-0KA32-1AR0
			4 × 0.34 mm ²		▶	3RX8 000-0KA42-1AR0
			4 × 0.34 mm ² , shielded		▶	3RX8 000-0KA42-1GR0
	T-distributor, M12 connection For connection of thru-beam sensors to AS-Interface modules				▶	3RX8 000-0JA20

¹⁾ For terminal assignment, see page 2/273.

▶ Preferred type, available from stock.

Schematics

Plug connections

Type A, E

NSD01032a

proximity switches with NO contact

Type B, F, L, N, P

NSD0_01033a

proximity switches with NC/NO contact

Type B, F, L, N, P

NSD0_01034a

sonar proximity switches in M18 compact series

Type C, H

NSD01035a

proximity switches with NO contact, prnp

Type D

NSD01036a

proximity switches with NO contact, npn

Type G, M

NSD0_01037a

proximity switches with NC/NO contact, sonar proximity switches M30 K2 and M30 K3 compact series

Type J

NSD0_01038a

proximity switch with NC or NO contact, prnp

Type K

NSD01039a

proximity switch with NO contact or NC/NO contact, prnp

Type O

FS10_00139

PXQ530/540 proximity switch

BN = Brown
BK = Black
WH = White

BU = Blue
GR = Gray
GN = Green

YE = Yellow
PK = Pink
RD = Red

Pin assignment

M8 wiring for cable plugs and angular cable plugs

Type A, C, D

FS10_00140

Type B

FS10_00141

M12 wiring for cable plugs and angular cable plugs

Type E, F, H, J, K, L, N

FS10_00142

Type O

FS10_00144

Type G, M

FS10_00143

Proximity switches

Accessories

Sensor assembly system

Overview



Sensor assembly system

Selection and Ordering data

Order No.

Sensor assembly system

Consisting of:

Mounting base for sensor assembly system, with 12 mm hole for inserting round rod **▶ 3RX7 322**

Holding plate for sensor assembly system, for mounting on 12 mm round rod, suitable for all cubic proximity switches **▶ 3RX7 326**

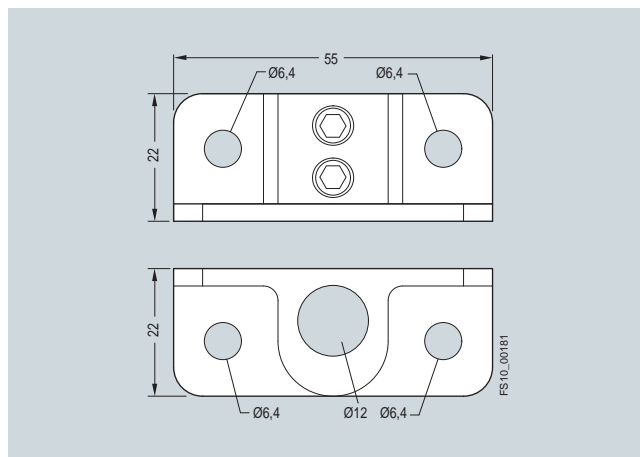
Round rod for sensor assembly system, 12 mm diameter

• 200 mm long **▶ 3RX7 315**

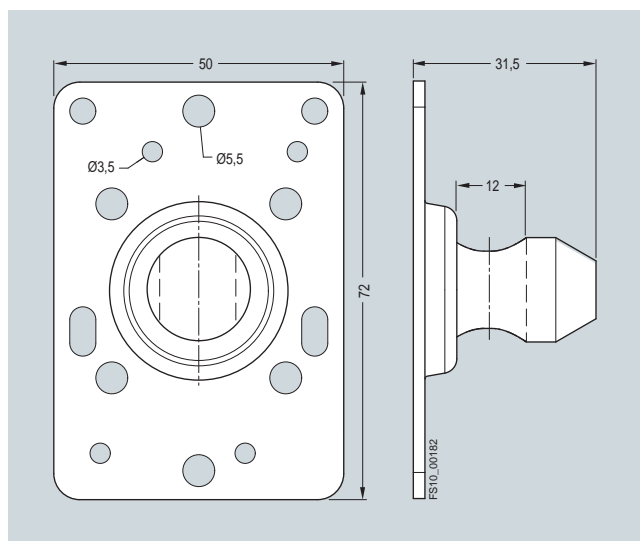
• 300 mm long **▶ 3RX7 316**

▶ Preferred type, available from stock.

Dimensions



Mounting base 3RX7 322



Holding plate for accommodating 3RX7 326 sensors

Proximity switches

Accessories

Mounting hardware for SIMATIC PXS

Selection and Ordering data

	Type	Order No.																											
	Aligning unit with mounting bracket for M30 Sonar proximity switch Swivel range approx. 20° around longitudinal axis of proximity switch. Following alignment, the proximity switch is screwed tight in the selected position.	3RX1 301																											
	Aligning unit with mounting flange for M30 Sonar proximity switch Swivel range approx. 20° around longitudinal axis of proximity switch. Following alignment, the proximity switch is screwed tight in the selected position.	3RX1 302																											
	Diverting reflector for M30 Sonar proximity switch	3RX1 910																											
	Mounting clamp (molded plastic) <ul style="list-style-type: none"> for Sonar proximity switch, M18 design for Sonar proximity switch, M30 design <table border="1"> <thead> <tr> <th></th> <th>3SX6 283</th> <th>3SX6 284</th> </tr> </thead> <tbody> <tr> <td>a</td> <td>45</td> <td>58</td> </tr> <tr> <td>b</td> <td>30</td> <td>30</td> </tr> <tr> <td>c</td> <td>26</td> <td>36</td> </tr> <tr> <td>d</td> <td>∅ 4.5</td> <td>∅ 4.5</td> </tr> <tr> <td>e</td> <td>32</td> <td>44</td> </tr> <tr> <td>f</td> <td>19.6</td> <td>19.6</td> </tr> <tr> <td>g</td> <td>18.0</td> <td>29.8</td> </tr> <tr> <td></td> <td>(for M18)</td> <td>(for M30)</td> </tr> </tbody> </table>		3SX6 283	3SX6 284	a	45	58	b	30	30	c	26	36	d	∅ 4.5	∅ 4.5	e	32	44	f	19.6	19.6	g	18.0	29.8		(for M18)	(for M30)	<ul style="list-style-type: none"> ▶ 3SX6 283 ▶ 3SX6 284
	3SX6 283	3SX6 284																											
a	45	58																											
b	30	30																											
c	26	36																											
d	∅ 4.5	∅ 4.5																											
e	32	44																											
f	19.6	19.6																											
g	18.0	29.8																											
	(for M18)	(for M30)																											
	Aligning unit for 3SG16 67 Sonar proximity switch	3SX6 287																											

▶ Preferred type, available from stock.

For plug-in connections and cables see from page 2/268.

Selection and Ordering data

	Type	Order No.
	<p>Mounting brackets for photoelectric proximity switches with M18 cylindrical enclosure Material: galvanized steel</p>	<p>▶ 3RX7 301</p>
	<p>Mounting brackets for photoelectric proximity switches in K20 or K21 design</p>	<p>▶ 3RX7 308-0AA00</p>
	<p>Mounting brackets for photoelectric proximity switches in K30 or K31 design Material: galvanized steel</p>	<p>▶ 3RX7 910</p>
	<p>Mounting brackets for 35 mm DIN rail for photoelectric proximity switches in K30 or K31 design Material: galvanized steel</p>	<p>▶ 3RX7 304</p>

▶ Preferred type, available from stock.

Proximity switches

Accessories

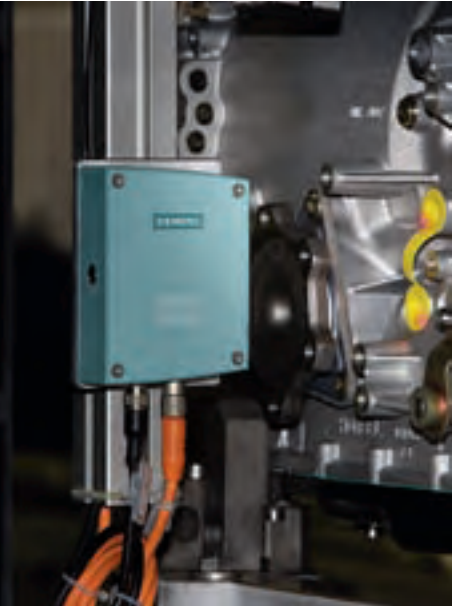
Montagematerial für SIMATIC PXO

2

	Type	Order No.
	<p>Mounting brackets for photoelectric proximity switches in K80 design</p> <p>Material: galvanized steel</p>	<p>▶ 3RX7 303</p>
	<p>Mounting brackets for photoelectric proximity switches with M18 cylindrical enclosure, especially for laser proximity switches in L18 design</p> <p>Material: galvanized steel</p>	<p>3RX7 300</p>
	<p>Mounting brackets for laser proximity switches in L50 design</p> <p>Material: galvanized steel</p>	<p>▶ 3RX7 302</p>

▶ Preferred type, available from stock.

Vision Sensors



3/2	Introduction
3/4	SIMATIC MV220
3/7	SIMATIC MV230
3/10	SIMATIC VS120
3/13	Lenses

Vision Sensors

Introduction

Vision sensors – Simple and intelligent

SIMATIC MV220 color mark sensor

The SIMATIC MV220 compact color mark sensor is a complete image processing system for automatic inspection of colored objects. It is ideally suited for use under harsh industrial conditions due to its degree of protection IP65.

It is used for applications in manufacturing, the packaging industry and food and beverages industry. It is so easy to operate that no courses are necessary and the system is "trained" instead of programmed, so even non-experts can use it instantly. It is integrated in the plant automation using digital inputs and outputs.

SIMATIC MV230 surface profile sensor

The SIMATIC MV230 compact surface profile sensor is a complete image processing system for the automatic inspection of objects based on their surface contour or profile. It is ideally suited for use under harsh industrial conditions due to its degree of protection IP65.

The application areas lie in production engineering, machine construction and the packaging industry. It is so easy to operate that no courses are necessary and the system is "trained" instead of programmed, so even non-experts can use it instantly. It is integrated in the plant automation using digital inputs and outputs.

SIMATIC VS120 Vision Sensors

For inspection of small components for shape, type or position, our intelligent VS120 vision sensors are the perfect choice. The complete package comprises lighting, evaluation unit, sensor and cables. They are installed and commissioned with a flick of the wrist. It is so easy to operate that no courses are necessary and the system is "trained" instead of programmed, so even non-experts can use it instantly.

The compact design allows it to be used in a wide range of different infeed systems such as vibrating conveyors, conveyor belts or grippers. Thanks to standardized interfaces, the vision sensors can be flexibly integrated into the plant automation. For simple conveyor units, a stand-alone solution is available without an additional PLC.

Highlights

SIMATIC MV220 color mark sensor

- Eminently suitable for use in harsh industrial environments thanks to degree of protection IP65
- Control of extremely high-speed processes possible thanks to the short inspection time of the sensor (approximately 30 inspections per second)
- Short changeover times thanks to simple model change
 - 16 inspection models can be taught
 - Inspection models are selected using digital inputs
- Flexible adaptation to the individual applications possible
 - Flexible adjustment of image window and operating distance
 - Flexible adjustment of parameters
- Fast commissioning
 - No image processing knowledge necessary
 - No programming necessary

Highlights

SIMATIC MV230 surface profile sensor

- Eminently suitable for use in harsh industrial environments thanks to degree of protection IP65
- Shielding against ambient light is not usually necessary due to its high degree of immunity to ambient light
- Short changeover times thanks to simple model change
 - 16 inspection models can be taught
 - Inspection models are selected using digital inputs
- Flexible adaptation to the individual applications possible
 - Flexible adjustment of the laser line range that can be evaluated
 - Flexible adjustment of parameters
- Fast commissioning
 - No image processing knowledge necessary
 - No programming necessary
- Effective start-up and maintenance functions using diagnostics, checksums and statistical information
- Prevention of unauthorized operation through button disabling

Highlights

SIMATIC VS120 Vision Sensors

- Simple configuration by presenting the "good" object to be detected.
- The "teach-in" is performed automatically when the training function of the device is activated.
- Parameters are assigned by means of a web-based user interface that is executable on different platforms to which the following requirements apply: Browser (IE5.5 and higher) or JAVA-VM (MS, SUN).
- The web-based user interface can also be used to control the device from an HMI device. The requirements regarding the browser and JAVA VM also apply here.
- Remote maintenance concept by means of web-based user interface.
- Remote control via integrated digital inputs, PROFIBUS or PROFINET IO.
- Supplied as a complete package in several variants for different object sizes

Application

Fields of application for the vision sensors	
Object inspection with SIMATIC MV220	
Inspection task	Color inspection tasks in manufacturing and assembly systems
Applications	Manufacturing, packaging industry and food and beverages industry
Type of parts to be inspected	e.g. completeness of colored parts, blister packs, cups, bottles, labels and covers
Object inspection with SIMATIC MV230	
Inspection task	Inspection of surface contours and profiles in production engineering and assembly
Applications	Production engineering, the packaging industry and machine construction
Type of parts to be inspected	Inspection, parts recognition and position checking of parts based on their geometric surface contour or profile
Object inspection with SIMATIC VS120	
Inspection task	Correctness, lack of damage and position of a part or pattern; position of the part with x/y coordinate and angle of rotation in degrees
Applications	Conveyor belts, workholder carousels, gripper units, production machines
Type of parts to be inspected	e.g. screws, bolts, molded parts, pharmaceutical products, confectionery, logos, patterns ...

Technical specifications

Type	MV220	MV230	VS120
Main task	Object inspection (color)	Object inspection	Object inspection
Sensor type	CMOS sensor (color), 640 x 480 pixels	CMOS sensor, 750 x 480 pixels	CCD chip, 640 x 480 quadratic pixels
Image capture	Digital, max. 33 frames/second	Digital, 20 frames/second	Triggered frame transfer
Sensor head type	Variable display field size	Fixed display field size	2 x fixed focus with fixed display field size, 1 x C/CS-Mount with variable display field size
<ul style="list-style-type: none"> • Available versions • Enclosure • Degree of protection 	Complete system see below IP65	see below IP65	Extruded aluminum enclosure IP65
Parts size (W x H)	Display field size (infinitely) adjustable <ul style="list-style-type: none"> • For object distance of 50 mm: Display field size 40 x 30 mm • For object distance of 250 mm: Display field size 200 x 150 mm 	<ul style="list-style-type: none"> • For object distance of 310 mm: Display field size 75 x 100 mm 	<ul style="list-style-type: none"> • Objects up to 60 x 40 mm, inspection window: 70 x 50 mm • Objects up to 34 x 24 mm, inspection window: 40 x 30 mm • Variable size of object with C/CS-Mount
Ambient temperature	0 ... 45 °C, no condensation	0 ... 45 °C, no condensation	0 ... 50 °C, without fans
Lighting			
<ul style="list-style-type: none"> • Illuminant • Enclosure 	Integrated white LEDs see below	Laser diode, red light see below	Red LEDs Plastic ring light with plastic diffusing panel IP65
<ul style="list-style-type: none"> • Degree of protection 	IP65	IP65	IP65
Evaluation unit			
<ul style="list-style-type: none"> • Operator controls 	4-character text display with 4 operator buttons	4-character text display with 4 operator buttons	LCD display panel (4 lines with 10 characters each) and 6 operator buttons for menu operation
<ul style="list-style-type: none"> • Number of types to be saved • Triggering inspection 	up to 16 External	up to 16 External or internal freewheeling trigger	up to 64 External
<ul style="list-style-type: none"> • Permissible parts rate 	33 inspections/s	20 inspections/s	20 items/s (object-dependent)
Infeed direction			
<ul style="list-style-type: none"> - For external triggering - For automatic triggering 	Any -	Any Any	Any -
Enclosure (degree of protection)	Plastic, aluminum (IP65)	Plastic, aluminum (IP65)	Plastic, suitable for cabinetless installation (IP40)
Interfaces on evaluation unit			
<ul style="list-style-type: none"> • Digital inputs for 24 V DC • Digital outputs for 24 V DC • Integrated interface • Sensor head interface • Supply voltage 	6 (including 1 trigger input) 5 - - 24 V DC	6 (including 1 trigger input) 4 - - 24 V DC	8 (including 1 trigger input) 6 PROFIBUS DP/Ethernet/PROFINET IO Digital interface 24 V DC
Current consumption, max.	2 A	2 A	4 A

Vision Sensors

SIMATIC MV220

Overview



- Compact image processing sensor for automatic inspection of colored objects
- A synthesis of high-performance image processing technology with simple, compact sensors
- For applications in manufacturing, the packaging industry and food and beverages industry
- Process-oriented implementation thanks to degree of protection IP65
- Integration in plant automation using digital inputs and outputs
- Quick familiarization with task thanks to the teach-in function

Benefits

- Eminently suitable for use in harsh industrial environments thanks to degree of protection IP65
- Control of extremely high-speed processes possible thanks to the short inspection time of the sensor (approximately 30 inspections per second)
- Short changeover times thanks to simple model change
 - 16 inspection models can be taught
 - Inspection models are selected using digital inputs
- Flexible adaptation to the individual applications possible
 - Flexible adjustment of image window and operating distance
 - Flexible adjustment of parameters
- Fast commissioning
 - No image processing knowledge necessary
 - No programming necessary

Application

The SIMATIC MV220 image processing sensor is a complete image processing system for automatic inspection of color objects. It completes the product portfolio in the low-end image processing segment and high-end segment of conventional sensors.

Due to its high performance and simplicity, simple color inspection tasks are accessible that are too complex for the other image processing systems and which exclude themselves on grounds of cost.

The module is used in:

- Manufacturing and assembly systems for automobile industry suppliers and electronics;
- Checking the presence of colored components
- Packaging machines for blister packs and combined packs

- Checking for presence, part recognition and checking the location of colored objects
- Cup and bottle filling in the food & beverages industry
- Print inspection and parts identification for labels and covers

Design

The SIMATIC MV220 image processing sensor combines all the components required for the test in a compact housing:

- Rugged plastic/metal housing with degree of protection IP65
- Digital camera for evaluation of color pictures:
 - CMOS chip
 - Resolution of 640 x 480 pixels
- Continuously adjustable lens:
 - Variable image field from 40 x 30 mm to 200 x 150 mm
 - Variable object distance from 50 mm to 250 mm
- Integrated white lighting
- Laser-based alignment tool
- Operator controls and displays:
 - Input keys
 - Display
 - LEDs
- M12 plug and socket with connections for:
 - Power supply
 - Digital inputs and outputs
- M4 fastening holes for mechanical fixing system for industrial sensors

Function

The following functions are available:

- Teaching in the models using one or more good parts
- Inspecting an object using the features extracted during teach-in
- Inspection can be performed on stationary and moving objects
- Inspection of the object supplies a good/bad statement in accordance with the set threshold values
- The results are output on two digital outputs:
 - OK: Compliance of the object with the saved model is better or equal to the set threshold value
 - N_OK: Compliance of the object with the saved model is worse than or equal to the set threshold value

Mode of operation

Manual alignment of the sensor is supported by a laser-based alignment tool. Two laser beams project two light spots into the image window of the sensor.

The sensor is calibrated to the ambient conditions, menu-driven, based on the templates supplied.

The inspection tasks are taught by presenting one or more good objects. The result of teach-in can be saved in one of 16 data records. The learned inspection task can then be tested immediately in test mode.

To start the evaluation mode you have to select a trained object data record and switch to "RUN" mode. The sensor starts the evaluation after triggering.

Depending on the trained threshold values and the actual evaluated values, the result is output to the OK or N_OK digital outputs for a good or bad result respectively.

The inspection task can be changed by selecting a different data record (model) in "RUN" mode.

Any sensor faults or errors in operating the sensor are reported in the diagnostics. Evaluation mode continues or is terminated depending on the type of error.

Technical specifications

MV220 Vision Sensor	
Image sensor	
Image acquisition	CMOS sensor (color); 640 x 480 pixels
Size of the image field	Continuously variable; depending on the object distance
<ul style="list-style-type: none"> For object distance of 50 mm For object distance of 250 mm 	40 x 30 mm 200 x 150 mm
Number of distinguishable colors	Depending on inspection severity; 2048 colors / 64 colors / 16 colors
Inspection types	Matching, recognition
Inspection triggering	External; via digital input
Output of results	"OK" and "N_OK"; via LEDs and digital outputs
Lighting	
Light source	Integrated white LEDs
Light intensity	800 LUX for object distance of 150 mm
External lighting	Controllable via digital output
Functions	
Operator control	4-character text display and 4 operator buttons
Alignment tool	Using laser projection (laser class 2)
Number of models that can be stored	16; using digital inputs
Teach-in of models	Using "Teach-in"
Diagnostics messages	Using LED, text display and digital output
Operating status display	Using LED and digital output
Disabling operation of keys	Possible using digital input
Interfaces	
Digital inputs	6 inputs, 24 V DC of which one trigger input (100 µs delay time) and 5 inputs for model selection and key disabling
Digital outputs	5 outputs; 24 V DC Outputs for results, 500 mA Outputs for diagnostics and external lighting, 100 mA Outputs for operating status, 20 mA
Connection of digital inputs and outputs	M12 socket and M12 plug, 8-pole
Mounting the sensor	Using M4 fixing holes
General specifications	
Supply voltage	
<ul style="list-style-type: none"> Rated value Voltage range 	24 V DC 20.4 ... 28.8 V DC; with reverse polarity protection
Power consumption max.	2 A
Material	
<ul style="list-style-type: none"> Housing Lens cover 	Plastic, aluminum Plastic
Mechanical strength	
<ul style="list-style-type: none"> Oscillations Shock 	acc. to IEC61131-2 acc. to IEC61131-2

MV220 Vision Sensor

Dimensions (H x W x D) in mm	113 x 35 x 90
Degree of protection	IP65 acc. to DIN EN 60529
Ambient temperature	0 ... 45 °C
Weight	430 g

Selection and Ordering data

SIMATIC MV220 ▶ **6GF5 110-0AA00-0AA0** Order No.

Color mark sensor for
inspecting colored objects;
size of image field 40 x
30 mm ... 200 x 150 mm;
operating unit, display unit
and LED lighting integrated;
incl. operating instructions
and templates

Accessories

M12 cable plug ▶ **3RX8 000-0CB81-1GF0**

With 5 m PUR cable, black,
shielded,
8-pole (8 x 0.25 mm²)

M12 cable plugs ▶ **3RX8 000-0CD81-1GF0**

With 5 m PUR cable, black,
shielded,
8-pole (8 x 0.25 mm²)

Round-steel fixing bar

Diameter = 12 mm, ▶ **3RX7 315**
length = 200 mm,
for fixing system for sensors

Diameter = 12 mm, ▶ **3RX7 316**
length = 300 mm,
for fixing system for sensors

Holding plate ▶ **3RX7 326**

For accommodating the
SIMATIC MV 220, use in
connection with fixing bar;
for fixing system for sensors

Mounting base ▶ **3RX7 322**

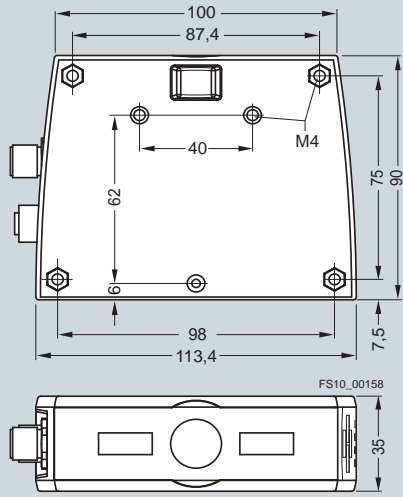
With 12 mm receptacle
for sensor fixing system

▶ Preferred type, available from stock.

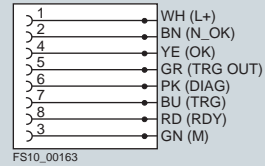
Vision Sensors

SIMATIC MV220

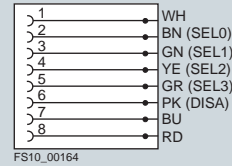
Dimensions



Schematics



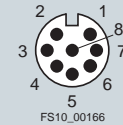
MV220 Vision Sensor, X1 interface



MV220 Vision Sensor, X2 interface



MV220 Vision Sensor, socket pin assignment



MV220 Vision Sensor, plug pin assignment

Overview



- Compact image processing sensor for the automatic testing of objects based on the specific surface contour or profile.
- A synthesis of high-performance image processing technology with simple, compact sensors
- High stability against ambient light
- For applications in manufacturing, the packaging industry and in the construction of special machines and serial machines
- Process-oriented implementation thanks to degree of protection IP65
- Integration in plant automation using digital inputs and outputs
- Quick familiarization with task thanks to the teach-in function

Benefits

- Degree of protection IP65 makes use in harsh industrial environments possible
- Costs for shielding against ambient light can normally be saved due to their high stability against ambient light
- Short changeover times thanks to simple model change
 - 16 inspection models can be taught
 - inspection models are selected using digital inputs
- Rapid startup thanks to Teach In
 - no image processing knowledge necessary
 - effective start-up and maintenance functions using diagnostics, checksums and statistical information
- Prevention of unauthorized operation through button disabling

Application

The SIMATIC MV230 height profile sensor is a complete image processing system for the automatic inspection of objects based on the specific height contour or profile. The split-beam method and laser projection on which it is based supports extremely rugged and reliable inspection. It completes the product portfolio in the low-end image processing segment and high-end segment of conventional sensors.

Its performance capability, simplicity and in particular the ruggedness of the test procedures can be used for inspection tasks that are too complex for other image processing systems and that must be disregarded for cost reasons.

The module is used in:

- Production and assembly systems for automotive suppliers and electrical engineering; checking, parts recognition and position inspection during assembly

- Packaging machines
Checking for presence, parts recognition and checking the location of objects
- General machine construction
Checking for presence, parts recognition and checking the location of objects

Design

The SIMATIC MV230 height profile sensor combines all the components required for the test in a compact enclosure:

- Rugged plastic/metal enclosure with degree of protection IP65
- Digital camera:
 - CMOS chip
 - Resolution of 750 x 480 pixels
- Integrated laser line of up to 75 mm in length
- Operator controls and displays:
 - Input keys
 - Display
 - LED displays
- M12 plug and socket with connections for:
 - Power supply
 - Digital inputs and outputs
- M4 fastening holes for mechanical fixing system for industrial sensors

Function

The following functions are available:

- Training of models based on a Good object
- Inspecting an object using the features extracted during teach-in
- Inspection of the object supplies a good/bad statement in accordance with the set threshold values (Q-LIMIT)
- Inspection results are output on two digital outputs:
 - OK: Compatibility of the object with the saved model is greater than or equal to the set threshold value
 - N_OK: Compatibility of the object with the saved model is less than the set threshold value

Operating principle

Manual alignment of the sensor is supported by the visible laser line.

The inspection task is trained by presenting a Good object. The object to be inspected or the object area to be inspected is positioned under the laser line.

For smaller objects, the length of the laser line range that can be evaluated can be reduced. The teach-in result is saved under one of 16 data records (model number).

The learned inspection task can then be tested immediately in test mode.

To start the evaluation mode you have to select a trained object data record and switch to "RUN" mode.

After triggering, the sensor starts evaluation. On the basis of the learned threshold values and the actual values of the evaluation, a result is output on the OK digital outputs (Good) or N_OK (Bad).

The inspection task can be changed by selecting a different data record (model) in "RUN" mode.

Any sensor faults or errors in operating the sensor are reported in the diagnostics. Evaluation mode continues or is terminated depending on the type of error.

Vision Sensors

SIMATIC MV230

Technical specifications

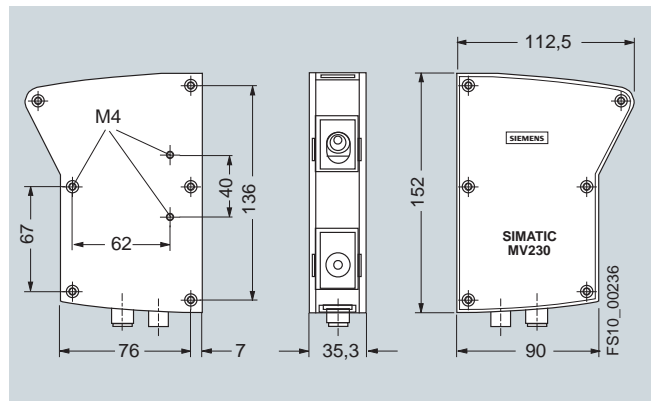
MV230 Vision Sensor	
Image capture and evaluation	
Image sensor	CMOS sensor; 750 x 480 pixels
Operating distance	210 ... 310 mm
Size of the image field	75 x 100 mm (for 310 mm operating distance)
Measuring principle	Split-beam (laser-based triangulation)
Test type	Profile evaluation
Accuracy/physical resolution	Height accuracy: 0.5 mm; Width accuracy: 0.2 mm
Triggering for image capture	Internal, freewheeling trigger; external trigger through digital input TRG
Max. cycle time	50 ms
Response time	16 ms
Output of results	"OK" and "N_OK"; via LEDs and digital outputs
Lighting	
Light source	Laser diode, red light
Laser protection class	2M (IEC 825-1, EN 60825-1)
Length of laser line	50 ... 75 mm
Functions	
Operation	4-character text display and 4 operator buttons
Number of models that can be taught	16
Teach-in of models	"Teach-in" on the sensor
Diagnostic messages	available; using LED, text display and digital output
Operating status display	available; using LED and digital output
Disabling operation of keys	possible; using digital input
Checking the set values	possible using global and model-specific checksums
Statistics function	available
Interfaces	
Digital inputs	6 inputs; for trigger (TRG), model selection (SEL0-3) and button disable (DISA)
Rated voltage	24 V DC
Input current	typ. 7 mA
Voltage range	Signal 1: 15 ... 30 V Signal 0: -3 ... 5 V
Input delay	3 ms typical (input TRG 0.1 ms)
Input characteristics curve	IEC1131, Type 1
Digital outputs	4 outputs; for result output (OK, N_OK), diagnostics (DIAG) and ready status (RDY)
Output voltage for "1" signal	L+ (-0.8 V)
Output current for "1" signal	500 mA (outputs OK, N_OK) 100 mA (DIAG) 20 mA (RDY)
Short-circuit protection at the outputs	Yes, electronic

MV230 Vision Sensor	
General data	
Supply voltage L+	
• Nominal value	24 V DC
• Voltage range	20.4 ... 28.8 V DC, with reverse polarity protection
Power consumption max.	2 A
Mechanical strength	
• Vibration	acc. to IEC61131-2
• Shock	acc. to IEC61131-2
Material	
• Enclosure	Plastic, aluminum
• Lens cover	plastic
Dimensions (H x W x D) in mm	161 x 35 x 112
Degree of protection	IP65 to DIN EN 60529
Ambient temperature	0 ... 45 °C, no moisture condensation
Weight	450 g

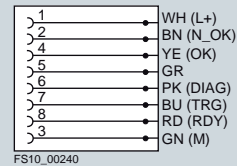
Selection and Ordering data	Order No.
SIMATIC MV230 ▶ Image processing sensor for the automatic inspection of objects and their position based on the specific surface contour and profile	6GF2 110-0BA00-0AA0
Accessories	
M12 cable plug ▶ With 5 m PUR cable, black, shielded, 8-pole (8 x 0.25 mm ²)	3RX8 000-0CB81-1GF0
M12 cable plugs ▶ With 5 m PUR cable, black, shielded, 8-pole (8 x 0.25 mm ²)	3RX8 000-0CD81-1GF0
Round-steel fixing bar	
Diameter = 12 mm, length = 200 mm, for fixing system for sensors ▶	3RX7 315
Diameter = 12 mm, length = 300 mm, for fixing system for sensors ▶	3RX7 316
Holding plate ▶ For accommodating the SIMATIC MV230, use in connection with fixing bar; for fixing system for sensors	3RX7 326
Mounting base ▶ With 12 mm receptacle for sensor fixing system	3RX7 322

▶ Preferred type, available from stock.

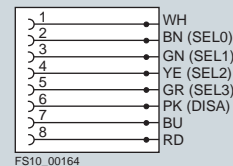
Dimensions



Schematics



Plug connection for interface X1 and core color for M12 cable socket, 8-pin, length 5 m (Order No.: 3RX8 000-0CB81-1GF0)



Plug connection for interface X2 and core color for M12 cable plug, 8-pin, length 5 m (Order No.: 3RX8 000-0CD81-1GF0)



Pin assignment X1, M8 connection for cable sockets

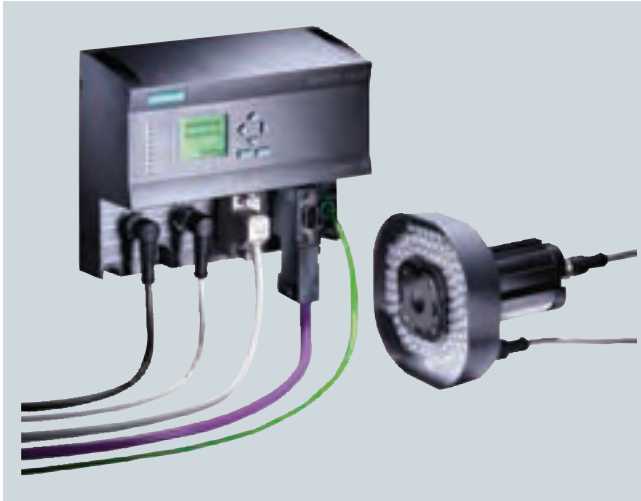


Pin assignment X2, M8 connection for cable plug

Vision Sensors

SIMATIC VS120

Overview



- Vision sensor for object finding and object size testing in reflected light
- VS120 finds and checks different objects and / or patterns, e.g.:
 - printed symbols (product markings on labels, packaging, etc.)
 - injection-molded parts,
 - ceramic elements,
 - ...
- Can be used in principle for the following applications:
 - position detection for Pick&Place applications,
 - checking the presence and position of objects in production,
 - checking the orientation of objects in infeed systems
- Easy configuration through presentation of the good object to be recognized. "Training" is done automatically by activating the training function of the unit.
- Parameter definition is done using the web-based operating interface and can be run on various platforms with the following requirements:
 - Browser (IE5.5 or higher),
 - JAVA-VM (MS, SUN).
- The web-based operator interface is also used for controlling the device from an HMI device. The same prerequisites apply here concerning the Browser and JAVA VM.
- Remote maintenance concept using web-based operator interface.
- Remote controlled with integrated digital inputs, PROFIBUS or PROFINET IO.
- Can be supplied as a complete package in several variations for different object sizes

Application

The intelligent vision sensor can be used for the following applications:

- Determining the position for Pick & Place applications
- Checking the presence and position of objects in production
- Checking the orientation of objects in infeed systems

Examples of possible inspection tasks and inspection objects:

- Checking the presence and position of symbols (warnings) and logos (corporate logos) on print media and packaging
- Checking the presence and position of objects in production for the quality assurance of assembly steps
- Checking the orientation of assembly items in infeed systems

Design

The SIMATIC VS 120 vision sensor offers the following image field sizes:

- 70 x 50 mm fixed-focus sensor head
- 40 x 30 mm fixed-focus sensor head
- Variable field of view with C/CS-Mount sensor head

The following components are required for use of the fixed-focus version of the SIMATIC VS120 vision sensor and are included in the scope of delivery:

- Sensor head
- Front lighting in the form of a ring light matched to the application and sensor head
- Evaluation unit
- Connecting cables
- CD with configuration software and assembly/operating instructions

To start up the fixed focus version you also need the following items (not included in the scope of delivery):

- Ethernet cable (see "Accessories") for connecting the evaluator to any web client. The web client, e.g. a PC with web browser installed, is used to adjust the sensor head and the lighting.

The following components are required for use of the C/CS mount version of the SIMATIC VS120 vision sensor and are included in the scope of delivery:

- Sensor head (without lens!)
- Evaluation unit
- Connecting cables (no connecting cable for lighting!)
- CD with configuration software and assembly/operating instructions

To start up the C/CS-Mount version you also need the following items (not included in the scope of delivery):

- C/CS-Mount lens with the required imaging properties
- Suitable light source and suitable connecting cable (see accessories)
- Ethernet cable (see "Accessories") for connecting the evaluator to any web client. The web client, e.g. a PC with web browser installed, is used to adjust the sensor head and the lighting.

Sensor head

The sensor head is equipped with:

- Extruded aluminium housing to degree of protection IP65 (fixed-focus version)
- CCD chip (640 x 480 quadratic pixels)
- Lens, permanently installed and non-adjustable (fixed focus version)
- Interface for digital transmission of image data to the evaluation unit

A sensor head for C/CS-Mount lenses is additionally available.

Evaluation unit

The evaluation unit has:

- Plastic housing, designed for cabinetless construction (IP40)
- Connections for
 - Supply voltage 24 V DC
 - Lighting
 - Sensor head
 - Digital inputs and outputs
 - Ethernet interface (DHCP-Client, DHCP-Server, fixed IP address)
 - PROFIBUS DP
- 4-line text display for operator prompting

- 6 keys for operating the unit
- User guidance with web-based operator interface (HTML, JAVA VM)
- Access protection by means of password.

The following communication services are included:

- PROFINET IO (slave)
- PROFIBUS DP V0 (slave),
- TCP/IP native

The analysis is carried out by a powerful digital signal processor.

Front lighting

- Designed as ring light pushed onto sensor head
- Can be dismantled, and secured with different orientation on the machine
- Housing with degree of protection IP65
- Equipped with red LEDs
- Operation in flash mode
- Power control for the flash integrated in the light

Function

- Training the object test parameters using one or more good objects
- Testing an object and/or pattern with the features taken from the training
- Testing can be performed on stationary and moving objects
- Checking for a match with the reference provides a good/poor indication after comparison with set-value criteria
- Test results output to three control outputs:
 - OK: trained object and/or pattern found based on features; degree of match greater than set value
 - N_OK: trained object and/or pattern NOT found based on features; degree of match NOT greater than set value
- Position information output via PROFIBUS DP, PROFINET IO, Ethernet or with converter to RS 232 interface
- Integrated DI/O enables "stand-alone" operation without additional controller.
- Remote control via PROFIBUS DP, PROFINET IO, DI/O or Ethernet
- Remote maintenance via web-based operator interface Intranet or Internet:
 - monitoring (live image in read mode)
 - diagnostics (fault image, log information, ...)
 - system administration (software update, ...)
 - error analysis for troubleshooting for faulty readings
- Actuation of ring lighting

Mode of operation

The following steps are required for using the SIMATIC VS120:

- Mount the vision sensor and lighting.
- Manual alignment of the camera, lighting check: This is handled with the web-server integrated in the unit and the web-based operator interface contained within. The operator interface displays the camera image. In the setup phase, the sensor head can be aligned with reference to the live image in the user interface. The user interface executes on any PC with Microsoft Internet Explorer and JAVA VM installation. If the sensor head adjustment is complete, the vision sensor automatically takes over the following procedures:
 - optimization of lighting control.
 - "Training" the image processing parameters by applying a reference object
 - the result of the training is stored under one of the 64 data records

- Starting the evaluation operation requires loading a trained object record and changing into the "RUN" operating mode. The VS120 starts the evaluation after triggering.
- Depending on the trained set values and the actual values of the evaluation, one of the digital control outputs OK (good result) or N_OK (poor result) is set.

The position information is output via the PROFIBUS DP, PROFINET IO or Ethernet interface.

Programming

SIMATIC VS120 is not programmed and parameters are not defined as on standard image processing systems. It is trained for its special task, finding and testing a special object. The SIMATIC VS120 is shown a good object and the device is "trained" to this object.

The training procedure can be performed while a conveyor system is running.

Up to 64 different data records can be stored in the device and can be called up at any time by the operator or can also be called up through an external controller.

Technical specifications

SIMATIC VS120 Vision Sensor	
Sensor head	
Image capture	CCD chip ¼", 640 x 480 square pixels; full frame shutter with automatic exposure time
Image data transfer	Triggered frame transfer
Available versions	<ul style="list-style-type: none"> • Fixed lens system for two different field of view sizes and mounting positions • One C/CS-mount version without lens.
<ul style="list-style-type: none"> • Large field of view 	Size of field of view: 70 x 50 mm for object sizes up to approx.: 60 x 40 mm Operating distance: 120 mm
<ul style="list-style-type: none"> • Small field of view 	Size of field of view: 40 x 30 mm for object sizes up to approx.: 34 x 24 mm Operating distance: 85 mm
<ul style="list-style-type: none"> • Variable field of view 	Lens can be selected by the user; hence freely selectable field of view size and object size Operating distance: dependent on the lens
Enclosure	Aluminum profile casing, anodized black
Dimensions (W x H x D) in mm	42 x 42 x 100
Degree of protection	IP65 according to DIN EN 60529 / VDE 0470-1
Ambient temperature	0 ... 50 °C
Mechanical strength	
<ul style="list-style-type: none"> • Vibrations 	1 g (60 ... 500 Hz)
<ul style="list-style-type: none"> • Shock 	70 g (6 ms, 3 shocks)

Vision Sensors

SIMATIC VS120

3

SIMATIC VS120 Vision Sensor	
Lighting	
Illuminant	LED, wavelength 630 nm (red), designed as a flash of 20 μs ... 10 ms, diffuse
Enclosure	Ring lamp with multiple fixing possibilities; plastic with plastic diffusing panel
Dimensions (W x H x D) in mm	102 x 102 x 26.5
Degree of protection	IP65 according to DIN EN 60529 / VDE 0470-1
Ambient temperature	0 ... 50 °C
Evaluation unit	
Operator controls	4-line text display and 6 operator buttons
Training	Fully-automatic training procedure
Number of types saved	64 different data records, can be selected via control button or digital inputs or PROFIBUS DP or PROFINET IO, network-fail-safe storage
Triggering inspection	External (via digital input, PROFIBUS DP or PROFINET IO)
Permitted object rate, max.	20 objects/s
Infeed direction of the objects	
• For external triggering	As required
• Setup software	Software for displaying the sensor image when mounting and adjusting the sensor head and lighting. The software is provided directly by the integrated web server and can be executed on every JAVA-capable browser (preferably IE6.0).
Enclosure	Plastic, all cables can be plugged in, suitable for installation without cabinet
Dimensions (W x H x D) in mm	170 x 140 x 76
Degree of protection	IP40 according to DIN EN 60529 / VDE 0470-1
Ambient temperature	0 ... 50 °C
Mechanical strength	
• Vibrations	1 g (60 ... 500 Hz)
• Shock	70 g (6 ms, 3 shocks)
Interfaces on evaluation unit	
• Digital inputs for 24 V DC	8; of which one interrupt-capable trigger input for standard binary sensors, 7 further PLC-capable control inputs
• Digital outputs for 24 V DC	6; of which 3 quality outputs 0.5 A are for the direct activation of pneumatic valves (15-pin Sub-D socket for inputs/outputs)
• Integrated PROFIBUS DP interface	DP (9 pin D-sub socket) to control the testing and real-time transmission of test results
• Integrated PROFINET IO interface	RJ45 (socket) for operating software, controlling the testing and real-time transmission of test results
• Integrated Ethernet interface	RJ45 (socket) for operating software, controlling the testing and real-time transmission of test results

SIMATIC VS120 Vision Sensor	
• Lighting control	4-pin circular connector (female) for power supply and for triggering the flash
• Sensor head interface	Digital interface (26 pin Sub-D socket) for connecting the VS120 sensor head
Power supply	
• Rated value	24 V DC
• Permitted range	20 ... 30 V DC
Current consumption, max.	4 A, of which up to 1.5 A for supplying the pneumatic valves that can be connected

Selection and Ordering data

SIMATIC VS120 Vision Sensor	Order No.
<p>Complete package for object testing; consisting of sensor head, LED front lighting, evaluation unit and the following cables:</p> <ul style="list-style-type: none"> • Cable between evaluation unit and sensor head, for lengths see below • Cable between lighting and evaluation unit (except for vision sensor with variable field of view), for length see below • Cable for power supply, length 10 m • Cable for connecting digital I/O devices, length 10 m 	
Incl. documentation package for SIMATIC VS120	
• Field of view 70 x 50 mm	
- With cable length 2.5 m	▶ B 6GF1 120-1AA
- With cable length 10 m	▶ B 6GF1 120-1AA01
• Field of view 40 x 30 mm	
- With cable length 2.5 m	▶ B 6GF1 120-2AA
- With cable length 10 m	▶ B 6GF1 120-2AA01
• Variable field of view, prepared for IP65 protective housing /note: supplied without light and light cable)	
- With cable length 2.5 m	▶ B 6GF1 120-3AB
- With cable length 10 m	▶ B 6GF 1 120-3AB01
▶ Preferred type, available from stock. B: Subject to export regulations AL = N and ECCN = EAR99S	

Accessories

Accessories for SIMATIC VS120 can be found starting with page 6/14.

Overview



Using a lens appropriate to the respective image evaluation task, the size of the image field at a desired working distance is determined for the camera image. In order to achieve reproducible statements from the image evaluation concerning the position, measurement or quality, the geometry and light intensity for the image must be kept constant within the permissible tolerances. For this reason, only lenses with a fixed focal length, aperture and focus are usually used. Motorized zoom, automatic aperture or autofocus are more detrimental than helpful.

Application

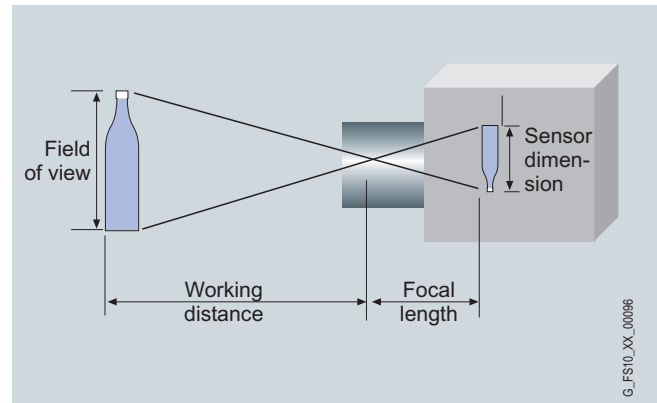
- **Measuring tasks and form recognition**
For high-precision, reproducible measurement of geometric variables, a full-format image is necessary to satisfy resolution requirements. Lenses must therefore be selected that have low distortion, high modulation depth and a small angle of view. Telecentric lenses are recommended for objects that have protrusions in the direction of the lens.
- **Quality control and parts recognition**
For recognition or inspection of the features of an object on the surface, the quality of the results depends on contrast and lack of distortion of the image. Macro lenses are often used at close range.
- **Code and text reading**
The recognition algorithms are tolerant to variations in form and size of the patterns. The requirements on quality of the optics are not very high. Low-cost lenses contribute towards the cost-effectiveness of image evaluation systems especially when they are used in more than one reading station.
- **Check for completeness and handling**
For localization and pattern recognition, the same criteria apply as for measurement tasks or parts recognition.

Function

Image types

The optical path of the lens is defined by its construction.

For **spherical lenses** the solid angle depends on the focal length, focus adjustment and aperture; all rays run through the focal point of the lens (central projection). Objects that are further away from the lens are depicted smaller; objects that are closer to the lens are depicted larger:



The required image field size (height and width of the image), the size of the sensor chip and the focal length of the lens determine the operating distance:

$$d = (f \times IS) / b$$

d = Operating distance (distance from lens to test object) in mm

f = Focal length of the lens in mm

IS = Size of image in the plane of the test object in mm

b = effective dimensions of the sensor in mm

In the case of lenses used in image processing systems, the focal length is fixed, the aperture and focus settings can be fixed. The focal length, the maximum focal aperture and the focusing range are normally specified on the lenses.

Focal distance

The focal length makes a statement about the angle of the image field or magnification of the lens.

The focal length of the lens is determined by the size of the required image field and the size of the camera chip when a specific distance has to be maintained. The most common chip sizes in cameras today are $\frac{1}{2}$ ", $\frac{1}{3}$ " and $\frac{1}{4}$ ". If the distance to the object lies below the adjustable focusing range of the lens, i.e. at close range, the focus can be adjusted using intermediate rings.

If the seating dimensions are designed for CS-Mount lenses in this camera, as for VS 100, a 5 mm intermediate ring can be used to adjust a C-Mount lens.

Aperture

Reduction of the light intensity by interrupting the optical path.

Focus

Setting the focus of the lens to a specific distance.

Depth of field

Depth of field is the area within which (in front of and behind the object) that is displayed with sufficient sharpness of focus. The larger the aperture (the smaller the aperture number), the smaller the depth of field.

Lenses with a larger focal length have a smaller depth of field, the effect is considerable for images at close range.

Vision Sensors

Lenses

Lens types

Lenses with smaller focal length are called wide-angle lenses, they can also be used at short operating distances, but produce intense distortion of the image. At a suitable distance, they have a large image field.

Lenses with a long focal length are called telephoto lenses; they have a large magnification but cannot be focused at close range, so macro lenses are used that can be focused by means of large telescopic extensions or intermediate rings. At a suitable distance, they have a small image field.

In the case of telecentric lenses, at least the optical path at the object end is almost parallel (parallel projection). This means

that objects at different distances are depicted in the same size. Objects can, however, only be displayed that are smaller than the diameter of the lens. It is not possible to adjust the range of focus with these lenses.

The optical characteristics can be restricted by means of optical filter glasses to counteract distortion in the image. Colored filters limit the spectral range, gray filters limit the light intensity and polarization filters restrict the transmission plane. Filters of this type can be attached either by using the internal thread or the flange on the front of the lens. The holder for the filter glass is designed to fit the lens.

Selection and Ordering data

Order No.

Order No.

Lenses for reading code and plain text and parts recognition



with fixed focal length, adjustable aperture and focus, with locking screw

- Mini lens 8.5 mm, 1:1.5 ▶ K **6GF9001-1BE01**
D = 42 mm, L = 47 mm;
successor type for
6GF9001-1BE
- Mini lens 12 mm, 1:1.4 ▶ K **6GF9001-1BL01**
D = 29.5 mm, L = 35.7 mm
- Mini lens 16 mm, 1:1.4 ▶ K **6GF9001-1BF01**
D = 29.5 mm, L = 37.2 mm;
successor type for
6GF9001-1BF
- Mini lens 25 mm, 1:1.4 ▶ K **6GF9001-1BG01**
D = 29.5 mm, L = 38.9 mm;
Successor type for
6GF9001-1BG
- Mini lens 35 mm, 1:1.6 ▶ K **6GF9001-1BH01**
D = 29.5 mm, L = 41.4 mm
- Mini lens 50 mm, 1:2.8 ▶ K **6GF9001-1BJ01**
D = 29.5 mm, L = 38.0 mm;
successor type for
6GF9001-1AH
- Mini lens 75 mm, 1:2.8 ▶ K **6GF9001-1BK01**
D = 34.0 mm, L = 63.6 mm

CS-Mount for C-Mount adapter ring 5 mm

▶ K

6GF9001-1AP02

Accessories for utilizing the mini lenses at close range:

- Set of intermediate rings with 0.5 mm, 1.0 mm, 5.0 mm, 10.0 mm, 20.0 mm, 40 mm rings with 31 mm diameter C thread, attached between the lens and the camera body for shots in the macro range

▶ K

6GF9001-1BU

Accessories for utilizing the mini lenses in telephoto range:

- Focal length extender, D = 30.5 mm, L = 17.9 mm with C thread, attached between the lens and the camera body for extending the focal length by a factor of 2
- Lens intermediate ring 15 mm

▶ K

6GF9001-1BV

M

6GF9001-1AP01

Filter for utilization of the mini lenses in the limited field of view:

- Infrared filter for lenses 6GF9001-1BF01, -1BG01, -1BH01, -1BJ01, -1BL01
- Blue filter for lenses 6GF9001-1BF01, -1BG01, -1BH01, -1BJ01, -1BL01
- Polarization filter for lenses 6GF9001-1BF01, -1BG01, -1BH01, -1BJ01, -1BL01

▶ M

6GF9001-2AD

▶ M

6GF9001-2AE

▶ M

6GF9001-2AF

▶ Preferred type, available from stock.

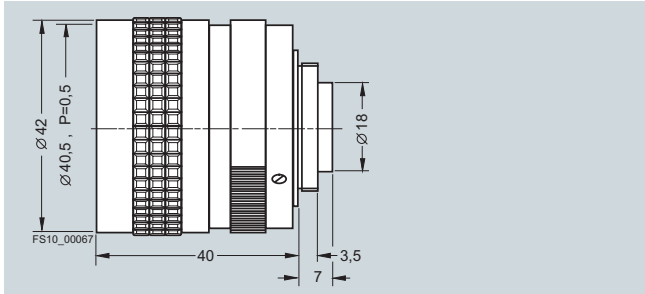
K: Subject to export regulations AL = 91999 and ECCN = EAR99H

M: Subject to export regulations AL = 91999 and ECCN = N

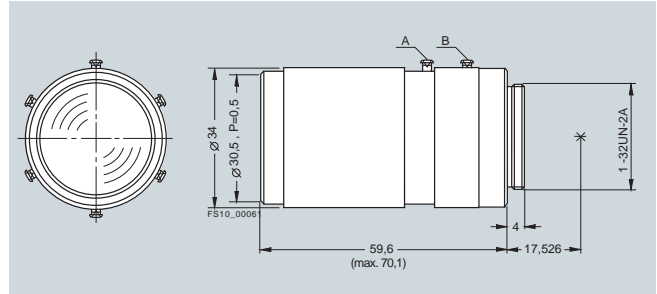
Dimensions

Lenses for reading code and plain text and parts recognition

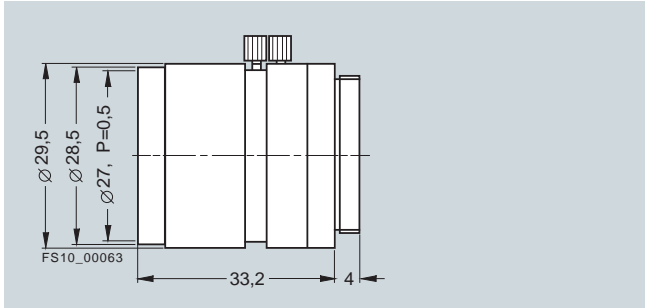
Lens 6GF9 001-1BE01



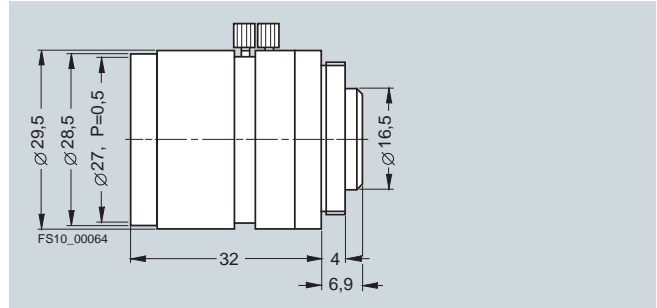
Lens 6GF9 001-1BK01



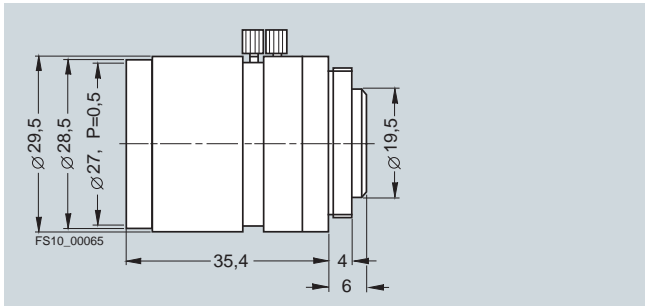
Lens 6GF9 001-1BF01



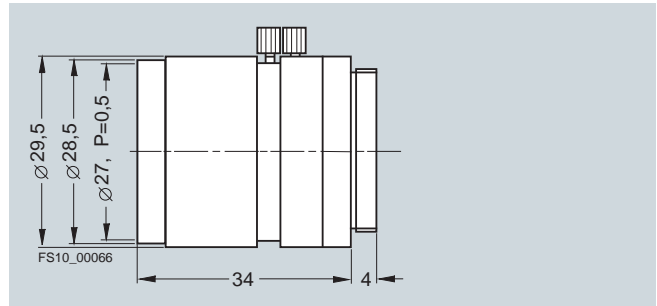
Lens 6GF9 001-1BG01



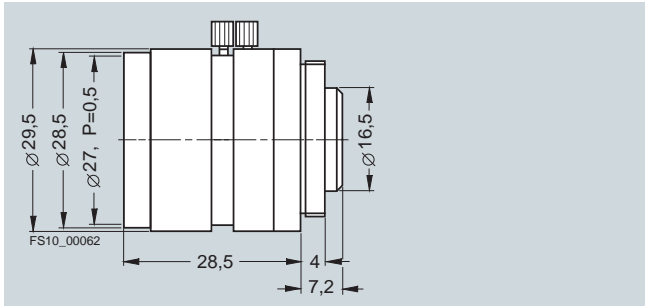
Lens 6GF9 001-1BH01



Lens 6GF9 001-1BJ01

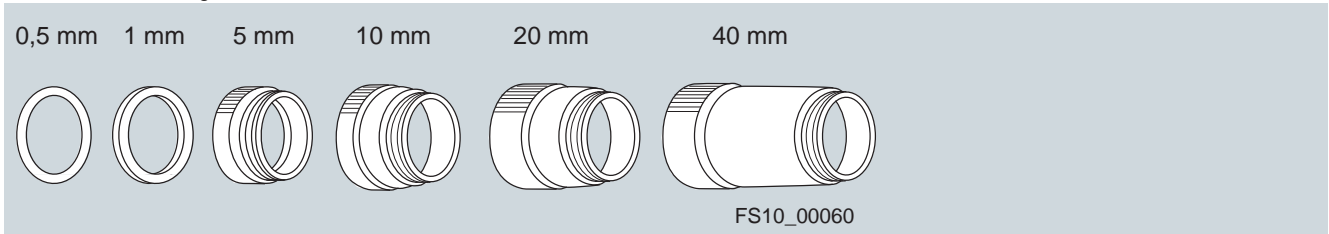


Lens 6GF9 001-1BL01



Accessories for lenses

Pentax intermediate ring set 6GF9 001-1BU:



Vision Sensors

Lenses



Notes



Fail-safe sensors



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4/14	Program overview	4/74	3RG78 43 series, type 2 Integrated evaluation
4/16	3RG78 44 series, type 4 Integrated evaluation	4/76	Standard function package transistor output according to IEC/EN 61508 (SIL 2)
4/18	Blanking function package transistor output	4/78	3RG78 41 series, type 2 External evaluation
4/25	Blanking function package relay output	4/80	Transistor output
4/26	Muting function package transistor output	4/82	Evaluation units
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4/32	Sequence control system function package relay output	4/104	Standard laser scanners
4/34	3RG78 45 series, type 4 Integrated evaluation	4/108	ASIsafe laser scanner
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4/49	3SF78 44 series, type 4 Integrated evaluation		
4/52	Blanking function package ASIsafe		
4/53	Muting function package ASIsafe		
4/55	Sequence control system function package ASIsafe		
4/59	Blanking function package PROFIsafe		
4/60	Muting function package PROFIsafe		
4/61	Sequence control system function package PROFIsafe		

Fail-safe sensors

Introduction

Fail-safe sensors – For all-round protection of persons and machines

For the protection of persons and machines in the industrial environment, maximum process reliability is paramount. Not simply to prevent adverse events but also to achieve the greatest possible plant availability for maximum efficiency. A clear case for our optical safety sensors. They ensure safe and reliable protection for persons, machines and systems. They are, of course, integrated into our uniform safety concept Safety Integrated.

Highlights

- Laser scanners, light barriers, light curtains and light grids for contact-free guarding of danger areas
- Safe all-round protection for persons and systems in stationary and mobile applications
- Wear-free and maintenance-free technology for maximum availability
- Freedom in machine design, without the need for mechanical safety gates
- Component of the complete Siemens Safety Integrated product range

Requirements for categories according to EN 954-1

Category ¹⁾	Summary of requirements	System response ²⁾	Principles for achieving safety
B	The safety-relevant components of controls and/or their protective equipment and components must be designed, constructed, selected, assembled and combined in compliance with all applicable standards such as to be capable of withstanding all potentially hazardous influences.	The occurrence of a fault can result in loss of the safety function.	Mainly characterized by the selection of components
1	The requirements of Category B must be met. Well-proven components and well-proven safety principles must be implemented.	The occurrence of a fault can result in loss of the safety function but the probability of it occurring is less than for Category B.	
2	The requirements of Category B must be met and well-proven safety principles must be implemented. The safety functions must be tested at regular intervals by the machine control.	The occurrence of a fault can result in loss of the safety function between tests. The loss of safety functionality is detected in the course of testing.	Mainly characterized by the structure
3	The requirements of Category B must be met and well-proven safety principles must be implemented. Parts with relevance for safety must be implemented such that: <ul style="list-style-type: none"> • A single fault in any of these components does not result in loss of the safety function. • If it can be implemented in an appropriate way, individual faults/errors can be detected. 	If the single fault/error occurs, the safety function always remains operational. <ul style="list-style-type: none"> • Some but not all faults are detected. • An accumulation of undetected faults may lead to loss of the safety function. 	
4	The requirements of Category B must be met and well-proven safety principles must be implemented. Parts with relevance for safety must be implemented such that: <ul style="list-style-type: none"> • A single fault in any of these components does not result in loss of the safety function. • The individual fault is detected during or before the next activation of the safety function or, if this is not possible, an accumulation of faults will not result in loss of the safety function. 	When faults occur, the safety function is always maintained. <ul style="list-style-type: none"> • Faults are detected early to prevent loss of the safety function. 	

¹⁾ The categories are not intended to be applied in a specific sequence or hierarchy with reference to the safety requirements.

²⁾ The risk assessment will establish whether complete or partial loss of the safety function(s) due to faults is acceptable.

SIMATIC FS100 switching strips

Finger-traps are a danger on many machines and other technical installations. In these situations, the simplest protection is implemented with rubber switching strips that on the one hand halt the dangerous motion in a fail-safe state and on the other hand act as a buffer to prevent injury.

The edge of the rubber strip (signal encoder) is monitored optically by means of a fail-safe send/receive sensor that is inserted into the strip from the outside. This means that any length can be used, cut to length as required by the customer.



SIMATIC FS200 light barriers

When space is at a premium, contact-free light barriers are the ideal solution for access protection to danger zones, danger points or entry points. Designed to the degree of protection IP65, they have a range of up to 150 m in Category 2.

The light barriers of Category 4 with a range of up to 60 m feature frequency modulated infrared light and integral pollution monitoring. Additional evaluation units support start/restart inhibiting, contactor control and muting functions.



SIMATIC FS400 light curtains and light grids

The contact-free, active optoelectronic light curtains and light grids for Category 2 and 4 according to EN 954-1 protect operating personnel at running machines or plants or in their vicinity. Thanks to specially developed integrated circuits (ASICs) and a patented, intelligent evaluation technique, they are extremely fault-tolerant and highly available. A wide range of different functions including start/restart inhibiting, contactor control, muting, cycle control and blanking support a wide range of different applications such as finger and hand protection, horizontal danger zone protection or access protection to large areas. Versions for connection to ASIsafe and PROFIsafe are available.

A light curtain or light grid comprises an emitter and a receiver, which must be mounted opposite each other. Depending on the resolution and the length, a certain number of transmit and receive diodes are arranged on top of each other. The infrared LEDs of the emitter emit short light pulses that are detected by the receive diodes.



SIMATIC FS600 laser scanner

The laser scanner is an optical distance sensor for flexible guarding of danger zones. By emitting harmless laser pulses and subsequently evaluating the reflections, the scanner detects persons and objects and responds in accordance to the programmed protected fields.



SIMATIC FS100 switching strips

Switching strips Category 4

Overview



The safety strips for machine construction consist of sensitive edges and protect persons from being crushed or becoming stuck. If the safety strip is moved or if a fault occurs in the safety strip or the cable connections, the output circuits trip and the drive is halted.

The safety strips are approved with the corresponding evaluation unit for Category 4 to EN 954-1.

Application

Typical application examples in machine and plant construction are protective covers of machines, driverless transport systems, lifting tables, washing portals, lifting platforms and automatic handling devices.

Safety strips can also be used for limiting the force applied to an obstruction in door and gate areas as well as for automatically closing doors and windows in vehicle construction.

Design

The monitoring system consists of a 3RG78 55 safety strip and a 3RG78 57 evaluation unit.

The safety strip comprises the mounting strip (aluminum rail), the sensitive edge (rubber strip) and an infrared sensor. The sensor, consisting of a transmitter and receiver, has a sensing range of 0.5 to 10 m.

The evaluation unit is fitted in a narrow housing (width 22.5 mm) for mounting onto standard rails. A separate evaluation unit is required for each switch strip, i.e. the combination of transmitter and receiver.

A three-core cable connects the transmitter and receiver to the evaluation unit.

Installation

The mounting strip is cut to size and fitted to the edge to be protected.

The rubber strip is cut to size and inserted in the mounting strip. The transmitter and receiver are inserted into the hollow space of the rubber strip on the left and right.

The brown, green and white cores must be connected to the evaluation unit, ensuring the colors are connected correctly.

The infrared light beam between the transmitter and the receiver is routed along the rubber strip. It is reflected from the smooth inner surface of the strip. This allows the rubber strip to be curved to a certain extent without switch-off occurring.

Function

Due to the dynamic nature of the circuit, every fault is detected. In the event of a fault or when the strip is operated, the monitoring unit switches to the safe state. The restart must be acknowledged via an external circuit (e.g. by a Ready/On button).

The status of the unit is indicated via two LEDs (supply voltage, enable) on the front plate.

Outputs

The evaluation unit has:

- two positively opening relay outputs that are used as enabling circuits
- a semiconductor output (signaling output, with no relevance for safety) for reporting the fault to the controller (npn open collector).

Technical specifications

Processing unit

Type	3RG78 57
Approvals	Category 4 according to EN 954-1.
Overvoltage category according to DIN VDE 0110	3 (4 kV)
Operating voltage	24 V DC (+20%/-10%)
Intrinsic consumption	< 4 W
Supply voltage fuse protection	1 A (time-lag)
Output contacts	2 NO (safety-oriented) / 1 NC (HL, low-side switching)
Response time	approx. 32 ms
Continuous current	4 A
Switching current	max. 4 A
Operational voltage	max. 250 V AC, 50/60 Hz
Switching capacity (AC)	max. 1250 VA
Function indication	
• PM340	Green LED
• Channel	Green LED



Type	3RG78 57
Mechanical service life	30 mill. operating cycles
Degree of protection to IEC 60529	Terminal enclosure IP20
Ambient temperature	+5 ... +55 °C
Enclosure fixing	Snap-on mounting on 35-mm mounting rail
Service position	As required


Patching strip (shaped rubber strip)

Type	3RG78 55
Material	EPDM, 60 Shore
Dimensions	W = 25 mm, H = 30 mm
Thermal stability	
• Temporary	-50 ... +120 °C
• Constant	-30 ... +100 °C
Resistance to chemicals	Ozone; oils conditionally, fuels, solvents, acids

Switching strips Category 4

Selection and Ordering data

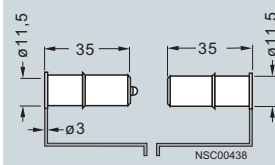
Version	Range m	Length m	Order No.
Optical safety switching strips			
 3RG78 55-1RG	Emitter/receiver sensors Receiver cable length 3 m, emitter cable length 10.5 m	0.5 ... 10	▶ 3RG78 55-1RG
 3RG78 55-.BB	Sensor strip (rubber profile)		▶ 3RG78 55-2BB
			▶ 3RG78 55-2BD
			▶ 3RG78 55-2BF
			▶ 3RG78 55-2BG
	Sensor strip, oil resistant (rubber profile)		▶ 3RG78 55-4BB
			▶ 3RG78 55-4BD
			▶ 3RG78 55-4BF
	Mounting strip (aluminum profile)		▶ 3RG78 55-3BB
			▶ 3RG78 55-3BD

Application	Control	Available category to EN 954-1	Order No.
24 V DC processing unit			
	Monitoring safety switching strips	Dynamic signal 4	▶ 3RG78 57-1BD

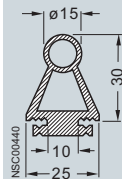
▶ Preferred type, available from stock.

Dimensions

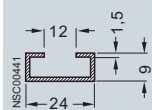
3RG78 55-1R emitter/receiver sensor



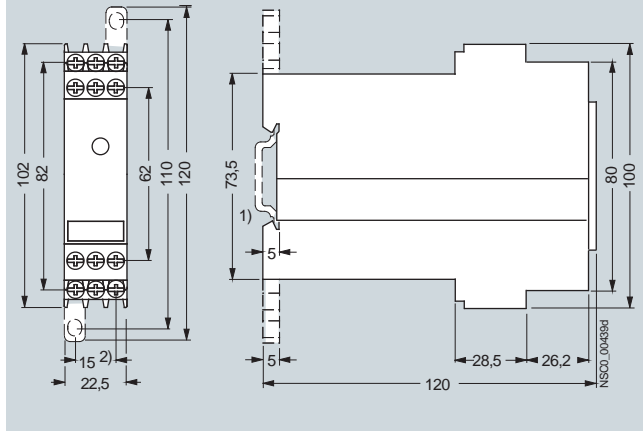
3RG78 55-2B sensor strip



3RG78 55-3B mounting strip



3RG78 57-1BD processing unit



4

SIMATIC FS200 light barriers

Light barriers Category 2 with evaluation unit, Light barriers Category 4

Overview



Light barriers are contact-free protective devices to guard access to danger zones, dangerous positions and entry points. They are the optimum solution in most cases, especially when safety has to be assured without adversely affecting productivity or causing a hindrance.

Each interruption of a light beam triggers a signal for reliable interruption of a dangerous movement of a machine, plant or other motorized installation.

A complete system comprises at least one one-way light barrier with a separate emitter and receiver. Two different systems are available that are approved by an employer's liability insurance association as a unit for Safety Category 2 or 4 in accordance with EN 954-1:

- Category 2 with separate evaluation unit
- Category 4, operation without an evaluation unit is possible.

The 3RG78 23 light barrier (Category 2) only operates in combination with the 3RG78 25 or 3RG78 47 evaluation unit as a contact-free protective device. The 3RG78 24 light barrier (Category 4) can also be operated in combination with 3RG78 47 evaluation units.

For further details on 3RG78 47, evaluation unit see page 4/82.

Application

Typical applications for light barriers include access protection for:

- Motorized windows, doors and gates
- Warehouse installations and devices
- Packaging machines
- Paletizing machines
- Stacking machines
- Winding and unwinding machines
- Textile machines
- Food processing machines
- Printing and paper processing machines
- Processing machines of the chemicals, plastics and rubber industry
- Rotary paternosters
- Lifting platforms
- Meat packing machines

and much more.

Technical specifications

Light barriers

Type	3RG78 23	3RG78 24
Categories according to EN 954-1	Category 2	Category 4
Operating voltage	24 V DC	24 V DC
Operating range	0 ... 120 m	0 ... 60 m
Typical range limit ¹⁾	0 ... 150 m	–
Illuminant	Infrared (880 nm)	
Beam angle	max. 4°	max. 2°
Obstacle size (diameter)	min. 9 mm	min. 13 mm
Operating temperature	–25 ... +60 °C	
Degree of protection	IP65	
Connection	M12 circular connector	Pg gland

Evaluation units

Type	3RG78 25	–
Categories according to EN 954-1	Category 2	
Operating voltage	24 V DC, ± 15%	
Response time	max. 20 ms	
Current consumption	approx. 200 mA	
Safety output	2 floating NO contacts	
Load capability	max. 4 A	
Signaling outputs	Separate pnp transistor outputs	
Operating temperature	–20 ... +60 °C	
Degree of protection ²⁾	IP40	

¹⁾ The range limit is the maximum achievable range without surplus light emission.

²⁾ Only suitable for use in electrical operating spaces, e.g. in control cabinet to deg

Selection and Ordering data

Version	Connection	Order No.
Safety light barriers		
Category 2 according to EN 954-1		
Emitter	Circular connector M12	▶ 3RG78 23-3BG00
Receiver, range 0 ... 150 m	Circular connector M12	▶ 3RG78 23-3KB00
Category 4 according to EN 954-1		
Emitter	Pg11 heavy-gauge threaded joint	▶ 3RG78 24-6BG00
Receiver, range 0 ... 60 m	Pg11 heavy-gauge threaded joint	▶ 3RG78 24-6JB00
Evaluation unit		
Category 2 according to EN 954-1		
Evaluation unit, suitable for 3RG78 41 light curtains and 3RG78 23 light barriers	up to 6 pairs of light barriers can be connected	▶ 3RG78 25-1CB1
Accessories		
M12 cable plug, 4-pole, with black PUR cable		
Cable length 5 m	▶	3RX80 00-OCB42-1AF0
Cable length 10 m	▶	3RX80 00-OCB42-1AL0

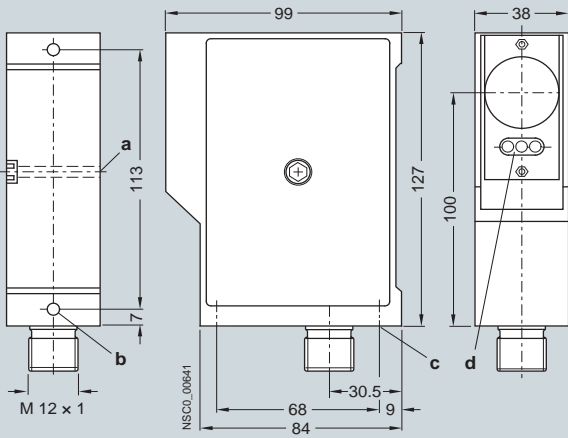
▶ Preferred type, available from stock.

SIMATIC FS200 light barriers

Light barriers Category 2 with evaluation unit,
Light barriers Category 4

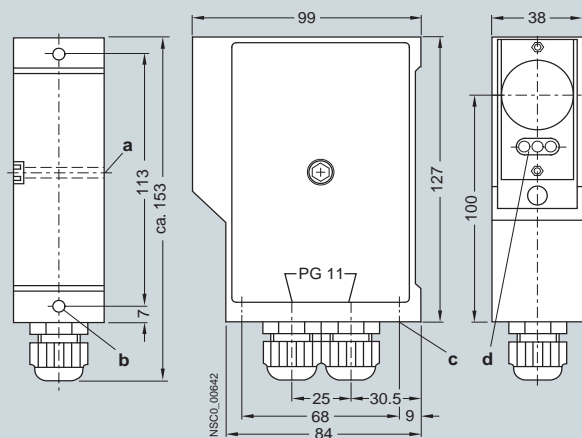
Dimensions

3RG78 23 light barrier



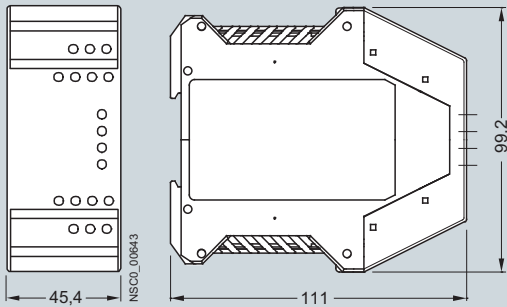
- a = Device mounting M 6 x 12
- b = Device mounting M 6 x 9
- c = Device mounting M 6 x 9
- d = LED

3RG78 24 light barrier



- a = Device mounting M 6 x 12
- b = Device mounting M 6 x 9
- c = Device mounting M 6 x 12
- d = LED

3RG78 25 evaluation unit



4

Overview



3RG78 4 and 3SF78 4 light curtains and light grids (for AS-Interface and PROFIBUS)

- are active optoelectronic protective devices (AOPD),
- comply with type 2 or 4 acc. to EN 61496-1, -2,
- comply with SIL 2 and 3 acc. to IEC/EN 61508,
- are EU prototype tested,
- protect the operating personnel at or near dangerous machines,
- operate contact-free,
- are free of wear in comparison with mechanical systems (e.g. safety mats).

For further details, please refer to the "Safety Integrated" manual and the operating instructions for the respective devices.

Tests/service

The devices are EU prototype tested (German Technical Inspectorate (TÜV) Product Service in cooperation with the German Statutory Industrial Accident Insurance Institution (BIA)).

Where necessary, tests can be performed before initial start-up as well as during the annual inspection (e.g. as per regulatory requirements for presses). Please contact your Siemens representative.

Benefits

Integrated functions:

- Start/restart inhibit
- Contactor control
- Blanking function package with
 - Fixed blanking
 - Floating blanking
 - Reduced resolution
- "Muting" function package
- Multi-scan function
- Cycle control

Configuration:

- By means of teach-in key using optomagnetic key
- Transmission of configuration data through a plug-in configuration card
- 2 transmission channels
- Cascading of host and guest devices
- Expanded display (2 × 7 segments)

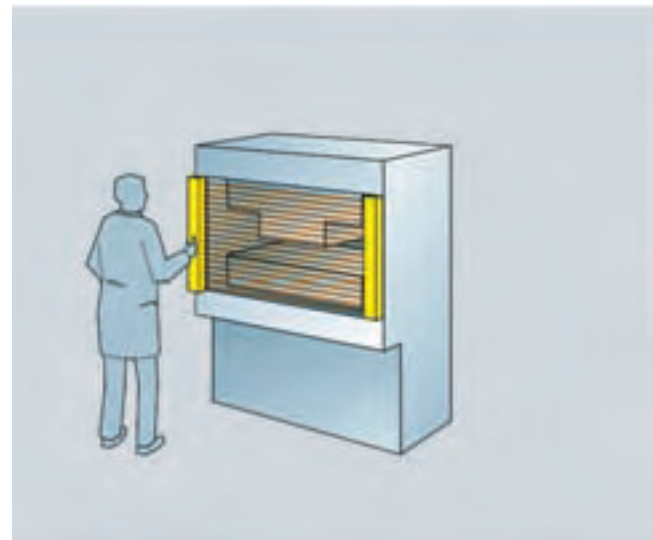
Outputs/connections:

- Local interface
- M12 connection
- Hirschmann connection
- Brad Harrison connection (required primarily for applications in the NAFTA market (North American Free Trade Agreement))
- Transistor outputs
- Relay outputs
- Connection to AS-Interface
- Connection to PROFIBUS

Application

Light curtains for finger and hand protection in hazardous areas

Protection from entering hazardous areas by mounting light curtains near dangerous machine parts (finger and hand protection)



SIMATIC FS400 light curtains and light grids

Introduction

Device selection

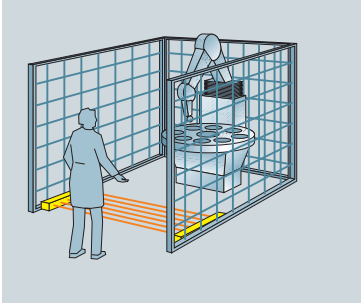
Light curtains for category 2 or 4, with 14, 20, 30 and 40 mm resolution

Application areas

E.g. presses, punches, filter presses, cutting machines

Light curtains to secure horizontal hazardous areas near the floor

Reliable detection of persons in hazardous areas by mounting the light curtain near the floor (not possible to crawl under)



Device selection

Light curtains for category 2 or 4, with 50 and 55 mm resolution

Application areas

E.g. welding and assembly lines and robots in the automotive industry

Light curtains to secure horizontal hazardous areas

Reliable detection of persons in hazardous areas by mounting the light curtain at heights of 0.6 to 1 m

Device selection

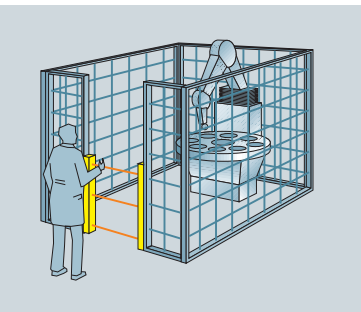
Light curtains for category 2 or 4, with 80 and 90 mm resolution

Application areas

E.g. welding and assembly lines and robots in the automotive industry

Light grids for securing access points

Reliable detection of persons when they enter hazardous areas



Device selection

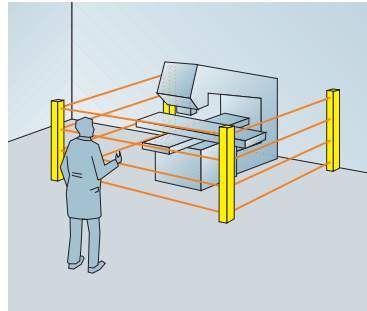
2-beam, 3-beam or 4-beam light grids for category 4, with 18 m range

Application areas

Securing access points, e.g. to robots or handling machines.

Light grids to protect access to large areas

Reliable detection of persons when they enter hazardous areas



Securing larger hazardous areas with high ranges of 60 m and 70 m.

Device selection

2-beam, 3-beam or 4-beam light grids for category 4, with 60 m and 70 m ranges.

Application areas

Securing access points, e.g. to automatic processing centers or palleting machines.

Safety categories

Depending on the safety category requirement to EN 954-1 that results from the C standard and/or the machine or system risk analysis, light curtains or grids up to type 2 or 4 can be used (definition of safety categories: see page 4/2).

Design

A light curtain or light grid comprises an emitter and a receiver, which must be mounted opposite each other. Depending on the resolution and the length, a certain number of transmit and receive diodes are arranged on top of each other. The infrared LEDs of the emitter emit short light pulses that are detected by the receive diodes.

Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (as an option).

- 3RG78 44 and 3SF78 44 light curtains and grids with integrated evaluation for Type 4 according to IEC/EN 61496 or SIL 3 to IEC 61508
 - Resolution 14, 30, 50 and 90 mm
 - Protection field height: 150 mm to 3000 mm
 - 2-beam, 3-beam or 4-beam light grids
 - Transceiver, 2-beam with deflection mirror
 - Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (as an option).
- 3RG78 45 light curtains and grids with integrated evaluation for Type 4 to IEC/EN 61496
 - Resolution 14, 30, 50 and 90 mm
 - Protection field height: 150 mm to 3000 mm
 - Transceiver, 2-beam with reflective mirror
 - 2, 3, or 4-beam light grids
 - Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (as an option).
- 3RG78 41 light curtains for external evaluation for Type 2 to IEC/EN 61496
 - Resolution: 30, 55, and 80 mm
 - Protection field height: 150 mm to 1800 mm
 - Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (as an option).

Introduction

- 3RG78 43 light curtains with integrated evaluation for Type 2 according to IEC/EN 61496, developed according to EN 61508 (SIL 2), suited for risk assessment according to pr EN ISO 13849-1
 - Resolution 20, 30, 40 and 90 mm
 - Protection field heights from 150 mm to 1800 mm
- 3RG78 46 light curtains with integrated evaluation for Type 4 to IEC/EN 61496
 - Resolution 14, 20, 30, 40 and 90 mm
 - Protection field heights from 150 mm to 1800 mm
- 3RG78 42 light curtains and grids with external evaluation for Type 4 to IEC/EN 61496
 - Resolution 14, 30, 50 and 90 mm
 - Protection field heights from 150 mm to 3000 mm
 - Transceiver, 2-beam with reflective mirror
 - 2-beam, 3-beam or 4-beam light grids
 - Connection to actuator sensor interface
 - Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (as an option).

Standards

- IEC/EN 61496-1, -2 (requirements for non-contact protection systems)
- EN 999 (including calculation of safety clearances)
- EN 954-1 (machine safety, safety-related parts of control systems)
- EN 61508 (functional safety of electrical/electronic/programmable electronic safety-related systems)

Function**Blanking function package**

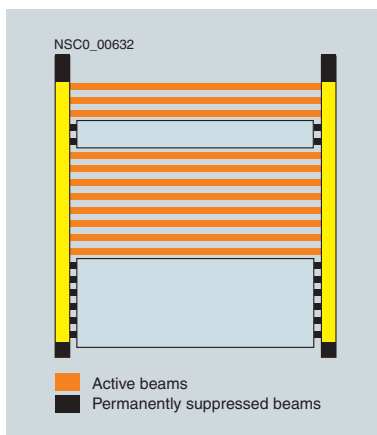
The light curtains can also be supplied with an optional blanking function.

Fixed blanking

If an object is permanently located in the light path, the corresponding zone can be suppressed. This is achieved by suppressing the required number of beams.

The suppressed objects must be permanently located in the protective zone, otherwise safety cannot be guaranteed. The light curtain switches the equipment off.

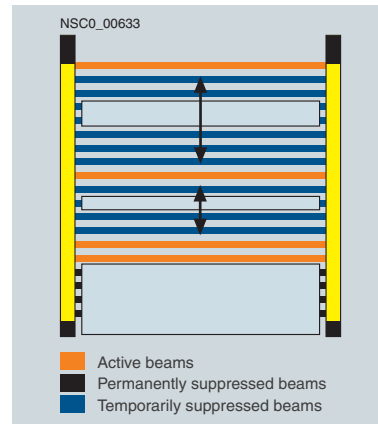
Configuration is carried out using a teach-in function by means of the safety key or using the programming and diagnostics software SafetyLab.

**Floating blanking**

If moving objects are located in the light path, any number of beams can be suppressed. The objects can move within the suppressed beams without the light curtain switching off.

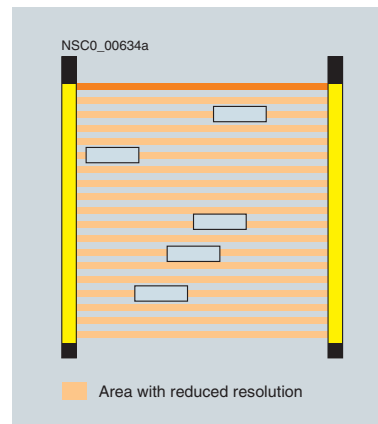
If the moving objects are removed from the zone, the light curtain will interrupt the hazardous movement, otherwise safety can no longer be guaranteed.

Configuration is carried out using a teach-in function by means of the safety key or using the programming and diagnostics software SafetyLab.

**Reduced resolution**

If an object is located in the light path, two or three beams can be suppressed. The difference between reduced resolution and floating blanking is that continuous monitoring does not take place.

A DIP switch is used for configuration or the programming and diagnostics software SafetyLab.

**"Muting" function package**

When arranged vertically, light curtains, light grids, and transceivers are often used for protecting access points. With additional sensor signals, the protective function can be suppressed to allow material to be transported in or out of hazardous areas, for example. The protection field is temporarily suppressed and, once the goods have passed through, reactivated. Personnel must not be allowed to enter the hazardous area while muting is active.

Using the number of connected sensors or the sequence of the muting signals, the devices automatically recognize the "sequential muting" mode when inputs M1 to M4 are assigned and "2-sensor parallel muting" when the signals M2 and M3 are assigned. A DIP switch can be used to set "4-sensor parallel muting".

SIMATIC FS400 light curtains and light grids

Introduction

Muting restart

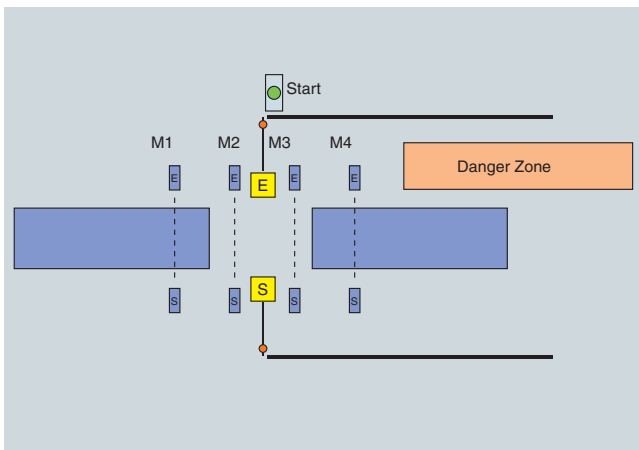
If the power fails while goods are passing the muting sensors, for example, the valid muting sequence is interrupted. When the power supply has been restored, muting is not automatically resumed because the muting sequence is not as expected.

To remove the goods from the area covered by the muting sensors, an integrated retraction mode can be activated using the start key. The light curtain attempts to find a valid muting sequence from the muting sensors. If successful, the muting indicator lamp stops flashing and is lit continuously. If unsuccessful, the start key must be kept depressed until the muting path is completely free.

4-sensor sequential muting

If the material that is to be transported in the danger zone always has the same dimensions and there is no lack of space, the use of sequential muting is preferred. With sequential muting, four muting sensors are connected. These must be activated in a predefined sequence to trigger muting. They can be activated in either of the following sequences: M1, M2, M3, M4 or M4, M3, M2, M1. The transported goods must be of sufficient length to briefly activate all 4 sensors simultaneously. Sequential muting is successfully completed when the third muting sensor to be activated is not activated any longer.

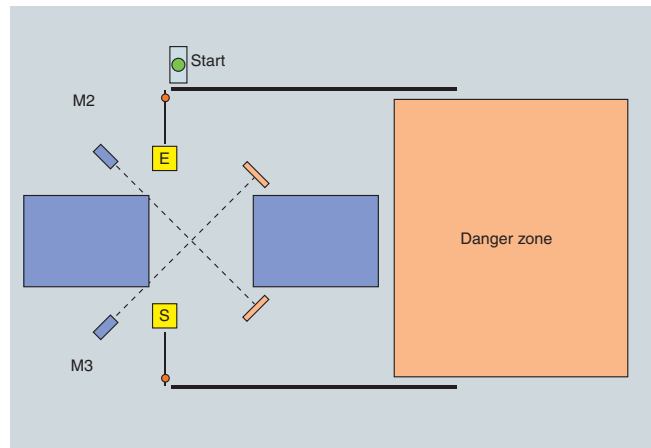
The SafetyLab software can be used to select a muting variant in which the second muting sequence is triggered before the first has finished (sequential muting with two objects). This variant saves time and, in turn, production costs for the user.



2-sensor parallel muting

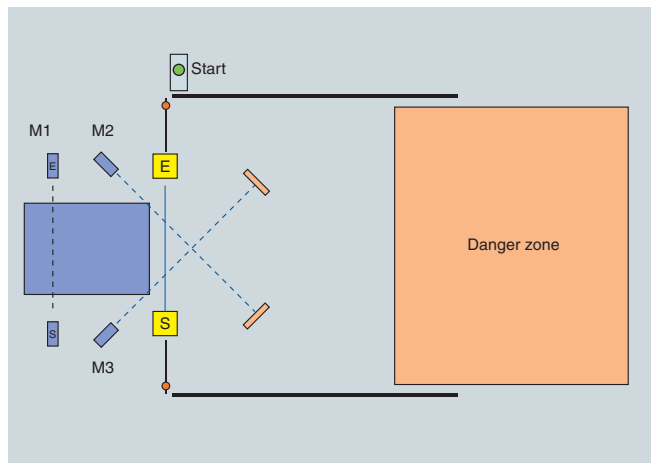
Parallel muting is ideal in plants in which the dimensions of the goods are not constant or space requirements must be kept to a minimum. Two muting sensors can be used, whose beams intersect behind the protection field in the danger zone.

Parallel muting is used when signals M2 and M3 are switched simultaneously without M1 and M4 having been activated or connected beforehand or simultaneously. Two-sensor parallel muting is straightforward because only two muting sensors are required. Goods can also be moved forward and backward within the muting area.



3-sensor direction muting

Three-sensor direction muting is configured in a similar way to 2-sensor parallel muting. Material can only be transported through the light curtain in one direction. To trigger the muting function, muting sensor M1 must first be activated, followed by muting sensors M2 and M3. If the paths for muting sensors M2 and M3 are interrupted, sensor M1 does not need to be activated.

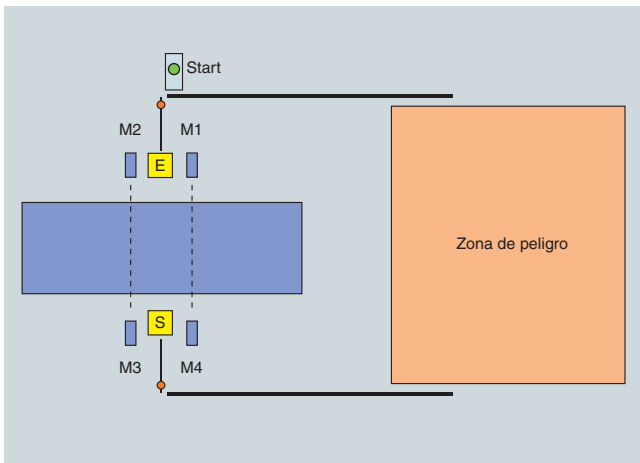


Parallel muting with 4 sensors

4-sensor parallel muting can be used advantageously wherever

- the transported material is too small to be acquired simultaneously by 4 sensors arranged sequentially,
- the available space is too small even for the crossover light beams of 2-sensor parallel muting.

The function of 4-sensor parallel muting corresponds to that of 2-sensor parallel muting with the additional characteristic of the muting activation signal being obtained from two sensor pairs. Muting is triggered when within a 2.5 s interval, M2 is activated with M3 or M1 is activated with M4.



Transceiver

The transceiver comprises a transmitter and receiver in a single unit. The infrared light of the transmit diode is reflected twice through 90° so that it returns to the receive diode of the transceiver. This creates a twin-beam light barrier that is more cost effective than conventional light barriers with separate transmitters and receivers. 3RG78 45 series transceivers have integrated contactor control and startup/restart inhibit. 3RG78 44 and 3SF78 44 series transceivers have additional integrated muting functions. These devices include five 5-pole M12 sockets on the front panel, to which the muting sensors can be directly connected.

Cascading of devices: Host/guest combinations

Cascading of devices refers to lengthening the optical axis and therefore the protection field height, whereby protection on the horizontal and vertical levels can be realized at the same time using a flexible connecting cable between the host and guest device. The safety outputs and the processor tasks are located in the host device so that the guest devices can be connected regardless of the function package or outputs.

The standard cable that can be used to connect the host to the guest is already installed on the guest device. The host comes with the appropriate M12 socket on its underside. Host devices can only be operated together with a guest device.

The guest devices are from the 3RG78 42 series, but they are also suitable for the 3SF78 42, 3RG78 44, 3SF78 44 and 3RG78 45 series. The guest device resolution can be combined with any other resolution (e.g. the host device can have a 14 mm resolution while a 30 or 50 mm resolution is sufficient for the guest device).

PC software

PC software can be used to visualize and record the function of the light curtains.

SafetyLab is the diagnostic and parameterization software for 3RG78 44 / 3SF78 44 light curtains, light grids and transceivers. SafetyLab can be used for all available light curtain and light grid function packages as of firmware Version 3.10:

- Blanking function package
- Muting function package
- Sequence control function package

The firmware version of the receiver is indicated on the 7-segment display during start-up.

Mounting sets

To facilitate installation, alignment, commissioning and troubleshooting, a practical accessories package containing mounting columns, reflecting mirror columns, reflecting mirrors, mounting supports and laser alignment tools is available.

SIMATIC FS400 light curtains and light grids

Program overview

Overview

Unit type	Evaluation	Category type	Function package	Output	Connection type	LEDs	Page
3RG78 44 series							
Light curtains	Internal	4	Blanking	Transistor	M12 plug connector	-	4/18
Light curtains	Internal	4	Blanking	Transistor	Cable gland	-	4/19
Light curtains	Internal	4	Blanking	Transistor	Brad Harrison (MIN)	-	4/21
Light curtains	Internal	4	Blanking	Transistor	Hirschmann	-	4/23
Light curtains	Internal	4	Blanking	Relay	Hirschmann	-	4/25
Light curtains	Internal	4	Muting	Transistor	M12 plug connector	-	4/26
Light curtains	Internal	4	Muting	Transistor	Cable gland	-	4/26
Light grids	Internal	4	Muting	Transistor	Cable gland	-	4/27
Transceivers	Internal	4	Muting	Transistor	Cable gland	with and without	4/27
Light curtains	Internal	4	Muting	Transistor	Brad Harrison (MIN)	-	4/27
Light grids	Internal	4	Muting	Transistor	Brad Harrison (MIN)	-	4/28
Light grids	Internal	4	Muting	Transistor	Hirschmann	-	4/28
Light curtains	Internal	4	Muting	Relay	Hirschmann	-	4/28
Light curtains	Internal	4	Muting	Relay	Hirschmann	with	4/29
Light grids	Internal	4	Muting	Transistor	M12 plug connector	-	4/29
Light grids	Internal	4	Muting	Relay	Hirschmann	-	4/30
Light grids	Internal	4	Muting	Relay	Hirschmann	with	4/30
Transceivers	Internal	4	Muting	Transistor	M12 plug connector	with and without	4/31
Transceivers	Internal	4	Muting	Relay	Hirschmann	with and without	4/31
Light curtains	Internal	4	Sequence control system	Transistor	M12 plug connector	-	4/32
Light curtains	Internal	4	Sequence control system	Relay	Hirschmann	-	4/32
3RG78 45 series							
Light curtains	Internal	4	Standard	Transistor	M12 plug connector	-	4/36
Light grids	Internal	4	Standard	Transistor	M12 plug connector	-	4/39
Transceivers	Internal	4	Standard	Transistor	M12 plug connector	-	4/39
Light curtains	Internal	4	Standard	Transistor	Hirschmann	-	4/39
Light grids	Internal	4	Standard	Transistor	Hirschmann	-	4/41
Transceivers	Internal	4	Standard	Transistor	Hirschmann	-	4/41
Light curtains	Internal	4	Standard	Transistor	Brad Harrison (MIN)	-	4/41
Light grids	Internal	4	Standard	Transistor	Brad Harrison (MIN)	-	4/44
Transceivers	Internal	4	Standard	Transistor	Brad Harrison (MIN)	-	4/44
Light curtains	Internal	4	Standard	Transistor	Cable gland	-	4/45
Light grids	Internal	4	Standard	Transistor	Cable gland	-	4/47
Transceivers	Internal	4	Standard	Transistor	Cable gland	-	4/47
3SF78 44 ASIsafe series							
Light curtains	Internal	4	Blanking	ASIsafe	ASIsafe	-	4/52
Light curtains	Internal	4	Muting	ASIsafe	ASIsafe	-	4/53
Light curtains	Internal	4	Muting	ASIsafe	ASIsafe	with	4/53
Light grids	Internal	4	Muting	ASIsafe	ASIsafe	-	4/54
Light grids	Internal	4	Muting	ASIsafe	ASIsafe	with	4/54
Transceivers	Internal	4	Muting	ASIsafe	ASIsafe	with and without	4/54
Light curtains	Internal	4	Sequence control system	ASIsafe	ASIsafe	-	4/55

SIMATIC FS400 light curtains and light grids

Program overview

Unit type	Evaluation	Category type	Function package	Output	Connection type	LEDs	Page
3SF78 44 PROFIsafe series							
Light curtains	Internal	4	Blanking	PROFIsafe	PROFIsafe	-	4/60
Light curtains	Internal	4	Muting	PROFIsafe	PROFIsafe	-	4/60
Light grids	Internal	4	Muting	PROFIsafe	PROFIsafe	-	4/62
Transceivers	Internal	4	Muting	PROFIsafe	PROFIsafe	with and without	4/62
Light curtains	Internal	4	Sequence control system	PROFIsafe	PROFIsafe	-	4/62
3SF78 42 ASIsafe series							
Light curtains	external	4	-	ASIsafe	ASIsafe	-	4/64
Light grids	external	4	-	ASIsafe	ASIsafe	-	4/67
Transceivers	external	4	-	ASIsafe	ASIsafe	-	4/67
3SF78 46 FS420I series							
Light curtains	Internal	4	Standard	Transistor	M12 plug connector	-	4/72
3RG78 43 FS420I series							
Light curtains	Internal	2 (SIL 2)	Standard	Transistor	M12 plug connector	-	4/76
3RG78 41 series							
Light curtains	external	2	-	Transistor	M12 plug connector	-	4/80

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Overview



3RG78 44 light curtains and grids with integrated evaluation for type 4 in accordance with IEC/EN 61496

- with function packages "Blanking", "Muting" and "Cycle Control",
- Resolutions: 14, 30, and 50 mm
- Protection field height: 150 mm to 3000 mm
- 2-beam, 3-beam or 4-beam light grids
- Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (as an option).

Two standard 3RG78 48-0AB mounting brackets each are enclosed with all devices (can also be ordered as accessories, see page 4/92).

Technical specifications

Type	3RG78 44
Safety category	
• to EN, IEC 61496-1, -2	Type 4
• according to IEC 61508	SIL 3
Protection field height	
• for 14 and 30 mm resolution	150 ... 1800 mm
• for 50 mm resolution	450 ... 3000 mm
Protection field width, range	
• for 14 mm resolution	0.3 ... 6 m
• for 30 and 50 mm resolution	0.8 ... 18 m
Detection capability (resolution)	14 mm, 30 mm, 50 mm
Supply voltage (emitter and receiver)	24 V DC \pm 20% (external power pack with safe isolation and compensation of 20 ms voltage dip is necessary)
Residual ripple	< 5%
Current consumption	
• Emitter	75 mA
• Receiver	180 mA (without external load)
General value for external fuse in the transmitter and receiver supply leads	4 A
Wave length	880 nm (infrared)
Synchronization	Optically between emitter and receiver
Vibration resistance	5 g, 10 ... 55 Hz to IEC/EN 60068-2-6
Shock resistance	10 g, 16 ms to IEC/EN 60068-2-29
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	-25 ... +70 °C
Relative humidity	15 ... 95%
Degree of protection	IP65
Safety class to DIN VDE 0106	III

Application of the EN ISO 13849-1 standard: 2006 "Safety of machinery" for 3RG78 44 light curtains and light grids

	Protection field height/number of beams	PL 13849-1	Category ISO 13849-1	Cat. 954-1	PFH _D	B10d DC 13 (ind. L)	B10d AC 15 (ind. L)	T _M /years
3RG78 44-... light grids	4-beam	e	4	4	1.90 x 10 ⁻⁸			20
3RG78 44-... light curtain	900 mm	e	4	4	2.26 x 10 ⁻⁸			20
3RG78 44-... light curtain	1800 mm	e	4	4	2.67 x 10 ⁻⁸			20
3RG78 44-8-...-... also for light curtains and light grids with relay output						630000 (5 A, 24 V)	1480000 (3 A, 230 V)	

Explanation

PFH_D = Probability of dangerous failure per hour

PL = Performance level

Discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions: from PL "a" (highest probability of failure) to PL "e" (lowest probability of failure).

B10

The B10 value for components subject to wear is expressed in number of switching cycles: it is the number of switching cycles after which 10% of the test specimens fail in the course of an endurance test. With the B10 value and the operating cycle, the failure rate of electromechanical components can be calculated:

For further explanations, see the brochure "European machinery directive - implemented easily", Order No. E20001-A230-M103-V1-7600.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

3RG78 44 program overview

Unit type	Function package	Output	Connection type	For light curtains: Resolution For light grids and transceivers: Range			LEDs	See page
				14 mm	30 mm	50 mm		
Light curtains	Blanking	Transistor	M12 plug connector	✓	✓	-	-	4/18
Light curtains	Blanking	Transistor	Cable gland	✓	✓	✓	-	4/19
Light curtains	Blanking	Transistor	Brad Harrison (MIN) ¹⁾	✓	✓	✓	-	4/21
Light curtains	Blanking	Transistor	Hirschmann	✓	✓	✓	-	4/23
Light curtains	Blanking	Relay	Hirschmann	✓	✓	-	-	4/25
Light curtains	Muting	Transistor	M12 plug connector	-	✓	-	-	4/26
Light curtains	Muting	Transistor	Cable gland	-	✓	-	-	4/26
Light grids	Muting	Transistor	Cable gland	0.8 ... 18 m; 6 ... 70 m			-	4/27
Transceivers	Muting	Transistor	Cable gland	6.5 m			with and without	4/27
Light curtains	Muting	Transistor	Brad Harrison (MIN) ¹⁾	-	✓	-	-	4/27
Light grids	Muting	Transistor	Brad Harrison (MIN) ¹⁾	0.8 ... 18 m			-	4/28
Light grids	Muting	Transistor	Hirschmann	6 ... 70 m			-	4/28
Light curtains	Muting	Relay	Hirschmann	-	✓	-	-	4/28
Light curtains	Muting	Relay	Hirschmann	-	✓	-	with	4/29
Light grids	Muting	Transistor	M12 plug connector	0.8 ... 18 m			-	4/29
Light grids	Muting	Relay	Hirschmann	0.8 ... 18 m; 6 ... 70 m			-	4/30
Light grids	Muting	Relay	Hirschmann	0.8 ... 18 m			with	4/30
Transceivers	Muting	Transistor	M12 plug connector	6.5 m			with and without	4/31
Transceivers	Muting	Relay	Hirschmann	6.5 m			with and without	4/31
Light curtains	Sequence control system	Transistor	M12 plug connector	✓	-	-	-	4/32
Light curtains	Sequence control system	Relay	Hirschmann	✓	✓	-	-	4/32

Accessories

Electrical connection

- Hirschmann type cables and cable plugs 4/94
- Brad Harrison type cable (MIN series) 4/94
- Connecting cable with M12 connection 4/95

Accessory cable

- for the local connection to connect muting lights, key-operated switches, reset buttons, etc. 4/94

Assembly materials

- Fixing columns, reflecting mirror 4/91
- Muting mounting systems 4/92
- Muting accessories 4/95

Laser alignment aids, diagnostic software

4/93

1) Required primarily for applications in the NAFTA market

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Ordering notes

Included in the scope of supply:

3RG78 44 light curtains with blanking, muting or sequence control system function package	
Emitter	3RG78 48-0AB mounting bracket set and emitter insert
Receiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets and safety key
• in addition with 14 mm resolution	3RG78 48-0FH test rod (14/24/33 and 19/29 mm)
• in addition with 30 mm resolution	3RG78 48-0AH/BH test rod (14/30 and 38 mm)
Guest devices of the 3RG78 42 series	
Emitter	3RG78 48-0AB mounting bracket set
Receiver	3RG78 48-0AB mounting bracket set
• in addition with 14/30 mm resolution	3RG78 48-0AH test rod
3RG78 44 light grids with muting function package	
Emitter	3RG78 48-0AB mounting bracket set and emitter insert
Receiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets
3RG78 44 transceivers with muting function package	
Transceiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets

Selection and Ordering data

Light curtains with blanking function package Transistor output with M12 plug connection¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 14 mm				
300	Receiver	3RG78 44-3BB04-0SS1	3RG78 44-3BB04-1SS1	3RG78 42-6BD21
300	Emitter	3RG78 44-3SB04-0SS0	3RG78 44-3SB04-1SS0	3RG78 42-6BD20
450	Receiver	3RG78 44-3BB06-0SS1	3RG78 44-3BB06-1SS1	3RG78 42-6BE21
450	Emitter	3RG78 44-3SB06-0SS0	3RG78 44-3SB06-1SS0	3RG78 42-6BE20
600	Receiver	3RG78 44-3BB08-0SS1	3RG78 44-3BB08-1SS1	3RG78 42-6BF21
600	Emitter	3RG78 44-3SB08-0SS0	3RG78 44-3SB08-1SS0	3RG78 42-6BF20
750	Receiver	3RG78 44-3BB11-0SS1	3RG78 44-3BB11-1SS1	3RG78 42-6BG21
750	Emitter	3RG78 44-3SB11-0SS0	3RG78 44-3SB11-1SS0	3RG78 42-6BG20
900	Receiver	3RG78 44-3BB13-0SS1	3RG78 44-3BB13-1SS1	3RG78 42-6BH21
900	Emitter	3RG78 44-3SB13-0SS0	3RG78 44-3SB13-1SS0	3RG78 42-6BH20
1050	Receiver	3RG78 44-3BB15-0SS1	3RG78 44-3BB15-1SS1	3RG78 42-6BJ21
1050	Emitter	3RG78 44-3SB15-0SS0	3RG78 44-3SB15-1SS0	3RG78 42-6BJ20
1200	Receiver	3RG78 44-3BB17-0SS1	3RG78 44-3BB17-1SS1	3RG78 42-6BK21
1200	Emitter	3RG78 44-3SB17-0SS0	3RG78 44-3SB17-1SS0	3RG78 42-6BK20
1350	Receiver	3RG78 44-3BB20-0SS1	3RG78 44-3BB20-1SS1	3RG78 42-6BL21
1350	Emitter	3RG78 44-3SB20-0SS0	3RG78 44-3SB20-1SS0	3RG78 42-6BL20
1500	Receiver	3RG78 44-3BB22-0SS1	3RG78 44-3BB22-1SS1	3RG78 42-6BM21
1500	Emitter	3RG78 44-3SB22-0SS0	3RG78 44-3SB22-1SS0	3RG78 42-6BM20
1650	Receiver	3RG78 44-3BB24-0SS1	3RG78 44-3BB24-1SS1	3RG78 42-6BN21
1650	Emitter	3RG78 44-3SB24-0SS0	3RG78 44-3SB24-1SS0	3RG78 42-6BN20
1800	Receiver	3RG78 44-3BB26-0SS1	3RG78 44-3BB26-1SS1	3RG78 42-6BP21
1800	Emitter	3RG78 44-3SB26-0SS0	3RG78 44-3SB26-1SS0	3RG78 42-6BP20

1) For scope of supply see top of page 4/18

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
300	Receiver	3RG78 44-3BD04-0SS1	3RG78 44-3BD04-1SS1	3RG78 42-6DD21
300	Emitter	3RG78 44-3SD04-0SS0	3RG78 44-3SD04-1SS0	3RG78 42-6DD20
450	Receiver	3RG78 44-3BD06-0SS1	3RG78 44-3BD06-1SS1 ▶	3RG78 42-6DE21
450	Emitter	3RG78 44-3SD06-0SS0	3RG78 44-3SD06-1SS0 ▶	3RG78 42-6DE20
600	Receiver	3RG78 44-3BD08-0SS1	3RG78 44-3BD08-1SS1	3RG78 42-6DF21
600	Emitter	3RG78 44-3SD08-0SS0	3RG78 44-3SD08-1SS0	3RG78 42-6DF20
750	Receiver	3RG78 44-3BD11-0SS1	3RG78 44-3BD11-1SS1	3RG78 42-6DG21
750	Emitter	3RG78 44-3SD11-0SS0	3RG78 44-3SD11-1SS0	3RG78 42-6DG20
900	Receiver	3RG78 44-3BD13-0SS1	3RG78 44-3BD13-1SS1	3RG78 42-6DH21
900	Emitter	3RG78 44-3SD13-0SS0	3RG78 44-3SD13-1SS0	3RG78 42-6DH20
1050	Receiver	3RG78 44-3BD15-0SS1	3RG78 44-3BD15-1SS1	3RG78 42-6DJ21
1050	Emitter	3RG78 44-3SD15-0SS0	3RG78 44-3SD15-1SS0	3RG78 42-6DJ20
1200	Receiver	3RG78 44-3BD17-0SS1	3RG78 44-3BD17-1SS1	3RG78 42-6DK21
1200	Emitter	3RG78 44-3SD17-0SS0	3RG78 44-3SD17-1SS0	3RG78 42-6DK20
1350	Receiver	3RG78 44-3BD20-0SS1	3RG78 44-3BD20-1SS1	3RG78 42-6DL21
1350	Emitter	3RG78 44-3SD20-0SS0	3RG78 44-3SD20-1SS0	3RG78 42-6DL20
1500	Receiver	3RG78 44-3BD22-0SS1	3RG78 44-3BD22-1SS1	3RG78 42-6DM21
1500	Emitter	3RG78 44-3SD22-0SS0	3RG78 44-3SD22-1SS0	3RG78 42-6DM20
1650	Receiver	3RG78 44-3BD24-0SS1	3RG78 44-3BD24-1SS1	3RG78 42-6DN21
1650	Emitter	3RG78 44-3SD24-0SS0	3RG78 44-3SD24-1SS0	3RG78 42-6DN20
1800	Receiver	3RG78 44-3BD26-0SS1	3RG78 44-3BD26-1SS1	3RG78 42-6DP21
1800	Emitter	3RG78 44-3SD26-0SS0	3RG78 44-3SD26-1SS0	3RG78 42-6DP20

Light curtains with blanking function package Transistor output with cable gland¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 14 mm				
150	Receiver	3RG78 44-6BB02-0SS1	–	3RG78 42-6BB21
150	Emitter	3RG78 44-6SB02-0SS0	–	3RG78 42-6BB20
225	Receiver	3RG78 44-6BB03-0SS1	3RG78 44-6BB03-1SS1	3RG78 42-6BC21
225	Emitter	3RG78 44-6SB03-0SS0	3RG78 44-6SB03-1SS0	3RG78 42-6BC20
300	Receiver	3RG78 44-6BB04-0SS1	3RG78 44-6BB04-1SS1	3RG78 42-6BD21
300	Emitter	3RG78 44-6SB04-0SS0	3RG78 44-6SB04-1SS0	3RG78 42-6BD20
450	Receiver	3RG78 44-6BB06-0SS1	3RG78 44-6BB06-1SS1	3RG78 42-6BE21
450	Emitter	3RG78 44-6SB06-0SS0	3RG78 44-6SB06-1SS0	3RG78 42-6BE20
600	Receiver	3RG78 44-6BB08-0SS1	3RG78 44-6BB08-1SS1	3RG78 42-6BF21
600	Emitter	3RG78 44-6SB08-0SS0	3RG78 44-6SB08-1SS0	3RG78 42-6BF20
750	Receiver	3RG78 44-6BB11-0SS1	3RG78 44-6BB11-1SS1	3RG78 42-6BG21
750	Emitter	3RG78 44-6SB11-0SS0	3RG78 44-6SB11-1SS0	3RG78 42-6BG20
900	Receiver	3RG78 44-6BB13-0SS1	3RG78 44-6BB13-1SS1	3RG78 42-6BH21
900	Emitter	3RG78 44-6SB13-0SS0	3RG78 44-6SB13-1SS0	3RG78 42-6BH20
1050	Receiver	3RG78 44-6BB15-0SS1	3RG78 44-6BB15-1SS1	3RG78 42-6BJ21
1050	Emitter	3RG78 44-6SB15-0SS0	3RG78 44-6SB15-1SS0	3RG78 42-6BJ20
1200	Receiver	3RG78 44-6BB17-0SS1	3RG78 44-6BB17-1SS1	3RG78 42-6BK21
1200	Emitter	3RG78 44-6SB17-0SS0	3RG78 44-6SB17-1SS0	3RG78 42-6BK20

1) For scope of supply see top of page 4/18

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
1350	Receiver	3RG78 44-6BB20-0SS1	3RG78 44-6BB20-1SS1	3RG78 42-6BL21
1350	Emitter	3RG78 44-6SB20-0SS0	3RG78 44-6SB20-1SS0	3RG78 42-6BL20
1500	Receiver	3RG78 44-6BB22-0SS1	3RG78 44-6BB22-1SS1	3RG78 42-6BM21
1500	Emitter	3RG78 44-6SB22-0SS0	3RG78 44-6SB22-1SS0	3RG78 42-6BM20
1650	Receiver	3RG78 44-6BB24-0SS1	3RG78 44-6BB24-1SS1	3RG78 42-6BN21
1650	Emitter	3RG78 44-6SB24-0SS0	3RG78 44-6SB24-1SS0	3RG78 42-6BN20
1800	Receiver	3RG78 44-6BB26-0SS1	3RG78 44-6BB26-1SS1	3RG78 42-6BP21
1800	Emitter	3RG78 44-6SB26-0SS0	3RG78 44-6SB26-1SS0	3RG78 42-6BP20
Resolution 30 mm				
150	Receiver	3RG78 44-6BD02-0SS1	–	3RG78 42-6DB21
150	Emitter	3RG78 44-6SD02-0SS0	–	3RG78 42-6DB20
225	Receiver	3RG78 44-6BD03-0SS1	3RG78 44-6BD03-1SS1	3RG78 42-6DC21
225	Emitter	3RG78 44-6SD03-0SS0	3RG78 44-6SD03-1SS0	3RG78 42-6DC20
300	Receiver	3RG78 44-6BD04-0SS1	3RG78 44-6BD04-1SS1	3RG78 42-6DD21
300	Emitter	3RG78 44-6SD04-0SS0	3RG78 44-6SD04-1SS0	3RG78 42-6DD20
450	Receiver	3RG78 44-6BD06-0SS1	3RG78 44-6BD06-1SS1	▶ 3RG78 42-6DE21
450	Emitter	3RG78 44-6SD06-0SS0	3RG78 44-6SD06-1SS0	▶ 3RG78 42-6DE20
600	Receiver	3RG78 44-6BD08-0SS1	3RG78 44-6BD08-1SS1	3RG78 42-6DF21
600	Emitter	3RG78 44-6SD08-0SS0	3RG78 44-6SD08-1SS0	3RG78 42-6DF20
750	Receiver	3RG78 44-6BD11-0SS1	3RG78 44-6BD11-1SS1	3RG78 42-6DG21
750	Emitter	3RG78 44-6SD11-0SS0	3RG78 44-6SD11-1SS0	3RG78 42-6DG20
900	Receiver	3RG78 44-6BD13-0SS1	3RG78 44-6BD13-1SS1	3RG78 42-6DH21
900	Emitter	3RG78 44-6SD13-0SS0	3RG78 44-6SD13-1SS0	3RG78 42-6DH20
1050	Receiver	3RG78 44-6BD15-0SS1	3RG78 44-6BD15-1SS1	3RG78 42-6DJ21
1050	Emitter	3RG78 44-6SD15-0SS0	3RG78 44-6SD15-1SS0	3RG78 42-6DJ20
1200	Receiver	3RG78 44-6BD17-0SS1	3RG78 44-6BD17-1SS1	3RG78 42-6DK21
1200	Emitter	3RG78 44-6SD17-0SS0	3RG78 44-6SD17-1SS0	3RG78 42-6DK20
1350	Receiver	3RG78 44-6BD20-0SS1	3RG78 44-6BD20-1SS1	3RG78 42-6DL21
1350	Emitter	3RG78 44-6SD20-0SS0	3RG78 44-6SD20-1SS0	3RG78 42-6DL20
1500	Receiver	3RG78 44-6BD22-0SS1	3RG78 44-6BD22-1SS1	3RG78 42-6DM21
1500	Emitter	3RG78 44-6SD22-0SS0	3RG78 44-6SD22-1SS0	3RG78 42-6DM20
1650	Receiver	3RG78 44-6BD24-0SS1	3RG78 44-6BD24-1SS1	3RG78 42-6DN21
1650	Emitter	3RG78 44-6SD24-0SS0	3RG78 44-6SD24-1SS0	3RG78 42-6DN20
1800	Receiver	3RG78 44-6BD26-0SS1	3RG78 44-6BD26-1SS1	3RG78 42-6DP21
1800	Emitter	3RG78 44-6SD26-0SS0	3RG78 44-6SD26-1SS0	3RG78 42-6DP20
Resolution 50 mm				
450	Receiver	3RG78 44-6BE06-0SS1	3RG78 44-6BE06-1SS1	3RG78 42-6EE21
450	Emitter	3RG78 44-6SE06-0SS0	3RG78 44-6SE06-1SS0	3RG78 42-6EE20
600	Receiver	3RG78 44-6BE08-0SS1	3RG78 44-6BE08-1SS1	3RG78 42-6EF21
600	Emitter	3RG78 44-6SE08-0SS0	3RG78 44-6SE08-1SS0	3RG78 42-6EF20
750	Receiver	3RG78 44-6BE11-0SS1	3RG78 44-6BE11-1SS1	3RG78 42-6EG21
750	Emitter	3RG78 44-6SE11-0SS0	3RG78 44-6SE11-1SS0	3RG78 42-6EG20
900	Receiver	3RG78 44-6BE13-0SS1	3RG78 44-6BE13-1SS1	3RG78 42-6EH21
900	Emitter	3RG78 44-6SE13-0SS0	3RG78 44-6SE13-1SS0	3RG78 42-6EH20
1050	Receiver	3RG78 44-6BE15-0SS1	3RG78 44-6BE15-1SS1	3RG78 42-6EJ21
1050	Emitter	3RG78 44-6SE15-0SS0	3RG78 44-6SE15-1SS0	3RG78 42-6EJ20
1200	Receiver	3RG78 44-6BE17-0SS1	3RG78 44-6BE17-1SS1	3RG78 42-6EK21
1200	Emitter	3RG78 44-6SE17-0SS0	3RG78 44-6SE17-1SS0	3RG78 42-6EK20

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device		Host device		Guest device	
		Order No.		Order No.		Order No.	
1350	Receiver	3RG78 44-6BE20-0SS1		3RG78 44-6BE20-1SS1		3RG78 42-6EL21	
1350	Emitter	3RG78 44-6SE20-0SS0		3RG78 44-6SE20-1SS0		3RG78 42-6EL20	
1500	Receiver	3RG78 44-6BE22-0SS1		3RG78 44-6BE22-1SS1		3RG78 42-6EM21	
1500	Emitter	3RG78 44-6SE22-0SS0		3RG78 44-6SE22-1SS0		3RG78 42-6EM20	
1650	Receiver	3RG78 44-6BE24-0SS1		3RG78 44-6BE24-1SS1		3RG78 42-6EN21	
1650	Emitter	3RG78 44-6SE24-0SS0		3RG78 44-6SE24-1SS0		3RG78 42-6EN20	
1800	Receiver	3RG78 44-6BE26-0SS1		3RG78 44-6BE26-1SS1		3RG78 42-6EP21	
1800	Emitter	3RG78 44-6SE26-0SS0		3RG78 44-6SE26-1SS0		3RG78 42-6EP20	
2100	Receiver	3RG78 44-6BE28-0SS1		3RG78 44-6BE28-1SS1		3RG78 42-6ER21	
2100	Emitter	3RG78 44-6SE28-0SS0		3RG78 44-6SE28-1SS0		3RG78 42-6ER20	
2400	Receiver	3RG78 44-6BE31-0SS1		3RG78 44-6BE31-1SS1		3RG78 42-6ES21	
2400	Emitter	3RG78 44-6SE31-0SS0		3RG78 44-6SE31-1SS0		3RG78 42-6ES20	
2700	Receiver	3RG78 44-6BE33-0SS1		3RG78 44-6BE33-1SS1		3RG78 42-6ET21	
2700	Emitter	3RG78 44-6SE33-0SS0		3RG78 44-6SE33-1SS0		3RG78 42-6ET20	
3000	Receiver	3RG78 44-6BE35-0SS1		3RG78 44-6BE35-1SS1		3RG78 42-6EU21	
3000	Emitter	3RG78 44-6SE35-0SS0		3RG78 44-6SE35-1SS0		3RG78 42-6EU20	

Light curtains with blanking function package Transistor output with Brad Harrison connection (MIN Series)¹⁾²⁾

Protection field height mm	Type	Standard device		Host device		Guest device	
		Order No.		Order No.		Order No.	
Resolution 14 mm							
225	Receiver	3RG78 44-4BB03-0SS1		3RG78 44-4BB03-1SS1		3RG78 42-6BC21	
225	Emitter	3RG78 44-4SB03-0SS0		3RG78 44-4SB03-1SS0		3RG78 42-6BC20	
300	Receiver	3RG78 44-4BB04-0SS1		3RG78 44-4BB04-1SS1		3RG78 42-6BD21	
300	Emitter	3RG78 44-4SB04-0SS0		3RG78 44-4SB04-1SS0		3RG78 42-6BD20	
450	Receiver	3RG78 44-4BB06-0SS1		3RG78 44-4BB06-1SS1		3RG78 42-6BE21	
450	Emitter	3RG78 44-4SB06-0SS0		3RG78 44-4SB06-1SS0		3RG78 42-6BE20	
600	Receiver	3RG78 44-4BB08-0SS1		3RG78 44-4BB08-1SS1		3RG78 42-6BF21	
600	Emitter	3RG78 44-4SB08-0SS0		3RG78 44-4SB08-1SS0		3RG78 42-6BF20	
750	Receiver	3RG78 44-4BB11-0SS1		3RG78 44-4BB11-1SS1		3RG78 42-6BG21	
750	Emitter	3RG78 44-4SB11-0SS0		3RG78 44-4SB11-1SS0		3RG78 42-6BG20	
900	Receiver	3RG78 44-4BB13-0SS1		3RG78 44-4BB13-1SS1		3RG78 42-6BH21	
900	Emitter	3RG78 44-4SB13-0SS0		3RG78 44-4SB13-1SS0		3RG78 42-6BH20	
1050	Receiver	3RG78 44-4BB15-0SS1		3RG78 44-4BB15-1SS1		3RG78 42-6BJ21	
1050	Emitter	3RG78 44-4SB15-0SS0		3RG78 44-4SB15-1SS0		3RG78 42-6BJ20	
1200	Receiver	3RG78 44-4BB17-0SS1		3RG78 44-4BB17-1SS1		3RG78 42-6BK21	
1200	Emitter	3RG78 44-4SB17-0SS0		3RG78 44-4SB17-1SS0		3RG78 42-6BK20	
1350	Receiver	3RG78 44-4BB20-0SS1		3RG78 44-4BB20-1SS1		3RG78 42-6BL21	
1350	Emitter	3RG78 44-4SB20-0SS0		3RG78 44-4SB20-1SS0		3RG78 42-6BL20	
1500	Receiver	3RG78 44-4BB22-0SS1		3RG78 44-4BB22-1SS1		3RG78 42-6BM21	
1500	Emitter	3RG78 44-4SB22-0SS0		3RG78 44-4SB22-1SS0		3RG78 42-6BM20	
1650	Receiver	3RG78 44-4BB24-0SS1		3RG78 44-4BB24-1SS1		3RG78 42-6BN21	
1650	Emitter	3RG78 44-4SB24-0SS0		3RG78 44-4SB24-1SS0		3RG78 42-6BN20	
1800	Receiver	3RG78 44-4BB26-0SS1		3RG78 44-4BB26-1SS1		3RG78 42-6BP21	
1800	Emitter	3RG78 44-4SB26-0SS0		3RG78 44-4SB26-1SS0		3RG78 42-6BP20	

1) Required above all for applications on the NAFTA market

2) For scope of supply see top of page 4/18

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
Resolution 30 mm				
150	Receiver	3RG78 44-4BD02-0SS1	–	3RG78 42-6DB21
150	Emitter	3RG78 44-4SD02-0SS0	–	3RG78 42-6DB20
225	Receiver	3RG78 44-4BD03-0SS1	3RG78 44-4BD03-1SS1	3RG78 42-6DC21
225	Emitter	3RG78 44-4SD03-0SS0	3RG78 44-4SD03-1SS0	3RG78 42-6DC20
300	Receiver	3RG78 44-4BD04-0SS1	3RG78 44-4BD04-1SS1	3RG78 42-6DD21
300	Emitter	3RG78 44-4SD04-0SS0	3RG78 44-4SD04-1SS0	3RG78 42-6DD20
450	Receiver	3RG78 44-4BD06-0SS1	3RG78 44-4BD06-1SS1	▶ 3RG78 42-6DE21
450	Emitter	3RG78 44-4SD06-0SS0	3RG78 44-4SD06-1SS0	▶ 3RG78 42-6DE20
600	Receiver	3RG78 44-4BD08-0SS1	3RG78 44-4BD08-1SS1	3RG78 42-6DF21
600	Emitter	3RG78 44-4SD08-0SS0	3RG78 44-4SD08-1SS0	3RG78 42-6DF20
750	Receiver	3RG78 44-4BD11-0SS1	3RG78 44-4BD11-1SS1	3RG78 42-6DG21
750	Emitter	3RG78 44-4SD11-0SS0	3RG78 44-4SD11-1SS0	3RG78 42-6DG20
900	Receiver	3RG78 44-4BD13-0SS1	3RG78 44-4BD13-1SS1	3RG78 42-6DH21
900	Emitter	3RG78 44-4SD13-0SS0	3RG78 44-4SD13-1SS0	3RG78 42-6DH20
1050	Receiver	3RG78 44-4BD15-0SS1	3RG78 44-4BD15-1SS1	3RG78 42-6DJ21
1050	Emitter	3RG78 44-4SD15-0SS0	3RG78 44-4SD15-1SS0	3RG78 42-6DJ20
1200	Receiver	3RG78 44-4BD17-0SS1	3RG78 44-4BD17-1SS1	3RG78 42-6DK21
1200	Emitter	3RG78 44-4SD17-0SS0	3RG78 44-4SD17-1SS0	3RG78 42-6DK20
1350	Receiver	3RG78 44-4BD20-0SS1	3RG78 44-4BD20-1SS1	3RG78 42-6DL21
1350	Emitter	3RG78 44-4SD20-0SS0	3RG78 44-4SD20-1SS0	3RG78 42-6DL20
1500	Receiver	3RG78 44-4BD22-0SS1	3RG78 44-4BD22-1SS1	3RG78 42-6DM21
1500	Emitter	3RG78 44-4SD22-0SS0	3RG78 44-4SD22-1SS0	3RG78 42-6DM20
1650	Receiver	3RG78 44-4BD24-0SS1	3RG78 44-4BD24-1SS1	3RG78 42-6DN21
1650	Emitter	3RG78 44-4SD24-0SS0	3RG78 44-4SD24-1SS0	3RG78 42-6DN20
1800	Receiver	3RG78 44-4BD26-0SS1	3RG78 44-4BD26-1SS1	3RG78 42-6DP21
1800	Emitter	3RG78 44-4SD26-0SS0	3RG78 44-4SD26-1SS0	3RG78 42-6DP20
Resolution 50 mm				
450	Receiver	3RG78 44-4BE06-0SS1	3RG78 44-4BE06-1SS1	3RG78 42-6EE21
450	Emitter	3RG78 44-4SE06-0SS0	3RG78 44-4SE06-1SS0	3RG78 42-6EE20
600	Receiver	3RG78 44-4BE08-0SS1	3RG78 44-4BE08-1SS1	3RG78 42-6EF21
600	Emitter	3RG78 44-4SE08-0SS0	3RG78 44-4SE08-1SS0	3RG78 42-6EF20
750	Receiver	3RG78 44-4BE11-0SS1	3RG78 44-4BE11-1SS1	3RG78 42-6EG21
750	Emitter	3RG78 44-4SE11-0SS0	3RG78 44-4SE11-1SS0	3RG78 42-6EG20
900	Receiver	3RG78 44-4BE13-0SS1	3RG78 44-4BE13-1SS1	3RG78 42-6EH21
900	Emitter	3RG78 44-4SE13-0SS0	3RG78 44-4SE13-1SS0	3RG78 42-6EH20
1050	Receiver	3RG78 44-4BE15-0SS1	3RG78 44-4BE15-1SS1	3RG78 42-6EJ21
1050	Emitter	3RG78 44-4SE15-0SS0	3RG78 44-4SE15-1SS0	3RG78 42-6EJ20
1200	Receiver	3RG78 44-4BE17-0SS1	3RG78 44-4BE17-1SS1	3RG78 42-6EK21
1200	Emitter	3RG78 44-4SE17-0SS0	3RG78 44-4SE17-1SS0	3RG78 42-6EK20
1350	Receiver	3RG78 44-4BE20-0SS1	3RG78 44-4BE20-1SS1	3RG78 42-6EL21
1350	Emitter	3RG78 44-4SE20-0SS0	3RG78 44-4SE20-1SS0	3RG78 42-6EL20
1500	Receiver	3RG78 44-4BE22-0SS1	3RG78 44-4BE22-1SS1	3RG78 42-6EM21
1500	Emitter	3RG78 44-4SE22-0SS0	3RG78 44-4SE22-1SS0	3RG78 42-6EM20
1650	Receiver	3RG78 44-4BE24-0SS1	3RG78 44-4BE24-1SS1	3RG78 42-6EN21
1650	Emitter	3RG78 44-4SE24-0SS0	3RG78 44-4SE24-1SS0	3RG78 42-6EN20
1800	Receiver	3RG78 44-4BE26-0SS1	3RG78 44-4BE26-1SS1	3RG78 42-6EP21
1800	Emitter	3RG78 44-4SE26-0SS0	3RG78 44-4SE26-1SS0	3RG78 42-6EP20

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device		Host device		Guest device	
		Order No.		Order No.		Order No.	
2100	Receiver	3RG78 44-4BE28-0SS1		3RG78 44-4BE28-1SS1		3RG78 42-6ER21	
2100	Emitter	3RG78 44-4SE28-0SS0		3RG78 44-4SE28-1SS0		3RG78 42-6ER20	
2400	Receiver	3RG78 44-4BE31-0SS1		3RG78 44-4BE31-1SS1		3RG78 42-6ES21	
2400	Emitter	3RG78 44-4SE31-0SS0		3RG78 44-4SE31-1SS0		3RG78 42-6ES20	
2700	Receiver	3RG78 44-4BE33-0SS1		3RG78 44-4BE33-1SS1		3RG78 42-6ET21	
2700	Emitter	3RG78 44-4SE33-0SS0		3RG78 44-4SE33-1SS0		3RG78 42-6ET20	
3000	Receiver	3RG78 44-4BE35-0SS1		3RG78 44-4BE35-1SS1		3RG78 42-6EU21	
3000	Emitter	3RG78 44-4SE35-0SS0		3RG78 44-4SE35-1SS0		3RG78 42-6EU20	

Light curtains with blanking function package Transistor output with Hirschmann connection¹⁾

Protection field height mm	Type	Standard device		Host device		Guest device	
		Order No.		Order No.		Order No.	
Resolution 14 mm							
150	Receiver	3RG78 44-2BB02-0SS1		–		3RG78 42-6BB21	
150	Emitter	3RG78 44-2SB02-0SS0		–		3RG78 42-6BB20	
225	Receiver	3RG78 44-2BB03-0SS1		3RG78 44-2BB03-1SS1		3RG78 42-6BC21	
225	Emitter	3RG78 44-2SB03-0SS0		3RG78 44-2SB03-1SS0		3RG78 42-6BC20	
300	Receiver	3RG78 44-2BB04-0SS1		3RG78 44-2BB04-1SS1		3RG78 42-6BD21	
300	Emitter	3RG78 44-2SB04-0SS0		3RG78 44-2SB04-1SS0		3RG78 42-6BD20	
450	Receiver	3RG78 44-2BB06-0SS1		3RG78 44-2BB06-1SS1		3RG78 42-6BE21	
450	Emitter	3RG78 44-2SB06-0SS0		3RG78 44-2SB06-1SS0		3RG78 42-6BE20	
600	Receiver	3RG78 44-2BB08-0SS1		3RG78 44-2BB08-1SS1		3RG78 42-6BF21	
600	Emitter	3RG78 44-2SB08-0SS0		3RG78 44-2SB08-1SS0		3RG78 42-6BF20	
750	Receiver	3RG78 44-2BB11-0SS1		3RG78 44-2BB11-1SS1		3RG78 42-6BG21	
750	Emitter	3RG78 44-2SB11-0SS0		3RG78 44-2SB11-1SS0		3RG78 42-6BG20	
900	Receiver	3RG78 44-2BB13-0SS1		3RG78 44-2BB13-1SS1		3RG78 42-6BH21	
900	Emitter	3RG78 44-2SB13-0SS0		3RG78 44-2SB13-1SS0		3RG78 42-6BH20	
1050	Receiver	3RG78 44-2BB15-0SS1		3RG78 44-2BB15-1SS1		3RG78 42-6BJ21	
1050	Emitter	3RG78 44-2SB15-0SS0		3RG78 44-2SB15-1SS0		3RG78 42-6BJ20	
1200	Receiver	3RG78 44-2BB17-0SS1		3RG78 44-2BB17-1SS1		3RG78 42-6BK21	
1200	Emitter	3RG78 44-2SB17-0SS0		3RG78 44-2SB17-1SS0		3RG78 42-6BK20	
1350	Receiver	3RG78 44-2BB20-0SS1		3RG78 44-2BB20-1SS1		3RG78 42-6BL21	
1350	Emitter	3RG78 44-2SB20-0SS0		3RG78 44-2SB20-1SS0		3RG78 42-6BL20	
1500	Receiver	3RG78 44-2BB22-0SS1		3RG78 44-2BB22-1SS1		3RG78 42-6BM21	
1500	Emitter	3RG78 44-2SB22-0SS0		3RG78 44-2SB22-1SS0		3RG78 42-6BM20	
1650	Receiver	3RG78 44-2BB24-0SS1		3RG78 44-2BB24-1SS1		3RG78 42-6BN21	
1650	Emitter	3RG78 44-2SB24-0SS0		3RG78 44-2SB24-1SS0		3RG78 42-6BN20	
1800	Receiver	3RG78 44-2BB26-0SS1		3RG78 44-2BB26-1SS1		3RG78 42-6BP21	
1800	Emitter	3RG78 44-2SB26-0SS0		3RG78 44-2SB26-1SS0		3RG78 42-6BP20	
Resolution 30 mm							
150	Receiver	3RG78 44-2BD02-0SS1		–		3RG78 42-6DB21	
150	Emitter	3RG78 44-2SD02-0SS0		–		3RG78 42-6DB20	
225	Receiver	3RG78 44-2BD03-0SS1		3RG78 44-2BD03-1SS1		3RG78 42-6DC21	
225	Emitter	3RG78 44-2SD03-0SS0		3RG78 44-2SD03-1SS0		3RG78 42-6DC20	
300	Receiver	3RG78 44-2BD04-0SS1		3RG78 44-2BD04-1SS1		3RG78 42-6DD21	
300	Emitter	3RG78 44-2SD04-0SS0		3RG78 44-2SD04-1SS0		3RG78 42-6DD20	
450	Receiver	3RG78 44-2BD06-0SS1		3RG78 44-2BD06-1SS1	▶	3RG78 42-6DE21	
450	Emitter	3RG78 44-2SD06-0SS0		3RG78 44-2SD06-1SS0	▶	3RG78 42-6DE20	

1) For scope of supply see top of page 4/18

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device		Host device		Guest device	
		Order No.		Order No.		Order No.	
600	Receiver	3RG78 44-2BD08-OSS1		3RG78 44-2BD08-1SS1		3RG78 42-6DF21	
600	Emitter	3RG78 44-2SD08-OSS0		3RG78 44-2SD08-1SS0		3RG78 42-6DF20	
750	Receiver	3RG78 44-2BD11-OSS1		3RG78 44-2BD11-1SS1		3RG78 42-6DG21	
750	Emitter	3RG78 44-2SD11-OSS0		3RG78 44-2SD11-1SS0		3RG78 42-6DG20	
900	Receiver	3RG78 44-2BD13-OSS1		3RG78 44-2BD13-1SS1		3RG78 42-6DH21	
900	Emitter	3RG78 44-2SD13-OSS0		3RG78 44-2SD13-1SS0		3RG78 42-6DH20	
1050	Receiver	3RG78 44-2BD15-OSS1		3RG78 44-2BD15-1SS1		3RG78 42-6DJ21	
1050	Emitter	3RG78 44-2SD15-OSS0		3RG78 44-2SD15-1SS0		3RG78 42-6DJ20	
1200	Receiver	3RG78 44-2BD17-OSS1		3RG78 44-2BD17-1SS1		3RG78 42-6DK21	
1200	Emitter	3RG78 44-2SD17-OSS0		3RG78 44-2SD17-1SS0		3RG78 42-6DK20	
1350	Receiver	3RG78 44-2BD20-OSS1		3RG78 44-2BD20-1SS1		3RG78 42-6DL21	
1350	Emitter	3RG78 44-2SD20-OSS0		3RG78 44-2SD20-1SS0		3RG78 42-6DL20	
1500	Receiver	3RG78 44-2BD22-OSS1		3RG78 44-2BD22-1SS1		3RG78 42-6DM21	
1500	Emitter	3RG78 44-2SD22-OSS0		3RG78 44-2SD22-1SS0		3RG78 42-6DM20	
1650	Receiver	3RG78 44-2BD24-OSS1		3RG78 44-2BD24-1SS1		3RG78 42-6DN21	
1650	Emitter	3RG78 44-2SD24-OSS0		3RG78 44-2SD24-1SS0		3RG78 42-6DN20	
1800	Receiver	3RG78 44-2BD26-OSS1		3RG78 44-2BD26-1SS1		3RG78 42-6DP21	
1800	Emitter	3RG78 44-2SD26-OSS0		3RG78 44-2SD26-1SS0		3RG78 42-6DP20	
Resolution 50 mm							
450	Receiver	3RG78 44-2BE06-OSS1		3RG78 44-2BE06-1SS1		3RG78 42-6EE21	
450	Emitter	3RG78 44-2SE06-OSS0		3RG78 44-2SE06-1SS0		3RG78 42-6EE20	
600	Receiver	3RG78 44-2BE08-OSS1		3RG78 44-2BE08-1SS1		3RG78 42-6EF21	
600	Emitter	3RG78 44-2SE08-OSS0		3RG78 44-2SE08-1SS0		3RG78 42-6EF20	
750	Receiver	3RG78 44-2BE11-OSS1		3RG78 44-2BE11-1SS1		3RG78 42-6EG21	
750	Emitter	3RG78 44-2SE11-OSS0		3RG78 44-2SE11-1SS0		3RG78 42-6EG20	
900	Receiver	3RG78 44-2BE13-OSS1		3RG78 44-2BE13-1SS1		3RG78 42-6EH21	
900	Emitter	3RG78 44-2SE13-OSS0		3RG78 44-2SE13-1SS0		3RG78 42-6EH20	
1050	Receiver	3RG78 44-2BE15-OSS1		3RG78 44-2BE15-1SS1		3RG78 42-6EJ21	
1050	Emitter	3RG78 44-2SE15-OSS0		3RG78 44-2SE15-1SS0		3RG78 42-6EJ20	
1200	Receiver	3RG78 44-2BE17-OSS1		3RG78 44-2BE17-1SS1		3RG78 42-6EK21	
1200	Emitter	3RG78 44-2SE17-OSS0		3RG78 44-2SE17-1SS0		3RG78 42-6EK20	
1350	Receiver	3RG78 44-2BE20-OSS1		3RG78 44-2BE20-1SS1		3RG78 42-6EL21	
1350	Emitter	3RG78 44-2SE20-OSS0		3RG78 44-2SE20-1SS0		3RG78 42-6EL20	
1500	Receiver	3RG78 44-2BE22-OSS1		3RG78 44-2BE22-1SS1		3RG78 42-6EM21	
1500	Emitter	3RG78 44-2SE22-OSS0		3RG78 44-2SE22-1SS0		3RG78 42-6EM20	
1650	Receiver	3RG78 44-2BE24-OSS1		3RG78 44-2BE24-1SS1		3RG78 42-6EN21	
1650	Emitter	3RG78 44-2SE24-OSS0		3RG78 44-2SE24-1SS0		3RG78 42-6EN20	
1800	Receiver	3RG78 44-2BE26-OSS1		3RG78 44-2BE26-1SS1		3RG78 42-6EP21	
1800	Emitter	3RG78 44-2SE26-OSS0		3RG78 44-2SE26-1SS0		3RG78 42-6EP20	
2100	Receiver	3RG78 44-2BE28-OSS1		3RG78 44-2BE28-1SS1		3RG78 42-6ER21	
2100	Emitter	3RG78 44-2SE28-OSS0		3RG78 44-2SE28-1SS0		3RG78 42-6ER20	
2400	Receiver	3RG78 44-2BE31-OSS1		3RG78 44-2BE31-1SS1		3RG78 42-6ES21	
2400	Emitter	3RG78 44-2SE31-OSS0		3RG78 44-2SE31-1SS0		3RG78 42-6ES20	
2700	Receiver	3RG78 44-2BE33-OSS1		3RG78 44-2BE33-1SS1		3RG78 42-6ET21	
2700	Emitter	3RG78 44-2SE33-OSS0		3RG78 44-2SE33-1SS0		3RG78 42-6ET20	
3000	Receiver	3RG78 44-2BE35-OSS1		3RG78 44-2BE35-1SS1		3RG78 42-6EU21	
3000	Emitter	3RG78 44-2SE35-OSS0		3RG78 44-2SE35-1SS0		3RG78 42-6EU20	

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Light curtains with blanking function package
Relay output with Hirschmann connection¹⁾

Protective zone height mm	Type	Standard device	Standard device
		14 mm resolution	30 mm resolution
		Order No.	Order No.
Resolution 14 mm and 30 mm			
300	Receiver	3RG78 44-8BB04-0SS1	3RG78 44-8BD04-0SS1
300	Emitter	3RG78 44-2SB04-0SS0	3RG78 44-2SD04-0SS0
450	Receiver	3RG78 44-8BB06-0SS1	3RG78 44-8BD06-0SS1
450	Emitter ▶	3RG78 44-2SB06-0SS0	3RG78 44-2SD06-0SS0
600	Receiver	3RG78 44-8BB08-0SS1	3RG78 44-8BD08-0SS1
600	Emitter	3RG78 44-2SB08-0SS0	3RG78 44-2SD08-0SS0
750	Receiver	3RG78 44-8BB11-0SS1	3RG78 44-8BD11-0SS1
750	Emitter	3RG78 44-2SB11-0SS0	3RG78 44-2SD11-0SS0
900	Receiver	3RG78 44-8BB13-0SS1	3RG78 44-8BD13-0SS1
900	Emitter	3RG78 44-2SB13-0SS0	3RG78 44-2SD13-0SS0
1050	Receiver	3RG78 44-8BB15-0SS1	3RG78 44-8BD15-0SS1
1050	Emitter	3RG78 44-2SB15-0SS0	3RG78 44-2SD15-0SS0
1200	Receiver	3RG78 44-8BB17-0SS1	3RG78 44-8BD17-0SS1
1200	Emitter	3RG78 44-2SB17-0SS0	3RG78 44-2SD17-0SS0
1350	Receiver	3RG78 44-8BB20-0SS1	3RG78 44-8BD20-0SS1
1350	Emitter	3RG78 44-2SB20-0SS0	3RG78 44-2SD20-0SS0
1500	Receiver	On request	3RG78 44-8BD22-0SS1
1500	Emitter	On request	3RG78 44-2SD22-0SS0
1650	Receiver	On request	3RG78 44-8BD24-0SS1
1650	Emitter	On request	3RG78 44-2SD24-0SS0
1800	Receiver	On request	3RG78 44-8BD26-0SS1
1800	Emitter	On request	3RG78 44-2SD26-0SS0

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1) For scope of supply see top of page 4/18

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Light curtains with muting function package
Transistor output with M12 plug connection¹⁾

Protective zone height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
300	Receiver	3RG78 44-3MD04-0SS1	On request	3RG78 42-6DD21
300	Emitter	3RG78 44-3SD04-0SS0	On request	3RG78 42-6DD20
450	Receiver	3RG78 44-3MD06-0SS1	On request	▶ 3RG78 42-6DE21
450	Emitter	3RG78 44-3SD06-0SS0	On request	▶ 3RG78 42-6DE20
600	Receiver	3RG78 44-3MD08-0SS1	On request	3RG78 42-6DF21
600	Emitter	3RG78 44-3SD08-0SS0	On request	3RG78 42-6DF20
750	Receiver	3RG78 44-3MD11-0SS1	On request	3RG78 42-6DG21
750	Emitter	3RG78 44-3SD11-0SS0	On request	3RG78 42-6DG20
900	Receiver	3RG78 44-3MD13-0SS1	On request	3RG78 42-6DH21
900	Emitter	3RG78 44-3SD13-0SS0	On request	3RG78 42-6DH20
1050	Receiver	3RG78 44-3MD15-0SS1	On request	3RG78 42-6DJ21
1050	Emitter	3RG78 44-3SD15-0SS0	On request	3RG78 42-6DJ20
1200	Receiver	3RG78 44-3MD17-0SS1	On request	3RG78 42-6DK21
1200	Emitter	3RG78 44-3SD17-0SS0	On request	3RG78 42-6DK20
1350	Receiver	3RG78 44-3MD20-0SS1	On request	3RG78 42-6DL21
1350	Emitter	3RG78 44-3SD20-0SS0	On request	3RG78 42-6DL20
1500	Receiver	3RG78 44-3MD22-0SS1	On request	3RG78 42-6DM21
1500	Emitter	3RG78 44-3SD22-0SS0	On request	3RG78 42-6DM20
1650	Receiver	3RG78 44-3MD24-0SS1	On request	3RG78 42-6DN21
1650	Emitter	3RG78 44-3SD24-0SS0	On request	3RG78 42-6DN20
1800	Receiver	3RG78 44-3MD26-0SS1	On request	3RG78 42-6DP21
1800	Emitter	3RG78 44-3SD26-0SS0	On request	3RG78 42-6DP20

Light curtains with muting function package
Transistor output with cable gland¹⁾

Protective zone height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
300	Receiver	3RG78 44-6MD04-0SS1	On request	3RG78 42-6DD21
300	Emitter	3RG78 44-6SD04-0SS0	On request	3RG78 42-6DD20
450	Receiver	3RG78 44-6MD06-0SS1	On request	▶ 3RG78 42-6DE21
450	Emitter	3RG78 44-6SD06-0SS0	On request	▶ 3RG78 42-6DE20
600	Receiver	3RG78 44-6MD08-0SS1	On request	3RG78 42-6DF21
600	Emitter	3RG78 44-6SD08-0SS0	On request	3RG78 42-6DF20
750	Receiver	3RG78 44-6MD11-0SS1	On request	3RG78 42-6DG21
750	Emitter	3RG78 44-6SD11-0SS0	On request	3RG78 42-6DG20
900	Receiver	3RG78 44-6MD13-0SS1	On request	3RG78 42-6DH21
900	Emitter	3RG78 44-6SD13-0SS0	On request	3RG78 42-6DH20
1050	Receiver	3RG78 44-6MD15-0SS1	On request	3RG78 42-6DJ21
1050	Emitter	3RG78 44-6SD15-0SS0	On request	3RG78 42-6DJ20
1200	Receiver	3RG78 44-6MD17-0SS1	On request	3RG78 42-6DK21
1200	Emitter	3RG78 44-6SD17-0SS0	On request	3RG78 42-6DK20
1350	Receiver	3RG78 44-6MD20-0SS1	On request	3RG78 42-6DL21
1350	Emitter	3RG78 44-6SD20-0SS0	On request	3RG78 42-6DL20
1500	Receiver	3RG78 44-6MD22-0SS1	On request	3RG78 42-6DM21
1500	Emitter	3RG78 44-6SD22-0SS0	On request	3RG78 42-6DM20

1) For scope of supply see top of page 4/18

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protective zone height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
1650	Receiver	3RG78 44-6MD24-0SS1	On request	3RG78 42-6DN21
1650	Emitter	3RG78 44-6SD24-0SS0	On request	3RG78 42-6DN20
1800	Receiver	3RG78 44-6MD26-0SS1	On request	3RG78 42-6DP21
1800	Emitter	3RG78 44-6SD26-0SS0	On request	3RG78 42-6DP20

Light grids with muting function package Transistor output with cable gland¹⁾

No. of beams	Beam distance	Type	Standard device
	mm		Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver	3RG78 44-6MM50-0SS1
4-beam	300	Emitter	3RG78 44-6SM50-0SS0
3-beam	400	Receiver	3RG78 44-6MP50-0SS1
3-beam	400	Emitter	3RG78 44-6SP50-0SS0
2-beam	500	Receiver	3RG78 44-6MS50-0SS1
2-beam	500	Emitter	3RG78 44-6SS50-0SS0
Range 6 ... 70 m			
4-beam	300	Receiver	3RG78 44-6MM51-0SS1
4-beam	300	Emitter	3RG78 44-6SM51-0SS0
3-beam	400	Receiver	3RG78 44-6MP51-0SS1
3-beam	400	Emitter	3RG78 44-6SP51-0SS0
2-beam	500	Receiver	3RG78 44-6MS51-0SS1
2-beam	500	Emitter	3RG78 44-6SS51-0SS0

Transceiver with muting function package Transistor output with cable gland¹⁾

No. of beams	Beam distance	Type	Standard device
	mm		Order No.
Range 6.5 m			
2-beam	500	Transceiver	3RG78 44-6MS50-0ST0
2-beam	500	Transceiver with integrated LED	3RG78 44-6MS50-0MT0
Reflecting mirrors for transceivers			3RG78 48-1TL

Light curtains with muting function package Transistor output with Brad Harrison connection (MIN Series)¹⁾²⁾

Protective zone height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
300	Receiver	3RG78 44-4MD04-0SS1	On request	3RG78 42-6DD21
300	Emitter	3RG78 44-4SD04-0SS0	On request	3RG78 42-6DD20
450	Receiver	3RG78 44-4MD06-0SS1	On request	3RG78 42-6DE21
450	Emitter	3RG78 44-4SD06-0SS0	On request	3RG78 42-6DE20
600	Receiver	3RG78 44-4MD08-0SS1	On request	3RG78 42-6DF21
600	Emitter	3RG78 44-4SD08-0SS0	On request	3RG78 42-6DF20
750	Receiver	3RG78 44-4MD11-0SS1	On request	3RG78 42-6DG21
750	Emitter	3RG78 44-4SD11-0SS0	On request	3RG78 42-6DG20
900	Receiver	3RG78 44-4MD13-0SS1	On request	3RG78 42-6DH21
900	Emitter	3RG78 44-4SD13-0SS0	On request	3RG78 42-6DH20

1) For scope of supply see top of page 4/18.

2) Required above all for applications on the NAFTA market.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protective zone height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
1050	Receiver	3RG78 44-4MD15-0SS1	On request	3RG78 42-6DJ21
1050	Emitter	3RG78 44-4SD15-0SS0	On request	3RG78 42-6DJ20
1200	Receiver	3RG78 44-4MD17-0SS1	On request	3RG78 42-6DK21
1200	Emitter	3RG78 44-4SD17-0SS0	On request	3RG78 42-6DK20
1350	Receiver	3RG78 44-4MD20-0SS1	On request	3RG78 42-6DL21
1350	Emitter	3RG78 44-4SD20-0SS0	On request	3RG78 42-6DL20
1500	Receiver	3RG78 44-4MD22-0SS1	On request	3RG78 42-6DM21
1500	Emitter	3RG78 44-4SD22-0SS0	On request	3RG78 42-6DM20
1650	Receiver	3RG78 44-4MD24-0SS1	On request	3RG78 42-6DN21
1650	Emitter	3RG78 44-4SD24-0SS0	On request	3RG78 42-6DN20
1800	Receiver	3RG78 44-4MD26-0SS1	On request	3RG78 42-6DP21
1800	Emitter	3RG78 44-4SD26-0SS0	On request	3RG78 42-6DP20

Light grids with muting function package Transistor output with Brad Harrison connection (MIN Series)¹⁾²⁾

No. of beams	Beam distance	Type	Standard device
	mm		Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver	3RG78 44-4MM50-0SS1
4-beam	300	Emitter	3RG78 44-4SM50-0SS0
3-beam	400	Receiver	3RG78 44-4MP50-0SS1
3-beam	400	Emitter	3RG78 44-4SP50-0SS0
2-beam	500	Receiver	3RG78 44-4MS50-0SS1
2-beam	500	Emitter	3RG78 44-4SS50-0SS0

Light curtains with muting function package Transistor output with Hirschmann connection ²⁾

No. of beams	Beam distance	Type	Standard device
	mm		Order No.
Range 6 ... 70 m			
4-beam	300	Receiver	3RG78 44-2MM51-0SS1
4-beam	300	Emitter	3RG78 44-2SM51-0SS0
3-beam	400	Receiver	3RG78 44-2MP51-0SS1
3-beam	400	Emitter	3RG78 44-2SP51-0SS0
2-beam	500	Receiver	3RG78 44-2MS51-0SS1
2-beam	500	Emitter	3RG78 44-2SS51-0SS0

Light curtains with muting function package Relay output with Hirschmann connection ²⁾

Protective zone height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
300	Receiver	3RG78 44-8MD04-0SS1	On request	3RG78 42-6DD21
300	Emitter	3RG78 44-2SD04-0SS0	On request	3RG78 42-6DD20
450	Receiver	3RG78 44-8MD06-0SS1	On request	3RG78 42-6DE21
450	Emitter	3RG78 44-2SD06-0SS0	On request	3RG78 42-6DE20

1) Required above all for applications on the NAFTA market.

2) For scope of supply see top of page 4/18.

► Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Protective zone height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
Resolution 30 mm				
600	Receiver	3RG78 44-8MD08-0SS1	On request	3RG78 42-6DF21
600	Emitter	3RG78 44-2SD08-0SS0	On request	3RG78 42-6DF20
750	Receiver	3RG78 44-8MD11-0SS1	On request	3RG78 42-6DG21
750	Emitter	3RG78 44-2SD11-0SS0	On request	3RG78 42-6DG20
900	Receiver	3RG78 44-8MD13-0SS1	On request	3RG78 42-6DH21
900	Emitter	3RG78 44-2SD13-0SS0	On request	3RG78 42-6DH20
1050	Receiver	3RG78 44-8MD15-0SS1	On request	3RG78 42-6DJ21
1050	Emitter	3RG78 44-2SD15-0SS0	On request	3RG78 42-6DJ20
1200	Receiver	3RG78 44-8MD17-0SS1	On request	3RG78 42-6DK21
1200	Emitter	3RG78 44-2SD17-0SS0	On request	3RG78 42-6DK20
1350	Receiver	3RG78 44-8MD20-0SS1	On request	3RG78 42-6DL21
1350	Emitter	3RG78 44-2SD20-0SS0	On request	3RG78 42-6DL20
1500	Receiver	3RG78 44-8MD22-0SS1	On request	3RG78 42-6DM21
1500	Emitter	3RG78 44-2SD22-0SS0	On request	3RG78 42-6DM20
1650	Receiver	3RG78 44-8MD24-0SS1	On request	3RG78 42-6DN21
1650	Emitter	3RG78 44-2SD24-0SS0	On request	3RG78 42-6DN20
1800	Receiver	3RG78 44-8MD26-0SS1	On request	3RG78 42-6DP21
1800	Emitter	3RG78 44-2SD26-0SS0	On request	3RG78 42-6DP20

Light curtains with Muting function package Relay output with Hirschmann connection and integrated LED ¹⁾

Protective zone height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
Resolution 30 mm				
300	Receiver	3RG78 44-8MD04-0KS1	On request	3RG78 42-6DD21
300	Emitter	3RG78 44-2SD04-0SS0	On request	3RG78 42-6DD20
450	Receiver	3RG78 44-8MD06-0KS1	On request	3RG78 42-6DE21
450	Emitter	3RG78 44-2SD06-0SS0	On request	3RG78 42-6DE20
600	Receiver	3RG78 44-8MD08-0KS1	On request	3RG78 42-6DF21
600	Emitter	3RG78 44-2SD08-0SS0	On request	3RG78 42-6DF20
750	Receiver	3RG78 44-8MD11-0KS1	On request	3RG78 42-6DG21
750	Emitter	3RG78 44-2SD11-0SS0	On request	3RG78 42-6DG20
900	Receiver	3RG78 44-8MD13-0KS1	On request	3RG78 42-6DH21
900	Emitter	3RG78 44-2SD13-0SS0	On request	3RG78 42-6DH20
1050	Receiver	3RG78 44-8MD15-0KS1	On request	3RG78 42-6DJ21
1050	Emitter	3RG78 44-2SD15-0SS0	On request	3RG78 42-6DJ20
1200	Receiver	3RG78 44-8MD17-0KS1	On request	3RG78 42-6DK21
1200	Emitter	3RG78 44-2SD17-0SS0	On request	3RG78 42-6DK20

Light grids with Muting function package Transistor output with M12 plug connection ¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver	3RG78 44-3MM50-0SS1
4-beam	300	Emitter	3RG78 44-3SM50-0SS0
3-beam	400	Receiver	3RG78 44-3MP50-0SS1
3-beam	400	Emitter	3RG78 44-3SP50-0SS0
2-beam	500	Receiver	3RG78 44-3MS50-0SS1
2-beam	500	Emitter	3RG78 44-3SS50-0SS0

1) For scope of supply see top of page 4/18.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

*Light grids with Muting function package
Relay output with Hirschmann connection¹⁾*

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver ▶	3RG78 44-8MM50-0SS1
4-beam	300	Emitter ▶	3RG78 44-2SM50-0SS0
3-beam	400	Receiver	3RG78 44-8MP50-0SS1
3-beam	400	Emitter	3RG78 44-2SP50-0SS0
2-beam	500	Receiver	3RG78 44-8MS50-0SS1
2-beam	500	Emitter	3RG78 44-2SS50-0SS0
Range 6 ... 70 m			
4-beam	300	Receiver	3RG78 44-8MM51-0SS1
4-beam	300	Emitter	3RG78 44-2SM51-0SS0
3-beam	400	Receiver	3RG78 44-8MP51-0SS1
3-beam	400	Emitter	3RG78 44-2SP51-0SS0
2-beam	500	Receiver	3RG78 44-8MS51-0SS1
2-beam	500	Emitter	3RG78 44-2SS51-0SS0

*Light grids with Muting function package
Relay output with Hirschmann connection and integrated
LED¹⁾*

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver	3RG78 44-8MM50-0KS1
4-beam	300	Emitter	3RG78 44-2SM50-0SS0
3-beam	400	Receiver	3RG78 44-8MP50-0KS1
3-beam	400	Emitter	3RG78 44-2SP50-0SS0
2-beam	500	Receiver	3RG78 44-8MS50-0KS1
2-beam	500	Emitter	3RG78 44-2SS50-0SS0

1) For scope of supply see top of page 4/18.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

Transceivers with Muting function package Transistor output with M12 plug connection¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 6.5 m			
2-beam	500	Transceiver	3RG78 44-3MS50-0ST0
2-beam	500	Transceiver with integrated LED	3RG78 44-3MS50-0MT0
Reflecting mirrors for transceivers			3RG78 48-1TL

Transceivers with Muting function package Relay output with Hirschmann connection¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 6.5 m			
2-beam	500	Transceiver ▶	3RG78 44-8MS50-0ST0
2-beam	500	Transceiver with integrated LED ▶	3RG78 44-8MS50-0MT0
Reflecting mirrors for transceivers			3RG78 48-1TL

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1) For scope of supply see top of page 4/18.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 44 series, type 4

Integrated evaluation

*Light curtains with sequence control system function package
Transistor output with M12 plug connection¹⁾*

Protection field height	Type	Standard device 14 mm resolution	Host device 14 mm resolution
mm		Order No.	Order No.
Resolution 14 mm			
300	Receiver	3RG78 44-3TB04-0SS1	3RG78 44-3TB04-1SS1
300	Emitter	3RG78 44-3SB04-0SS0	3RG78 44-3SB04-1SS0
450	Receiver	3RG78 44-3TB06-0SS1	3RG78 44-3TB06-1SS1
450	Emitter	3RG78 44-3SB06-0SS0	3RG78 44-3SB06-1SS0
600	Receiver	3RG78 44-3TB08-0SS1	3RG78 44-3TB08-1SS1
600	Emitter	3RG78 44-3SB08-0SS0	3RG78 44-3SB08-1SS0
750	Receiver	3RG78 44-3TB11-0SS1	3RG78 44-3TB11-1SS1
750	Emitter	3RG78 44-3SB11-0SS0	3RG78 44-3SB11-1SS0
900	Receiver	3RG78 44-3TB13-0SS1	3RG78 44-3TB13-1SS1
900	Emitter	3RG78 44-3SB13-0SS0	3RG78 44-3SB13-1SS0

Additional products on request.

*Light curtains with sequence control system function package
Relay output with Hirschmann connection¹⁾*

Protection field height	Type	Standard device 14 mm resolution	Standard device 30 mm resolution
mm		Order No.	Order No.
Resolution 14 mm and 30 mm			
300	Receiver	3RG78 44-8TB04-0SS1	3RG78 44-8TD04-0SS1
300	Emitter	3RG78 44-2SB04-0SS0	3RG78 44-2SD04-0SS0
450	Receiver	3RG78 44-8TB06-0SS1	3RG78 44-8TD06-0SS1
450	Emitter	▶ 3RG78 44-2SB06-0SS0	3RG78 44-2SD06-0SS0
600	Receiver	3RG78 44-8TB08-0SS1	3RG78 44-8TD08-0SS1
600	Emitter	3RG78 44-2SB08-0SS0	3RG78 44-2SD08-0SS0
750	Receiver	3RG78 44-8TB11-0SS1	3RG78 44-8TD11-0SS1
750	Emitter	3RG78 44-2SB11-0SS0	3RG78 44-2SD11-0SS0
900	Receiver	3RG78 44-8TB13-0SS1	3RG78 44-8TD13-0SS1
900	Emitter	3RG78 44-2SB13-0SS0	3RG78 44-2SD13-0SS0

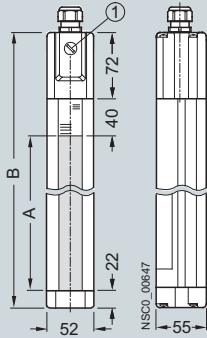
Additional products on request.

1) For scope of supply see top of page 4/18.

▶ Preferred type, available from stock.

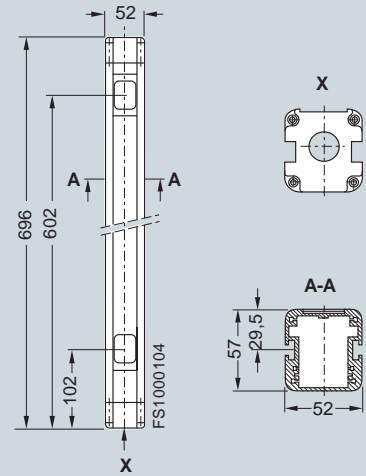
Dimensions

3RG78 44 standard light curtains, 3RG78 44 light grids



- ① Pg 9 cover (receiver only, for local interface)
- A Protection field height (see Selection and Ordering data)
- B Overall length = Protection field height A + 134 mm

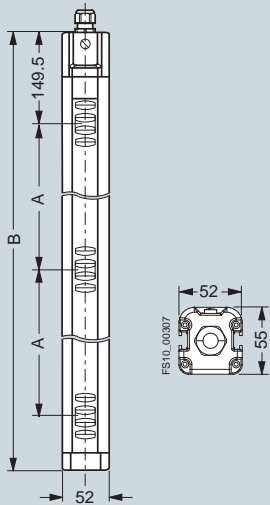
3RG78 48-1TL reflecting mirror



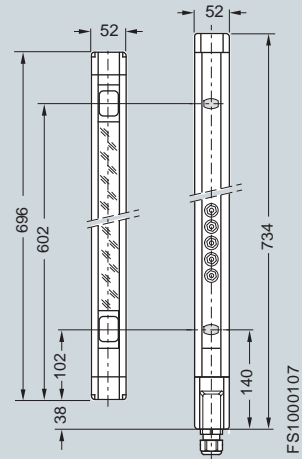
3RG78 44 light grids, additional dimensions

Additional dimensions for light grids only:

Type	B	A	Beams
3RG78 44-..M	1184	300	4
3RG78 44-..P	1034	400	3
3RG78 44-..S	734	500	2



3RG78 48-1TL reflecting mirror (left) and muting transceiver (right)



SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Overview



3RG78 45 light curtains and light grids with integrated evaluation for type 4 in accordance with IEC/EN 61496

- With "Standard" function package
- Resolutions: 14, 30, 50, and 90 mm
- Protection field height: 150 mm to 3000 mm
- 2-beam, 3-beam or 4-beam light grids
- Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (optional).

Two standard 3RG78 48-0AB mounting brackets each are enclosed with all devices (can also be ordered as accessories see page 4/92).

3RG78 45 program overview

Unit type	Function package	Output	Connection type	For light curtains: Resolution For light grids and transceivers: Range				See page
				14 mm	30 mm	50 mm	90 mm	
Light curtains	Standard	Transistor	M12 plug connector	✓	✓	✓	✓	4/36
Light grids	Standard	Transistor	M12 plug connector	0.8 ... 18 m; 6 ... 60 m				4/39
Transceivers	Standard	Transistor	M12 plug connector	6.5 m				4/39
Light curtains	Standard	Transistor	Hirschmann	✓	✓	–	–	4/39
Light grids	Standard	Transistor	Hirschmann	0.8 ... 18 m; 6 ... 60 m				4/41
Transceivers	Standard	Transistor	Hirschmann	6.5 m				4/41
Light curtains	Standard	Transistor	Brad Harrison (MIN) ¹⁾	✓	✓	✓	✓	4/41
Light grids	Standard	Transistor	Brad Harrison (MIN) ¹⁾	0.8 ... 18 m; 6 ... 60 m				4/44
Transceivers	Standard	Transistor	Brad Harrison (MIN) ¹⁾	6.5 m				4/44
Light curtains	Standard	Transistor	Cable gland	✓	✓	✓	✓	4/45
Light grids	Standard	Transistor	Cable gland	0.8 ... 18 m; 6 ... 60 m				4/47
Transceivers	Standard	Transistor	Cable gland	6.5 m				4/47

Accessories

Electrical connection

- Hirschmann type cables and cable plugs
- Brad Harrison type cable (MIN series)
- Connecting cable with M12 connection

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4/94

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Assembly materials

- Fixing columns, reflecting mirror
- Muting mounting systems
- Muting accessories

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4/92

4/95

Laser alignment assistance, diagnostic software

4/93

1) Required primarily for applications in the NAFTA market

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation
Technical specifications

Type	3RG78 45
Safety category to EN, IEC 61496-1, -3	Type 4 (self-monitoring)
Detection capability (resolution)	14 mm, 30 mm, 50 mm, 90 mm or whole person with 2, 3 or 4 beams
Protection field height	
• for 14 and 30 mm resolution	150 ... 1800 mm
• for 50 mm resolution	450 ... 3000 mm
• for 90 mm resolution	750 ... 3000 mm
Protection field width, sensing field	
• for 14 mm resolution	0.3 ... 6 m
• for 30, 50 and 90 mm resolution	0.8 ... 18 m
• for 18 m light grid	0.8 ... 18 m
• for 60 m light grid	6 ... 60 m
Supply voltage (emitter and receiver)	24 V DC \pm 20% (external power pack with safe isolation and 20 ms voltage power loss ride-through)
Current consumption	
• Emitter	75 mA
• Receiver	180 mA (without external load)
Vibration resistance	5 g, 10 ... 55 Hz to IEC/EN 60068-2-6
Shock resistance	10 g, 16 ms to IEC/EN 60068-2-29
Infrared stray light suppression	2 procedures may be selected
• Standard	High suppression
• d-scan	Very high suppression (response time increases in units with more than 15 beams)
Synchronization between emitter and receiver	Optical; 2 transmission channels can be selected
Ambient temperature	
• Operation	0 ... +55 °C
• Storage	-25 ... +70 °C
Humidity	15 ... 95%
Degree of protection	IP65
Electrical connection	via Pg 13 screw-type terminals and pluggable wiring space

Type	3RG78 45
Connecting cable	
• Emitter	7-pole: 0.5 ... 1.0 mm ²
• Receiver	7-pole: 0.5 ... 1.0 mm ² (shielded, if necessary)
Cable length for 1.0 mm ²	100 m

Inputs

Emitter test input	Closed-circuit principle
Minimum opening duration	50 ms

Outputs

Safety outputs	2 failsafe pnp outputs with cross-circuit monitoring (short circuit proof)
Output voltage $U_{a \min}$	$U_{\text{vers}} - 2.7 \text{ V}$
Output current $I_{a \max}$	0.3 A
Peak current	0.4 A
Continuous current	
• at 35 °C	0.3 A
• at 55 °C	0.22 A
Max. load capacity per output	300 nF (100 nF at channel 2)
Response time from the protection field interrupt to disconnection of the safety outputs	Increases with higher number of beams
• for 14 mm resolution	7 ... 39 ms (d-scan 10 ... 78 ms)
• for 30 mm resolution	7 ... 20 ms (d-scan 10 ... 39 ms)
• for 50 mm resolution	17 ms (d-scan 33 ms)
• for 90 mm resolution	13 ms (d-scan 20 ms)
• for 2, 3, or 4-beam light grids	5 ms (d-scan 8 ms)
Reactivation time from release of the protection field to connection of the safety outputs	
• For all resolutions	0.5 ms
• After very brief protection field interrupts	100 ms
Pollution and error message output	pnp output, short circuit proof
Output current, max.	70 mA
Safety and diagnostic interfaces	RS485, 57.6 kBaud

Application of the EN ISO 13849-1 standard: 2006 "Safety of machinery" for 3RG78 45 light curtains and light grids

	Protection field height/number of beams	PL 13849-1	Category ISO 13849-1	Cat. 954-1	PFH _D	T _M /years
3RG78 45-... light grids	4-beam	e	4	4	6.6×10^{-9}	20
3RG78 45-... light curtain	900 mm	e	4	4	7.3×10^{-9}	20
3RG78 45-... light curtain	1800 mm	e	4	4	8.3×10^{-9}	20
3RG78 45-... light curtain	3000 mm	e	4	4	9.5×10^{-9}	20

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Explanation

PFH_D = Probability of dangerous failure per hour

PL = Performance level

Discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions: From PL "a" (highest probability of failure) to PL "e" (lowest probability of failure).

For further explanations, see the brochure "European machinery directive – implemented easily", Order No. E20001-A230-M103-V1-7600.

Ordering notes

Included in the scope of supply:

3RG78 45 light curtains with standard function package	
Emitter	3RG78 48-0AB mounting bracket set and emitter insert
• in addition for transistor output and Hirschmann connection	7-pole cable plug
Receiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets
• in addition for 14 mm and 30 mm resolution	3RG78 48-0AH test rod
• in addition for transistor output and Hirschmann connection	7-pole cable plug
Guest devices of the 3RG78 42 series	
Emitter	3RG78 48-0AB mounting bracket set
Receiver	3RG78 48-0AB mounting bracket set
• in addition for 14 mm and 30 mm resolution	3RG78 48-0AH test rod
3RG78 45 light grids with standard function package	
Emitter	3RG78 48-0AB mounting bracket set and emitter insert
• in addition for transistor output and Hirschmann connection	7-pole cable plug
Receiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets
• in addition for transistor output and Hirschmann connection	7-pole cable plug
3RG78 45 transceiver with standard function package	
Transceiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets
• in addition for transistor output and Hirschmann connection	7-pole cable plug

Selection and Ordering data

Light curtains with standard function package Transistor output with M12 plug connection¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 14 mm				
150	Receiver	3RG78 45-3BB01	–	3RG78 42-6BB21
150	Emitter	3RG78 45-3BB00	–	3RG78 42-6BB20
225	Receiver	3RG78 45-3BC01	3RG78 45-3BC11	3RG78 42-6BC21
225	Emitter	3RG78 45-3BC00	3RG78 45-3BC10	3RG78 42-6BC20
300	Receiver	3RG78 45-3BD01	3RG78 45-3BD11	3RG78 42-6BD21
300	Emitter	3RG78 45-3BD00	3RG78 45-3BD10	3RG78 42-6BD20
450	Receiver	3RG78 45-3BE01	3RG78 45-3BE11	3RG78 42-6BE21
450	Emitter	3RG78 45-3BE00	3RG78 45-3BE10	3RG78 42-6BE20
600	Receiver	3RG78 45-3BF01	3RG78 45-3BF11	3RG78 42-6BF21
600	Emitter	3RG78 45-3BF00	3RG78 45-3BF10	3RG78 42-6BF20
750	Receiver	3RG78 45-3BG01	3RG78 45-3BG11	3RG78 42-6BG21
750	Emitter	3RG78 45-3BG00	3RG78 45-3BG10	3RG78 42-6BG20
900	Receiver	3RG78 45-3BH01	3RG78 45-3BH11	3RG78 42-6BH21
900	Emitter	3RG78 45-3BH00	3RG78 45-3BH10	3RG78 42-6BH20

1) For scope of supply see top of page 4/36

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
1050	Receiver	3RG78 45-3BJ01	3RG78 45-3BJ11	3RG78 42-6BJ21
1050	Emitter	3RG78 45-3BJ00	3RG78 45-3BJ10	3RG78 42-6BJ20
1200	Receiver	3RG78 45-3BK01	3RG78 45-3BK11	3RG78 42-6BK21
1200	Emitter	3RG78 45-3BK00	3RG78 45-3BK10	3RG78 42-6BK20
1350	Receiver	3RG78 45-3BL01	3RG78 45-3BL11	3RG78 42-6BL21
1350	Emitter	3RG78 45-3BL00	3RG78 45-3BL10	3RG78 42-6BL20
1500	Receiver	3RG78 45-3BM01	3RG78 45-3BM11	3RG78 42-6BM21
1500	Emitter	3RG78 45-3BM00	3RG78 45-3BM10	3RG78 42-6BM20
1650	Receiver	3RG78 45-3BN01	3RG78 45-3BN11	3RG78 42-6BN21
1650	Emitter	3RG78 45-3BN00	3RG78 45-3BN10	3RG78 42-6BN20
1800	Receiver	3RG78 45-3BP01	3RG78 45-3BP11	3RG78 42-6BP21
1800	Emitter	3RG78 45-3BP00	3RG78 45-3BP10	3RG78 42-6BP20
Resolution 30 mm				
150	Receiver	3RG78 45-3DB01	–	3RG78 42-6DB21
150	Emitter	3RG78 45-3DB00	–	3RG78 42-6DB20
225	Receiver	3RG78 45-3DC01	3RG78 45-3DC11	3RG78 42-6DC21
225	Emitter	3RG78 45-3DC00	3RG78 45-3DC10	3RG78 42-6DC20
300	Receiver	3RG78 45-3DD01	3RG78 45-3DD11	3RG78 42-6DD21
300	Emitter	3RG78 45-3DD00	3RG78 45-3DD10	3RG78 42-6DD20
450	Receiver	3RG78 45-3DE01	3RG78 45-3DE11 ▶	3RG78 42-6DE21
450	Emitter	3RG78 45-3DE00	3RG78 45-3DE10 ▶	3RG78 42-6DE20
600	Receiver	3RG78 45-3DF01	3RG78 45-3DF11	3RG78 42-6DF21
600	Emitter	3RG78 45-3DF00	3RG78 45-3DF10	3RG78 42-6DF20
750	Receiver	3RG78 45-3DG01	3RG78 45-3DG11	3RG78 42-6DG21
750	Emitter	3RG78 45-3DG00	3RG78 45-3DG10	3RG78 42-6DG20
900	Receiver	3RG78 45-3DH01	3RG78 45-3DH11	3RG78 42-6DH21
900	Emitter	3RG78 45-3DH00	3RG78 45-3DH10	3RG78 42-6DH20
1050	Receiver	3RG78 45-3DJ01	3RG78 45-3DJ11	3RG78 42-6DJ21
1050	Emitter	3RG78 45-3DJ00	3RG78 45-3DJ10	3RG78 42-6DJ20
1200	Receiver	3RG78 45-3DK01	3RG78 45-3DK11	3RG78 42-6DK21
1200	Emitter	3RG78 45-3DK00	3RG78 45-3DK10	3RG78 42-6DK20
1350	Receiver	3RG78 45-3DL01	3RG78 45-3DL11	3RG78 42-6DL21
1350	Emitter	3RG78 45-3DL00	3RG78 45-3DL10	3RG78 42-6DL20
1500	Receiver	3RG78 45-3DM01	3RG78 45-3DM11	3RG78 42-6DM21
1500	Emitter	3RG78 45-3DM00	3RG78 45-3DM10	3RG78 42-6DM20
1650	Receiver	3RG78 45-3DN01	3RG78 45-3DN11	3RG78 42-6DN21
1650	Emitter	3RG78 45-3DN00	3RG78 45-3DN10	3RG78 42-6DN20
1800	Receiver	3RG78 45-3DP01	3RG78 45-3DP11	3RG78 42-6DP21
1800	Emitter	3RG78 45-3DP00	3RG78 45-3DP10	3RG78 42-6DP20
Resolution 50 mm				
450	Receiver	3RG78 45-3EE01	3RG78 45-3EE11	3RG78 42-6EE21
450	Emitter	3RG78 45-3EE00	3RG78 45-3EE10	3RG78 42-6EE20
600	Receiver	3RG78 45-3EF01	3RG78 45-3EF11	3RG78 42-6EF21
600	Emitter	3RG78 45-3EF00	3RG78 45-3EF10	3RG78 42-6EF20
750	Receiver	3RG78 45-3EG01	3RG78 45-3EG11	3RG78 42-6EG21
750	Emitter	3RG78 45-3EG00	3RG78 45-3EG10	3RG78 42-6EG20
900	Receiver	3RG78 45-3EH01	3RG78 45-3EH11	3RG78 42-6EH21
900	Emitter	3RG78 45-3EH00	3RG78 45-3EH10	3RG78 42-6EH20

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
1050	Receiver	3RG78 45-3EJ01	3RG78 45-3EJ11	3RG78 42-6EJ21
1050	Emitter	3RG78 45-3EJ00	3RG78 45-3EJ10	3RG78 42-6EJ20
1200	Receiver	3RG78 45-3EK01	3RG78 45-3EK11	3RG78 42-6EK21
1200	Emitter	3RG78 45-3EK00	3RG78 45-3EK10	3RG78 42-6EK20
1350	Receiver	3RG78 45-3EL01	3RG78 45-3EL11	3RG78 42-6EL21
1350	Emitter	3RG78 45-3EL00	3RG78 45-3EL10	3RG78 42-6EL20
1500	Receiver	3RG78 45-3EM01	3RG78 45-3EM11	3RG78 42-6EM21
1500	Emitter	3RG78 45-3EM00	3RG78 45-3EM10	3RG78 42-6EM20
1650	Receiver	3RG78 45-3EN01	3RG78 45-3EN11	3RG78 42-6EN21
1650	Emitter	3RG78 45-3EN00	3RG78 45-3EN10	3RG78 42-6EN20
1800	Receiver	3RG78 45-3EP01	3RG78 45-3EP11	3RG78 42-6EP21
1800	Emitter	3RG78 45-3EP00	3RG78 45-3EP10	3RG78 42-6EP20
2100	Receiver	3RG78 45-3ER01	3RG78 45-3ER11	3RG78 42-6ER21
2100	Emitter	3RG78 45-3ER00	3RG78 45-3ER10	3RG78 42-6ER20
2400	Receiver	3RG78 45-3ES01	3RG78 45-3ES11	3RG78 42-6ES21
2400	Emitter	3RG78 45-3ES00	3RG78 45-3ES10	3RG78 42-6ES20
2700	Receiver	3RG78 45-3ET01	3RG78 45-3ET11	3RG78 42-6ET21
2700	Emitter	3RG78 45-3ET00	3RG78 45-3ET10	3RG78 42-6ET20
3000	Receiver	3RG78 45-3EU01	3RG78 45-3EU11	3RG78 42-6EU21
3000	Emitter	3RG78 45-3EU00	3RG78 45-3EU10	3RG78 42-6EU20
Resolution 90 mm				
750	Receiver	3RG78 45-3JG01	3RG78 45-3JG11	3RG78 42-6JG21
750	Emitter	3RG78 45-3JG00	3RG78 45-3JG10	3RG78 42-6JG20
900	Receiver	3RG78 45-3JH01	3RG78 45-3JH11	3RG78 42-6JH21
900	Emitter	3RG78 45-3JH00	3RG78 45-3JH10	3RG78 42-6JH20
1050	Receiver	3RG78 45-3JJ01	3RG78 45-3JJ11	3RG78 42-6JJ21
1050	Emitter	3RG78 45-3JJ00	3RG78 45-3JJ10	3RG78 42-6JJ20
1200	Receiver	3RG78 45-3JK01	3RG78 45-3JK11	3RG78 42-6JK21
1200	Emitter	3RG78 45-3JK00	3RG78 45-3JK10	3RG78 42-6JK20
1350	Receiver	3RG78 45-3JL01	3RG78 45-3JL11	3RG78 42-6JL21
1350	Emitter	3RG78 45-3JL00	3RG78 45-3JL10	3RG78 42-6JL20
1500	Receiver	3RG78 45-3JM01	3RG78 45-3JM11	3RG78 42-6JM21
1500	Emitter	3RG78 45-3JM00	3RG78 45-3JM10	3RG78 42-6JM20
1650	Receiver	3RG78 45-3JN01	3RG78 45-3JN11	3RG78 42-6JN21
1650	Emitter	3RG78 45-3JN00	3RG78 45-3JN10	3RG78 42-6JN20
1800	Receiver	3RG78 45-3JP01	3RG78 45-3JP11	3RG78 42-6JP21
1800	Emitter	3RG78 45-3JP00	3RG78 45-3JP10	3RG78 42-6JP20
2100	Receiver	3RG78 45-3JR01	3RG78 45-3JR11	3RG78 42-6JR21
2100	Emitter	3RG78 45-3JR00	3RG78 45-3JR10	3RG78 42-6JR20
2400	Receiver	3RG78 45-3JS01	3RG78 45-3JS11	3RG78 42-6JS21
2400	Emitter	3RG78 45-3JS00	3RG78 45-3JS10	3RG78 42-6JS20
2700	Receiver	3RG78 45-3JT01	3RG78 45-3JT11	3RG78 42-6JT21
2700	Emitter	3RG78 45-3JT00	3RG78 45-3JT10	3RG78 42-6JT20
3000	Receiver	3RG78 45-3JU01	3RG78 45-3JU11	3RG78 42-6JU21
3000	Emitter	3RG78 45-3JU00	3RG78 45-3JU10	3RG78 42-6JU20

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Light grids with standard function package Transistor output with M12 plug connection ¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 mm			
4-beam	300	Receiver	3RG78 45-3MH01
4-beam	300	Emitter	3RG78 45-3MH00
3-beam	400	Receiver	3RG78 45-3PG01
3-beam	400	Emitter	3RG78 45-3PG00
2-beam	500	Receiver	3RG78 45-3SE01
2-beam	500	Emitter	3RG78 45-3SE00
Range 6 ... 60 m			
4-beam	300	Receiver	3RG78 45-3MH51
4-beam	300	Emitter	3RG78 45-3MH50
3-beam	400	Receiver	3RG78 45-3PG51
3-beam	400	Emitter	3RG78 45-3PG50
2-beam	500	Receiver	3RG78 45-3SE51
2-beam	500	Emitter	3RG78 45-3SE50

Transceiver with standard function package Transistor output with M12 plug connection ¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 6.5 m			
2-beam	500	Transceiver	3RG78 45-3TE01
Reflecting mirrors for transceivers			3RG78 48-1TL

Light curtains with standard function package Transistor output with Hirschmann connection ¹⁾

Protective zone height mm	Type	Standard device Order No.	Host device Order No.	Guest device Order No.
Resolution 14 mm				
150	Receiver	3RG78 45-2BB01	–	3RG78 42-6BB21
150	Emitter	3RG78 45-2BB00	–	3RG78 42-6BB20
225	Receiver	3RG78 45-2BC01	On request	3RG78 42-6BC21
225	Emitter	3RG78 45-2BC00	On request	3RG78 42-6BC20
300	Receiver	3RG78 45-2BD01	On request	3RG78 42-6BD21
300	Emitter	3RG78 45-2BD00	On request	3RG78 42-6BD20
450	Receiver	3RG78 45-2BE01	On request	3RG78 42-6BE21
450	Emitter	3RG78 45-2BE00	On request	3RG78 42-6BE20
600	Receiver	3RG78 45-2BF01	On request	3RG78 42-6BF21
600	Emitter	3RG78 45-2BF00	On request	3RG78 42-6BF20
750	Receiver	3RG78 45-2BG01	On request	3RG78 42-6BG21
750	Emitter	3RG78 45-2BG00	On request	3RG78 42-6BG20
900	Receiver	3RG78 45-2BH01	On request	3RG78 42-6BH21
900	Emitter	3RG78 45-2BH00	On request	3RG78 42-6BH20
1050	Receiver	3RG78 45-2BJ01	On request	3RG78 42-6BJ21
1050	Emitter	3RG78 45-2BJ00	On request	3RG78 42-6BJ20

¹⁾ For scope of supply see top of page 4/36

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Protective zone height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
1200	Receiver	3RG78 45-2BK01	On request	3RG78 42-6BK21
1200	Emitter	3RG78 45-2BK00	On request	3RG78 42-6BK20
1350	Receiver	3RG78 45-2BL01	On request	3RG78 42-6BL21
1350	Emitter	3RG78 45-2BL00	On request	3RG78 42-6BL20
1500	Receiver	3RG78 45-2BM01	On request	3RG78 42-6BM21
1500	Emitter	3RG78 45-2BM00	On request	3RG78 42-6BM20
1650	Receiver	3RG78 45-2BN01	On request	3RG78 42-6BN21
1650	Emitter	3RG78 45-2BN00	On request	3RG78 42-6BN20
1800	Receiver	3RG78 45-2BP01	On request	3RG78 42-6BP21
1800	Emitter	3RG78 45-2BP00	On request	3RG78 42-6BP20
Resolution 30 mm				
150	Receiver	3RG78 45-2DB01	–	3RG78 42-6DB21
150	Emitter	3RG78 45-2DB00	–	3RG78 42-6DB20
225	Receiver	3RG78 45-2DC01	On request	3RG78 42-6DC21
225	Emitter	3RG78 45-2DC00	On request	3RG78 42-6DC20
300	Receiver	3RG78 45-2DD01	On request	3RG78 42-6DD21
300	Emitter	3RG78 45-2DD00	On request	3RG78 42-6DD20
450	Receiver	3RG78 45-2DE01	On request	▶ 3RG78 42-6DE21
450	Emitter	3RG78 45-2DE00	On request	▶ 3RG78 42-6DE20
600	Receiver	3RG78 45-2DF01	On request	3RG78 42-6DF21
600	Emitter	3RG78 45-2DF00	On request	3RG78 42-6DF20
750	Receiver	3RG78 45-2DG01	On request	3RG78 42-6DG21
750	Emitter	3RG78 45-2DG00	On request	3RG78 42-6DG20
900	Receiver	3RG78 45-2DH01	On request	3RG78 42-6DH21
900	Emitter	3RG78 45-2DH00	On request	3RG78 42-6DH20
1050	Receiver	3RG78 45-2DJ01	On request	3RG78 42-6DJ21
1050	Emitter	3RG78 45-2DJ00	On request	3RG78 42-6DJ20
1200	Receiver	3RG78 45-2DK01	On request	3RG78 42-6DK21
1200	Emitter	3RG78 45-2DK00	On request	3RG78 42-6DK20
1350	Receiver	3RG78 45-2DL01	On request	3RG78 42-6DL21
1350	Emitter	3RG78 45-2DL00	On request	3RG78 42-6DL20
1500	Receiver	3RG78 45-2DM01	On request	3RG78 42-6DM21
1500	Emitter	3RG78 45-2DM00	On request	3RG78 42-6DM20
1650	Receiver	3RG78 45-2DN01	On request	On request
1650	Emitter	3RG78 45-2DN00	On request	On request
1800	Receiver	3RG78 45-2DP01	On request	On request
1800	Emitter	3RG78 45-2DP00	On request	On request

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Light grids with standard function package Transistor output with Hirschmann connection¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver	3RG78 45-2MH01
4-beam	300	Emitter	3RG78 45-2MH00
3-beam	400	Receiver	3RG78 45-2PG01
3-beam	400	Emitter	3RG78 45-2PG00
2-beam	500	Receiver	3RG78 45-2SE01
2-beam	500	Emitter	3RG78 45-2SE00
Range 6 ... 60 m			
4-beam	300	Receiver	3RG78 45-2MH51
4-beam	300	Emitter	3RG78 45-2MH50
3-beam	400	Receiver	3RG78 45-2PG51
3-beam	400	Emitter	3RG78 45-2PG50
2-beam	500	Receiver	3RG78 45-2SE51
2-beam	500	Emitter	3RG78 45-2SE50

Transceiver with standard function package Transistor output with Hirschmann connection¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 6.5 m			
2-beam	500	Transceiver	3RG78 45-2TE01
Reflecting mirrors for transceivers			3RG78 48-1TL

Light curtains with standard function package Transistor output with Brad Harrison connection (MIN Series)¹⁾²⁾

Protection field height mm	Type	Standard device Order No.	Host device Order No.	Guest device Order No.
Resolution 14 mm				
150	Receiver	3RG78 45-4BB01	–	3RG78 42-6BB21
150	Emitter	3RG78 45-4BB00	–	3RG78 42-6BB20
225	Receiver	3RG78 45-4BC01	3RG78 45-4BC11	3RG78 42-6BC21
225	Emitter	3RG78 45-4BC00	3RG78 45-4BC10	3RG78 42-6BC20
300	Receiver	3RG78 45-4BD01	3RG78 45-4BD11	3RG78 42-6BD21
300	Emitter	3RG78 45-4BD00	3RG78 45-4BD10	3RG78 42-6BD20
450	Receiver	3RG78 45-4BE01	3RG78 45-4BE11	3RG78 42-6BE21
450	Emitter	3RG78 45-4BE00	3RG78 45-4BE10	3RG78 42-6BE20
600	Receiver	3RG78 45-4BF01	3RG78 45-4BF11	3RG78 42-6BF21
600	Emitter	3RG78 45-4BF00	3RG78 45-4BF10	3RG78 42-6BF20
750	Receiver	3RG78 45-4BG01	3RG78 45-4BG11	3RG78 42-6BG21
750	Emitter	3RG78 45-4BG00	3RG78 45-4BG10	3RG78 42-6BG20
900	Receiver	3RG78 45-4BH01	3RG78 45-4BH11	3RG78 42-6BH21
900	Emitter	3RG78 45-4BH00	3RG78 45-4BH10	3RG78 42-6BH20
1050	Receiver	3RG78 45-4BJ01	3RG78 45-4BJ11	3RG78 42-6BJ21
1050	Emitter	3RG78 45-4BJ00	3RG78 45-4BJ10	3RG78 42-6BJ20
1200	Receiver	3RG78 45-4BK01	3RG78 45-4BK11	3RG78 42-6BK21
1200	Emitter	3RG78 45-4BK00	3RG78 45-4BK10	3RG78 42-6BK20

1) For scope of supply see top of page 4/36

2) Required above all for applications on the NAFTA market

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device		Host device		Guest device	
		Order No.		Order No.		Order No.	
1350	Receiver	3RG78 45-4BL01		3RG78 45-4BL11		3RG78 42-6BL21	
1350	Emitter	3RG78 45-4BL00		3RG78 45-4BL10		3RG78 42-6BL20	
1500	Receiver	3RG78 45-4BM01		3RG78 45-4BM11		3RG78 42-6BM21	
1500	Emitter	3RG78 45-4BM00		3RG78 45-4BM10		3RG78 42-6BM20	
1650	Receiver	3RG78 45-4BN01		3RG78 45-4BN11		3RG78 42-6BN21	
1650	Emitter	3RG78 45-4BN00		3RG78 45-4BN10		3RG78 42-6BN20	
1800	Receiver	3RG78 45-4BP01		3RG78 45-4BP11		3RG78 42-6BP21	
1800	Emitter	3RG78 45-4BP00		3RG78 45-4BP10		3RG78 42-6BP20	
Resolution 30 mm							
150	Receiver	3RG78 45-4DB01		–		3RG78 42-6DB21	
150	Emitter	3RG78 45-4DB00		–		3RG78 42-6DB20	
225	Receiver	3RG78 45-4DC01		3RG78 45-4DC11		3RG78 42-6DC21	
225	Emitter	3RG78 45-4DC00		3RG78 45-4DC10		3RG78 42-6DC20	
300	Receiver	3RG78 45-4DD01		3RG78 45-4DD11		3RG78 42-6DD21	
300	Emitter	3RG78 45-4DD00		3RG78 45-4DD10		3RG78 42-6DD20	
450	Receiver	3RG78 45-4DE01		3RG78 45-4DE11	▶	3RG78 42-6DE21	
450	Emitter	3RG78 45-4DE00		3RG78 45-4DE10	▶	3RG78 42-6DE20	
600	Receiver ▶	3RG78 45-4DF01		3RG78 45-4DF11		3RG78 42-6DF21	
600	Emitter ▶	3RG78 45-4DF00		3RG78 45-4DF10		3RG78 42-6DF20	
750	Receiver ▶	3RG78 45-4DG01		3RG78 45-4DG11		3RG78 42-6DG21	
750	Emitter ▶	3RG78 45-4DG00		3RG78 45-4DG10		3RG78 42-6DG20	
900	Receiver ▶	3RG78 45-4DH01	▶	3RG78 45-4DH11		3RG78 42-6DH21	
900	Emitter ▶	3RG78 45-4DH00	▶	3RG78 45-4DH10		3RG78 42-6DH20	
1050	Receiver	3RG78 45-4DJ01		3RG78 45-4DJ11		3RG78 42-6DJ21	
1050	Emitter	3RG78 45-4DJ00		3RG78 45-4DJ10		3RG78 42-6DJ20	
1200	Receiver	3RG78 45-4DK01		3RG78 45-4DK11		3RG78 42-6DK21	
1200	Emitter	3RG78 45-4DK00		3RG78 45-4DK10		3RG78 42-6DK20	
1350	Receiver	3RG78 45-4DL01		3RG78 45-4DL11		3RG78 42-6DL21	
1350	Emitter	3RG78 45-4DL00		3RG78 45-4DL10		3RG78 42-6DL20	
1500	Receiver	3RG78 45-4DM01		3RG78 45-4DM11		3RG78 42-6DM21	
1500	Emitter	3RG78 45-4DM00		3RG78 45-4DM10		3RG78 42-6DM20	
1650	Receiver	3RG78 45-4DN01		3RG78 45-4DN11		3RG78 42-6DN21	
1650	Emitter	3RG78 45-4DN00		3RG78 45-4DN10		3RG78 42-6DN20	
1800	Receiver	3RG78 45-4DP01		3RG78 45-4DP11		3RG78 42-6DP21	
1800	Emitter	3RG78 45-4DP00		3RG78 45-4DP10		3RG78 42-6DP20	
Resolution 50 mm							
450	Receiver	3RG78 45-4EE01		3RG78 45-4EE11		3RG78 42-6EE21	
450	Emitter	3RG78 45-4EE00		3RG78 45-4EE10		3RG78 42-6EE20	
600	Receiver	3RG78 45-4EF01		3RG78 45-4EF11		3RG78 42-6EF21	
600	Emitter	3RG78 45-4EF00		3RG78 45-4EF10		3RG78 42-6EF20	
750	Receiver	3RG78 45-4EG01		3RG78 45-4EG11		3RG78 42-6EG21	
750	Emitter	3RG78 45-4EG00		3RG78 45-4EG10		3RG78 42-6EG20	
900	Receiver	3RG78 45-4EH01		3RG78 45-4EH11		3RG78 42-6EH21	
900	Emitter	3RG78 45-4EH00		3RG78 45-4EH10		3RG78 42-6EH20	
1050	Receiver	3RG78 45-4EJ01		3RG78 45-4EJ11		3RG78 42-6EJ21	
1050	Emitter	3RG78 45-4EJ00		3RG78 45-4EJ10		3RG78 42-6EJ20	
1200	Receiver	3RG78 45-4EK01		3RG78 45-4EK11		3RG78 42-6EK21	
1200	Emitter	3RG78 45-4EK00		3RG78 45-4EK10		3RG78 42-6EK20	

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
1350	Receiver	3RG78 45-4EL01	3RG78 45-4EL11	3RG78 42-6EL21
1350	Emitter	3RG78 45-4EL00	3RG78 45-4EL10	3RG78 42-6EL20
1500	Receiver	3RG78 45-4EM01	3RG78 45-4EM11	3RG78 42-6EM21
1500	Emitter	3RG78 45-4EM00	3RG78 45-4EM10	3RG78 42-6EM20
1650	Receiver	3RG78 45-4EN01	3RG78 45-4EN11	3RG78 42-6EN21
1650	Emitter	3RG78 45-4EN00	3RG78 45-4EN10	3RG78 42-6EN20
1800	Receiver	3RG78 45-4EP01	3RG78 45-4EP11	3RG78 42-6EP21
1800	Emitter	3RG78 45-4EP00	3RG78 45-4EP10	3RG78 42-6EP20
2100	Receiver	3RG78 45-4ER01	3RG78 45-4ER11	3RG78 42-6ER21
2100	Emitter	3RG78 45-4ER00	3RG78 45-4ER10	3RG78 42-6ER20
2400	Receiver	3RG78 45-4ES01	3RG78 45-4ES11	3RG78 42-6ES21
2400	Emitter	3RG78 45-4ES00	3RG78 45-4ES10	3RG78 42-6ES20
2700	Receiver	3RG78 45-4ET01	3RG78 45-4ET11	3RG78 42-6ET21
2700	Emitter	3RG78 45-4ET00	3RG78 45-4ET10	3RG78 42-6ET20
3000	Receiver	3RG78 45-4EU01	3RG78 45-4EU11	3RG78 42-6EU21
3000	Emitter	3RG78 45-4EU00	3RG78 45-4EU10	3RG78 42-6EU20
Resolution 90 mm				
750	Receiver	3RG78 45-4JG01	3RG78 45-4JG11	3RG78 42-6JG21
750	Emitter	3RG78 45-4JG00	3RG78 45-4JG10	3RG78 42-6JG20
900	Receiver	3RG78 45-4JH01	3RG78 45-4JH11	3RG78 42-6JH21
900	Emitter	3RG78 45-4JH00	3RG78 45-4JH10	3RG78 42-6JH20
1050	Receiver	3RG78 45-4JJ01	3RG78 45-4JJ11	3RG78 42-6JJ21
1050	Emitter	3RG78 45-4JJ00	3RG78 45-4JJ10	3RG78 42-6JJ20
1200	Receiver	3RG78 45-4JK01	3RG78 45-4JK11	3RG78 42-6JK21
1200	Emitter	3RG78 45-4JK00	3RG78 45-4JK10	3RG78 42-6JK20
1350	Receiver	3RG78 45-4JL01	3RG78 45-4JL11	3RG78 42-6JL21
1350	Emitter	3RG78 45-4JL00	3RG78 45-4JL10	3RG78 42-6JL20
1500	Receiver	3RG78 45-4JM01	3RG78 45-4JM11	3RG78 42-6JM21
1500	Emitter	3RG78 45-4JM00	3RG78 45-4JM10	3RG78 42-6JM20
1650	Receiver	3RG78 45-4JN01	3RG78 45-4JN11	3RG78 42-6JN21
1650	Emitter	3RG78 45-4JN00	3RG78 45-4JN10	3RG78 42-6JN20
1800	Receiver	3RG78 45-4JP01	3RG78 45-4JP11	3RG78 42-6JP21
1800	Emitter	3RG78 45-4JP00	3RG78 45-4JP10	3RG78 42-6JP20
2100	Receiver	3RG78 45-4JR01	3RG78 45-4JR11	3RG78 42-6JR21
2100	Emitter	3RG78 45-4JR00	3RG78 45-4JR10	3RG78 42-6JR20
2400	Receiver	3RG78 45-4JS01	3RG78 45-4JS11	3RG78 42-6JS21
2400	Emitter	3RG78 45-4JS00	3RG78 45-4JS10	3RG78 42-6JS20
2700	Receiver	3RG78 45-4JT01	3RG78 45-4JT11	3RG78 42-6JT21
2700	Emitter	3RG78 45-4JT00	3RG78 45-4JT10	3RG78 42-6JT20
3000	Receiver	3RG78 45-4JU01	3RG78 45-4JU11	3RG78 42-6JU21
3000	Emitter	3RG78 45-4JU00	3RG78 45-4JU10	3RG78 42-6JU20

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SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

*Light grids with standard function package
Transistor output with Brad Harrison connection (MIN Series)¹⁾²⁾*

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver	3RG78 45-4MH01
4-beam	300	Emitter	3RG78 45-4MH00
3-beam	400	Receiver	3RG78 45-4PG01
3-beam	400	Emitter	3RG78 45-4PG00
2-beam	500	Receiver	3RG78 45-4SE01
2-beam	500	Emitter	3RG78 45-4SE00
Range 6 ... 60 m			
4-beam	300	Receiver	3RG78 45-4MH51
4-beam	300	Emitter	3RG78 45-4MH50
3-beam	400	Receiver	3RG78 45-4PG51
3-beam	400	Emitter	3RG78 45-4PG50
2-beam	500	Receiver	3RG78 45-4SE51
2-beam	500	Emitter	3RG78 45-4SE50

*Transceiver with standard function package
Transistor output with Brad Harrison connection (MIN Series)¹⁾²⁾*

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 6.5 m			
2-beam	500	Transceiver	3RG78 45-4TE01
Reflecting mirrors for transceivers			3RG78 48-1TL

1) For scope of supply see top of page 4/36

2) Required above all for applications on the NAFTA market

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Light curtains with standard function package
Transistor output with cable gland¹⁾

Protection field height mm	Type	Standard device Order No.	Host device Order No.	Guest device Order No.
Resolution 14 mm				
150	Receiver	3RG78 45-6BB01	–	3RG78 42-6BB21
150	Emitter	3RG78 45-6BB00	–	3RG78 42-6BB20
225	Receiver	3RG78 45-6BC01	3RG78 45-6BC11	3RG78 42-6BC21
225	Emitter	3RG78 45-6BC00	3RG78 45-6BC10	3RG78 42-6BC20
300	Receiver	3RG78 45-6BD01	3RG78 45-6BD11	3RG78 42-6BD21
300	Emitter	3RG78 45-6BD00	3RG78 45-6BD10	3RG78 42-6BD20
450	Receiver ▶	3RG78 45-6BE01	3RG78 45-6BE11	3RG78 42-6BE21
450	Emitter ▶	3RG78 45-6BE00	3RG78 45-6BE10	3RG78 42-6BE20
600	Receiver ▶	3RG78 45-6BF01	3RG78 45-6BF11	3RG78 42-6BF21
600	Emitter ▶	3RG78 45-6BF00	3RG78 45-6BF10	3RG78 42-6BF20
750	Receiver ▶	3RG78 45-6BG01	3RG78 45-6BG11	3RG78 42-6BG21
750	Emitter ▶	3RG78 45-6BG00	3RG78 45-6BG10	3RG78 42-6BG20
900	Receiver ▶	3RG78 45-6BH01	3RG78 45-6BH11	3RG78 42-6BH21
900	Emitter ▶	3RG78 45-6BH00	3RG78 45-6BH10	3RG78 42-6BH20
1050	Receiver	3RG78 45-6BJ01	3RG78 45-6BJ11	3RG78 42-6BJ21
1050	Emitter	3RG78 45-6BJ00	3RG78 45-6BJ10	3RG78 42-6BJ20
1200	Receiver	3RG78 45-6BK01	3RG78 45-6BK11	3RG78 42-6BK21
1200	Emitter	3RG78 45-6BK00	3RG78 45-6BK10	3RG78 42-6BK20
1350	Receiver	3RG78 45-6BL01	3RG78 45-6BL11	3RG78 42-6BL21
1350	Emitter	3RG78 45-6BL00	3RG78 45-6BL10	3RG78 42-6BL20
1500	Receiver	3RG78 45-6BM01	3RG78 45-6BM11	3RG78 42-6BM21
1500	Emitter	3RG78 45-6BM00	3RG78 45-6BM10	3RG78 42-6BM20
1650	Receiver	3RG78 45-6BN01	3RG78 45-6BN11	3RG78 42-6BN21
1650	Emitter	3RG78 45-6BN00	3RG78 45-6BN10	3RG78 42-6BN20
1800	Receiver	3RG78 45-6BP01	3RG78 45-6BP11	3RG78 42-6BP21
1800	Emitter	3RG78 45-6BP00	3RG78 45-6BP10	3RG78 42-6BP20
Resolution 30 mm				
150	Receiver	3RG78 45-6DB01	–	3RG78 42-6DB21
150	Emitter	3RG78 45-6DB00	–	3RG78 42-6DB20
225	Receiver	3RG78 45-6DC01	3RG78 45-6DC11	3RG78 42-6DC21
225	Emitter	3RG78 45-6DC00	3RG78 45-6DC10	3RG78 42-6DC20
300	Receiver ▶	3RG78 45-6DD01	3RG78 45-6DD11	3RG78 42-6DD21
300	Emitter ▶	3RG78 45-6DD00	3RG78 45-6DD10	3RG78 42-6DD20
450	Receiver ▶	3RG78 45-6DE01	3RG78 45-6DE11 ▶	3RG78 42-6DE21
450	Emitter ▶	3RG78 45-6DE00	3RG78 45-6DE10 ▶	3RG78 42-6DE20
600	Receiver ▶	3RG78 45-6DF01	3RG78 45-6DF11	3RG78 42-6DF21
600	Emitter ▶	3RG78 45-6DF00	3RG78 45-6DF10	3RG78 42-6DF20
750	Receiver ▶	3RG78 45-6DG01	3RG78 45-6DG11	3RG78 42-6DG21
750	Emitter ▶	3RG78 45-6DG00	3RG78 45-6DG10	3RG78 42-6DG20
900	Receiver ▶	3RG78 45-6DH01	3RG78 45-6DH11	3RG78 42-6DH21
900	Emitter ▶	3RG78 45-6DH00	3RG78 45-6DH10	3RG78 42-6DH20
1050	Receiver	3RG78 45-6DJ01	3RG78 45-6DJ11	3RG78 42-6DJ21
1050	Emitter	3RG78 45-6DJ00	3RG78 45-6DJ10	3RG78 42-6DJ20
1200	Receiver	3RG78 45-6DK01	3RG78 45-6DK11	3RG78 42-6DK21
1200	Emitter	3RG78 45-6DK00	3RG78 45-6DK10	3RG78 42-6DK20

1) For scope of supply see top of page 4/36

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device		Host device		Guest device	
		Order No.		Order No.		Order No.	
1350	Receiver	3RG78 45-6DL01		3RG78 45-6DL11		3RG78 42-6DL21	
1350	Emitter	3RG78 45-6DL00		3RG78 45-6DL10		3RG78 42-6DL20	
1500	Receiver	3RG78 45-6DM01		3RG78 45-6DM11		3RG78 42-6DM21	
1500	Emitter	3RG78 45-6DM00		3RG78 45-6DM10		3RG78 42-6DM20	
1650	Receiver	3RG78 45-6DN01		3RG78 45-6DN11		3RG78 42-6DN21	
1650	Emitter	3RG78 45-6DN00		3RG78 45-6DN10		3RG78 42-6DN20	
1800	Receiver	3RG78 45-6DP01		3RG78 45-6DP11		3RG78 42-6DP21	
1800	Emitter	3RG78 45-6DP00		3RG78 45-6DP10		3RG78 42-6DP20	
Resolution 50 mm							
450	Receiver ▶	3RG78 45-6EE01		3RG78 45-6EE11		3RG78 42-6EE21	
450	Emitter ▶	3RG78 45-6EE00		3RG78 45-6EE10		3RG78 42-6EE20	
600	Receiver	3RG78 45-6EF01		3RG78 45-6EF11		3RG78 42-6EF21	
600	Emitter	3RG78 45-6EF00		3RG78 45-6EF10		3RG78 42-6EF20	
750	Receiver	3RG78 45-6EG01		3RG78 45-6EG11		3RG78 42-6EG21	
750	Emitter	3RG78 45-6EG00		3RG78 45-6EG10		3RG78 42-6EG20	
900	Receiver	3RG78 45-6EH01		3RG78 45-6EH11		3RG78 42-6EH21	
900	Emitter	3RG78 45-6EH00		3RG78 45-6EH10		3RG78 42-6EH20	
1050	Receiver	3RG78 45-6EJ01		3RG78 45-6EJ11		3RG78 42-6EJ21	
1050	Emitter	3RG78 45-6EJ00		3RG78 45-6EJ10		3RG78 42-6EJ20	
1200	Receiver	3RG78 45-6EK01		3RG78 45-6EK11		3RG78 42-6EK21	
1200	Emitter	3RG78 45-6EK00		3RG78 45-6EK10		3RG78 42-6EK20	
1350	Receiver	3RG78 45-6EL01		3RG78 45-6EL11		3RG78 42-6EL21	
1350	Emitter	3RG78 45-6EL00		3RG78 45-6EL10		3RG78 42-6EL20	
1500	Receiver	3RG78 45-6EM01		3RG78 45-6EM11		3RG78 42-6EM21	
1500	Emitter	3RG78 45-6EM00		3RG78 45-6EM10		3RG78 42-6EM20	
1650	Receiver	3RG78 45-6EN01		3RG78 45-6EN11		3RG78 42-6EN21	
1650	Emitter	3RG78 45-6EN00		3RG78 45-6EN10		3RG78 42-6EN20	
1800	Receiver	3RG78 45-6EP01		3RG78 45-6EP11		3RG78 42-6EP21	
1800	Emitter	3RG78 45-6EP00		3RG78 45-6EP10		3RG78 42-6EP20	
2100	Receiver	3RG78 45-6ER01		3RG78 45-6ER11		3RG78 42-6ER21	
2100	Emitter	3RG78 45-6ER00		3RG78 45-6ER10		3RG78 42-6ER20	
2400	Receiver	3RG78 45-6ES01		3RG78 45-6ES11		3RG78 42-6ES21	
2400	Emitter	3RG78 45-6ES00		3RG78 45-6ES10		3RG78 42-6ES20	
2700	Receiver	3RG78 45-6ET01		3RG78 45-6ET11		3RG78 42-6ET21	
2700	Emitter	3RG78 45-6ET00		3RG78 45-6ET10		3RG78 42-6ET20	
3000	Receiver	3RG78 45-6EU01		3RG78 45-6EU11		3RG78 42-6EU21	
3000	Emitter	3RG78 45-6EU00		3RG78 45-6EU10		3RG78 42-6EU20	
Resolution 90 mm							
750	Receiver	3RG78 45-6JG01		3RG78 45-6JG11		3RG78 42-6JG21	
750	Emitter	3RG78 45-6JG00		3RG78 45-6JG10		3RG78 42-6JG20	
900	Receiver ▶	3RG78 45-6JH01		3RG78 45-6JH11		3RG78 42-6JH21	
900	Emitter ▶	3RG78 45-6JH00		3RG78 45-6JH10		3RG78 42-6JH20	
1050	Receiver	3RG78 45-6JJ01		3RG78 45-6JJ11		3RG78 42-6JJ21	
1050	Emitter	3RG78 45-6JJ00		3RG78 45-6JJ10		3RG78 42-6JJ20	
1200	Receiver	3RG78 45-6JK01		3RG78 45-6JK11		3RG78 42-6JK21	
1200	Emitter	3RG78 45-6JK00		3RG78 45-6JK10		3RG78 42-6JK20	
1350	Receiver	3RG78 45-6JL01		3RG78 45-6JL11		3RG78 42-6JL21	
1350	Emitter	3RG78 45-6JL00		3RG78 45-6JL10		3RG78 42-6JL20	
1500	Receiver	3RG78 45-6JM01		3RG78 45-6JM11		3RG78 42-6JM21	
1500	Emitter	3RG78 45-6JM00		3RG78 45-6JM10		3RG78 42-6JM20	

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Protection field height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
1650	Receiver	3RG78 45-6JN01	3RG78 45-6JN11	3RG78 42-6JN21
1650	Emitter	3RG78 45-6JN00	3RG78 45-6JN10	3RG78 42-6JN20
1800	Receiver	3RG78 45-6JP01	3RG78 45-6JP11	3RG78 42-6JP21
1800	Emitter	3RG78 45-6JP00	3RG78 45-6JP10	3RG78 42-6JP20
2100	Receiver	3RG78 45-6JR01	3RG78 45-6JR11	3RG78 42-6JR21
2100	Emitter	3RG78 45-6JR00	3RG78 45-6JR10	3RG78 42-6JR20
2400	Receiver	3RG78 45-6JS01	3RG78 45-6JS11	3RG78 42-6JS21
2400	Emitter	3RG78 45-6JS00	3RG78 45-6JS10	3RG78 42-6JS20
2700	Receiver	3RG78 45-6JT01	3RG78 45-6JT11	3RG78 42-6JT21
2700	Emitter	3RG78 45-6JT00	3RG78 45-6JT10	3RG78 42-6JT20
3000	Receiver	3RG78 45-6JU01	3RG78 45-6JU11	3RG78 42-6JU21
3000	Emitter	3RG78 45-6JU00	3RG78 45-6JU10	3RG78 42-6JU20

Light grids with standard function package Transistor output with cable gland¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver ▶	3RG78 45-6MH01
4-beam	300	Emitter ▶	3RG78 45-6MH00
3-beam	400	Receiver ▶	3RG78 45-6PG01
3-beam	400	Emitter ▶	3RG78 45-6PG00
2-beam	500	Receiver ▶	3RG78 45-6SE01
2-beam	500	Emitter ▶	3RG78 45-6SE00
Range 6 ... 60 m			
4-beam	300	Receiver ▶	3RG78 45-6MH51
4-beam	300	Emitter ▶	3RG78 45-6MH50
3-beam	400	Receiver ▶	3RG78 45-6PG51
3-beam	400	Emitter ▶	3RG78 45-6PG50
2-beam	500	Receiver ▶	3RG78 45-6SE51
2-beam	500	Emitter ▶	3RG78 45-6SE50

Transceiver with standard function package Transistor output with cable gland¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 6.5 m			
2-beam	500	Transceiver	3RG78 45-6TE01
Reflecting mirrors for transceivers			3RG78 48-1TL

1) For scope of supply see top of page 4/36.

▶ Preferred type, available from stock.

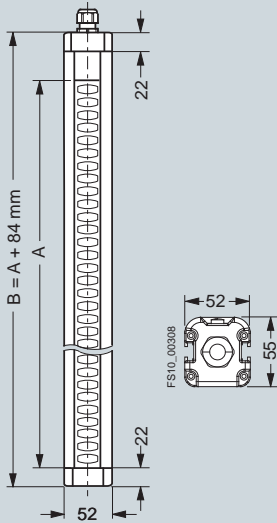
SIMATIC FS400 light curtains and light grids

3RG78 45 series, type 4

Integrated evaluation

Dimensions

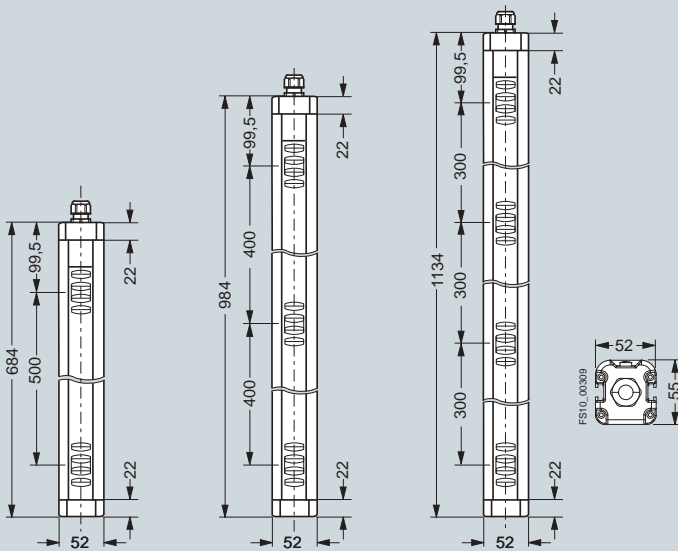
3RG78 45 standard light curtains,
3RG78 45 light grids



- ① Pg 9 cover (receiver only, for local interface)
- A Protection field height (see Selection and Ordering data)
- B Overall length = Protection field height A + 134 mm

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3RG78 45 light grids, additional dimensions



Additional dimensions (mm) for light grids only:

Type	Overall length	Beam distance	Beams
3RG78 45-..M	1134	300	4
3RG78 45-..P	984	400	3
3RG78 45-..S	684	500	2

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation, ASIsafe

Overview



3SF78 44 light curtains and light grids for ASIsafe with integrated evaluation for type 4 in accordance with IEC/EN 61496-1, -2

- With function packages "Blanking", "Muting", and "Cycle Control"
- Resolutions: 14, 30, and 50 mm
- Protection field height: 150 mm to 3000 mm
- 2-beam, 3-beam or 4-beam light grids
- Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (optional).

Two standard 3RG78 48-0AB mounting brackets each are enclosed with all devices (can also be ordered as accessories see page 4/92).

3SF78 44 (ASIsafe) program overview

Unit type	Function package	Output	Connection type	For light curtains: Resolution		LED indicator light	See page
				For light grids and transceivers: Range			
				14 mm	30 mm		
Light curtains	Blanking	ASIsafe	ASIsafe	✓	✓	–	4/52
Light curtains	Muting	ASIsafe	ASIsafe	–	✓	–	4/53
Light curtains	Muting	ASIsafe	ASIsafe	–	✓	with	4/53
Light grids	Muting	ASIsafe	ASIsafe	0.8 ... 18 m; 6 ... 70 m		–	4/54
Light grids	Muting	ASIsafe	ASIsafe	0.8 ... 18 m		with	4/54
Transceivers	Muting	ASIsafe	ASIsafe	6.5 m		with and without	4/54
Light curtains	Sequence control system	ASIsafe	ASIsafe	✓	✓	–	4/55

Accessories

Electrical connection		
• Connecting cable with M12 connector, also applicable for supplying power to the ASIsafe emitter		4/95
• ASIsafe modules		4/94
Accessory cable		
• for the local connection to connect muting lights, key-operated switches, reset buttons, etc.		4/94
Assembly materials		
• Fixing columns, reflecting mirror		4/91
• Muting mounting systems		4/92
• Muting accessories		4/95
Laser alignment assistance, diagnostic software		4/93

Other ASIsafe light curtains and light grids for external evaluation see pages 4/64 and 4/67.

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation, ASIsafe

Technical specifications

Type	3SF78 44
Safety category	
• to EN, IEC 61496-1, -2	Type 4
• according to IEC 61508	SIL 3
Protection field height	
• for 14 and 30 mm resolution	150 ... 1800 mm
• for 50 mm resolution	450 ... 3000 mm
Protection field width, range	
• for 14 mm resolution	0 ... 6 m
• for 30 and 50 mm resolution	0 ... 18 m
Detection capability (resolution)	14 mm, 30 mm, 50 mm
Supply voltage (emitter and receiver)	24 V DC \pm 20% (external power pack with safe isolation and compensation of 20 ms voltage dip is necessary)
Residual ripple	< 5%
Current consumption	
• Emitter	75 mA
• Receiver	160 mA (without external load)
General value for external fuse in the transmitter and receiver supply leads	4 A
Wave length	880 nm (infrared)
Synchronization	Optically between emitter and receiver
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	-25 ... +70 °C
Relative humidity	15 ... 95%
Degree of protection	IP65
Safety class to DIN VDE 0106	III
Vibration resistance	5 g, 10 ... 55 Hz acc. to IEC/EN 60068-2-6
Shock resistance	10 g, 16 ms to IEC/EN 60068-2-29

Signal inputs and outputs (local socket, optional)

Signal inputs	
• Restart inhibit unlocking	1 button with 1 NO contact (floating)
- Min. switching time	300 ms
- Max. switching time	4 sec
• Teach-in	2-pole key-operated switch (selector switch) (floating)
- Simultaneity	< 500 ms
Voltage output (for command devices or safety sensors only)	24 V DC \pm 20%, max 0.5 A

4

Receiver/transceiver machine interface, ASIsafe

OSSDs safety switching outputs	4 bit AS-i data		
	Minimum	Typical	Maximum
Permissible cable length	-	-	100 m
Restart time after beam interruption	-	140 ms	-
Slave address area	1	-	31
Slave address area (WE)	0 (ex works)		
ID code/IO code emitter	-		
ID code receiver	B		
IO code receiver	0		
AS-i profile	Secure slave		
Cycle time according to AS-i specification	5 ms		
OSSD response time	Beam number dependent, see operating instructions		
Additional AS-i system response time	40 ms		

Application of the EN ISO 13849-1 standard:**2006 "Safety of machinery" for 3SF78 44 ASIsafe light curtains and light grids**

	Protection field height/number of beams	PL 13849-1	Category ISO 13849-1	Cat. 954-1	PFH _D	T _M /years
3SF78 44-... light grids	4-beam	e	4	4	1.90 x 10 ⁻⁸	20
3SF78 44-... light curtain	900 mm	e	4	4	2.26 x 10 ⁻⁸	20
3SF78 44-... light curtain	1800 mm	e	4	4	2.67 x 10 ⁻⁸	20

ExplanationPFH_D = Probability of dangerous failure per hour

PL = Performance level

Discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions: from PL "a" (highest probability of failure) to PL "e" (lowest probability of failure).

For further explanations, see the brochure "European machinery directive - implemented easily", Order No. E20001-A230-M103-V1-7600.

Ordering notes**Included in the scope of supply:****3SF78 44 light curtains with blanking, muting or sequence control system function package**

Emitter	3RG78 48-0AB mounting bracket set and emitter insert
Receiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets and safety key
• in addition with 14 mm resolution	3RG78 48-0FH test rod (14/24/33 and 19/29 mm)
• in addition with 30 mm resolution	3RG78 48-0AH/BH test rod (14/30 and 38 mm)

Guest devices of the 3RG78 42 series

Emitter	3RG78 48-0AB mounting bracket set
Receiver	3RG78 48-0AB mounting bracket set
• in addition with 14/30 mm resolution	3RG78 48-0AH test rod

3SF78 44 light grids with muting function package

Emitter	3RG78 48-0AB mounting bracket set and emitter insert
Receiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets

3SF78 44 transceiver with muting function package

Transceiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets
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SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation

Selection and Ordering data

Light curtains with blanking function package
ASIsafe¹⁾

Protection field height	Type	Standard device 14 mm resolution	Standard device 30 mm resolution
mm		Order No.	Order No.
Resolution 14 mm and 30 mm			
300	Receiver	3SF78 44-6BB04-0SS1	3SF78 44-6BD04-0SS1
300	Emitter	3SF78 44-6SB04-0SS0	3SF78 44-6SD04-0SS0
450	Receiver	3SF78 44-6BB06-0SS1	3SF78 44-6BD06-0SS1
450	Emitter	3SF78 44-6SB06-0SS0	3SF78 44-6SD06-0SS0
600	Receiver	3SF78 44-6BB08-0SS1	3SF78 44-6BD08-0SS1
600	Emitter	3SF78 44-6SB08-0SS0	3SF78 44-6SD08-0SS0
750	Receiver	3SF78 44-6BB11-0SS1	3SF78 44-6BD11-0SS1
750	Emitter	3SF78 44-6SB11-0SS0	3SF78 44-6SD11-0SS0
900	Receiver	3SF78 44-6BB13-0SS1	3SF78 44-6BD13-0SS1
900	Emitter	3SF78 44-6SB13-0SS0	3SF78 44-6SD13-0SS0
1050	Receiver	3SF78 44-6BB15-0SS1	3SF78 44-6BD15-0SS1
1050	Emitter	3SF78 44-6SB15-0SS0	3SF78 44-6SD15-0SS0
1200	Receiver	3SF78 44-6BB17-0SS1	3SF78 44-6BD17-0SS1
1200	Emitter	3SF78 44-6SB17-0SS0	3SF78 44-6SD17-0SS0
1350	Receiver	On request	3SF78 44-6BD20-0SS1
1350	Emitter	On request	3SF78 44-6SD20-0SS0
1500	Receiver	On request	3SF78 44-6BD22-0SS1
1500	Emitter	On request	3SF78 44-6SD22-0SS0
1650	Receiver	On request	3SF78 44-6BD24-0SS1
1650	Emitter	On request	3SF78 44-6SD24-0SS0
1800	Receiver	On request	3SF78 44-6BD26-0SS1
1800	Emitter	On request	3SF78 44-6SD26-0SS0

1) For scope of supply see top of page 4/51

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation

Light curtains with muting function package ASIsafe¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
300	Receiver	3SF78 44-6MD04-0SS1	On request	3RG78 42-6DD21
300	Emitter	3SF78 44-6SD04-0SS0	On request	3RG78 42-6DD20
450	Receiver	3SF78 44-6MD06-0SS1	On request	▶ 3RG78 42-6DE21
450	Emitter	3SF78 44-6SD06-0SS0	On request	▶ 3RG78 42-6DE20
600	Receiver	3SF78 44-6MD08-0SS1	On request	3RG78 42-6DF21
600	Emitter	3SF78 44-6SD08-0SS0	On request	3RG78 42-6DF20
750	Receiver	3SF78 44-6MD11-0SS1	On request	3RG78 42-6DG21
750	Emitter	3SF78 44-6SD11-0SS0	On request	3RG78 42-6DG20
900	Receiver	3SF78 44-6MD13-0SS1	On request	3RG78 42-6DH21
900	Emitter	3SF78 44-6SD13-0SS0	On request	3RG78 42-6DH20
1050	Receiver	3SF78 44-6MD15-0SS1	On request	3RG78 42-6DJ21
1050	Emitter	3SF78 44-6SD15-0SS0	On request	3RG78 42-6DJ20
1200	Receiver	3SF78 44-6MD17-0SS1	On request	3RG78 42-6DK21
1200	Emitter	3SF78 44-6SD17-0SS0	On request	3RG78 42-6DK20
1350	Receiver	3SF78 44-6MD20-0SS1	On request	3RG78 42-6DL21
1350	Emitter	3SF78 44-6SD20-0SS0	On request	3RG78 42-6DL20
1500	Receiver	3SF78 44-6MD22-0SS1	On request	3RG78 42-6DM21
1500	Emitter	3SF78 44-6SD22-0SS0	On request	3RG78 42-6DM20
1650	Receiver	3SF78 44-6MD24-0SS1	On request	3RG78 42-6DN21
1650	Emitter	3SF78 44-6SD24-0SS0	On request	3RG78 42-6DN20
1800	Receiver	3SF78 44-6MD26-0SS1	On request	3RG78 42-6DP21
1800	Emitter	3SF78 44-6SD26-0SS0	On request	3RG78 42-6DP20

Light curtains with muting function package ASIsafe and integrated LED¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
300	Receiver	3SF78 44-6MD04-0KS1	On request	3RG78 42-6DD21
300	Emitter	3SF78 44-6SD04-0SS0	On request	3RG78 42-6DD20
450	Receiver	3SF78 44-6MD06-0KS1	On request	▶ 3RG78 42-6DE21
450	Emitter	3SF78 44-6SD06-0SS0	On request	▶ 3RG78 42-6DE20
600	Receiver	3SF78 44-6MD08-0KS1	On request	3RG78 42-6DF21
600	Emitter	3SF78 44-6SD08-0SS0	On request	3RG78 42-6DF20
750	Receiver	3SF78 44-6MD11-0KS1	On request	3RG78 42-6DG21
750	Emitter	3SF78 44-6SD11-0SS0	On request	3RG78 42-6DG20
900	Receiver	3SF78 44-6MD13-0KS1	On request	3RG78 42-6DH21
900	Emitter	3SF78 44-6SD13-0SS0	On request	3RG78 42-6DH20
1050	Receiver	3SF78 44-6MD15-0KS1	On request	3RG78 42-6DJ21
1050	Emitter	3SF78 44-6SD15-0SS0	On request	3RG78 42-6DJ20
1200	Receiver	3SF78 44-6MD17-0KS1	On request	3RG78 42-6DK21
1200	Emitter	3SF78 44-6SD17-0SS0	On request	3RG78 42-6DK20

1) For scope of supply see top of page 4/51

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation

Light grids with muting function package ASIsafe¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver	3SF78 44-6MM50-0SS1
4-beam	300	Emitter	3SF78 44-6SM50-0SS0
3-beam	400	Receiver	3SF78 44-6MP50-0SS1
3-beam	400	Emitter	3SF78 44-6SP50-0SS0
2-beam	500	Receiver	3SF78 44-6MS50-0SS1
2-beam	500	Emitter	3SF78 44-6SS50-0SS0
Range 6 ... 70 m			
4-beam	300	Receiver	3SF78 44-6MM51-0SS1
4-beam	300	Emitter	3SF78 44-6SM51-0SS0
3-beam	400	Receiver	3SF78 44-6MP51-0SS1
3-beam	400	Emitter	3SF78 44-6SP51-0SS0
2-beam	500	Receiver	3SF78 44-6MS51-0SS1
2-beam	500	Emitter	3SF78 44-6SS51-0SS0

Light grids with muting function package ASIsafe and integrated LED¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 0.8 ... 18 m			
4-beam	300	Receiver	3SF78 44-6MM50-0KS1
4-beam	300	Emitter	3SF78 44-6SM50-0SS0
3-beam	400	Receiver	3SF78 44-6MP50-0KS1
3-beam	400	Emitter	3SF78 44-6SP50-0SS0
2-beam	500	Receiver	3SF78 44-6MS50-0KS1
2-beam	500	Emitter	3SF78 44-6SS50-0SS0

Transceiver with muting function package ASIsafe¹⁾

No. of beams	Beam distance mm	Type	Standard device Order No.
Range 6.5 m			
2-beam	500	Transceiver	3SF78 44-6MS50-0ST0
2-beam	500	Transceiver with integrated LED	3SF78 44-6MS50-0MT0
Reflecting mirrors for transceivers			3RG78 48-1TL

1) For scope of supply see top of page 4/51.

▶ Preferred type, available from stock.

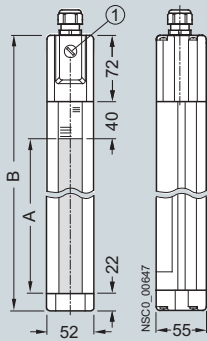
Light curtains with sequence control system function package ASIsafe¹⁾

Protection field height	Type	Standard device 14 mm resolution	Standard device 30 mm resolution
mm		Order No.	Order No.
Resolution 14 mm and 30 mm			
300	Receiver	3SF78 44-6TB04-0SS1	3SF78 44-6TD04-0SS1
300	Emitter	3SF78 44-6SB04-0SS0	3SF78 44-6SD04-0SS0
450	Receiver	3SF78 44-6TB06-0SS1	3SF78 44-6TD06-0SS1
450	Emitter	3SF78 44-6SB06-0SS0	3SF78 44-6SD06-0SS0
600	Receiver	3SF78 44-6TB08-0SS1	3SF78 44-6TD08-0SS1
600	Emitter	3SF78 44-6SB08-0SS0	3SF78 44-6SD08-0SS0
750	Receiver	3SF78 44-6TB11-0SS1	3SF78 44-6TD11-0SS1
750	Emitter	3SF78 44-6SB11-0SS0	3SF78 44-6SD11-0SS0
900	Receiver	3SF78 44-6TB13-0SS1	3SF78 44-6TD13-0SS1
900	Emitter	3SF78 44-6SB13-0SS0	3SF78 44-6SD13-0SS0

Additional products on request.

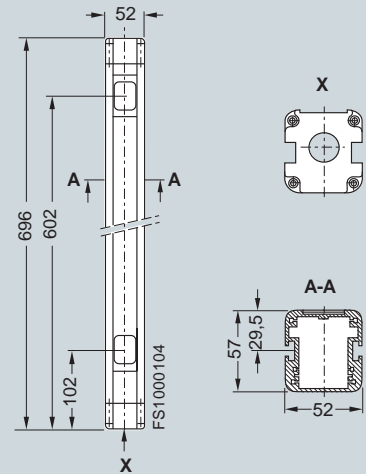
Dimensions

3SF78 44 standard light curtains, 3SF78 44 light grids

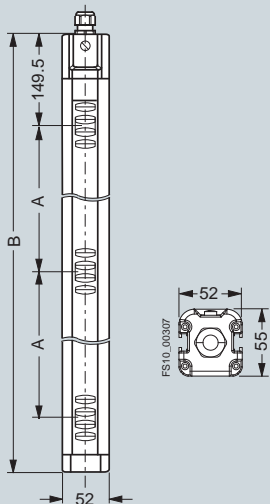


- ① Pg 9 cover (receiver only, for local interface)
- A Protection field height (see Selection and Ordering data)
- B Overall length = Protection field height A + 134 mm

3RG78 48-1TL reflecting mirror

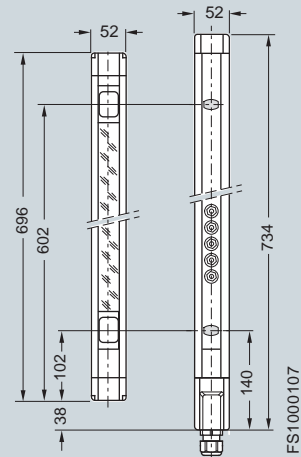


3SF78 44 light grids, additional dimensions Additional dimensions for light grids only:



Type	B	A	Beams
3SF78 44-..M	1184	300	4
3SF78 44-..P	1034	400	3
3SF78 44-..S	734	500	2

3RG78 48-1TL reflecting mirror (left) and muting transceiver (right)



SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation, PROFI-safe

Overview



3SF78 44 light curtains and grids for PROFI-safe with integrated evaluation for type 4 in accordance with IEC/EN 61496-1, -2

- with function packages "Blanking", "Muting", and "Cycle Control"
- Resolutions of 14 mm and 30 mm
- Protection field height: 150 mm to 3000 mm
- 2-beam, 3-beam or 4-beam light grids
- Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (as an option).

PROFIBUS connectivity only affects the receiver, as it also switches off the safety switch outputs on the PROFIBUS.

In the following selection and ordering data, a suitable emitter with AS-i M12 connection for power supply is always selected as emitter. However, the emitter can also be selected with other connection options such as M12, Hirschmann, cable gland, or Brad Harrison connector from the 3RG78 44 series. It is important that the selected 3RG78 44/3SF78 44 emitter has the same protection field height and resolution as the 3SF78 44 receiver!

Two standard 3RG78 48-0AB mounting brackets each are enclosed with all devices (can also be ordered as accessories see page 4/92).

Other versions not listed in the ordering data are available upon request.

3SF78 44 (PROFI-safe) program overview

Unit type	Function package	Output	Connection type	For light curtains: Resolution		LED indicator light	See page
				14 mm	30 mm		
Light curtains	Blanking	PROFI-safe	PROFI-safe	✓	✓	–	4/60
Light curtains	Muting	PROFI-safe	PROFI-safe	✓	✓	–	4/60
Light grids	Muting	PROFI-safe	PROFI-safe	0.8 ... 18 m		–	4/62
Transceivers	Muting	PROFI-safe	PROFI-safe	6.5 m		with and without	4/62
Light curtains	Sequence control system	PROFI-safe	PROFI-safe	✓	–	–	4/62

Accessories

Electrical connection

- Connecting cable with M12 connector, also applicable for supplying power to the PROFI-safe emitter

4/95

Accessory cable

- for the local connection to connect muting lights, key-operated switches, reset buttons, etc.

4/94

Assembly materials

- Fixing columns, reflecting mirror
- Muting mounting systems
- Muting accessories

4/91

4/92

4/95

Laser alignment aids, diagnostic software

4/93

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation, PROFIsafe
Technical specifications

Type	3SF78 44
Safety category to EN, IEC 61496-1, -2	Type 4
Protection field height	
• for 14 and 30 mm resolution	150 ... 1800 mm
• for 50 mm resolution	450 ... 3000 mm
Protection field width, range	
• for 14 mm resolution	0 ... 6 m
• for 30 and 50 mm resolution	0 ... 18 m
Detection capability (resolution)	14 mm, 30 mm, 50 mm
Supply voltage (emitter and receiver)	24 V DC \pm 20%
Wave length	880 nm (infrared)
Synchronization	Optically between emitter and receiver
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	-20 ... +60 °C
Relative humidity	15 ... 95%, without condensation
Degree of protection	IP65
Safety class to DIN VDE 0106	III
Vibration resistance	5 g, 10 ... 55 Hz to IEC/EN 60068-2-6
Shock resistance	10 g, 16 ms to IEC/EN 60068-2-29

Signal inputs and outputs (local socket, optional)

Signal inputs	
• Restart inhibit unlocking	1 button with 1 NO contact (floating)
- Min. switching time	300 ms
- Max. switching time	4 sec
• Teach-in	2-pole key-operated switch (selector switch) (floating)
- Simultaneity	< 500 ms
Voltage output (for command devices or safety sensors only)	24 V DC \pm 20%, max. 0.5 A

General PROFIsafe receiver system data

Safety category	<ul style="list-style-type: none"> • Type 4 to EN IEC 61496-1 • SIL 3 to IEC 61508
Supply voltage U_V	24 V DC, \pm 20%
Residual ripple of supply voltage U_V	\pm 5% within the limits of U_V , external power pack with safe isolation
Current consumption at	
• $U_V = 28.8$ V DC, +20%	150 mA
• $U_V = 24$ V DC	160 mA
• $U_V = 19.2$ V DC, -20%	170 mA
PROFIBUS	
• Data rate	9.6 kBd ... 12 MBd
• Connection	M12 connector, b-coded
Additional PROFIsafe part response time in the receiver	20 ms
Connection cable length	
• PROFIBUS output	0.2 m
• PROFIBUS input	0.4 m
• Power supply	0.6 m
Supply cable length, max.	< 100 m

PROFIsafe services

PROFIsafe driver version	V2, supports PROFIsafe profiles V1 and V2
Cyclic data	4 user data byte input data 4 user data byte output data
Acyclical data	To read the switching status of the individual beams
Ensure the parameters in the F-CPU via proxy function block for	<ul style="list-style-type: none"> • S7-315F • S7-317F • S7-416F
Number of parameter sets, can be changed using a secure program in the F-CPU	max. 255, depends on the available memory on the F-CPU
Restart delay is the larger value out of	<ul style="list-style-type: none"> • Watchdog time in the F-CPU +20 ms • Receiver restart delay

4

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation, PROFIsafe

Application of the EN ISO 13849-1 standard:
2006 "Safety of machinery" for 3SF78 44 PROFIsafe light curtains and light grids

	Protection field height/ number of beams	PL 13849-1	Category ISO 13849-1	Cat. 954-1	PFH _D	T _M /years
3SF78 44-... light grids	4-beam	e	4	4	1.90×10^{-8}	20
3SF78 44-... light curtain	900 mm	e	4	4	2.26×10^{-8}	20
3SF78 44-... light curtain	1800 mm	e	4	4	2.67×10^{-8}	20

Explanation

PFH_D = Probability of dangerous failure per hour

PL = Performance level

Discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions: From PL "a" (highest probability of failure) to PL "e" (lowest probability of failure).

For further explanations, see the brochure "European machinery directive – implemented easily", Order No. E20001-A230-M103-V1-7600.

Selection and Ordering data

Order No.

Order No.

Accessories for PROFIsafe light curtains

PROFIBUS M12 terminating connector

▶ 6GK1 905-0EC00

For PROFIBUS DP
1 packet = 5 items

PROFIBUS M12 connector for receivers

1 packet = 5 items

• Male insert

▶ 6GK1 905-0EA00

• Socket insert

▶ 6GK1 905-0EB00

Connecting cables for receivers

2-core (inverted coding)
preassembled, with M12 connectors, in different lengths:

0.5 m

▶ 6XV1830-3DE50

1.5 m

▶ 6XV1830-3DH15

3.0 m

▶ 6XV1830-3DH30

5.0 m

▶ 6XV1830-3DH50

10.0 m

▶ 6XV1830-3DN10

15.0 m

▶ 6XV1830-3DN15

Optical PC adapter cables

▶ 3RG78 38-1DC

Connecting cables for emitters and receivers

Power supply cable with M12 connector, straight, shielded, 5-pole in several lengths:

5.0 m

▶ 3RG7848-2EA

10.0 m

▶ 3RG7848-2EC

15.0 m

▶ 3RG7848-2EE

SafetyLab parameterization and diagnostic software

H 3RG78 48-2SL

incl. PC cable, RS232 – IR

▶ Preferred type, available from stock.

H: Subject to export regulations AL = N and ECCN = 5D992B1.

4

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation

Selection and Ordering data

Light curtains with blanking function package
PROFIsafe¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 14 mm				
300	Receiver	3SF78 44-8BB04-0SS1	3SF78 44-8BB04-1SS1	3RG78 42-6BD21
300	Emitter	3SF78 44-6SB04-0SS0	3SF78 44-6SB04-1SS0	3RG78 42-6BD20
450	Receiver	3SF78 44-8BB06-0SS1	3SF78 44-8BB06-1SS1	3RG78 42-6BE21
450	Emitter	3SF78 44-6SB06-0SS0	3SF78 44-6SB06-1SS0	3RG78 42-6BE20
600	Receiver	3SF78 44-8BB08-0SS1	3SF78 44-8BB08-1SS1	3RG78 42-6BF21
600	Emitter	3SF78 44-6SB08-0SS0	3SF78 44-6SB08-1SS0	3RG78 42-6BF20
750	Receiver	3SF78 44-8BB11-0SS1	3SF78 44-8BB11-1SS1	3RG78 42-6BG21
750	Emitter	3SF78 44-6SB11-0SS0	3SF78 44-6SB11-1SS0	3RG78 42-6BG20
900	Receiver	3SF78 44-8BB13-0SS1	3SF78 44-8BB13-1SS1	3RG78 42-6BH21
900	Emitter	3SF78 44-6SB13-0SS0	3SF78 44-6SB13-1SS0	3RG78 42-6BH20
1050	Receiver	3SF78 44-8BB15-0SS1	3SF78 44-8BB15-1SS1	3RG78 42-6BJ21
1050	Emitter	3SF78 44-6SB15-0SS0	3SF78 44-6SB15-1SS0	3RG78 42-6BJ20
1200	Receiver	3SF78 44-8BB17-0SS1	3SF78 44-8BB17-1SS1	3RG78 42-6BK21
1200	Emitter	3SF78 44-6SB17-0SS0	3SF78 44-6SB17-1SS0	3RG78 42-6BK20
1350	Receiver	3SF78 44-8BB20-0SS1	3SF78 44-8BB20-1SS1	3RG78 42-6BL21
1350	Emitter	3SF78 44-6SB20-0SS0	3SF78 44-6SB20-1SS0	3RG78 42-6BL20
1500	Receiver	3SF78 44-8BB22-0SS1	3SF78 44-8BB22-1SS1	3RG78 42-6BM21
1500	Emitter	3SF78 44-6SB22-0SS0	3SF78 44-6SB22-1SS0	3RG78 42-6BM20
1650	Receiver	3SF78 44-8BB24-0SS1	3SF78 44-8BB24-1SS1	3RG78 42-6BN21
1650	Emitter	3SF78 44-6SB24-0SS0	3SF78 44-6SB24-1SS0	3RG78 42-6BN20
1800	Receiver	3SF78 44-8BB26-0SS1	3SF78 44-8BB26-1SS1	3RG78 42-6BP21
1800	Emitter	3SF78 44-6SB26-0SS0	3SF78 44-6SB26-1SS0	3RG78 42-6BP20
Resolution 30 mm				
300	Receiver	3SF78 44-8BD04-0SS1	3SF78 44-8BD04-1SS1	3RG78 42-6DD21
300	Emitter	3SF78 44-6SD04-0SS0	3SF78 44-6SD04-1SS0	3RG78 42-6DD20
450	Receiver	3SF78 44-8BD06-0SS1	3SF78 44-8BD06-1SS1	▶ 3RG78 42-6DE21
450	Emitter	3SF78 44-6SD06-0SS0	3SF78 44-6SD06-1SS0	▶ 3RG78 42-6DE20
600	Receiver	3SF78 44-8BD08-0SS1	3SF78 44-8BD08-1SS1	3RG78 42-6DF21
600	Emitter	3SF78 44-6SD08-0SS0	3SF78 44-6SD08-1SS0	3RG78 42-6DF20
750	Receiver	3SF78 44-8BD11-0SS1	3SF78 44-8BD11-1SS1	3RG78 42-6DG21
750	Emitter	3SF78 44-6SD11-0SS0	3SF78 44-6SD11-1SS0	3RG78 42-6DG20
900	Receiver	3SF78 44-8BD13-0SS1	3SF78 44-8BD13-1SS1	3RG78 42-6DH21
900	Emitter	3SF78 44-6SD13-0SS0	3SF78 44-6SD13-1SS0	3RG78 42-6DH20
1050	Receiver	3SF78 44-8BD15-0SS1	3SF78 44-8BD15-1SS1	3RG78 42-6DJ21
1050	Emitter	3SF78 44-6SD15-0SS0	3SF78 44-6SD15-1SS0	3RG78 42-6DJ20
1200	Receiver	3SF78 44-8BD17-0SS1	3SF78 44-8BD17-1SS1	3RG78 42-6DK21
1200	Emitter	3SF78 44-6SD17-0SS0	3SF78 44-6SD17-1SS0	3RG78 42-6DK20
1350	Receiver	3SF78 44-8BD20-0SS1	3SF78 44-8BD20-1SS1	3RG78 42-6DL21
1350	Emitter	3SF78 44-6SD20-0SS0	3SF78 44-6SD20-1SS0	3RG78 42-6DL20
1500	Receiver	3SF78 44-8BD22-0SS1	3SF78 44-8BD22-1SS1	3RG78 42-6DM21
1500	Emitter	3SF78 44-6SD22-0SS0	3SF78 44-6SD22-1SS0	3RG78 42-6DM20
1650	Receiver	3SF78 44-8BD24-0SS1	3SF78 44-8BD24-1SS1	3RG78 42-6DN21
1650	Emitter	3SF78 44-6SD24-0SS0	3SF78 44-6SD24-1SS0	3RG78 42-6DN20

1) For scope of supply see top of page 4/51.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
1800	Receiver	3SF78 44-8BD26-0SS1	3SF78 44-8BD26-1SS1	3RG78 42-6DP21
1800	Emitter	3SF78 44-6SD26-0SS0	3SF78 44-6SD26-1SS0	3RG78 42-6DP20

Light curtains with muting function package PROFIsafe¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 14 mm				
300	Receiver	3SF78 44-8MB04-0SS1	On request	3RG78 42-6BD21
300	Emitter	3SF78 44-6SB04-0SS0	On request	3RG78 42-6BD20
450	Receiver	3SF78 44-8MB06-0SS1	On request	3RG78 42-6BE21
450	Emitter	3SF78 44-6SB06-0SS0	On request	3RG78 42-6BE20
600	Receiver	3SF78 44-8MB08-0SS1	On request	3RG78 42-6BF21
600	Emitter	3SF78 44-6SB08-0SS0	On request	3RG78 42-6BF20
750	Receiver	3SF78 44-8MB11-0SS1	On request	3RG78 42-6BG21
750	Emitter	3SF78 44-6SB11-0SS0	On request	3RG78 42-6BG20
900	Receiver	3SF78 44-8MB13-0SS1	On request	3RG78 42-6BH21
900	Emitter	3SF78 44-6SB13-0SS0	On request	3RG78 42-6BH20
1050	Receiver	3SF78 44-8MB15-0SS1	On request	3RG78 42-6BJ21
1050	Emitter	3SF78 44-6SB15-0SS0	On request	3RG78 42-6BJ20
1200	Receiver	3SF78 44-8MB17-0SS1	On request	3RG78 42-6BK21
1200	Emitter	3SF78 44-6SB17-0SS0	On request	3RG78 42-6BK20
1350	Receiver	3SF78 44-8MB20-0SS1	On request	3RG78 42-6BL21
1350	Emitter	3SF78 44-6SB20-0SS0	On request	3RG78 42-6BL20
1500	Receiver	3SF78 44-8MB22-0SS1	On request	3RG78 42-6BM21
1500	Emitter	3SF78 44-6SB22-0SS0	On request	3RG78 42-6BM20
1650	Receiver	3SF78 44-8MB24-0SS1	On request	3RG78 42-6BN21
1650	Emitter	3SF78 44-6SB24-0SS0	On request	3RG78 42-6BN20
1800	Receiver	3SF78 44-8MB26-0SS1	On request	3RG78 42-6BP21
1800	Emitter	3SF78 44-6SB26-0SS0	On request	3RG78 42-6BP20
Resolution 30 mm				
300	Receiver	3SF78 44-8MD04-0SS1	On request	3RG78 42-6DD21
300	Emitter	3SF78 44-6SD04-0SS0	On request	3RG78 42-6DD20
450	Receiver	3SF78 44-8MD06-0SS1	On request	3RG78 42-6DE21
450	Emitter	3SF78 44-6SD06-0SS0	On request	3RG78 42-6DE20
600	Receiver	3SF78 44-8MD08-0SS1	On request	3RG78 42-6DF21
600	Emitter	3SF78 44-6SD08-0SS0	On request	3RG78 42-6DF20
750	Receiver	3SF78 44-8MD11-0SS1	On request	3RG78 42-6DG21
750	Emitter	3SF78 44-6SD11-0SS0	On request	3RG78 42-6DG20
900	Receiver	3SF78 44-8MD13-0SS1	On request	3RG78 42-6DH21
900	Emitter	3SF78 44-6SD13-0SS0	On request	3RG78 42-6DH20
1050	Receiver	3SF78 44-8MD15-0SS1	On request	3RG78 42-6DJ21
1050	Emitter	3SF78 44-6SD15-0SS0	On request	3RG78 42-6DJ20
1200	Receiver	3SF78 44-8MD17-0SS1	On request	3RG78 42-6DK21
1200	Emitter	3SF78 44-6SD17-0SS0	On request	3RG78 42-6DK20
1350	Receiver	3SF78 44-8MD20-0SS1	On request	3RG78 42-6DL21
1350	Emitter	3SF78 44-6SD20-0SS0	On request	3RG78 42-6DL20

1) For scope of supply see top of page 4/51.

► Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
1500	Receiver	3SF78 44-8MD22-0SS1	On request	3RG78 42-6DM21
1500	Emitter	3SF78 44-6SD22-0SS0	On request	3RG78 42-6DM20
1650	Receiver	3SF78 44-8MD24-0SS1	On request	3RG78 42-6DN21
1650	Emitter	3SF78 44-6SD24-0SS0	On request	3RG78 42-6DN20
1800	Receiver	3SF78 44-8MD26-0SS1	On request	3RG78 42-6DP21
1800	Emitter	3SF78 44-6SD26-0SS0	On request	3RG78 42-6DP20

Light grids with muting function package PROFIsafe¹⁾

No. of beams	Beam distance	Type	Standard device
	mm		Order No.
Range 0.8 m ... 18 m			
4-beam	300	Receiver	3SF78 44-8MM50-0SS1
4-beam	300	Emitter	3SF78 44-6SM50-0SS0
3-beam	400	Receiver	3SF78 44-8MP50-0SS1
3-beam	400	Emitter	3SF78 44-6SP50-0SS0
2-beam	500	Receiver	3SF78 44-8MS50-0SS1
2-beam	500	Emitter	3SF78 44-6SS50-0SS0

Transceiver with muting function package PROFIsafe¹⁾

No. of beams	Beam distance	Type	Standard device
	mm		Order No.
Range 6.5 m			
2-beam	500	Transceiver	3SF78 44-8MS50-0ST0
2-beam	500	Transceiver with integrated LED	3SF78 44-8MS50-0MT0
Reflecting mirrors for transceivers			3RG78 48-1TL

Light curtains with sequence control system function package PROFIsafe¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	
Resolution 14 mm				
300	Receiver	3SF78 44-8TB04-0SS1	3SF78 44-8TB04-1SS1	3RG78 42-6BD21
300	Emitter	3SF78 44-6SB04-0SS0	3SF78 44-6SB04-1SS0	3RG78 42-6BD20
450	Receiver	3SF78 44-8TB06-0SS1	3SF78 44-8TB06-1SS1	3RG78 42-6BE21
450	Emitter	3SF78 44-6SB06-0SS0	3SF78 44-6SB06-1SS0	3RG78 42-6BE20
600	Receiver	3SF78 44-8TB08-0SS1	3SF78 44-8TB08-1SS1	3RG78 42-6BF21
600	Emitter	3SF78 44-6SB08-0SS0	3SF78 44-6SB08-1SS0	3RG78 42-6BF20
750	Receiver	3SF78 44-8TB11-0SS1	3SF78 44-8TB11-1SS1	3RG78 42-6BG21
750	Emitter	3SF78 44-6SB11-0SS0	3SF78 44-6SB11-1SS0	3RG78 42-6BG20
900	Receiver	3SF78 44-8TB13-0SS1	3SF78 44-8TB13-1SS1	3RG78 42-6BH21
900	Emitter	3SF78 44-6SB13-0SS0	3SF78 44-6SB13-1SS0	3RG78 42-6BH20

1) For scope of supply see top of page 4/51.

► Preferred type, available from stock.

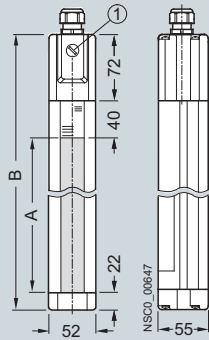
SIMATIC FS400 light curtains and light grids

3SF78 44 series, type 4

Integrated evaluation

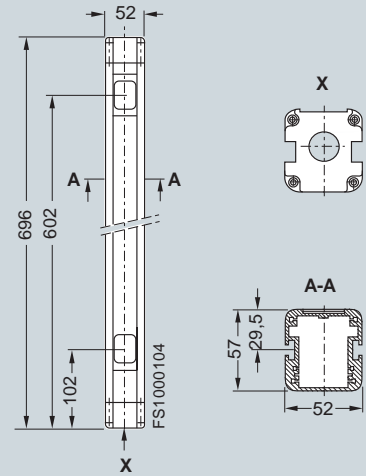
Dimensions

3SF78 44 standard light curtains, 3SF78 44 light grids



- ① Pg 9 cover (receiver only, for local interface)
- A Protection field height (see Selection and Ordering data)
- B Overall length = Protection field height A + 134 mm

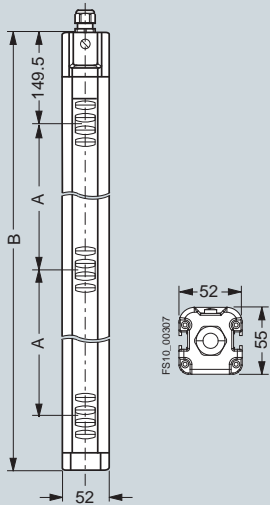
3RG78 48-1TL reflecting mirror



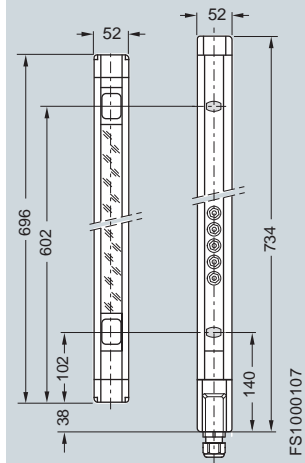
3SF78 44 light grids, additional dimensions

Additional dimensions for light grids only:

Type	B	A	Beams
3SF78 44-..M	1184	300	4
3SF8 44-..P	1034	400	3
3SF8 44-..S	734	500	2



3RG78 48-1TL reflecting mirror (left) and muting transceiver (right)



4

SIMATIC FS400 light curtains and light grids

3SF78 42 series, type 4

External evaluation
ASIsafe

Overview



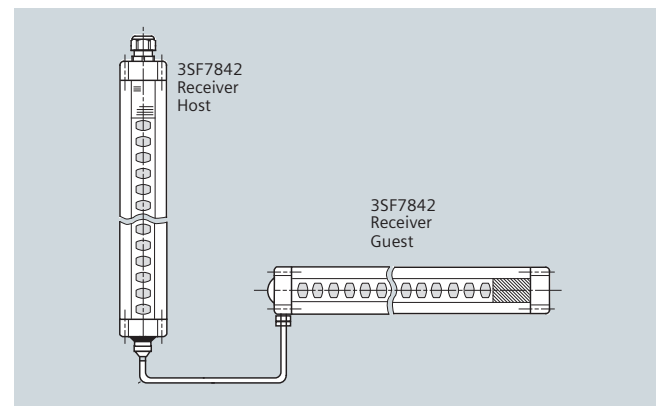
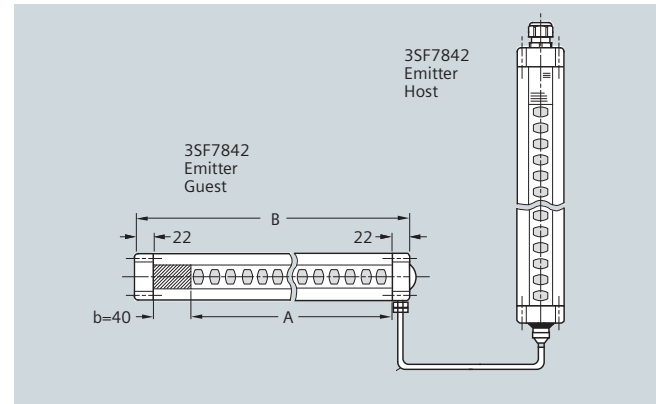
3SF78 42 light curtains and light grids for ASIsafe for type 4 in accordance with IEC/EN 61496-1, -2

- Resolution: 14, 30, 50, and 90 mm
- Protection field heights: 150 mm to 3000 mm
- 2-beam, 3-beam or 4-beam light grids
- Connection to AS-Interface

Cascading of host and guest devices for greater protection field heights and lengths or for an angular arrangement (optional).

Two standard 3RG78 48-0AB mounting brackets each are enclosed with all devices (can also be ordered as accessories see page 4/92).

Design



Host/guest: Cascading basic device-subsequent device

3SF78 42 (ASIsafe) program overview

Unit type	Function package	Output	Connection type	For light curtains: Resolution				See page
				For light grids and transceivers: Range				
				14 mm	30 mm	50 mm	90 mm	
Light curtains	–	ASIsafe	ASIsafe	✓	✓	✓	✓	4/64
Light grids	–	ASIsafe	ASIsafe	0.8 ... 18 m; 6 ... 60 m				4/67
Transceivers	–	ASIsafe	ASIsafe	6.5 m				4/64

Accessories

Electrical connection

- Connecting cable with M12 connection
- ASIsafe modules

Assembly materials

- Fixing columns, reflecting mirror
- Muting mounting systems
- Muting accessories

Laser alignment assistance, diagnostic software

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SIMATIC FS400 light curtains and light grids

3SF78 42 series, type 4

External evaluation
ASIsafe

Application of the EN ISO 13849-1 standard:
2006 "Safety of machinery" for 3SF78 42 ASIsafe light curtains and light grids

	Protection field height/number of beams	PL 13849-1	Category ISO 13849-1	Cat. 954-1	PFH _D	T _M /years
3SF78 42-... light grids	4-beam	e	4	4	6.6×10^{-9}	20
3SF78 42-... light curtain	900 mm	e	4	4	7.3×10^{-9}	20
3SF78 42-... light curtain	1800 mm	e	4	4	8.3×10^{-9}	20
3SF78 42-... light curtain	3000 mm	e	4	4	9.5×10^{-9}	20

Explanation

PFH_D = Probability of dangerous failure per hour

PL = Performance level

Discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions: From PL "a" (highest probability of failure) to PL "e" (lowest probability of failure).

For further explanations, see the brochure "European machinery directive – implemented easily", Order No. E20001-A230-M103-V1-7600.

Ordering notes

Included in the scope of supply:

3SF78 42 light curtains	
Emitter	3RG78 48-0AB mounting bracket set and emitter insert
Receiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets and safety key
• in addition with 14 mm resolution	3RG78 48-0FH test rod (14/24/33 and 19/29 mm)
• in addition with 30 mm resolution	3RG78 48-0AH/BH test rod (14/30 and 38 mm)
Guest devices of the 3RG78 42 series	
Emitter	3RG78 48-0AB mounting bracket set
Receiver	3RG78 48-0AB mounting bracket set
• in addition with 14 or 30 mm resolution	3RG78 48-0AH test rod
3SF78 42 light grids	
Emitter	3RG78 48-0AB mounting bracket set and emitter insert
Receiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets
3SF78 42 transceiver	
Transceiver	3RG78 48-0AB mounting bracket set, operating instructions/data sheets

Selection and Ordering data

Light curtains¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 14 mm				
150	Receiver	3SF78 42-6BB01	–	3RG78 42-6BB21
150	Emitter	3SF78 42-6BB00	–	3RG78 42-6BB20
225	Receiver	3SF78 42-6BC01	3SF78 42-6BC11	3RG78 42-6BC21
225	Emitter	3SF78 42-6BC00	3SF78 42-6BC10	3RG78 42-6BC20
300	Receiver	3SF78 42-6BD01	3SF78 42-6BD11	3RG78 42-6BD21
300	Emitter	3SF78 42-6BD00	3SF78 42-6BD10	3RG78 42-6BD20
450	Receiver	3SF78 42-6BE01	3SF78 42-6BE11	3RG78 42-6BE21
450	Emitter	3SF78 42-6BE00	3SF78 42-6BE10	3RG78 42-6BE20
600	Receiver	3SF78 42-6BF01	3SF78 42-6BF11	3RG78 42-6BF21
600	Emitter	3SF78 42-6BF00	3SF78 42-6BF10	3RG78 42-6BF20

1) For scope of supply see top of page 4/64

SIMATIC FS400 light curtains and light grids

3SF78 42 series, type 4

External evaluation
ASIsafe

Protection field height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
750	Receiver	3SF78 42-6BG01	3SF78 42-6BG11	3RG78 42-6BG21
750	Emitter	3SF78 42-6BG00	3SF78 42-6BG10	3RG78 42-6BG20
900	Receiver	3SF78 42-6BH01	3SF78 42-6BH11	3RG78 42-6BH21
900	Emitter	3SF78 42-6BH00	3SF78 42-6BH10	3RG78 42-6BH20
1050	Receiver	3SF78 42-6BJ01	3SF78 42-6BJ11	3RG78 42-6BJ21
1050	Emitter	3SF78 42-6BJ00	3SF78 42-6BJ10	3RG78 42-6BJ20
1200	Receiver	3SF78 42-6BK01	3SF78 42-6BK11	3RG78 42-6BK21
1200	Emitter	3SF78 42-6BK00	3SF78 42-6BK10	3RG78 42-6BK20
1350	Receiver	3SF78 42-6BL01	3SF78 42-6BL11	3RG78 42-6BL21
1350	Emitter	3SF78 42-6BL00	3SF78 42-6BL10	3RG78 42-6BL20
1500	Receiver	3SF78 42-6BM01	3SF78 42-6BM11	3RG78 42-6BM21
1500	Emitter	3SF78 42-6BM00	3SF78 42-6BM10	3RG78 42-6BM20
1650	Receiver	3SF78 42-6BN01	3SF78 42-6BN11	3RG78 42-6BN21
1650	Emitter	3SF78 42-6BN00	3SF78 42-6BN10	3RG78 42-6BN20
1800	Receiver	3SF78 42-6BP01	3SF78 42-6BP11	3RG78 42-6BP21
1800	Emitter	3SF78 42-6BP00	3SF78 42-6BP10	3RG78 42-6BP20
Resolution 30 mm				
150	Receiver	3SF78 42-6DB01	–	3RG78 42-6DB21
150	Emitter	3SF78 42-6DB00	–	3RG78 42-6DB20
225	Receiver	3SF78 42-6DC01	3SF78 42-6DC11	3RG78 42-6DC21
225	Emitter	3SF78 42-6DC00	3SF78 42-6DC10	3RG78 42-6DC20
300	Receiver	3SF78 42-6DD01	3SF78 42-6DD11	3RG78 42-6DD21
300	Emitter	3SF78 42-6DD00	3SF78 42-6DD10	3RG78 42-6DD20
450	Receiver	3SF78 42-6DE01	3SF78 42-6DE11	▶ 3RG78 42-6DE21
450	Emitter	3SF78 42-6DE00	3SF78 42-6DE10	▶ 3RG78 42-6DE20
600	Receiver	3SF78 42-6DF01	3SF78 42-6DF11	3RG78 42-6DF21
600	Emitter	3SF78 42-6DF00	3SF78 42-6DF10	3RG78 42-6DF20
750	Receiver	3SF78 42-6DG01	3SF78 42-6DG11	3RG78 42-6DG21
750	Emitter	3SF78 42-6DG00	3SF78 42-6DG10	3RG78 42-6DG20
900	Receiver	3SF78 42-6DH01	3SF78 42-6DH11	3RG78 42-6DH21
900	Emitter	3SF78 42-6DH00	3SF78 42-6DH10	3RG78 42-6DH20
1050	Receiver	3SF78 42-6DJ01	3SF78 42-6DJ11	3RG78 42-6DJ21
1050	Emitter	3SF78 42-6DJ00	3SF78 42-6DJ10	3RG78 42-6DJ20
1200	Receiver	3SF78 42-6DK01	3SF78 42-6DK11	3RG78 42-6DK21
1200	Emitter	3SF78 42-6DK00	3SF78 42-6DK10	3RG78 42-6DK20
1350	Receiver	3SF78 42-6DL01	3SF78 42-6DL11	3RG78 42-6DL21
1350	Emitter	3SF78 42-6DL00	3SF78 42-6DL10	3RG78 42-6DL20
1500	Receiver	3SF78 42-6DM01	3SF78 42-6DM11	3RG78 42-6DM21
1500	Emitter	3SF78 42-6DM00	3SF78 42-6DM10	3RG78 42-6DM20
1650	Receiver	3SF78 42-6DN01	3SF78 42-6DN11	3RG78 42-6DN21
1650	Emitter	3SF78 42-6DN00	3SF78 42-6DN10	3RG78 42-6DN20
1800	Receiver	3SF78 42-6DP01	3SF78 42-6DP11	3RG78 42-6DP21
1800	Emitter	3SF78 42-6DP00	3SF78 42-6DP10	3RG78 42-6DP20
Resolution 50 mm				
450	Receiver	3SF78 42-6EE01	3SF78 42-6EE11	3RG78 42-6EE21
450	Emitter	3SF78 42-6EE00	3SF78 42-6EE10	3RG78 42-6EE20
600	Receiver	3SF78 42-6EF01	3SF78 42-6EF11	3RG78 42-6EF21
600	Emitter	3SF78 42-6EF00	3SF78 42-6EF10	3RG78 42-6EF20

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3SF78 42 series, type 4

External evaluation
ASIsafe

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
750	Receiver	3SF78 42-6EG01	3SF78 42-6EG11	3RG78 42-6EG21
750	Emitter	3SF78 42-6EG00	3SF78 42-6EG10	3RG78 42-6EG20
900	Receiver	3SF78 42-6EH01	3SF78 42-6EH11	3RG78 42-6EH21
900	Emitter	3SF78 42-6EH00	3SF78 42-6EH10	3RG78 42-6EH20
1050	Receiver	3SF78 42-6EJ01	3SF78 42-6EJ11	3RG78 42-6EJ21
1050	Emitter	3SF78 42-6EJ00	3SF78 42-6EJ10	3RG78 42-6EJ20
1200	Receiver	3SF78 42-6EK01	3SF78 42-6EK11	3RG78 42-6EK21
1200	Emitter	3SF78 42-6EK00	3SF78 42-6EK10	3RG78 42-6EK20
1350	Receiver	3SF78 42-6EL01	3SF78 42-6EL11	3RG78 42-6EL21
1350	Emitter	3SF78 42-6EL00	3SF78 42-6EL10	3RG78 42-6EL20
1500	Receiver	3SF78 42-6EM01	3SF78 42-6EM11	3RG78 42-6EM21
1500	Emitter	3SF78 42-6EM00	3SF78 42-6EM10	3RG78 42-6EM20
1650	Receiver	3SF78 42-6EN01	3SF78 42-6EN11	3RG78 42-6EN21
1650	Emitter	3SF78 42-6EN00	3SF78 42-6EN10	3RG78 42-6EN20
1800	Receiver	3SF78 42-6EP01	3SF78 42-6EP11	3RG78 42-6EP21
1800	Emitter	3SF78 42-6EP00	3SF78 42-6EP10	3RG78 42-6EP20
2100	Receiver	3SF78 42-6ER01	3SF78 42-6ER11	3RG78 42-6ER21
2100	Emitter	3SF78 42-6ER00	3SF78 42-6ER10	3RG78 42-6ER20
2400	Receiver	3SF78 42-6ES01	3SF78 42-6ES11	3RG78 42-6ES21
2400	Emitter	3SF78 42-6ES00	3SF78 42-6ES10	3RG78 42-6ES20
2700	Receiver	3SF78 42-6ET01	3SF78 42-6ET11	3RG78 42-6ET21
2700	Emitter	3SF78 42-6ET00	3SF78 42-6ET10	3RG78 42-6ET20
3000	Receiver	3SF78 42-6EU01	3SF78 42-6EU11	3RG78 42-6EU21
3000	Emitter	3SF78 42-6EU00	3SF78 42-6EU10	3RG78 42-6EU20
Resolution 90 mm				
750	Receiver	3SF78 42-6JG01	3SF78 42-6JG11	3RG78 42-6JG21
750	Emitter	3SF78 42-6JG00	3SF78 42-6JG10	3RG78 42-6JG20
900	Receiver	3SF78 42-6JH01	3SF78 42-6JH11	3RG78 42-6JH21
900	Emitter	3SF78 42-6JH00	3SF78 42-6JH10	3RG78 42-6JH20
1050	Receiver	3SF78 42-6JJ01	3SF78 42-6JJ11	3RG78 42-6JJ21
1050	Emitter	3SF78 42-6JJ00	3SF78 42-6JJ10	3RG78 42-6JJ20
1200	Receiver	3SF78 42-6JK01	3SF78 42-6JK11	3RG78 42-6JK21
1200	Emitter	3SF78 42-6JK00	3SF78 42-6JK10	3RG78 42-6JK20
1350	Receiver	3SF78 42-6JL01	3SF78 42-6JL11	3RG78 42-6JL21
1350	Emitter	3SF78 42-6JL00	3SF78 42-6JL10	3RG78 42-6JL20
1500	Receiver	3SF78 42-6JM01	3SF78 42-6JM11	3RG78 42-6JM21
1500	Emitter	3SF78 42-6JM00	3SF78 42-6JM10	3RG78 42-6JM20
1650	Receiver	3SF78 42-6JN01	3SF78 42-6JN11	3RG78 42-6JN21
1650	Emitter	3SF78 42-6JN00	3SF78 42-6JN10	3RG78 42-6JN20
1800	Receiver	3SF78 42-6JP01	3SF78 42-6JP11	3RG78 42-6JP21
1800	Emitter	3SF78 42-6JP00	3SF78 42-6JP10	3RG78 42-6JP20
2100	Receiver	3SF78 42-6JR01	3SF78 42-6JR11	3RG78 42-6JR21
2100	Emitter	3SF78 42-6JR00	3SF78 42-6JR10	3RG78 42-6JR20
2400	Receiver	3SF78 42-6JS01	3SF78 42-6JS11	3RG78 42-6JS21
2400	Emitter	3SF78 42-6JS00	3SF78 42-6JS10	3RG78 42-6JS20
2700	Receiver	3SF78 42-6JT01	3SF78 42-6JT11	3RG78 42-6JT21
2700	Emitter	3SF78 42-6JT00	3SF78 42-6JT10	3RG78 42-6JT20
3000	Receiver	3SF78 42-6JU01	3SF78 42-6JU11	3RG78 42-6JU21
3000	Emitter	3SF78 42-6JU00	3SF78 42-6JU10	3RG78 42-6JU20

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SIMATIC FS400 light curtains and light grids

3SF78 42 series, type 4

External evaluation
ASIsafe*Light grids¹⁾*

No. of beams	Beam distance mm	Type	Range 0.8 m ... 18 m		Range 6 m ... 60 m	
			Order No.		Order No.	
4-beam	300	Emitter	▶	3SF78 42-6MH00		3SF78 42-6MH50
4-beam	300	Receiver	▶	3SF78 42-6MH01		3SF78 42-6MH51
3-beam	400	Emitter		3SF78 42-6PG00		3SF78 42-6PG50
3-beam	400	Receiver		3SF78 42-6PG01		3SF78 42-6PG51
2-beam	500	Emitter		3SF78 42-6SE00		3SF78 42-6SE50
2-beam	500	Receiver		3SF78 42-6SE01		3SF78 42-6SE51

Transceiver with ASIsafe¹⁾

No. of beams	Beam distance mm	Type	Standard device	
			Order No.	
Range 6.5 m				
2-beam	500	Transceiver		3SF78 42-6TE01
Reflecting mirrors for transceivers				3RG78 48-1TL

1) For scope of supply see top of page 4/64

▶ Preferred type, available from stock.

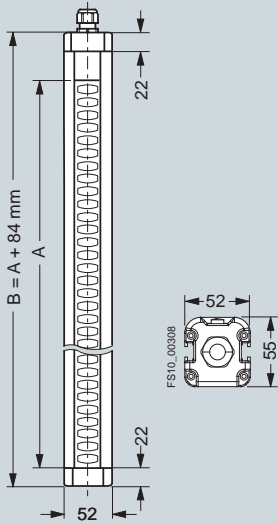
SIMATIC FS400 light curtains and light grids

3SF78 42 series, type 4

External evaluation
ASIsafe

Dimensions

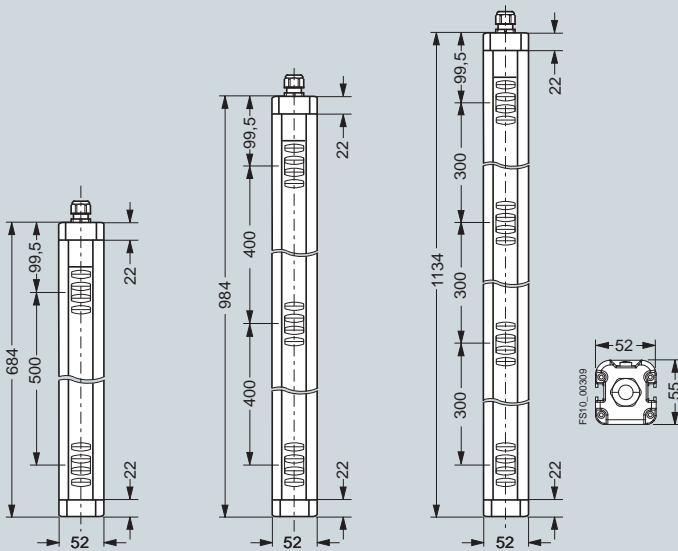
3SF78 42 standard light curtains,
3SF78 42 light grids



- ① Pg 9 cover (receiver only, for local interface)
- A Protection field height (see Selection and Ordering data)
- B Overall length = Protection field height A + 134 mm

4

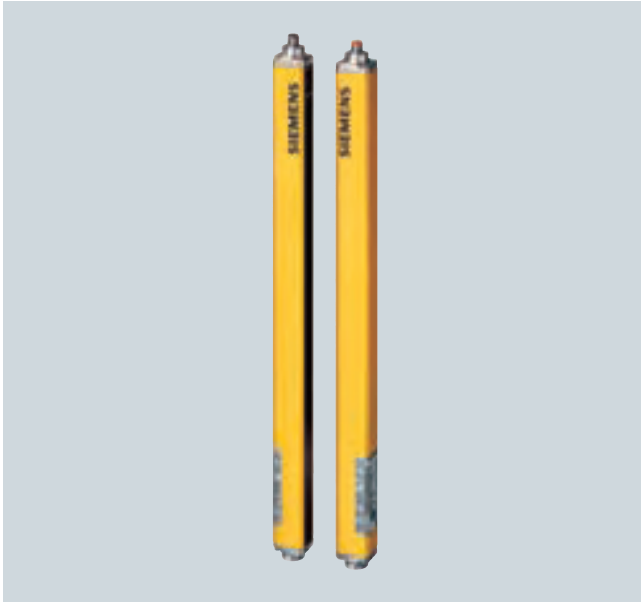
3SF78 42 light grids, additional dimensions



Additional dimensions(mm) for light grids only:

Type	Overall length	Beam distance	Beams
3SF78 42-...M	1134	300	4
3SF78 42-...P	984	400	3
3SF78 42-...S	684	500	2

Overview



3RG78 46 light curtains with integrated evaluation for type 4 in accordance with IEC/EN 61496-1, -2.

- Resolution: 14, 20, 30, 40 and 90 mm
- Protection field height: 150 mm to 1800 mm
- Two 360° mounting brackets 3RG78 48-2BA each are enclosed with all devices (can also be ordered as accessories see page 4/97)

3RG78 46 (FS420I) program overview

Unit type	Function package	Output	Connection type	Resolution					See page
				14 mm	20 mm	30 mm	40 mm	90 mm	
Light curtains	Standard	Transistor	M12 plug connector	✓	✓	✓	✓	✓	4/72
Accessories									
Electrical connection									
• Connecting cable with M12 connection									4/95
• Connecting cable for the K45F module (see also page 4/94) to connect the 3RG7843 and 3RG7846 series to ASIsafe									4/96
• ASIsafe modules									4/94
Assembly materials									
• Fixing columns, reflecting mirror									4/91f.
• Muting mounting systems									4/92
• Muting accessories									4/95
Laser alignment assistance, diagnostic software									4/93

SIMATIC FS400 light curtains and light grids

3RG78 46 series, type 4

Integrated evaluation
standard function package, transistor output

Technical specifications

Type	3RG78 46
Safety category IEC/EN 61496	Type 4
Detection capability (resolution)	14 mm, 20 mm, 30 mm, 40 mm, 90 mm
Protection field width, range	
• 14 mm resolution	0.5 ... 5 m
• 20 mm resolution	0.7 ... 14 m
• 30 mm resolution	0.5 ... 9 m
• 40 mm resolution	0.9 ... 20 m
• 90 mm resolution	0.9 ... 20 m
Supply voltage U_V (emitter and receiver)	24 V DC \pm 20% (external power pack with safe isolation and compensation of 20 ms voltage dip is necessary, minimum 1 A current reserve)
Residual ripple of supply voltage	\pm 5% within the limits of U_V
Current consumption	
• Emitter	75 mA
• Receiver	110 mA (without external load)
General value for external fuse in the transmitter and receiver supply leads	1 A medium time-lag
Permissible conductor cross-section	
• Emitter	0.25 mm ²
• Receiver	0.14 mm ²
Emitter	Light-emitting diodes according to EN 60825-1:1994+A1:2002+A:2001
• Class	1
• Wave length	950 nm
• Power	< 50 μ W

Type	3RG78 46
Synchronization	Optically between emitter and receiver
Safety class (VDE 106) ¹⁾	III
Ambient temperature	
• Operation	0 ... +55 °C
• Storage	-25 ... +70 °C
Relative humidity	15 ... 95%
Degree of protection	IP65
Signal inputs	
• Emitter pin 4 - Test input	<ul style="list-style-type: none"> • Input: Contact or transistor connected to +24 V DC • 0 V or spare = Test • Current load: 20 mA max.
• Receiver pin 1 - Start/restart key	Input: Contact (NO) connected to 24 V DC, current load: 15 mA max.
- Error/pollution group alarm	Output: pnp: Connected to 24 V DC, 80 mA max.
• Receiver pin 3 - EDM (contactor control)	<ul style="list-style-type: none"> • Input: Contact (NC) connected to 0 V • Current load: 15 mA max. 24 V DC connection
- without EDM	
• Receiver pin 4 - with RES - without RES	Input: 24 V DC Jumper to pin 1

¹⁾ The circuits connected to the inputs and outputs must comply with the air gaps and creepage distances specified in the applicable standards for safe isolation.

OSSD transistor outputs

2 pnp safety-related transistor outputs, cross-connection monitored, short-circuit-proof

	Minimum	Typical	Maximum
Operational voltage active high ($U_V - 1.6$ V) For resistive load $I_{rated} = 250$ mA	-	22 V	-
Operational voltage, low	-80 V ¹⁾	0 V	+ 2.8 V
Operational current	-	250 mA	-
Leakage current	-	< 5 μ A	< 20 μ A
Load capacitance	-	-	< 220 nF
Load inductance	-	-	< 2.0 H
Permissible line resistance to load	-	-	< 300 Ω ²⁾
Permissible line length between receiver and load (with 0.25 mm ²)	-	-	100 m
Test pulse width	30 μ s	-	100 μ s
Test pulse space	-	-	22 μ s
OSSD reactivation time after beam interruption (without RES)	40 ms	100 ms	-
OSSD response time	Depending on number of beams, see operating instructions		

¹⁾ Fast recovery voltage for contactors, otherwise 0 V

²⁾ Please note further constraints due to cable length and load current.

SIMATIC FS400 light curtains and light grids

3RG78 46 series, type 4

Integrated evaluation
standard function package, transistor output

Application of the EN ISO 13849-1 standard:
2006 "Safety of machinery" for 3RG78 46 light curtains

	Protection field height	PL 13849-1	Category ISO 13849-1	Cat. 954-1	PFH _D	T _M /years
3RG78 46-... light curtain	900 mm	e	4	4	6.0×10^{-9}	20
3RG78 46-... light curtain	1800 mm	e	4	4	7.3×10^{-9}	20

Explanation

PFH_D = Probability of dangerous failure per hour

PL = Performance level

Discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions: From PL "a" (highest probability of failure) to PL "e" (lowest probability of failure).

For further explanations, see the brochure
"European machinery directive – implemented easily",
Order No. E20001-A230-M103-V1-7600.

Ordering notes

Included in the scope of supply:

3RG78 46 light curtains	
Emitter	3RG78 48-2BA mounting bracket set and emitter insert
Receiver	3RG78 48-2BA mounting bracket set, operating instructions/data sheets
• in addition for 14 mm and 30 mm resolution	3RG78 48-0AH test rod
• in addition for 20 mm resolution	3RG78 48-1CH test rod
• in addition for 40 mm resolution	3RG78 48-1BH test rod

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SIMATIC FS400 light curtains and light grids

3RG78 46 series, type 4

Integrated evaluation
standard function package, transistor output

Selection and Ordering data

Light curtains with M12 plug connection¹⁾

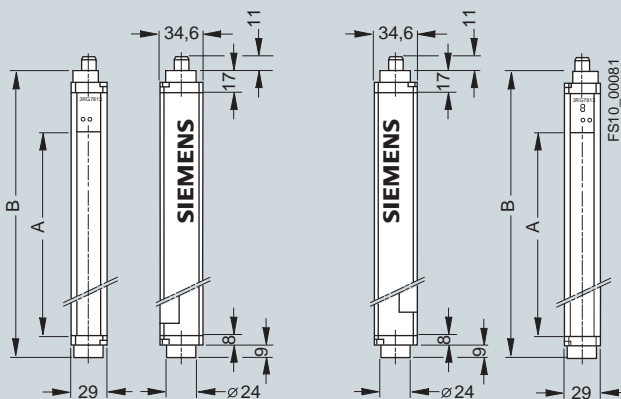
Protection field height mm	Type	Resolution 14 mm	Resolution 20 mm	Resolution 30 mm
		Order No.	Order No.	Order No.
SIMATIC FS420I				
150	Receiver	–	3RG78 46-3SC02-0SS1	3RG78 46-3SD02-0SS1
150	Emitter	–	3RG78 46-3SC02-0SS0	3RG78 46-3SD02-0SS0
225	Receiver	–	3RG78 46-3SC03-0SS1	3RG78 46-3SD03-0SS1
225	Emitter	–	3RG78 46-3SC03-0SS0	3RG78 46-3SD03-0SS0
300	Receiver	3RG7846-3SB04-0SS1	3RG78 46-3SC04-0SS1	3RG78 46-3SD04-0SS1
300	Emitter	3RG7846-3SB04-0SS0	3RG78 46-3SC04-0SS0	3RG78 46-3SD04-0SS0
450	Receiver	3RG78 46-3SB06-0SS1	3RG78 46-3SC06-0SS1	3RG78 46-3SD06-0SS1
450	Emitter	3RG78 46-3SB06-0SS0	3RG78 46-3SC06-0SS0	3RG78 46-3SD06-0SS0
600	Receiver	3RG78 46-3SB08-0SS1	3RG78 46-3SC08-0SS1	3RG78 46-3SD08-0SS1
600	Emitter	3RG78 46-3SB08-0SS0	3RG78 46-3SC08-0SS0	3RG78 46-3SD08-0SS0
750	Receiver	3RG78 46-3SB11-0SS1	3RG78 46-3SC11-0SS1	3RG78 46-3SD11-0SS1
750	Emitter	3RG78 46-3SB11-0SS0	3RG78 46-3SC11-0SS0	3RG78 46-3SD11-0SS0
900	Receiver	3RG78 46-3SB13-0SS1	3RG78 46-3SC13-0SS1	3RG78 46-3SD13-0SS1
900	Emitter	3RG78 46-3SB13-0SS0	3RG78 46-3SC13-0SS0	3RG78 46-3SD13-0SS0
1050	Receiver	3RG78 46-3SB15-0SS1	3RG78 46-3SC15-0SS1	3RG78 46-3SD15-0SS1
1050	Emitter	3RG78 46-3SB15-0SS0	3RG78 46-3SC15-0SS0	3RG78 46-3SD15-0SS0
1200	Receiver	3RG78 46-3SB17-0SS1	3RG78 46-3SC17-0SS1	3RG78 46-3SD17-0SS1
1200	Emitter	3RG78 46-3SB17-0SS0	3RG78 46-3SC17-0SS0	3RG78 46-3SD17-0SS0
1350	Receiver	3RG78 46-3SB20-0SS1	3RG78 46-3SC20-0SS1	3RG78 46-3SD20-0SS1
1350	Emitter	3RG78 46-3SB20-0SS0	3RG78 46-3SC20-0SS0	3RG78 46-3SD20-0SS0
1500	Receiver	3RG78 46-3SB22-0SS1	3RG78 46-3SC22-0SS1	3RG78 46-3SD22-0SS1
1500	Emitter	3RG78 46-3SB22-0SS0	3RG78 46-3SC22-0SS0	3RG78 46-3SD22-0SS0
1650	Receiver	3RG78 46-3SB24-0SS1	3RG78 46-3SC24-0SS1	3RG78 46-3SD24-0SS1
1650	Emitter	3RG78 46-3SB24-0SS0	3RG78 46-3SC24-0SS0	3RG78 46-3SD24-0SS0
1800	Receiver	3RG78 46-3SB26-0SS1	3RG78 46-3SC26-0SS1	3RG78 46-3SD26-0SS1
1800	Emitter	3RG78 46-3SB26-0SS0	3RG78 46-3SC26-0SS0	3RG78 46-3SD26-0SS0

1) For scope of supply see top of page 4/71

Protection field height mm	Type	Resolution 40 mm Order No.	Resolution 90 mm Order No.
SIMATIC FS420I			
150	Receiver	3RG78 46-3SF02-OSS1	–
150	Emitter	3RG78 46-3SF02-OSS0	–
225	Receiver	3RG78 46-3SF03-OSS1	–
225	Emitter	3RG78 46-3SF03-OSS0	–
300	Receiver	3RG78 46-3SF04-OSS1	–
300	Emitter	3RG78 46-3SF04-OSS0	–
450	Receiver	3RG78 46-3SF06-OSS1	–
450	Emitter	3RG78 46-3SF06-OSS0	–
600	Emitter	3RG78 46-3SF08-OSS0	3RG78 46-3SJ08-OSS0
600	Receiver	3RG78 46-3SF08-OSS1	3RG78 46-3SJ08-OSS1
750	Receiver	3RG78 46-3SF11-OSS1	3RG78 46-3SJ11-OSS1
750	Emitter	3RG78 46-3SF11-OSS0	3RG78 46-3SJ11-OSS0
900	Receiver	3RG78 46-3SF13-OSS1	3RG78 46-3SJ13-OSS1
900	Emitter	3RG78 46-3SF13-OSS0	3RG78 46-3SJ13-OSS0
1050	Receiver	3RG78 46-3SF15-OSS1	3RG78 46-3SJ15-OSS1
1050	Emitter	3RG78 46-3SF15-OSS0	3RG78 46-3SJ15-OSS0
1200	Receiver	3RG78 46-3SF17-OSS1	3RG78 46-3SJ17-OSS1
1200	Emitter	3RG78 46-3SF17-OSS0	3RG78 46-3SJ17-OSS0
1350	Receiver	3RG78 46-3SF20-OSS1	3RG78 46-3SJ20-OSS1
1350	Emitter	3RG78 46-3SF20-OSS0	3RG78 46-3SJ20-OSS0
1500	Receiver	3RG78 46-3SF22-OSS1	3RG78 46-3SJ22-OSS1
1500	Emitter	3RG78 46-3SF22-OSS0	3RG78 46-3SJ22-OSS0
1650	Receiver	3RG78 46-3SF24-OSS1	3RG78 46-3SJ24-OSS1
1650	Emitter	3RG78 46-3SF24-OSS0	3RG78 46-3SJ24-OSS0
1800	Receiver	3RG78 46-3SF26-OSS1	3RG78 46-3SJ26-OSS1
1800	Emitter	3RG78 46-3SF26-OSS0	3RG78 46-3SJ26-OSS0

Dimensions

3RG78 46 light curtains with integrated evaluation, Type 4



Emitter

Receiver

A Protection field height
(see Selection and Ordering data)

B Overall length without connector = Protection field height A + 75.5 mm

SIMATIC FS400 light curtains and light grids

3RG78 43 series, type 2

Integrated evaluation, Standard function package,
transistor output, acc. to IEC/EN 61508 (SIL 2)

Overview



3RG78 43 light curtains with integrated startup/restart inhibit and contactor control for type 2 according to IEC/EN 61496-1, -2.

- Developed according to EN 61508 (SIL 2)
- Risk assessment, suitable according to pr EN ISO 13849-1
- Resolution 20, 30, 40 and 90 mm
- Protection field height: 150 mm to 1800 mm

Two 360° mounting brackets 3RG78 48-2BA each are enclosed with all devices (can also be ordered as accessories see page 4/97)

3RG78 43 (FS420I) program overview

Unit type	Function package	Output	Connection type	Resolution				See page
				20 mm	30 mm	40 mm	90 mm	
Light curtains	Standard	Transistor	M12 plug connector	✓	✓	✓	✓	4/76
Accessories								
Electrical connection								
• Connecting cable with M12 connection								4/95
• Connecting cable for the K45F module (see also page 4/94) to connect the 3RG78 43 and 3RG78 46 series to ASIsafe								4/96
• ASIsafe modules								4/94
Assembly materials								
• Fixing columns, reflecting mirror								4/91f.
• Muting mounting systems								4/92
• Muting accessories								4/95
Laser alignment assistance, diagnostic software								4/93

SIMATIC FS400 light curtains and light grids

3RG78 43 series, type 2

Integrated evaluation, Standard function package, transistor output, acc. to IEC/EN 61508 (SIL 2)

Technical specifications

Type	3RG78 43
Safety category EN IEC 61496; SIL2 to IEC 61508	Type 2
Detection capability (resolution)	20 mm, 30 mm, 40 mm, 90 mm
Protection field width, range	
• for 20 mm resolution	0.5 ... 15 m
• for 30 mm resolution	0 ... 8 m
• for 40 mm resolution	0.8 ... 20 m
• for 90 mm resolution	0.8 ... 20 m
Supply voltage U_V (emitter and receiver)	24 V DC \pm 20% (external power pack with safe isolation and compensation of 20 ms voltage dip is necessary, min. 1 A current reserve)
Residual ripple of supply voltage	\pm 5% within the limits of U_V
Current consumption	
• Emitter	45 mA
• Receiver	140 mA (without external load)
General value for external fuse in the transmitter and receiver supply leads	1 A
Permissible conductor cross-section	
• Emitter	0.25 mm ²
• Receiver	0.14 mm ²

Type	3RG78 43
Emitter	Light-emitting diodes according to EN 60825-1:1994+ A1:2002+A:2001
• Class	1
• Wave length	950 nm
• Pulse duration	7 μ s
• Pulse interval	3.1 ms
• Power	< 10 μ W
Synchronization	Optically between emitter and receiver
Test repeat time for integrated cyclical test	100 ms
Safety class (VDE 106)	III ¹⁾
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	-25 ... +70 °C
Relative humidity	15 ... 95%
Degree of protection	IP65
Signal inputs	
• Emitter test input	Input: Contact or transistor connected to +24 V DC, current load: 20 mA max.
• Receiver signal input BA1	Input: Contact or transistor connected to +24 V DC, or connect to GND, current load: 10 mA max.
• Receiver signal input BA2	Input: Contact or transistor connected to +24 V DC, or connect to GND, current load: 10 mA max.

1) The circuits connected to the inputs and outputs must comply with the air gaps and creepage distances specified in the applicable standards for safe isolation.

4

Transistor outputs Receiver

OSSD transistor outputs	2 pnp safety-related transistor outputs, short-circuit-proof		
	Minimum	Typical	Maximum
Operational voltage active high	$U_V - 1.9$ V	$U_V - 1.0$ V	$U_V - 0.8$ V
Operational voltage, low	–	200 mV	+ 1 V
Operational current	–	–	250 mA
Leakage current	–	< 2 μ A ¹⁾	–
Load capacitance	–	–	< 2.2 μ F
Load inductance	–	–	2.0 H
Permissible line resistance to load	–	–	< 50 Ω ²⁾
Permissible conductor cross-section: Receiver	–	–	0.14 mm ²
Permissible cable lengths between receiver and load	–	–	100 m
Auxiliary pulse width	20 μ s	–	230 μ s
Auxiliary pulse interval	3.7 ms	–	46 ms
OSSD reactivation time after beam interruption (without RES)	–	100 ms	–
OSSD response time	Depending on number of beams, see operating instructions		

1) If an error occurs (when disconnecting the GND line), the output acts like a 120 k Ω resistance to U_V . A downstream safety PLC may not identify this as a logical "1".

2) Please note further constraints due to cable length and load current.

SIMATIC FS400 light curtains and light grids

3RG78 43 series, type 2

Integrated evaluation, Standard function package,
transistor output, acc. to IEC/EN 61508 (SIL 2)

Application of the EN ISO 13849-1 standard:
2006 "Safety of machinery" for 3RG78 43 light curtains

	Protection field height	PL 13849-1	Category ISO 13849-1	Cat. 954-1	PFH _D	T _M /years
3RG78 43-... light curtain	900 mm	d	2	2	8.18×10^{-8}	20
3RG78 43-... light curtain	1800 mm	d	2	2	8.92×10^{-8}	20

Explanation

PFH_D = Probability of dangerous failure per hour

PL = Performance level

Discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions: From PL "a" (highest probability of failure) to PL "e" (lowest probability of failure).

For further explanations, see the brochure
"European machinery directive – implemented easily",
Order No. E20001-A230-M103-V1.

Ordering notes

Included in the scope of supply:

3RG78 43 light curtain	
Emitter	3RG78 48-2BA mounting bracket set and emitter insert
Receiver	3RG78 48-2BA mounting bracket set, operating instructions/data sheets

Selection and Ordering data

Light curtains with M12 plug connection ¹⁾

Protection field height mm	Type	Resolution 20 mm Order No.	Resolution 30 mm Order No.
SIMATIC FS420I			
150	Receiver	3RG78 43-3SC02-0SS1	3RG78 43-3SD02-0SS1
150	Emitter	3RG78 43-3SC02-0SS0	3RG78 43-3SD02-0SS0
225	Receiver	3RG78 43-3SC03-0SS1	3RG78 43-3SD03-0SS1
225	Emitter	3RG78 43-3SC03-0SS0	3RG78 43-3SD03-0SS0
300	Receiver	3RG78 43-3SC04-0SS1	▶ 3RG78 43-3SD04-0SS1
300	Emitter	3RG78 43-3SC04-0SS0	▶ 3RG78 43-3SD04-0SS0
450	Receiver	▶ 3RG78 43-3SC06-0SS1	▶ 3RG78 43-3SD06-0SS1
450	Emitter	▶ 3RG78 43-3SC06-0SS0	▶ 3RG78 43-3SD06-0SS0
600	Receiver	3RG78 43-3SC08-0SS1	▶ 3RG78 43-3SD08-0SS1
600	Emitter	3RG78 43-3SC08-0SS0	▶ 3RG78 43-3SD08-0SS0
750	Receiver	3RG78 43-3SC11-0SS1	3RG78 43-3SD11-0SS1
750	Emitter	3RG78 43-3SC11-0SS0	3RG78 43-3SD11-0SS0
900	Receiver	3RG78 43-3SC13-0SS1	3RG78 43-3SD13-0SS1
900	Emitter	3RG78 43-3SC13-0SS0	3RG78 43-3SD13-0SS0
1050	Receiver	3RG78 43-3SC15-0SS1	3RG78 43-3SD15-0SS1
1050	Emitter	3RG78 43-3SC15-0SS0	3RG78 43-3SD15-0SS0
1200	Receiver	3RG78 43-3SC17-0SS1	3RG78 43-3SD17-0SS1
1200	Emitter	3RG78 43-3SC17-0SS0	3RG78 43-3SD17-0SS0
1350	Receiver	3RG78 43-3SC20-0SS1	3RG78 43-3SD20-0SS1
1350	Emitter	3RG78 43-3SC20-0SS0	3RG78 43-3SD20-0SS0
1500	Receiver	3RG78 43-3SC22-0SS1	3RG78 43-3SD22-0SS1
1500	Emitter	3RG78 43-3SC22-0SS0	3RG78 43-3SD22-0SS0
1650	Receiver	3RG78 43-3SC24-0SS1	3RG78 43-3SD24-0SS1
1650	Emitter	3RG78 43-3SC24-0SS0	3RG78 43-3SD24-0SS0
1800	Receiver	3RG78 43-3SC26-0SS1	3RG78 43-3SD26-0SS1
1800	Emitter	3RG78 43-3SC26-0SS0	3RG78 43-3SD26-0SS0

1) For scope of supply see top of page 4/76.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 43 series, type 2

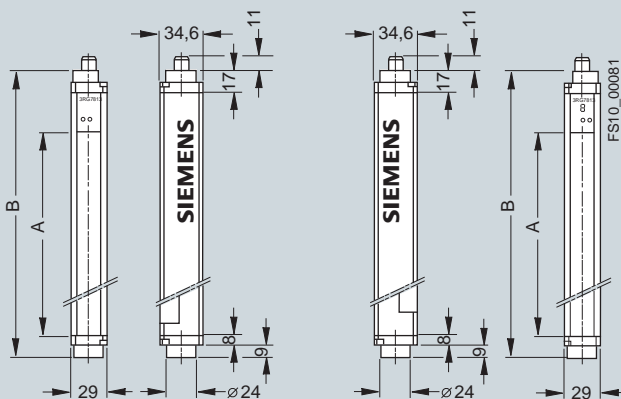
Integrated evaluation, Standard function package,
transistor output, acc. to IEC/EN 61508 (SIL 2)

Protection field height mm	Type	Resolution 40 mm Order No.	Resolution 90 mm Order No.
SIMATIC FS420I			
150	Receiver	3RG78 43-3SF02-0SS1	–
150	Emitter	3RG78 43-3SF02-0SS0	–
225	Receiver	3RG78 43-3SF03-0SS1	–
225	Emitter	3RG78 43-3SF03-0SS0	–
300	Receiver	3RG78 43-3SF04-0SS1	–
300	Emitter	3RG78 43-3SF04-0SS0	–
450	Receiver	3RG78 43-3SF06-0SS1	▶ 3RG78 43-3SJ06-0SS1
450	Emitter	3RG78 43-3SF06-0SS0	▶ 3RG78 43-3SJ06-0SS0
600	Receiver	3RG78 43-3SF08-0SS1	3RG78 43-3SJ08-0SS1
600	Emitter	3RG78 43-3SF08-0SS0	3RG78 43-3SJ08-0SS0
750	Receiver	3RG78 43-3SF11-0SS1	3RG78 43-3SJ11-0SS1
750	Emitter	3RG78 43-3SF11-0SS0	3RG78 43-3SJ11-0SS0
900	Receiver	3RG78 43-3SF13-0SS1	3RG78 43-3SJ13-0SS1
900	Emitter	3RG78 43-3SF13-0SS0	3RG78 43-3SJ13-0SS0
1050	Receiver	3RG78 43-3SF15-0SS1	3RG78 43-3SJ15-0SS1
1050	Emitter	3RG78 43-3SF15-0SS0	3RG78 43-3SJ15-0SS0
1200	Receiver	3RG78 43-3SF17-0SS1	3RG78 43-3SJ17-0SS1
1200	Emitter	3RG78 43-3SF17-0SS0	3RG78 43-3SJ17-0SS0
1350	Receiver	3RG78 43-3SF20-0SS1	3RG78 43-3SJ20-0SS1
1350	Emitter	3RG78 43-3SF20-0SS0	3RG78 43-3SJ20-0SS0
1500	Receiver	3RG78 43-3SF22-0SS1	3RG78 43-3SJ22-0SS1
1500	Emitter	3RG78 43-3SF22-0SS0	3RG78 43-3SJ22-0SS0
1650	Receiver	3RG78 43-3SF24-0SS1	3RG78 43-3SJ24-0SS1
1650	Emitter	3RG78 43-3SF24-0SS0	3RG78 43-3SJ24-0SS0
1800	Receiver	3RG78 43-3SF26-0SS1	3RG78 43-3SJ26-0SS1
1800	Emitter	3RG78 43-3SF26-0SS0	3RG78 43-3SJ26-0SS0

4

Dimensions

3RG78 43-3S...-0SS. light curtains



Emitter

Receiver

A Protection field height
(see Selection and Ordering data)

B Overall length without connector = Protection field height A + 75,5 mm

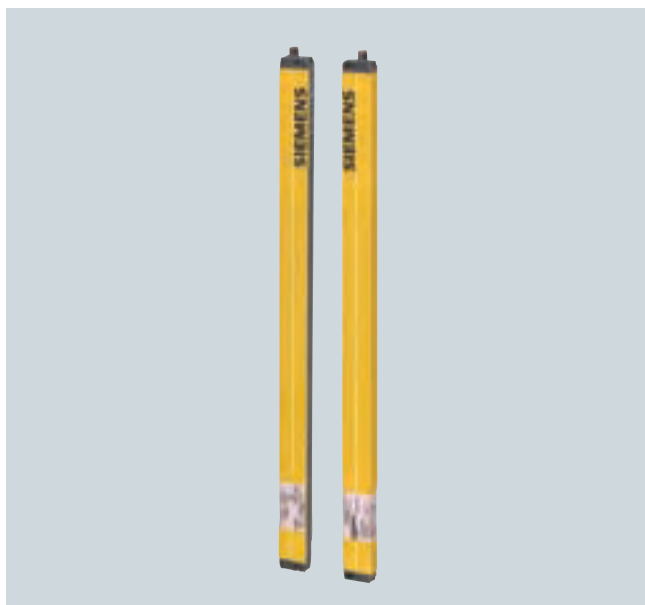
▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 41 series, type 2

External evaluation
Transistor output

Overview



3RG78 41 light curtains for type 2 in accordance with IEC/EN 61496-1, -2.

- Resolution: 30, 55, and 80 mm
- Protection field height: 150 mm to 1800 mm
- Cascading of host and guest devices for greater protection field heights or lengths or for an angular arrangement (optional)

3RG78 41 program overview

Unit type	Function package	Output	Connection type	Resolution			See page
				30 mm	55 mm	80 mm	
Light curtains	–	Transistor	M12 plug connector	✓	✓	✓	4/80
Accessories, e.g.							
Electrical connection							
• For the 3RG78 41 series							4/95
Muting accessories							4/95

SIMATIC FS400 light curtains and light grids

3RG78 41 series, type 2

External evaluation
Transistor output

Technical specifications

Type	3RG78 41
Safety category to EN/IEC 61496-1, -2	Type 2 (testable) in conjunction with an external type 2 monitoring unit
Detection capability (resolution)	30 mm, 55 mm, 80 mm
Protection field height	
• for 30 mm resolution	150 ... 1800 mm
• for 55 mm resolution	300 ... 1800 mm
• for 80 mm resolution	450 ... 1800 mm
Protection field width, sensing field	0.3 ... 6 m
Protection class	I
Supply voltage (emitter and receiver)	24 V DC \pm 20% (external power pack with safe isolation and 20 ms voltage power loss ride-through)
Current consumption	
• Emitter	75 mA
• Receiver	75 mA (without external load)
Synchronization between emitter and receiver	Optical; 2 transmission channels can be selected
Ambient temperature	
• Operation	0 ... +55 °C
• Storage	-25 ... +75 °C
Humidity	15 ... 95% (non-condensing)
Degree of protection	IP65
Electrical connection	M12 circular connector, 8-pole
Connecting cable	7-pole, 0.25 mm ² (enclosed, with sprayed connector), 5 or 15 m long
Vibration resistance	5 g, 10 ... 55 Hz to IEC/EN 60068-2-6
Shock resistance	10 g, 16 ms to IEC/EN 60068-2-29

Inputs

Type	3RG78 41
Emitter test input	via floating NC contact or pnp output
• No test	+24 V
• Test	0 V or high impedance
Minimum signal duration for test trigger	20 ms
Test execution time	10 ms

Outputs

OSSD safety outputs	pnp output, short circuit proof
Output current $I_{a \max}$	100 mA
Response time from the protection field interrupt to disconnection of the safety outputs	Increases with higher number of beams (see operating instructions for precise figures)
• for 30 mm resolution	8 ... 29 ms
• for 55 mm resolution	8 ... 19 ms
• for 80 mm resolution	8 ... 15 ms
Reactivation time from release of the protection field to connection of the safety outputs	
• For all resolutions	0.5 ms
• After very brief protection field interrupts	min. 100 ms
Pollution and error message output	pnp output, short circuit proof
Output current, max.	70 mA
Diagnostic interface, receiver	RS-485

Ordering notes

Included in the scope of supply:

3RG78 41 light curtains	
Emitter	Emitter insert
Receiver	Operating instructions

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SIMATIC FS400 light curtains and light grids

3RG78 41 series, type 2

External evaluation
Transistor output

Selection and Ordering data

Light curtains, M12 plug connection¹⁾

Protection field height	Type	Standard device	Host device	Guest device
mm		Order No.	Order No.	Order No.
Resolution 30 mm				
150	Receiver	3RG78 41-3DB01	3RG78 41-3DB11	3RG78 41-3DB21
150	Emitter	3RG78 41-3DB00	3RG78 41-3DB10	3RG78 41-3DB20
225	Receiver ▶	3RG78 41-3DC01	3RG78 41-3DC11	3RG78 41-3DC21
225	Emitter ▶	3RG78 41-3DC00	3RG78 41-3DC10	3RG78 41-3DC20
300	Receiver ▶	3RG78 41-3DD01	3RG78 41-3DD11	3RG78 41-3DD21
300	Emitter ▶	3RG78 41-3DD00	3RG78 41-3DD10	3RG78 41-3DD20
450	Receiver ▶	3RG78 41-3DE01	3RG78 41-3DE11	3RG78 41-3DE21
450	Emitter ▶	3RG78 41-3DE00	3RG78 41-3DE10	3RG78 41-3DE20
600	Receiver ▶	3RG78 41-3DF01	3RG78 41-3DF11	3RG78 41-3DF21
600	Emitter ▶	3RG78 41-3DF00	3RG78 41-3DF10	3RG78 41-3DF20
750	Receiver ▶	3RG78 41-3DG01	3RG78 41-3DG11	3RG78 41-3DG21
750	Emitter ▶	3RG78 41-3DG00	3RG78 41-3DG10	3RG78 41-3DG20
900	Receiver ▶	3RG78 41-3DH01	3RG78 41-3DH11	3RG78 41-3DH21
900	Emitter ▶	3RG78 41-3DH00	3RG78 41-3DH10	3RG78 41-3DH20
1050	Receiver	3RG78 41-3DJ01	3RG78 41-3DJ11	3RG78 41-3DJ21
1050	Emitter	3RG78 41-3DJ00	3RG78 41-3DJ10	3RG78 41-3DJ20
1200	Receiver	3RG78 41-3DK01	3RG78 41-3DK11	3RG78 41-3DK21
1200	Emitter	3RG78 41-3DK00	3RG78 41-3DK10	3RG78 41-3DK20
1350	Receiver	3RG78 41-3DL01	3RG78 41-3DL11	3RG78 41-3DL21
1350	Emitter	3RG78 41-3DL00	3RG78 41-3DL10	3RG78 41-3DL20
1500	Receiver	3RG78 41-3DM01	3RG78 41-3DM11	3RG78 41-3DM21
1500	Emitter	3RG78 41-3DM00	3RG78 41-3DM10	3RG78 41-3DM20
1650	Receiver	3RG78 41-3DN01	3RG78 41-3DN11	3RG78 41-3DN21
1650	Emitter	3RG78 41-3DN00	3RG78 41-3DN10	3RG78 41-3DN20
1800	Receiver	3RG78 41-3DP01	3RG78 41-3DP11	3RG78 41-3DP21
1800	Emitter	3RG78 41-3DP00	3RG78 41-3DP10	3RG78 41-3DP20
Resolution 55 mm				
300	Receiver	3RG78 41-3FD01	3RG78 41-3FD11	3RG78 41-3FD21
300	Emitter	3RG78 41-3FD00	3RG78 41-3FD10	3RG78 41-3FD20
450	Receiver	3RG78 41-3FE01	3RG78 41-3FE11	3RG78 41-3FE21
450	Emitter	3RG78 41-3FE00	3RG78 41-3FE10	3RG78 41-3FE20
600	Receiver ▶	3RG78 41-3FF01	3RG78 41-3FF11	3RG78 41-3FF21
600	Emitter ▶	3RG78 41-3FF00	3RG78 41-3FF10	3RG78 41-3FF20
750	Receiver ▶	3RG78 41-3FG01	3RG78 41-3FG11	3RG78 41-3FG21
750	Emitter ▶	3RG78 41-3FG00	3RG78 41-3FG10	3RG78 41-3FG20
900	Receiver	3RG78 41-3FH01	3RG78 41-3FH11	3RG78 41-3FH21
900	Emitter	3RG78 41-3FH00	3RG78 41-3FH10	3RG78 41-3FH20
1050	Receiver	3RG78 41-3FJ01	3RG78 41-3FJ11	3RG78 41-3FJ21
1050	Emitter	3RG78 41-3FJ00	3RG78 41-3FJ10	3RG78 41-3FJ20
1200	Receiver	3RG78 41-3FK01	3RG78 41-3FK11	3RG78 41-3FK21
1200	Emitter	3RG78 41-3FK00	3RG78 41-3FK10	3RG78 41-3FK20
1350	Receiver	3RG78 41-3FL01	3RG78 41-3FL11	3RG78 41-3FL21
1350	Emitter	3RG78 41-3FL00	3RG78 41-3FL10	3RG78 41-3FL20

1) For scope of supply see top of page 4/79.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

3RG78 41 series, type 2

External evaluation
Transistor output

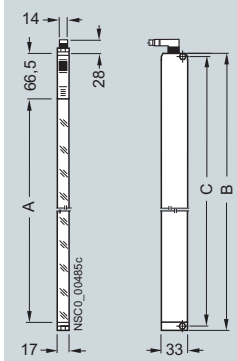
Protection field height mm	Type	Standard device	Host device	Guest device
		Order No.	Order No.	Order No.
1500	Receiver	3RG78 41-3FM01	3RG78 41-3FM11	3RG78 41-3FM21
1500	Emitter	3RG78 41-3FM00	3RG78 41-3FM10	3RG78 41-3FM20
1650	Receiver	3RG78 41-3FN01	3RG78 41-3FN11	3RG78 41-3FN21
1650	Emitter	3RG78 41-3FN00	3RG78 41-3FN10	3RG78 41-3FN20
1800	Receiver	3RG78 41-3FP01	3RG78 41-3FP11	3RG78 41-3FP21
1800	Emitter	3RG78 41-3FP00	3RG78 41-3FP10	3RG78 41-3FP20
Resolution 80 mm				
450	Receiver	3RG78 41-3HE01	3RG78 41-3HE11	3RG78 41-3HE21
450	Emitter	3RG78 41-3HE00	3RG78 41-3HE10	3RG78 41-3HE20
600	Receiver ▶	3RG78 41-3HF01	3RG78 41-3HF11	3RG78 41-3HF21
600	Emitter ▶	3RG78 41-3HF00	3RG78 41-3HF10	3RG78 41-3HF20
900	Receiver ▶	3RG78 41-3HH01	3RG78 41-3HH11	3RG78 41-3HH21
900	Emitter ▶	3RG78 41-3HH00	3RG78 41-3HH10	3RG78 41-3HH20
1200	Receiver	3RG78 41-3HK01	3RG78 41-3HK11	3RG78 41-3HK21
1200	Emitter	3RG78 41-3HK00	3RG78 41-3HK10	3RG78 41-3HK20
1500	Receiver	3RG78 41-3HM01	3RG78 41-3HM11	3RG78 41-3HM21
1500	Emitter	3RG78 41-3HM00	3RG78 41-3HM10	3RG78 41-3HM20
1800	Receiver	3RG78 41-3HP01	3RG78 41-3HP11	3RG78 41-3HP21
1800	Emitter	3RG78 41-3HP00	3RG78 41-3HP10	3RG78 41-3HP20

▶ Preferred type, available from stock.

4

Dimensions

3RG78 41-3..0. standard light curtains



Type	A	B	C
3RG78 41-3.B..	170.5	248.5	238.5
3RG78 41-3.C..	245.5	323.5	313.5
3RG78 41-3.D..	320.5	398.5	388.5
3RG78 41-3.E..	470.5	548.5	538.5
3RG78 41-3.F..	620.5	698.5	688.5
3RG78 41-3.G..	770.5	848.5	838.5
3RG78 41-3.H..	920.5	998.5	988.5
3RG78 41-3.J..	1 070.5	1 148.5	1 138.5
3RG78 41-3.K..	1 220.5	1 298.5	1 288.5
3RG78 41-3.L..	1 370.5	1 448.5	1 438.5
3RG78 41-3.M..	1 520.5	1 598.5	1 588.5
3RG78 41-3.N..	1 670.5	1 748.5	1 738.5
3RG78 41-3.P..	1 820.5	1 898.5	1 888.5

SIMATIC FS400 light curtains and light grids

Evaluation units

Overview



The 3RG78 47 evaluation units form a flexible product family of interface modules for light curtains and light grids. The modular design of this series can be used up to type 4 to IEC/EN61496-1,-2.

These units expand the functionality of the light curtains and light grids to include startup/restart inhibit and contact control as well as cycle control and muting depending on the version.

This product family also offers an extensive range of additional functions such as early error warning for the relay contacts, a PC diagnostics function as well as many signaling outputs to a higher-level controller.

4

Outputs	Relay outputs
OSSD safety outputs	2 safety-related NO contacts
Operational voltage/current switched	60 V DC, 250 V AC, max. 6 A
• Only with extended versions	1 safety-related NC contact, 60 V DC, 250 V AC, max. 6 A, minimum switched current 20 mA
OSSD external fusing	6 A T
OSSD response time of processing unit (without light curtain)	
• With light curtain, type 4, with semiconductor output	22 ms
• With light curtain, type 2	64 ms
• With safety switches	64 ms
OSSD reactivation time	100 ms
OSSD suitable spark quenching through coils of the successor relays	Required

Technical specifications

Standard evaluation units

Type	3RG78 47-4BA
Safety category to EN 954-1	up to 4 (depending on the category of the upstream protective device)
Supply voltage	24 V AC/DC, ±20%
Power consumption	1.5 W (supplied via AODP)
Safety switching outputs (OSSD)	2 relay outputs (NC contact)
Signaling output	Relay output (NC contact)
Continuous current per current path, max.	3 A
Response time	10 ms
Reactivation time	20 ms
Current consumption (inputs B1 and B3)	32 mA each

Type	3RG78 47-4BA
Permissible input resistance	50 Ω
Permissible ambient temperature	
• Operation	0 °C ... +50 °C
• Storage	-25 °C ... +70 °C
Protection class	II
Degree of protection	IP20
Connection method	Screw terminals
Dimensions (W x H x D)	17.5 mm x 99 mm x 113.6 mm
Assembly	on 35 mm mounting rail

SIMATIC FS400 light curtains and light grids

Evaluation units

Type	3RG78 47-4BB
Safety category to EN 954-1	Category 4
STOP category according to EN 60204-1 (11/ 98)	STOP category 0
Supply voltage	24 V AC/DC, -15 ... +10%
Residual ripple (with DC)	2.4 V _{ss}
Frequency (AC)	50 ... 60 Hz
Power consumption	2.1 W (AC)/1.7 W (DC)
External fusing of supply circuit	1 A slow-action
Output contacts	2 NO, 1 NC AgSnO ₂ , gold-flashed
Switching capacity according to EN 60947-5-1	
• AC-15, 230 V	6 A
• DC-13, 24 V (360 switching cycles/h)	6 A
• DC-13: 24 V (3600 switching cycles/h)	3 A
Max. continuous current per current path	6 A
Contact fusing per current path	6.3 A quick-action or 4 A slow-action
Max. summation current of all current paths	12 A
Mechanical service life	10 x 10 ⁶ switching cycles
Switching frequency	3600 switching cycles/h
ON delay	
• Manual start	70 ms
• Automatic start	230 ms
Returning time, response time	20 ms
Minimum ON period S34, S35	80 ms
Electronic fuse protection	
• Response time	2 sec
• Recovery time	2 sec
Control voltage/current at S11, S22, S31	24 V DC/20 mA
Permissible power input resistance	< 70 Ω
Emitted interference	EN 50081-1, -2
Noise immunity	EN 50082-2
Air gaps and creepage distances according to DIN VDE 0110 (04.97)	4 kV
Operating temperature	-25 ... +55 °C
Degree of protection	
• Enclosure	IP40
• Terminals	IP20
Connection cross-sections	
• Finely-stranded	2 x 0.14 ... 0.75 mm ²
• Finely stranded with end sleeve	2 x 0.25 ... 0.5 mm ²
• Finely stranded with twin end sleeve	2 x 1.5 mm ²
• Solid	1 x 0.14 ... 2.5 mm ²
• Finely stranded with end sleeve	2 x 0.25 ... 2.5 mm ²







Intelligent evaluation units

Type	3RG78 47
Protection according to EN, IEC 61496-1	Type 4
Safety category to EN 954-1	Category 4
STOP category according to EN 60204-1 (11/ 98)	STOP category 0
Supply voltage	24 V DC ± 20%, external power pack with safe isolation and compensation of 20 ms voltage dip is required
Current consumption	Approximately 200 mA without external load
External fusing (power supply)	2.5 A mT
Connectable safety sensors (extended versions)	1 light curtain, type 4, or up to 2 light curtains, type 2 (all according to IEC 61496) Up to 2 light curtains, type 4, or up to 4 light curtains, type 2 (all according to IEC 61496)
Test outputs T1 and T2, test interval	200 ms
Available functions	
• All versions	Startup/restart inhibit, contractor control, diagnostics
• Versions with cycle control	Protective, single-cycle and two-cycle operation
• Versions with muting function	Sequential muting, parallel muting, parallel double muting (only 3RG78 47-4.G)
Control inputs	
• Contactor control (EDM)	Reset of positive-action contacts of downstream contactors
• Start/restart inhibit (reset)	Floating NO (switch or key switch)
Connection	
• Non-testable muting sensors	Signal level in damped state: active high, +24 V
• Testable muting sensors	Active high, +24 V, plus test pulses T1 or T2
Outputs	
• Muting displays for lamps 24 V, max. 5 W	pnp switching outputs, muting function on, active high, +24 V, max. 200 mA
• Signaling outputs (depending on version)	Light curtain free/interrupted; switching status relay/transistor output; restart inhibit locked/unlocked; muting function status; muting error; warning defective muting lamp, internal error, etc.
Operating temperature	0 ... +55 °C
Degree of protection	IP20; must be built into control cabinet or housing with degree of protection of at least IP54
Installation	Mounting on 35-mm mounting rail
Connection method	Pluggable, coded screw terminals up to 2.5 mm ²

SIMATIC FS400 light curtains and light grids

Evaluation units

Selection and Ordering data

Version		Relay output Order No.
Evaluation units		
	Type 2 and 4 to EN 954-1 Relay module, dual-channel, for AOPDs with 2 OSSDs and contactor control ▶	3RG7847-4BA
3RG78 25-1CB1	Type 2 to EN 954-1 Standard, restart inhibit, contactor control (suited for 3RG78 41 light curtains and 3RG78 23 light barriers) ▶	3RG78 25-1CB1
	Type 4 to EN 954-1 ¹⁾ Standard, restart inhibit, contactor control (no diagnostic and test function, for category 4 light curtains and grids and for category 2 3RG78 43 light curtains only) ▶	3RG78 47-4BB
3RG78 47-4BB	Standard, restart inhibit, contactor control ▶	3RG78 47-4BD
	Standard, restart inhibit, contactor control, expanded version ²⁾ ▶	3RG78 47-4BE
3RG78 47-4BE	Muting function, restart inhibit, contactor control ▶	3RG78 47-4BF
	Muting function, restart inhibit, contactor control, expanded version ²⁾ ▶	3RG78 47-4BG
3RG78 47-4BF	Muting function, dual-channel, with UL certification, CSA certification requested	3RG78 47-5BF
	Muting function, with UL certification, CSA certification requested, expanded version ²⁾	3RG78 47-5BG
	Cycle control, restart inhibit, contactor control	3RG78 47-4BH
3RG78 47-4BH	Cycle control, restart inhibit, contactor control, expanded version ²⁾	3RG78 47-4BJ
	Muting function and cycle control, restart inhibit, contactor control	3RG78 47-4BK
3RG78 47-4BK	Muting function and cycle control, restart inhibit, contactor control, expanded version ²⁾	3RG78 47-4BL

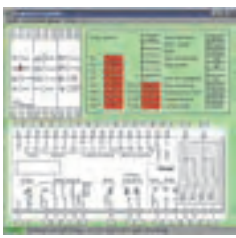
¹⁾ The electronic 3TK28 41 safety combination can also be used for category 4 light curtains and grids.

²⁾ Up to two type 4 light curtains or up to four type 2 light curtains or two safety switches (e.g. emergency stop) can be connected to the expanded version.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

Evaluation units

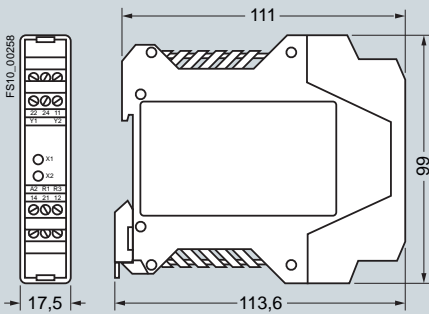
Version	Order No.
Diagnostics software for evaluation units	
 <p>Diagnostics software for evaluation units, with PC cable</p>	<p>▶ H 3RG78 48-4AC</p>

▶ Preferred type, available from stock.

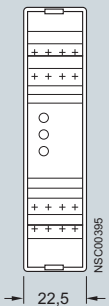
H: Subject to export regulations AL = N and ECCN = 5D992B1.

Dimensions

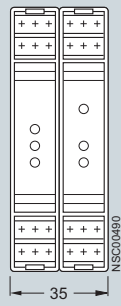
3RG78 47-4BA



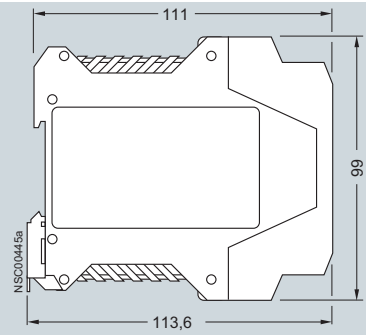
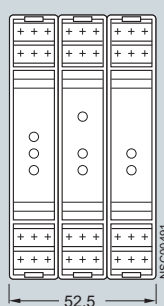
3RG78 47-4BB



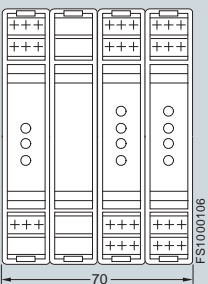
3RG78 47-4.D/E/H/J



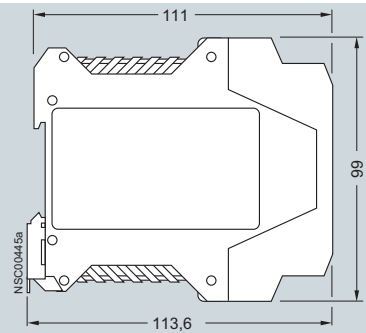
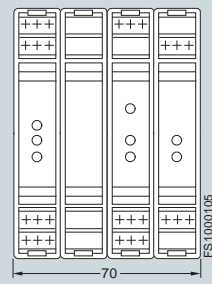
3RG78 47-4.F/G/K/L



3RG78 47-5BG/DG



3RG78 47-5BF/DF



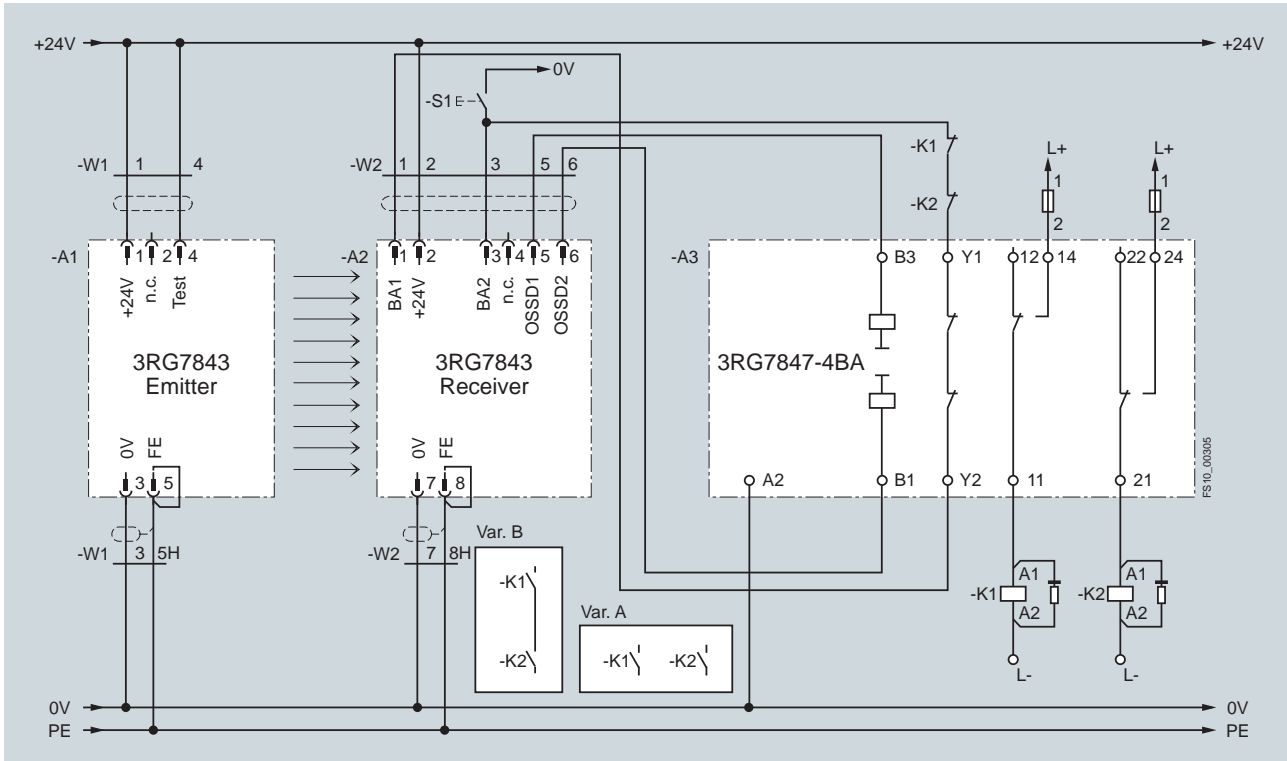
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SIMATIC FS400 light curtains and light grids

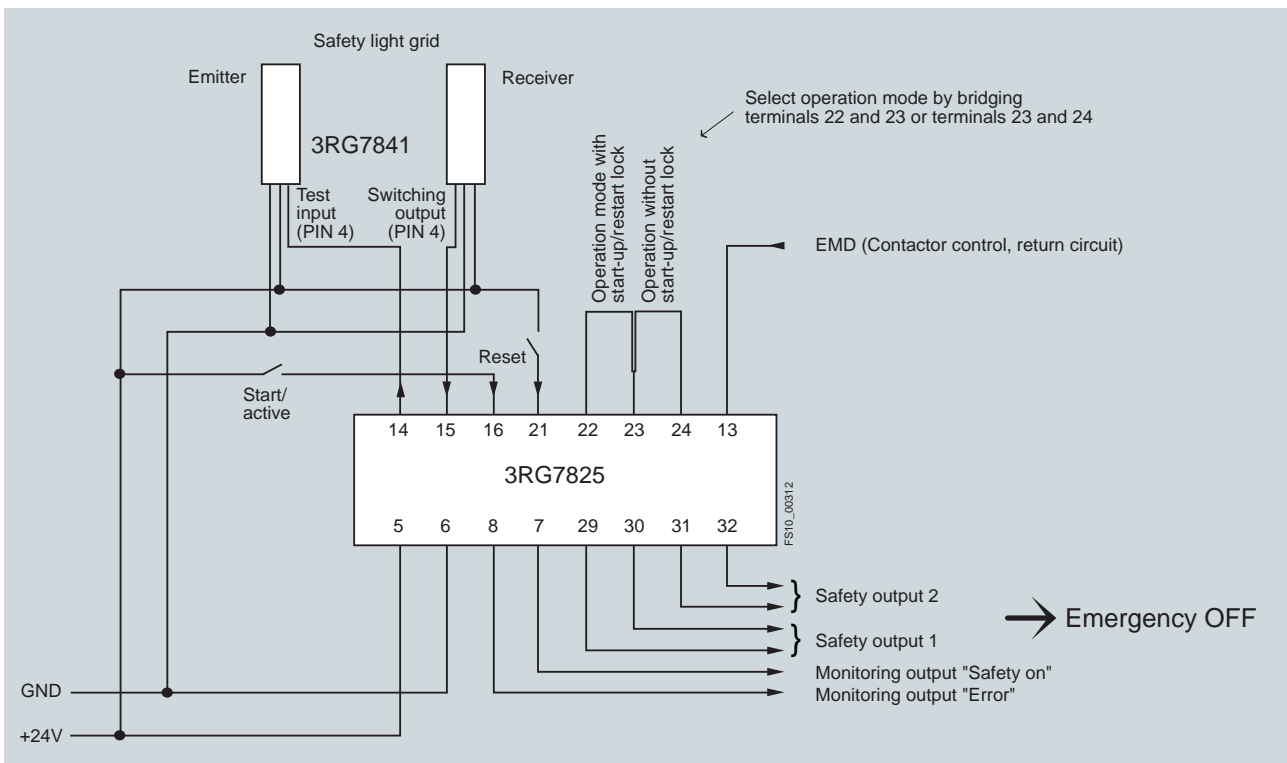
Evaluation units

Schematics

Connecting 3RG78 43 light curtains to the 3RG78 47-4BA relay module



Connecting 3RG78 41 light curtains to the 3RG7825-1CB1 evaluation unit

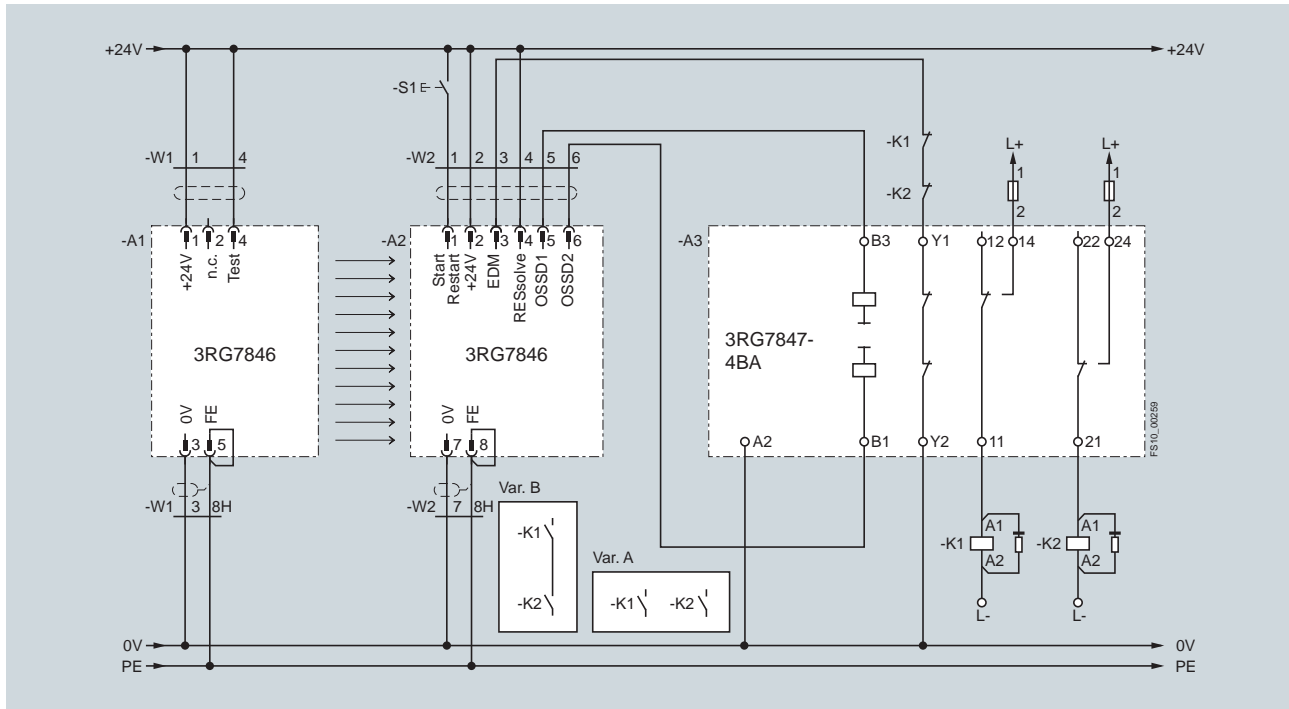


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SIMATIC FS400 light curtains and light grids

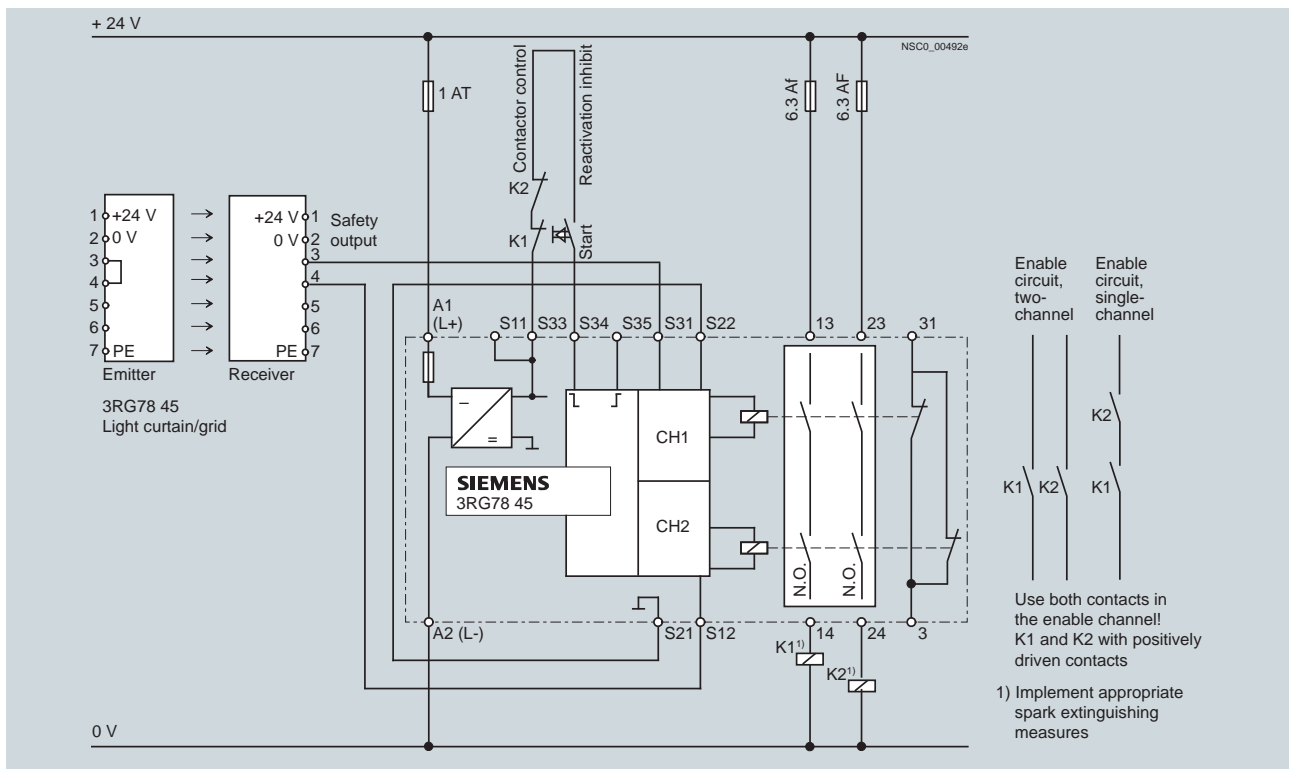
Evaluation units

Connecting 3RG78 46 light curtains to the 3RG78 47-4BA relay module



4

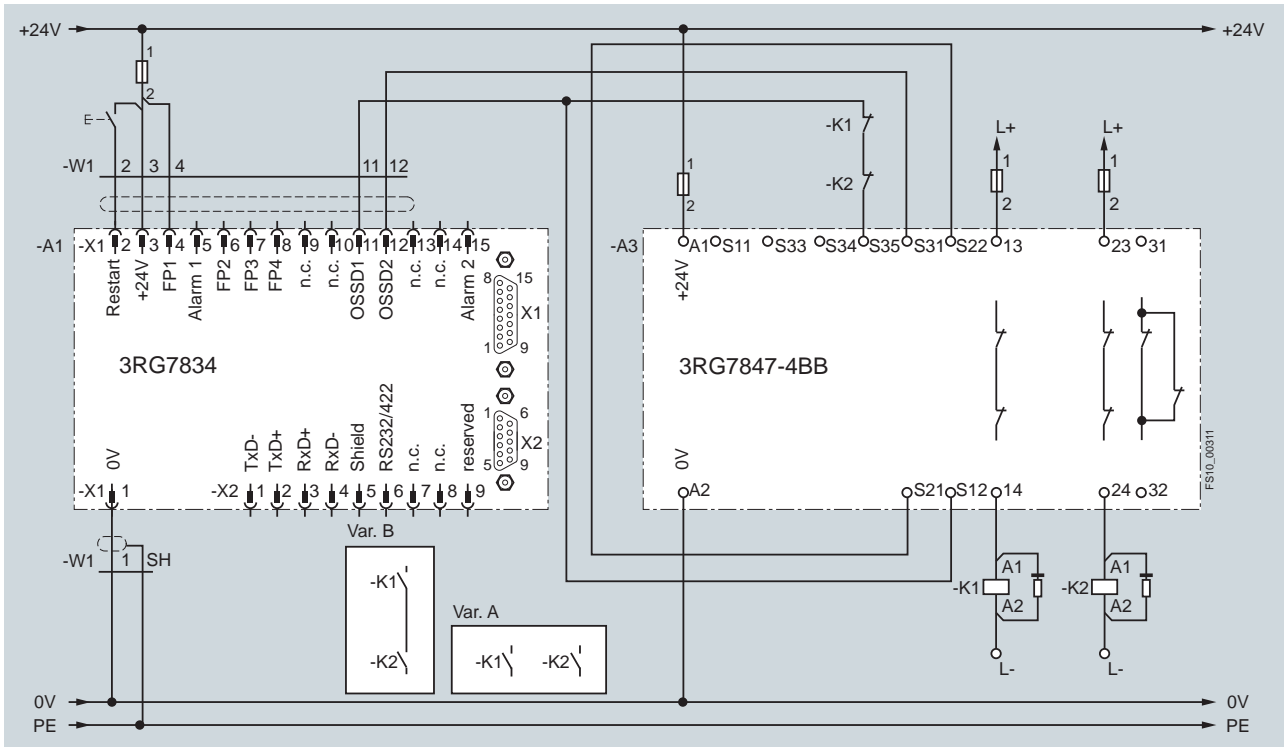
Connecting 3RG78 45 light curtains, light grids and transceivers to the standard 3RG78 47-4BB evaluation unit



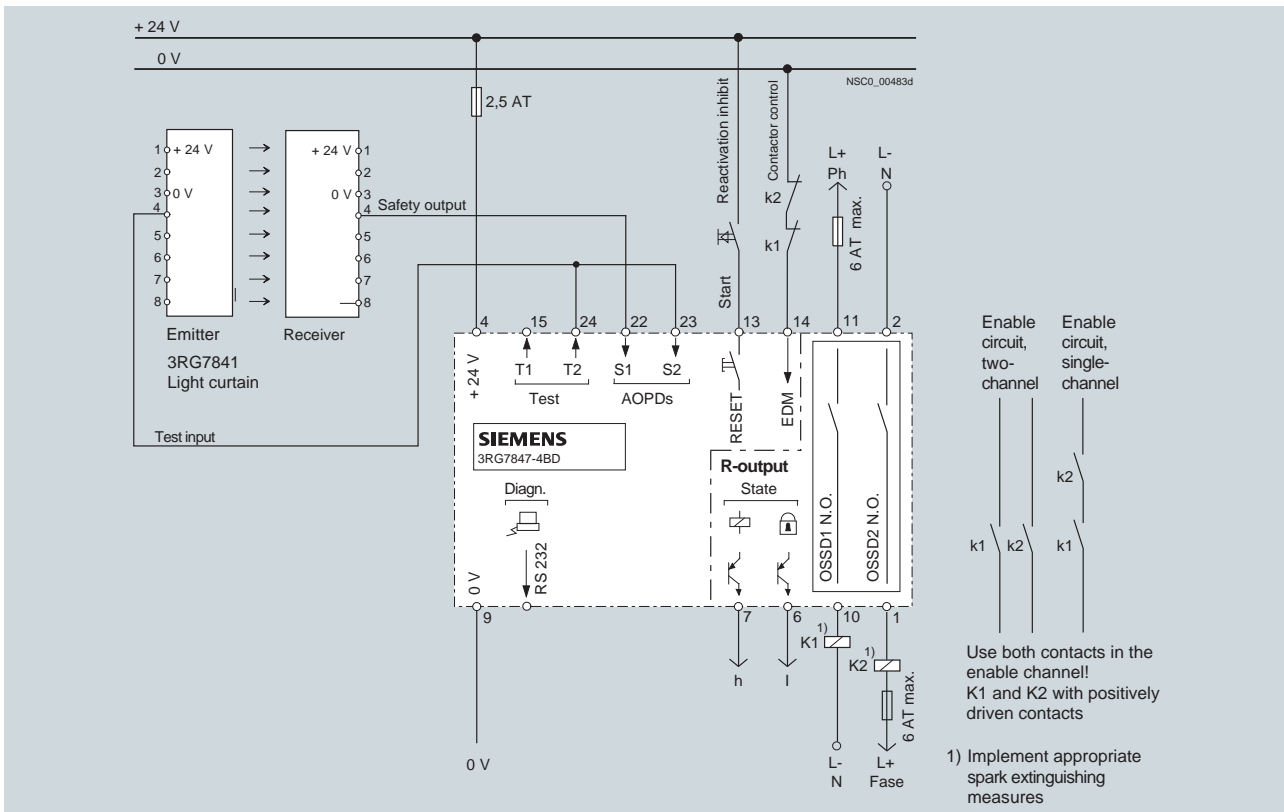
SIMATIC FS400 light curtains and light grids

Evaluation units

Connecting 3RG78 34 laser scanners to the 3RG78 47-4BB evaluation unit



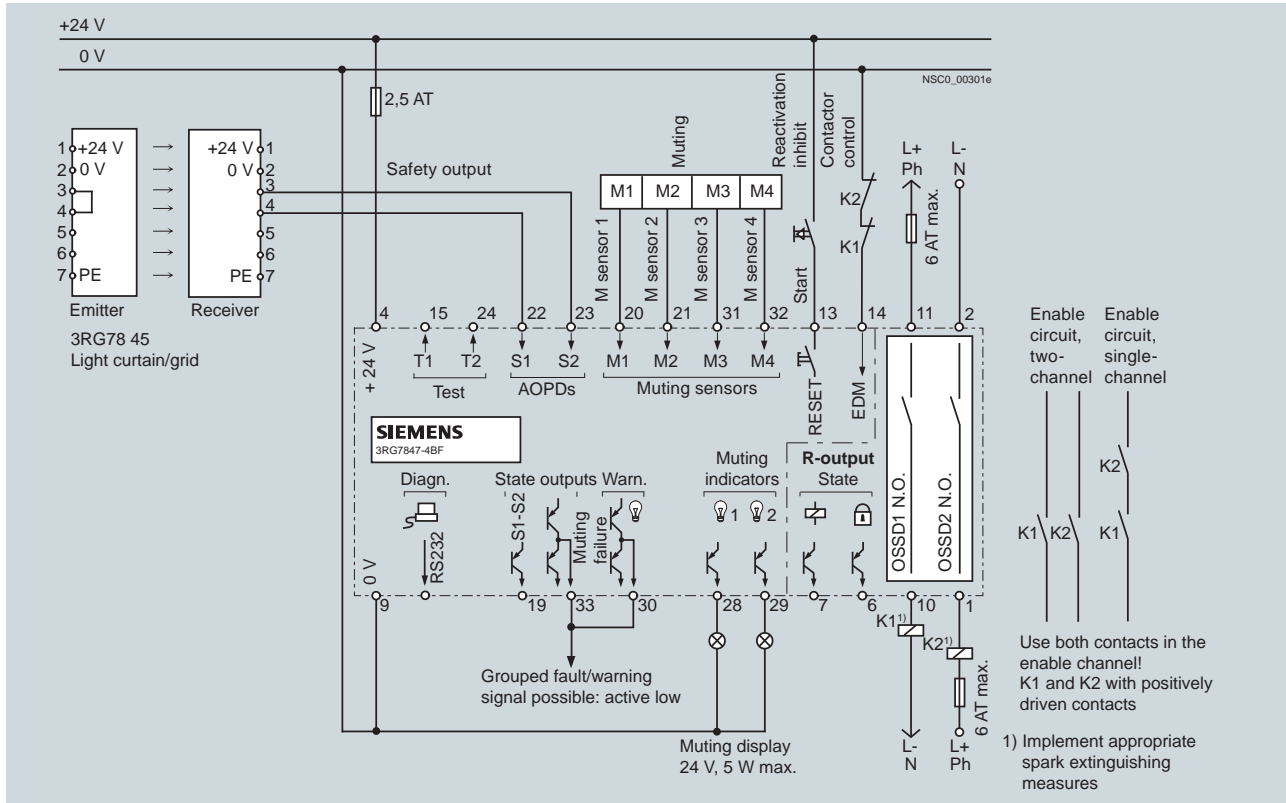
Connecting 3RG78 41 light curtains to the standard 3RG78 47-4BD evaluation unit



SIMATIC FS400 light curtains and light grids

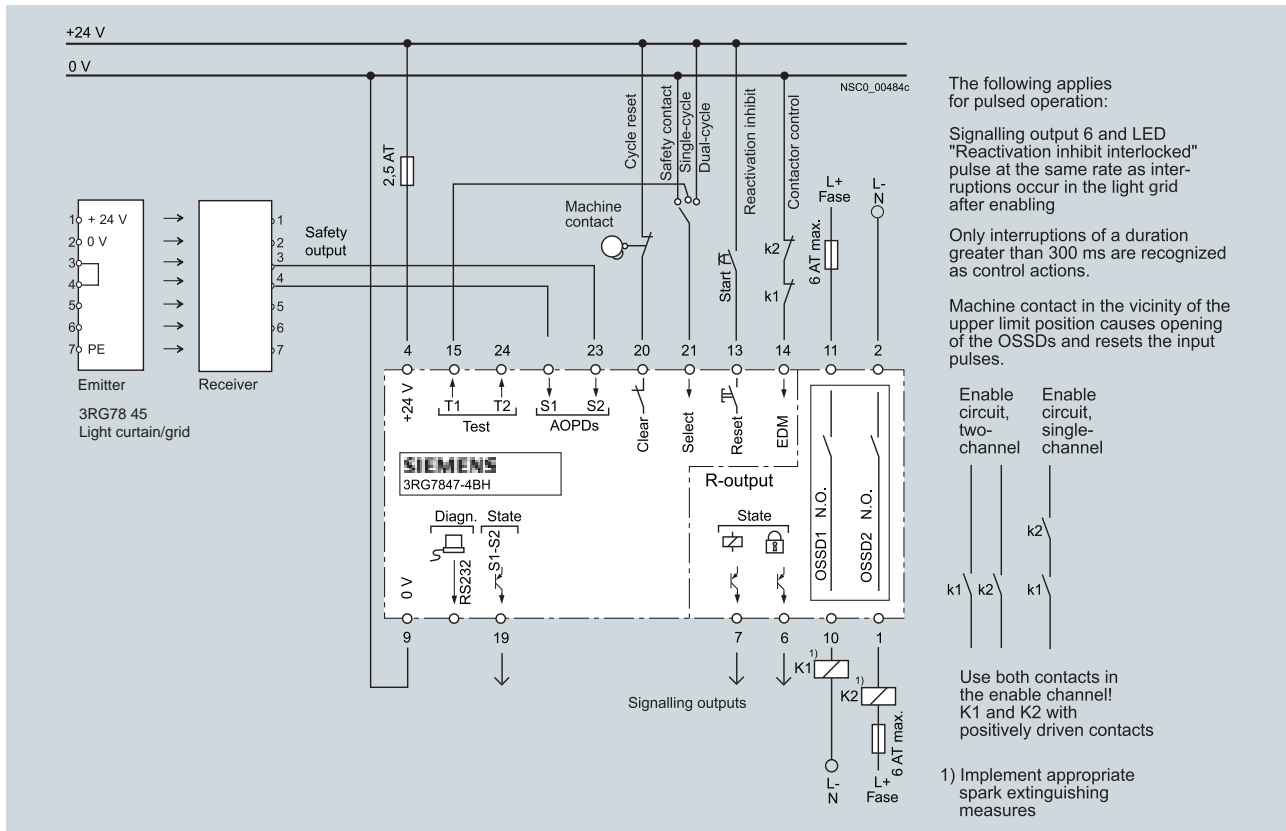
Evaluation units

Connecting 3RG78 45 light curtains, light grids and transceivers to the 3RG78 47-4BF/3RG78 47-5BF evaluation unit with integrated muting function



4

Connection of 3RG78 45 light curtains, light grids and transceivers to the 3RG7847-4BH evaluation unit with sequence control system



The following applies for pulsed operation:

Signalling output 6 and LED "Reactivation inhibit interlocked" pulse at the same rate as interruptions occur in the light grid after enabling

Only interruptions of a duration greater than 300 ms are recognized as control actions.

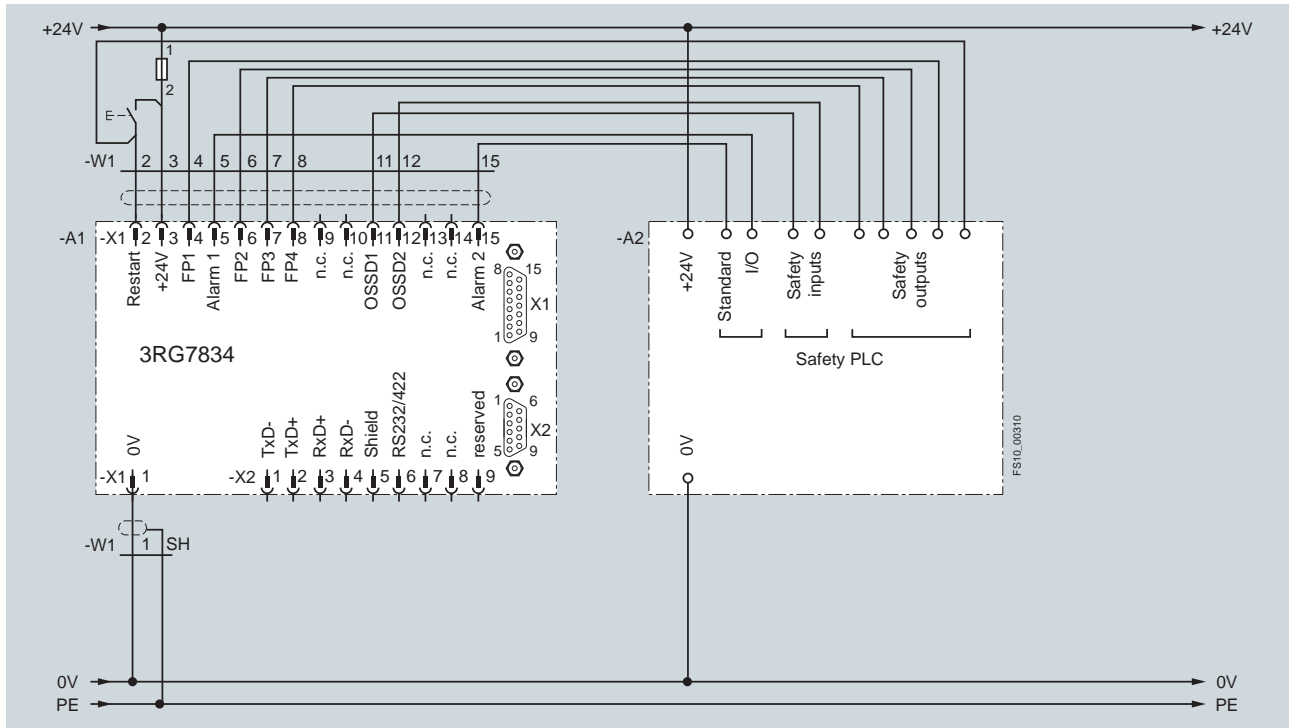
Machine contact in the vicinity of the upper limit position causes opening of the OSSDs and resets the input pulses.

SIMATIC FS400 light curtains and light grids

Evaluation units



Connecting 3RG7834 laser scanners to a SafetyPLC







4

Overview

To facilitate installation, alignment, commissioning and troubleshooting, a practical accessories package containing mounting columns, reflecting mirror columns, reflecting mirrors, mounting supports, protective disks and laser alignment tools is available.

In addition, PC software can be used to visualize and record the function of the light curtains as well as the evaluation units.

Selection and Ordering data



	Length mm	Order No.
Mounting columns		
	Suited for the 3RG78 43, 3RG78 44, 3RG78 45, 3RG78 46 as well as 3SF78 42 and 3SF78 44 series	
	1060	3RG78 48-1CL
	1360	3RG78 48-1CP
	1660	3RG78 48-1CR
	1960	3RG78 48-1CU
Reflecting mirror for light curtains		
	The 3RG78 43, 3RG78 44, 3RG78 45, 3RG78 46 as well as 3SF78 42 and 3SF78 44 series	
	Reflecting mirror	
	210	3RG78 48-1DC
	285	3RG78 48-1DD
	360	3RG78 48-1DL
	510	3RG78 48-1DM
	660	3RG78 48-1DN
	810	3RG78 48-1DP
	960	3RG78 48-1DR
	1110	3RG78 48-1DU
	1260	3RG78 48-1DE
	1410	3RG78 48-1DF
	1560	3RG78 48-1DG
	1710	3RG78 48-1DH
	1860	3RG78 48-1DK
	Reflecting mirror columns	
	1060	▶ 3RG78 48-0DL
	1360	▶ 3RG78 48-0DP
	1660	3RG78 48-0DR
	1960	3RG78 48-0DU
Reflecting mirror columns for light grids		
	The 3RG78 44, 3RG78 45 as well as 3SF78 42 and 3SF78 44 series	
	Adjustable separate mirrors	
	1060, 2-beam	▶ 3RG78 48-0FL
	1360, 3-beam	▶ 3RG78 48-0FP
	1360, 4-beam	▶ 3RG78 48-0FR

▶ Preferred type, available from stock.



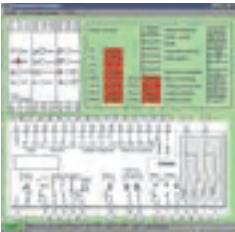
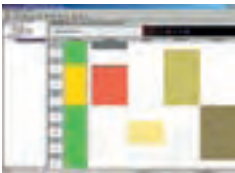
SIMATIC FS400 light curtains and light grids

Accessories

Length	Order No.
Protective disks	
The protective disks can prevent damage to the light curtains and light grids. The protective disks can be easily replaced, if necessary.	
For the 3RG78 42, 3RG78 44, 3RG78 45, 3SF78 42 and 3SF78 44 series	
For protection field height	
300 mm	3RG78 48-4AA
450 mm	3RG78 48-4BA
600 mm	3RG78 48-4CA
750 mm	3RG78 48-4DA
900 mm	3RG78 48-4FA
1050 mm	3RG78 48-4GA
1200 mm	3RG78 48-4HA
1350 mm	3RG78 48-4KA
1500 mm	3RG78 48-4LA
1650 mm	3RG78 48-4MA
1800 mm	3RG78 48-4NA
Holder set with 2 disk clamps for protective disks for protection field heights up to 900 mm	3RG78 48-4SA
Holder set with 3 disk clamps for protective disks for protection field heights of 900 mm and above	3RG78 48-4TA
For the 3RG78 43 and 3RG78 46 series	
For protection field height	
300 mm	3RG78 48-4DS
450 mm	3RG78 48-4FS
600 mm	3RG78 48-4GS
750 mm	3RG78 48-4HS
900 mm	3RG78 48-4KS
1050 mm	3RG78 48-4LS
1200 mm	3RG78 48-4MS
1350 mm	3RG78 48-4NS
1500 mm	3RG78 48-4SS
1650 mm	3RG78 48-4TS
1800 mm	3RG78 48-4US
Holder set with 2 disk clamps for protective disks for protection field heights up to 900 mm	3RG78 48-4BS
Holder set with 3 disk clamps for protective disks for protection field heights of 900 mm and above	3RG78 48-4CS

Type	Order No.
Assembly materials	
 Bracket, hinged with vibration damping (incl. 2 screws and 2 sliding blocks) ▶	3RG78 48-0BB
 Standard holding bracket kit (1 set = 2 units, incl. screws) ▶	3RG78 48-0AB
Sliding blocks (1 set = 2 units), M6 ▶	3RG78 48-0AC
Muting mounting system, total length 1000 mm with two 12 mm circular bars for light barrier mounting systems (see page 4/99)	3RG78 48-2AF
Muting mounting system, total length 1000 mm with 2 reflectors	3RG78 48-2LF

▶ Preferred type, available from stock.

Type	Order No.
Muting mounting system for sequential muting , total length 1000 mm with four 12 mm circular bars for light barrier mounting systems (see page 4/99)	3RG784 8-2DF
Muting mounting system for sequential muting , total length 1000 mm with 4 reflectors	3RG78 48-2KF
Muting mounting system , total length 350 mm with two 12 mm circular bars for light barrier mounting systems (see page 4/99)	3RG78 48-2GF
Muting mounting system to bolt mount directly to the unit for 2 sensors with angular circular bars for light barrier mounting systems (see page 4/99)	3RG78 48-2HF
Holding bar for mounting to muting mounting system , diameter 12 mm, length 200 mm	▶ 3RX7 315
Holding bar for mounting to muting mounting system , diameter 12 mm, length 300 mm	▶ 3RX7 316
Holding plate to hold sensor , mounting on 12 mm circular bar for sensor holding system	▶ 3RX7 326
Mounting base with 12 mm receptacle for fixing system	▶ 3RX7 322
Keys	
 Safety key for teach-in	3RG78 48-2AH
Laser alignment assistance	
 Standard version for slot mounting For installation with fixing columns For light barriers and laser scanners	3RG78 48-1AB 3RG78 48-1AG 3RG78 48-1AP
Test rods	
With 14 mm and 30 mm resolution	▶ 3RG78 48-0AH
20 mm test rod	3RG78 48-1CH
30 mm test rod	▶ 3RG78 48-0AH
40 mm test rod	3RG78 48-1BH
Diagnostics software	
 for evaluation units, including PC cable	▶ H 3RG78 48-4AC
 SafetyLab diagnostics and parameterization software with PC cable C	H 3RG78 48-2SL
PC connecting lead, including connector, 9-pole with optical interface	▶ 3RG78 38-1DC

H: Subject to export regulations AL = N and ECCN = 5D992B1

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

Accessories







Type	Length m	Poles	Order No.	
ASIsafe				
ASIsafe module for 3RG78 43 type 2 light curtains			▶ B 3RK1205-0BQ21-0AA3	
ASIsafe module for 3RG78 46 type 4 light curtains			▶ 3RK1205-0BQ24-0AA3	
ASIsafe adapter for 3SF78 44 series receiver for use with 3RG78 38-1EA or 3RG78 38-1EB 5-pole connecting cables, for bus connection and 24 V power supply			▶ 3RG78 38-1DG	
ASIsafe adapter for 3SF78 4 emitter and M12 bus terminal receiver for ASIsafe flat cable			▶ 3RX98 01-0AA00	
Connecting cable for 3RG78 38-1DG ASIsafe adapter M12 ASIsafe adapter for 3SF78 44 M12 receiver	1	5-pole	▶ 3RG78 38-1EA	
Connecting cable for 3RG78 38-1DG ASIsafe adapter M12 ASIsafe adapter for 3SF78 44 M12 receiver	2	5-pole	▶ 3RG78 38-1EB	
Cables and cable plugs of the Hirschmann type for the 3RG78 44 series				
Cable plug		12-pole	▶ 3RG78 48-2DA	
Angular cable socket		12-pole	▶ 3RG78 48-2DB	
Cable for machine interface, straight plug	10		▶ 3RG78 48-2CK	
Cable for machine interface, straight plug	25		▶ 3RG78 48-2DK	
Cable for machine interface, straight plug	50		▶ 3RG78 48-2EK	
Brad Harrison (MIN series) cable for 3RG78 45 and 3RG78 44 light curtains and light grids				
Notice: Primarily for the NAFTA market.	• Connecting cable for 3RG78 44 and 3RG78 45 receivers	4	7-pole	▶ 3RG78 48-0DB01
	• Connecting cable for 3RG78 45 emitter	4	5-pole	▶ 3RG78 48-0DB00
	• Connecting cable for 3RG7844 and 3RG7845 receivers	12	7-pole	▶ 3RG78 48-0KB01
	• Connecting cable for 3RG78 45 emitter	12	5-pole	▶ 3RG78 48-0KB00
	• Connecting cable for 3RG78 44 and 3RG78 45 receivers	20	7-pole	▶ 3RG78 48-0LB01
	• Connecting cable for 3RG78 45 emitter	20	5-pole	▶ 3RG78 48-0LB00
Cable and cable boxes for the 3RG78 44 and 3SF78 44 series				
Cable for local connection, with M12 angular connector, 8-pole	3		▶ 3RG78 48-2AK	
Cable for local connection, with M12 angular connector, 8-pole	10		▶ 3RG78 48-2BK	
External local connection box, with 6 M12 sockets and cable; for connecting the muting sensors and the muting lamp	0.5		▶ 3RG78 48-2AB	
Connecting cable, twisted (connecting pin 2 to plug pin 4), M12 angle plug – M12 connector	1.5	8-pole	▶ 3RG78 48-2FK	
Connecting cable, twisted (connecting pin 2 to plug pin 4), M12 plug – M12 connector	1.5	8-pole	▶ 3RG78 48-2GK	
Connecting cable, twisted (connecting pin 2 to plug pin 4), M12 angle plug – M12 angular connector	1.5	8-pole	▶ 3RG78 48-2HK	


B: Subject to export regulations AL = N and ECCN = EAR99.

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

Accessories

Type	Rated voltage	Order No.
Muting lamp and accessories		
 Continuous light element, clear	AC/DC 24 ... 230 V	▶ 8WD42 00-1AE
 Connecting element with end cover for conduit, floor and angled installation		▶ 8WD42 08-0AA
 Conduit, single, length 100 mm		▶ 8WD42 08-0EF
 Foot, single, in plastic, for floor installation		▶ 8WD42 08-0DE
 Bracket for wall mounting		▶ 8WD42 08-0CA
 Incandescent lamp, 5W, BA 15d base	AC/DC 24	▶ 8WD43 28-1XX

Length	Type	Order No.
Safety and mounting profiles for 3RG78 41 light curtains		
 150 mm		▶ 3RG78 48-0GB
225 mm		▶ 3RG78 48-0GC
300 mm		▶ 3RG78 48-0GD
450 mm		▶ 3RG78 48-0GE
600 mm		▶ 3RG78 48-0GF
750 mm		▶ 3RG78 48-0GG
900 mm		▶ 3RG78 48-0GH
1050 mm		3RG78 48-0GJ
1200 mm		3RG78 48-0GK
1350 mm		3RG78 48-0GL
1500 mm		3RG78 48-0GM
1650 mm		3RG78 48-0GN
1800 mm		3RG78 48-0GP

Connecting cable with M12 socket for 3RG78 41 light curtains		
5 m	straight	▶ 3RG78 48-1BA
5 m	angled	▶ 3RG78 48-1BC
15 m	straight	▶ 3RG78 48-1BD
15 m	angled	▶ 3RG78 48-1BE

Connecting cable with M12 plug-in connector for 3RG78 43, 3RG78 44, 3RG78 45, 3RG7846 and 3SF78 44 series emitter light curtains			
5-pole, shielded	5 m	straight	▶ 3RG78 48-2EA
5-pole, shielded	5 m	angled	▶ 3RG78 48-2EB
5-pole, shielded	10 m	straight	▶ 3RG78 48-2EC
5-pole, shielded	10 m	angled	▶ 3RG78 48-2ED
5-pole, shielded	15 m	straight	▶ 3RG78 48-2EE
5-pole, shielded	15 m	angled	▶ 3RG78 48-2EF
5-pole, shielded	30 m	straight	▶ 3RG78 48-2EM
5-pole, shielded	30 m	angled	▶ 3RG78 48-2EN

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids




Accessories

M12 socket	Connector, connecting cable	Length m	Order No.
Connecting cable with M12 plug-in connector for 3RG78 43, 3RG78 44, 3RG78 45 and 3RG78 46 series receiver light curtains			
8-pole, shielded	straight	5	▶ 3RG78 48-2CA
8-pole, shielded	angled	5	▶ 3RG78 48-2CB
8-pole, shielded	straight	10	▶ 3RG78 48-2CC
8-pole, shielded	angled	10	▶ 3RG78 48-2CD
8-pole, shielded	straight	15	▶ 3RG78 48-2CE
8-pole, shielded	angled	15	▶ 3RG78 48-2CF
8-pole, shielded	straight	30	▶ 3RG78 48-2CM
8-pole, shielded	angled	30	▶ 3RG78 48-2CN
Connection cable to connect to ASIsafe with a straight connector and straight/angular M12 socket for the 3RG78 43 and 3RG78 46 emitter light curtains			
straight	5-pole, shielded	5	3RG78 48-3EA
angled	5-pole, shielded	5	3RG78 48-3EB
straight	5-pole, shielded	10	3RG78 48-3EC
angled	5-pole, shielded	10	3RG78 48-3ED
straight	5-pole, shielded	15	3RG78 48-3EE
angled	5-pole, shielded	15	3RG78 48-3EF
Connection cable to connect to ASIsafe with a straight connector and straight/angular M12 socket for the 3RG78 43 and 3RG78 46 receiver light curtains			
straight	8-pole, shielded	5	3RG78 48-3CA
angled	8-pole, shielded	5	3RG78 48-3CB
straight	8-pole, shielded	10	3RG78 48-3CC
angled	8-pole, shielded	10	3RG78 48-3CD
straight	8-pole, shielded	15	3RG78 48-3CE
angled	8-pole, shielded	15	3RG78 48-3CF

▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

Accessories

Designation	Order No.
Mounting hardware for 3RG78 43 and 3RG 78 46 light curtains	
 360° bracket	3RG78 48-2BA
 L bracket	3RG78 48-2BB
 Z bracket	3RG78 48-2BC
360° support set, comprising two 360° supports	3RG78 48-2BD
L bracket set, comprising two L brackets	3RG78 48-2BE
Z bracket set, comprising two Z brackets	3RG78 48-2BF
Support, swivel-mounted, with vibration damping	▶ 3RG78 48-0BB

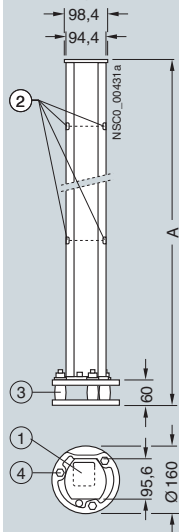
▶ Preferred type, available from stock.

SIMATIC FS400 light curtains and light grids

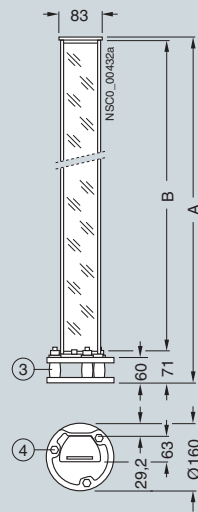
Accessories

Dimensions

3RG78 48-0C.
reflecting mirror columns



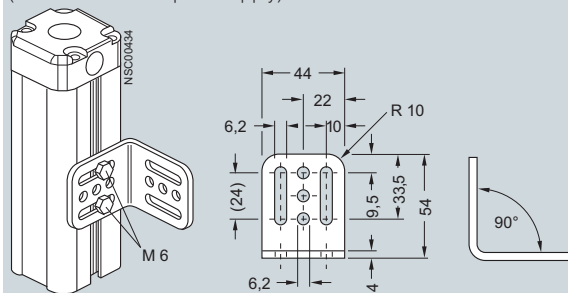
3RG78 48-0D., 3RG78 48-0F.
mounting columns



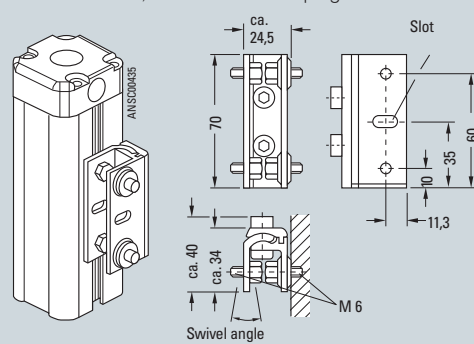
Type	A	B
3RG78 48-0.L	1060	974
3RG78 48-0.P	1360	1274
3RG78 48-0.R	1660	1574
3RG78 48-0.U	1960	1874

- ① light curtain
- ② 8 bore holes, diameter = 16 mm
- ③ plastic spring elements with automatic return mechanism
- ④ 3 bore holes in base for dowels, diameter = 10 mm, depth = 80 mm

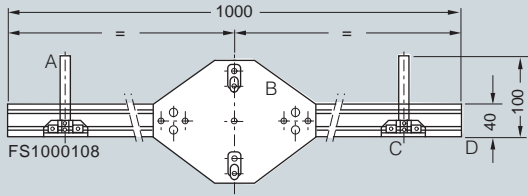
3RG78 48-0AB standard mounting bracket
(included in the scope of supply)



3RG78 48-0BB support,
swivel-mounted, with vibration damping

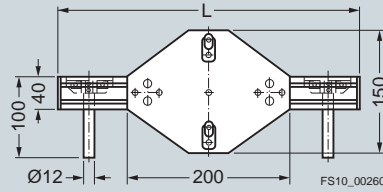


Muting mounting system

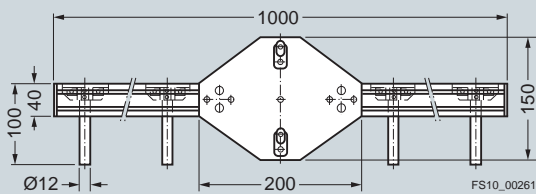


- A V2A circular bar 12 x 100 mm
- B Fixing plate
- C Aluminum profile
- D Cover

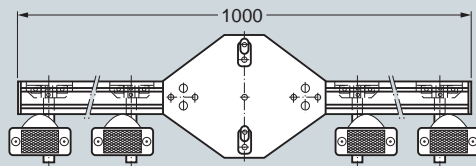
3RG78 48-2GF muting mounting system, length 350 mm with 2 circular bars



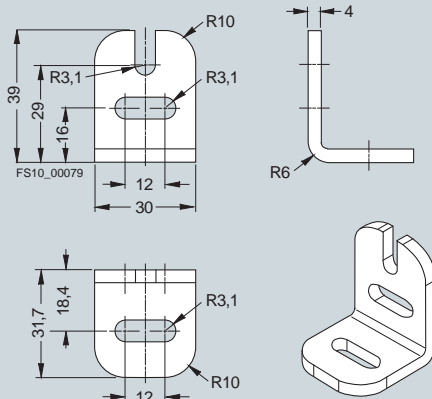
3RG78 48-2DF muting mounting system for sequential muting, total length 1000 mm with four 12 mm circular bars



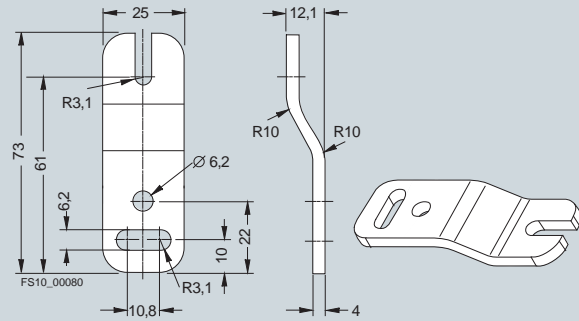
3RG78 48-2KF muting mounting system for sequential muting, length 1000 mm with four reflectors



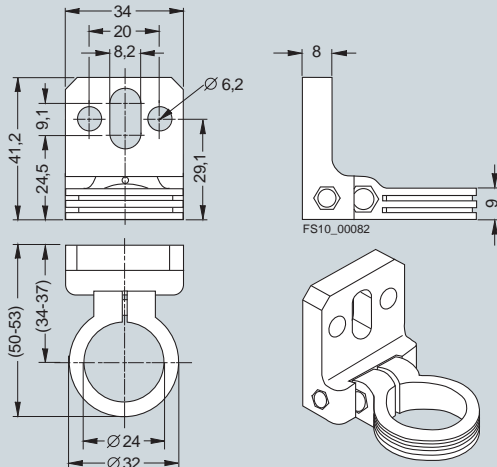
3RG78 48-2BB L-bracket



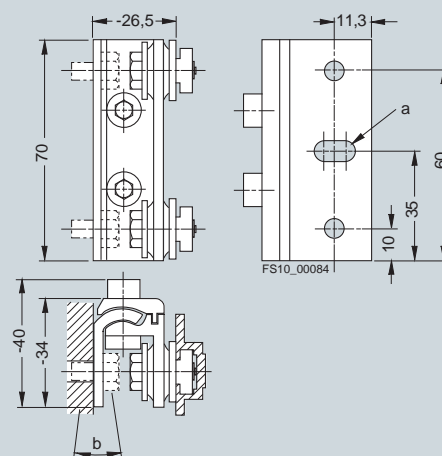
3RG78 48-2BC Z-bracket



3RG78 48-2BA support 360°



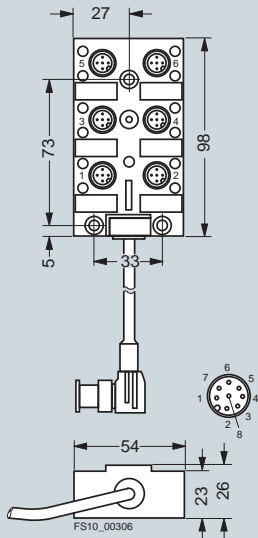
3RG78 48-0BB pivoting support



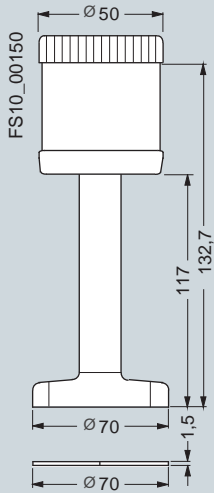
SIMATIC FS400 light curtains and light grids

Accessories

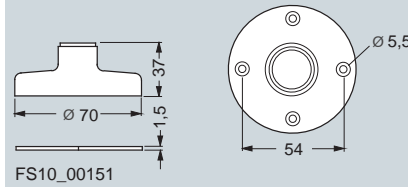
Local connectivity box 3RG7848-2AB



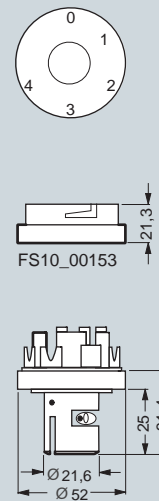
8WD42 00-1AE signaling column with continuous light element, 8WD42 08-0EF tube and 8WD42 08-0DE pedestal



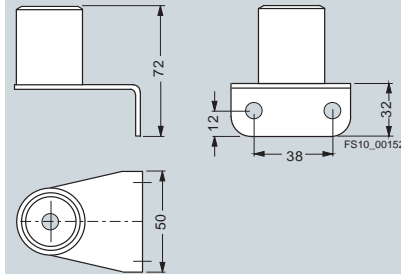
8WD42 08-0DE pedestal



8WD42 08-0DE connecting element



8WD42 08-0CA bracket for wall mounting



4

Overview

Our optical distance sensors provide perfect all-round protection to type 3 in accordance with IEC/EN 61496.

In an operating field of 190° and over a distance of up to 4.0 m (up to 15 m in non-safety-related applications), the laser scanner reliably senses every object and every person. And it works so simply: The distance sensor emits light pulses at regular intervals.

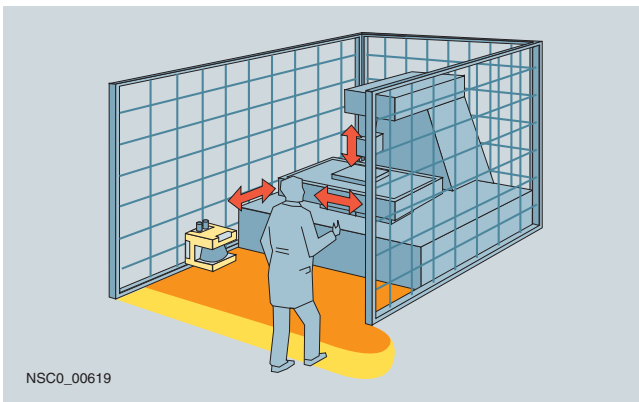
If they hit an obstruction, the sensor receives the reflected light and evaluates it. If this is evaluated as the predefined area to be protected, a Stop function is triggered.

With up to four programmable protection field pairs that can be selected during operation, our laser scanners can be optimally adapted to any application – on machines, production robots, conveyor systems or vehicles.

Different variants support optimal integration in the automation system: Whether conventionally in the safety circuit, over PROFIBUS with PROFIsafe or over AS-Interface with ASIsafe.

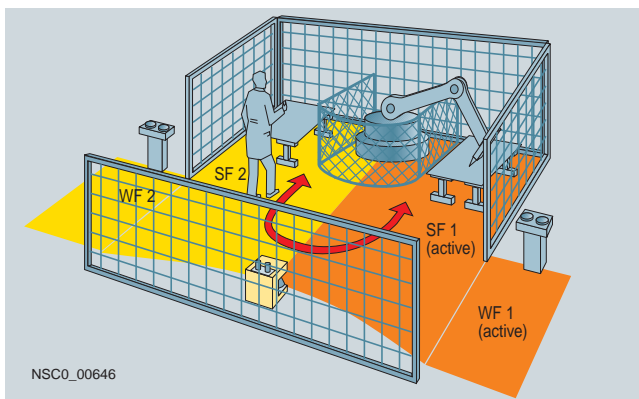
Application

Horizontal danger zone protection



- Reliable detection of persons and objects in danger zones around machines and plants.
- Flexible programming of almost any protection and warning zones.

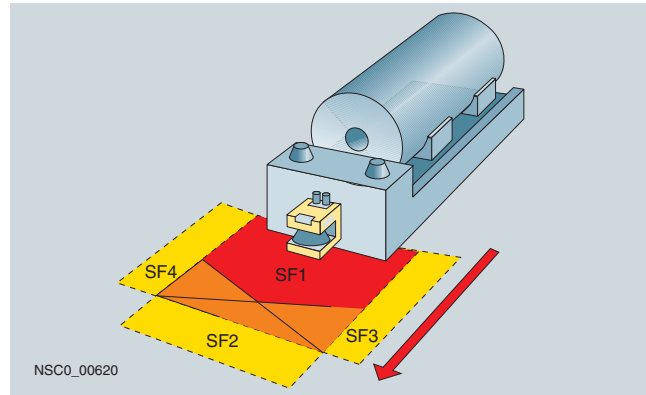
Horizontal danger zone protection with more than one protection field



- Reliable detection of persons in different danger zones by switching between protection fields.
- Increased availability due to accurate protection of just the fields that are currently active.

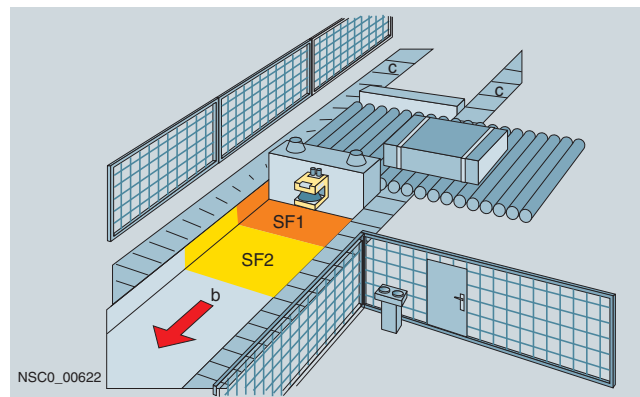
Introduction

Route monitoring for automatic guided vehicle systems



- Reliable detection of persons and objects approaching the vehicle.
- The laser scanner offers a greater protection range than bumpers and, therefore, permits higher speeds.

Collision protection for shifting units



- Reliable protection of persons in the path of the vehicle.
- Objects in the path of the vehicle are detected in good time and damage to the vehicle or its load is prevented.

Other applications

- Many different types of hazardous area protection
- Protection for rooms and entrances
- Projecting object monitoring to protect machines and personnel
- Non-safety-relevant measuring or detection tasks (e.g. determining distances, positions, or contours).

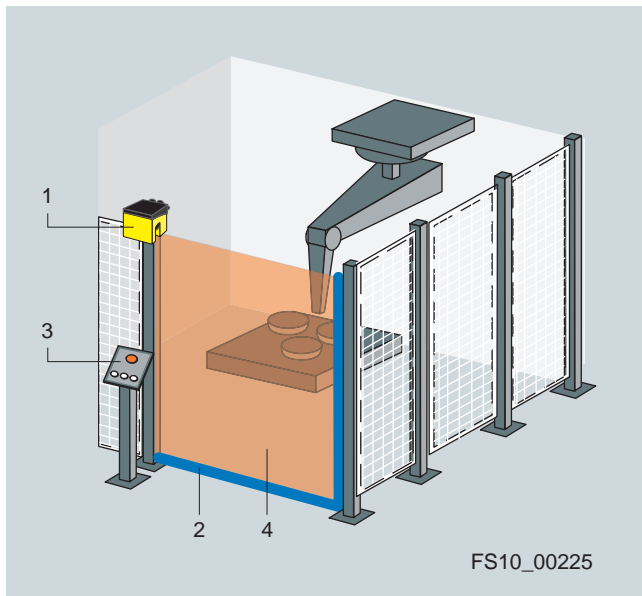
SIMATIC FS600 laser scanners

Introduction

Access protection by means of entry control

Access protection by means of entry control can be used when the entry location to a machine or to a danger zone can be precisely defined and when no other unsecured access to this area exists.

The laser scanner is preferably mounted above the entry point, aligned vertically. To protect the protective devices, laser scanners and fence from inadvertent adjustment and malicious manipulation, the protection fields of the laser scanners must be defined using reference contours. In this operating mode, the scanner uses the sampled environment as a reference and can therefore monitor changes to the structure of the protective equipment as well as each individual measurement to detect an entering person.



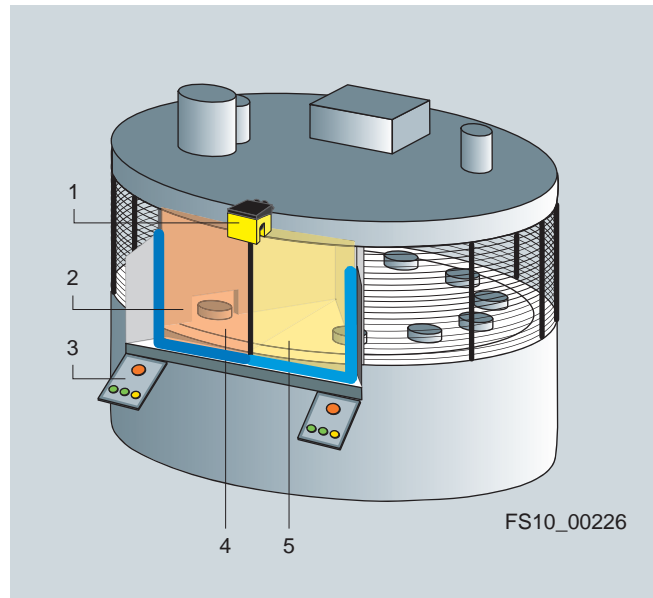
Access through entry control

- 1 Laser scanners
- 2 Reference contour
- 3 Emergency stop
- 4 Protection field

Securing danger zones by means of hand and arm guards

If a machine operator has to be close to the dangerous movement or if the operator coordinates the positioning and removal of workpieces at the machine, danger zone protection must be implemented at the machine.

A protective device must be used to guard these danger zones. The laser scanner is approved for securing danger zones by means of hand and arm guards and can, also in combination with protection field changeover, ensure flexible work safety. To protect the protective devices, laser scanners and the screens (attached to the sides as a reference and as additional access protection) from inadvertent adjustment and malicious manipulation, the protection fields of the laser scanners must be defined using reference contours.

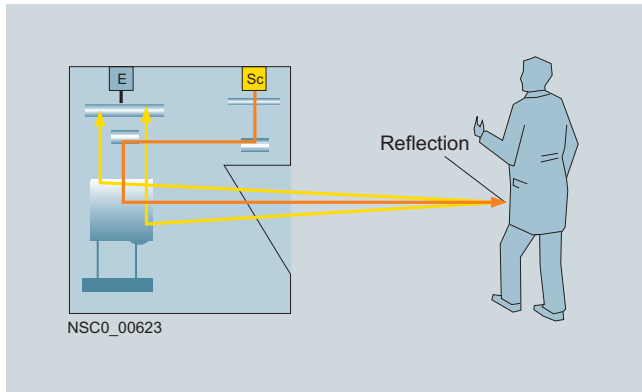


Application example for a circular table

- 1 Laser scanners
- 2 Reference contour
- 3 Emergency stop
- 4, 5 Protection fields with reference classes

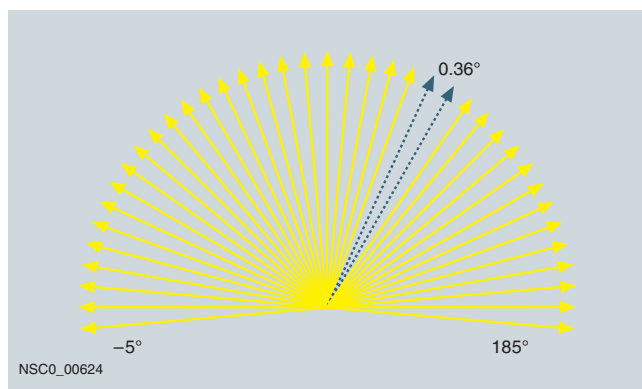
Function

The laser scanner is an optical, contact-free surface scanner – designed primarily for operator protection.



Using a laser diode with transmission optics, the laser scanner continuously generates bundled light pulses that are scattered throughout the operating range by an integrated rotating mirror. If objects or persons enter the field, it evaluates the reflected light pulses and continuously calculates the exact position coordinates on the basis of the light propagation time. If the defined personnel protection field is penetrated, the laser scanner stops the machine immediately (within the system response time). The Stop function is reset when the protection field is free again, either automatically or following acknowledgement (depending on the operating mode).

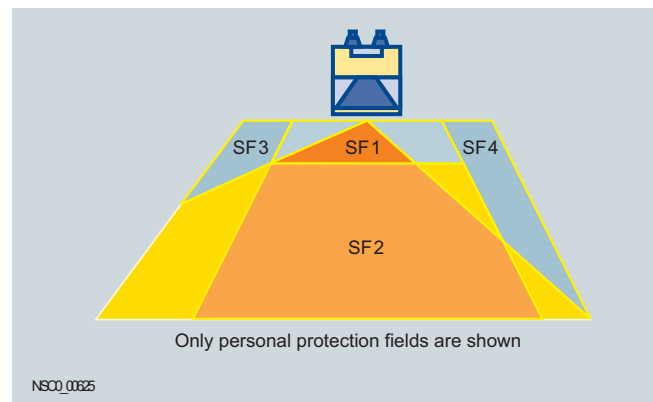
The operating range of the laser scanner spans 190° and is subdivided into angle segments of 0.36°.



The scan rate is 25 scans/second, i.e. one light pulse every 40 ms in each segment. A special algorithm ensures that objects larger than 70 mm (this corresponds to the scanner resolution) can be reliably detected and that contamination (e.g. dust) does not reduce system availability. The laser scanner detects people (even if they are wearing dark clothing) at a distance of up to 4 m (failsafe). People or objects can, however, be detected at a distance of up to 15 m so that a warning can be output, for example (not safety relevant).

Four protection field/warning field pairs

Four variable protection field pairs for the personnel protection field and warning field, which can be easily set on the PC, ensure that the laser scanner can be adapted to suit any requirement.



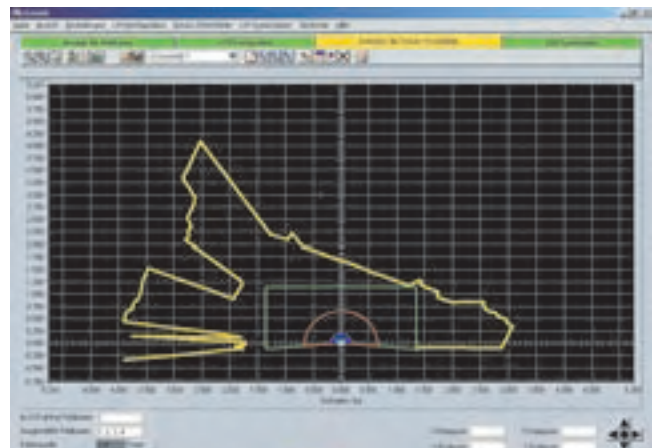
It can be implemented in stationary applications (machines and installations) or mobile applications (vehicles, automatic guided vehicle systems, or shifting units). In the case of a robot, for example, different operating ranges can be protected, whereby the laser scanner operates in succession with regard to time and space. In the case of automatic guided vehicle systems, four programmable protection fields can be protected (e.g. rapid travel, slow travel, turning left, turning right).

LS4soft operator software

Thanks to the PC operator software LS4soft, it could not be easier to optimize the laser scanner settings. The following functions have been integrated:

- User-friendly configuration of the protection field using a PC or laptop
- Configuration of additional functions, such as protection field selection, restart inhibit, etc. by means of a software wizard
- Comprehensive range of displays, e.g. defined protection fields, current scan contours, system settings, etc. reliable, password-protected access with different authorization levels
- Executable under Microsoft Windows 95/98/NT/2000/XP

The operator software is supplied with the laser scanner.



SIMATIC FS600 laser scanners

Standard laser scanners

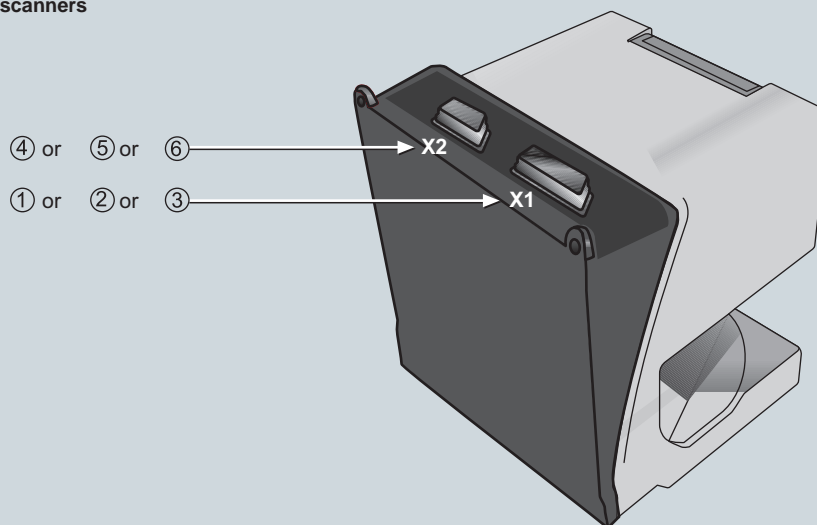
Overview



Standard laser scanner with port covers

Integration

Standard laser scanners



FS10_00138

Contact assignment

Connection	Description	Position	Connectable accessories	Order No.	
X1	15-pole Sub-D connector for control interface	①	ConfigPlug, straight, without cable	3RG78 38-2AB	
		②	(not applicable)	(not applicable)	
		③	Cable	3RG78 38-2BD	(5 m)
				3RG78 38-2BE	(10 m)
③	Cable	3RG78 38-2BF	(25 m)		
		3RG78 38-2BG	(50 m)		
③	Cable	3RG78 38-2BH	(10 m, angled)		
X2	9-pole Sub-D connector for RS232/RS422 PC interface	④	Connector, complete, 9-pole	3RG78 38-1CA	
		⑤	Connector, complete, 9-pole with side cable entry	3RG78 38-1CB	
		⑥	Connecting cable, incl. connector, 9-pole	3RG78 38-1CC	(3 m)
				3RG78 38-1CD	(5 m)
⑥	Connecting cable, incl. connector, 9-pole	3RG78 38-1CE	(10 m)		

Technical specifications

Type	Standard laser scanners
Operator protection zone	
Detection zone	0 ... 4 m (SIMATIC FS620I and SIMATIC FS660I) 0 ... 2.15 m (SIMATIC FS660 SR)
Degree of remission	min. 1.8%
Object size, object diameter	70 mm (cylindrical test object)
Response time	
• 2-fold evaluation (2 scans)	80 ms
• Adjustable up to 16 scans	640 ms
Number	4/8 (selectable via switched inputs)
Output	2 fail-safe pnp transistor outputs, 24 V, 250 mA
Safety category	
• according to DIN V 19250	Requirement class 4
• according to EN 954-1	Category 3, single fault safety
• according to IEC 61496-1, EN 61496-3	Type 3
• to IEC 61508	SIL 2
Start-up	The start-up test and the start-up inhibit can be adjusted separately
Warm restart	160 ms ... 10 s settable or manually
Additional distance with dust suppression deactivated	83 mm
Additional distance with dust suppression activated	
• For protection fields < 3.5 m	83 mm
• For protection fields > 3.5 m	100 mm
Additional distance for retro-reflectors or strongly reflective surfaces (such as certain metals or ceramics in the scan plane)	
• Over 1.2 m behind the protection field line	0 mm
• In the protection field or up to 1.2 m behind the protection field line	110 mm
Warning zone	
Detection zone	0 ... 15 m
Degree of remission	min. 20%
Object size	150 mm × 150 mm
Response time	
• 2-fold evaluation (2 scans)	80 ms
• Adjustable up to 16 scans	640 ms
Number of warning zones	4 (selectable via switched inputs)
Output	pnp transistor output, max. 100 mA
Contour measurement	
Detection zone	0 ... 50 m
Degree of remission	min. 20%
Object size	–
Output	Serial interface RS 232 (10 m), RS 422 (50 m)
Radial resolution	5 mm
Lateral resolution	0.36°

Type	Standard laser scanners
Power supply	
Operating voltage	Supply according to IEC 60742 with safety transformer or comparable with DC/DC converters
• External supply	24 V DC, –30 to +20%
Current consumption	approx. 300 mA, 2.5 A power supply should be used
Power consumption at 24 V	8 W plus output loading
Overcurrent protection	With fuse 1.25 A, medium time-lag, in control cabinet
Overvoltage protection	With safe switch-off at limit
Voltage dips	according to EN 61496-1
Protective conductor	Connection not permissible
Inputs	
Restart/Reset	Connection of a command device for operating mode with restart inhibit and/or device reset, dynamically monitored, 24 V DC opto-decoupled
Field pair switchover	Selection of 4 field pairs over 4 control lines with internal monitoring (1 field pair = 1 protective zone and 1 warning zone), 24 V DC opto-decoupled
Signal definition	
• High (logic 1)	16 ... 30 V
• Low (logic 0)	< 3 V
Parameterization	
Operator software	Communication and parameterization software under Windows 95/98/NT/2000/XP with secure protocol for programming
Interfaces	
For parameterizing devices and defining fields	RS232, RS422
Outputs	
Protection field	2 × safe semiconductor output, pnp, max. 250 mA short-circuit monitoring, protected against overcurrent
Warning zone/fouling/fault	pnp transistor output, max. 100 mA
Load properties, maximum values	Low-pass response
• Limit frequency f_g	< 1 kHz
• Capacitance C_{Load}	< 100 nF
Level	
• High (OSSD)	$U_b - 3.2 V$
• Low (OSSD)	< 2 V
• High (alarm active)	$U_b - 4 V$
• Low (alarm inactive)	< 2 V
Environment and material	
Degree of protection according to IEC 60529	IP65
Touch protection	Total insulation, protection class 2
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	–20 ... +60 °C
Humidity according to DIN 40040	Table 10, identification letter E (fairly dry)

SIMATIC FS600 laser scanners

Standard laser scanners

Type	Standard laser scanners
Enclosure material	Cast aluminum, plastic
Weight	approx. 2 kg
Dimensions (W x H x D) in mm	140 x 155 x 135
Distance from center of the scan plane to the bottom edge of the enclosure	48.75 mm
Distance from rear edge of enclosure to rotating mirror axis	68 mm
Vibratory load over 3 axes according to IEC 60068, Part 2-6	10 ... 150 Hz, max. 5 g
Continuous shock over 3 axes according to IEC 60068, Part 2-29	10 g, 16 ms
Interference immunity	
• according to EN 61496-1	According to the requirements for Type 4
• Additionally according to DIN 40839-1, -3	Test pulses 1, 2, 3a, 3b, 5 (not for use in vehicles with internal combustion engines)
Rotating mirror drive	Brushless DC motor
Rotating mirror bearings	Maintenance-free ball bearings

Connections

Connectors	2 connectors (connectable from above, soldered connection)
Cable lengths	
• Control cable X1	max. 50 m with 0.5 mm ² conductor cross-section, shielded
• Data cable X2, RS232	max. 10 m
• Data cable X2, RS422	max. 50 m (twisted pair)

Optical properties

Range of angle	max. 190°
Angle resolution	0.36°
Lateral tolerance	
• Without mounting system (with reference to rear of enclosure)	± 0.18°
• With mounting system (with reference to the mounting surface)	± 0.22°
Scan rate	25 scans/s or 40 ms/scan
Laser protection class according to EN 60825-1	Class 1 (safe for eyes)
Wave length	905 nm (infrared)
Beam divergence	2 mrad
Time basis	100 s

Selection and Ordering data

	Order No.
SIMATIC FS620I standard laser scanner ▶	3RG78 34-DD00
Including LS4soft software for securing danger zones	
SIMATIC FS660I standard laser scanner with vertical security ▶ B	3RG78 34-DE00
Including LS4soft software for securing danger zones, danger points and access protection	

SIMATIC FS660 SR standard laser scanner with vertical security

Including LS4soft software for securing danger zones, danger points and access protection
Maximum protective zone 2.15 m



Accessories

Assembly system, hinged, for easy adjustment ▶



Adapter plate for PLS support ▶

Cleaning set ▶

Includes cleaning fluid (1000 ml), cloths (100 units)

Connectors and cables

• Connector, complete, 9-pole (X2) ▶

• Connector, complete, 9-pole (X2) With lateral cable routing ▶

Connecting cable

Laser scanner control cable with ConfigPlug, 15-pole (X1)

ConfigPlug for all laser scanners, straight, without cable ▶

• 5 m cable, straight, unconnected end ▶ A

• 10 m cable, straight, unconnected end ▶

• 25 m cable, straight, unconnected end ▶

• 50 m cable, straight, unconnected end ▶

• 10 m cable, angled, unconnected end ▶

Connecting cable

incl. connector, 9-pole (X2)

• 3 m ▶

• 5 m ▶

• 10 m ▶

Suitable evaluation units, see page 4/82.

A: Subject to export regulations AL = N and ECCN = EAR99H

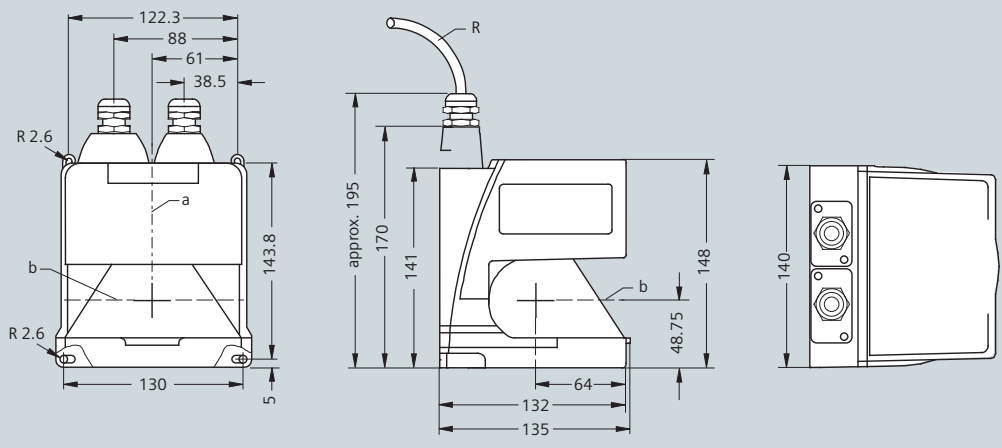
B: Subject to export regulations AL = N and ECCN = EAR99

▶ Preferred type, available from stock.

Standard laser scanners

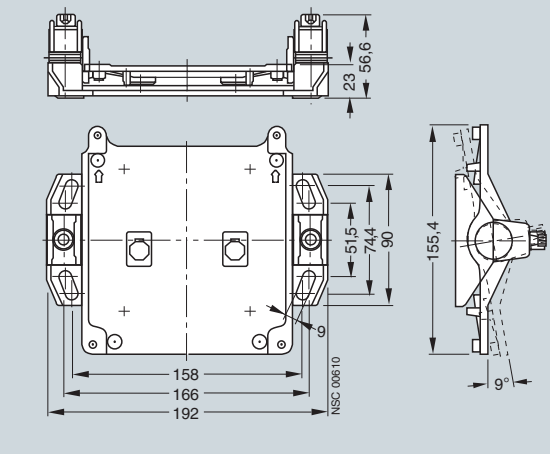
Dimensions

Standard laser scanner with switching output



R = smallest bending radius: 50 mm (original accessories)
 a = rotating mirror axis
 b = scan level

Assembly system 3RG78 38-1AA



SIMATIC FS600 laser scanners

ASIsafe laser scanner

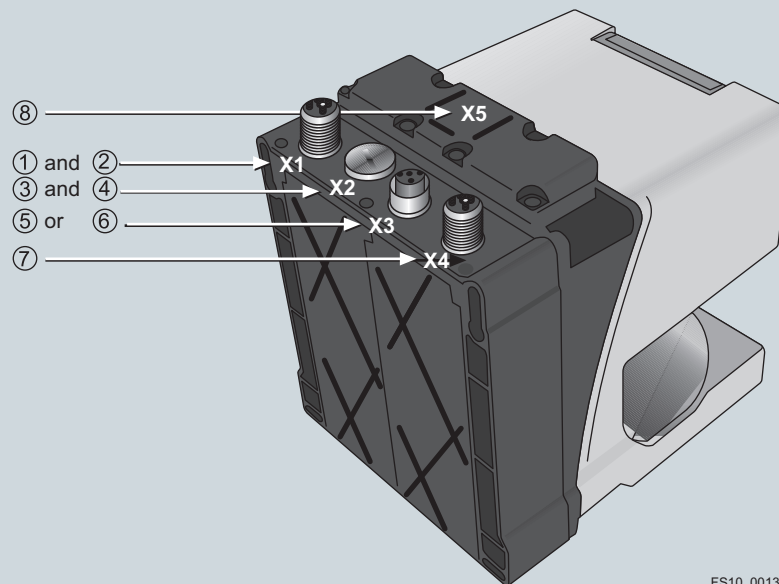
Overview



ASIsafe laser scanner

Integration

ASIsafe laser scanner



FS10_00136

Contact assignment

Terminal	Description	Item	Connectable accessories	Order No.
X1	M12 connector for AS-Interface connection (bus connection and 24 V DC power supply)	①	Laser scanner connecting cable to M12 AS-Interface adapter	3RG78 38-1EA (1 m) 3RG78 38-1EB (2 m)
		②	M12 AS-Interface adapter	3RG78 38-1DG
X2	Connection for AS-Interface addressing and diagnostics unit	③	AS-Interface addressing and diagnostics unit	3RK1 904-2AB01
		④	Connecting cable with M12 socket and M12 plug (3-core)	3RX8 000-0GF32-1AB5 (1.5 m)
X3	M12 socket for connecting the changeover for the protection fields	⑤	M12 jumper plug (suitable for protection field 1)	3RG78 38-1DF
		⑥	M12 connector with terminal housing, 5-pole	3RX8 000-0CD55
X4	M12 connector for connecting a restart button (optional)	⑦	M12 cable socket with terminal housing, 5-pole	3RX8 000-0CB55
X5	Optical PC interface	⑧	PC connecting cable for laser scanner with optical interface, 9-pole	3RG78 38-1DC

Technical specifications

Type	ASIsafe laser scanner
Protection field	
Detection zone	0 ... 4 m
Degree of remission	min. 1.8%
Object size (diameter)	70 mm (cylindrical test object)
Response time	
• 2-fold evaluation (2 scans)	85 ms (laser scanner only, without AS-Interface system times)
• Adjustable up to 16 scans	645 ms (laser scanner only, without AS-Interface system times)
Number	4 (selectable via switched inputs)
Safety category	
• according to EN 954-1	Category 3
• according to IEC 61496-1 or EN 61496-3	Type 3
• according to IEC 61506	SIL 2
Output	Safe AS-Interface interface
Start-up	Start-up test and start-up disable can be set separately
Warm restart	160 ms ... 10 s (settable or manually)
Protection field additional distance	
• with dust suppression deactivated	83 mm
• with dust suppression activated	
- For protection fields < 3.5 mm	83 mm
- For protection fields > 3.5 mm	100 mm
• Additional distance for retro-reflectors or strongly reflective surfaces (such as certain metals or ceramics in the scan plane)	
- Over 1.2 m behind the protection field line	0 mm
- In the protection field or up to 1.2 m behind the protection field line	110 mm
Warning zone	
Detection zone	0 ... 15 m
Degree of remission	min. 20%
Object size	150 x 150 mm
Response time	
• 2-fold evaluation (2 scans)	85 ms (laser scanner only, without AS-Interface system times)
• Adjustable up to 16 scans	645 ms (laser scanner only, without AS-Interface system times)
Number of warning zones	4 (selectable via switched inputs)
Output	AS-Interface
Contour measurement	
Detection zone	0 ... 50 m
Degree of remission	min. 20%
Output	RS232 serial interface via infrared interface
Radial resolution	5 mm
Lateral resolution	0.36°

Type	ASIsafe laser scanner
Supply voltage	
• via AS-Interface network	29.5 ... 31.6 V (according to AS-Interface specification)
• via external supply	24 V DC (+/-20%)
• Note	The power supply unit of the external power supply as well as the AS-Interface power supply unit used to supply the AS-Interface components must provide safe isolation from the supply according to IEC 60742 and bridge short-term power failures of up to 20 ms (e.g. the AS-Interface power supply unit 3RX9 307-0AA00)
Overcurrent protection	Fuse 1.25 A, slow acting
Current consumption from the supply circuit, typically	400 mA
Current consumption from the AS-Interface circuit, typically	50 mA
Inputs	
Restart/Reset	Connection of a command device for operating mode "With restart inhibit" and/or device reset, dynamically monitored, 24 V DC opto-decoupled
Field pair switchover	Selection of 4 field pairs over 4 control lines with internal monitoring (1 field pair = 1 protective zone and 1 warning zone), 24 V DC opto-decoupled
Signal definition	
• High (logic 1)	16 ... 30 V
• Low (logic 0)	< 3 V
Control cable	
• Length	max. 50 m (0.5 mm ² conductor cross-section, shielded)
AS-Interface address programming	Connection of a generally available AS-Interface address programming device
RS232 interfaces by means of infrared interface	For device parameterization and field function
Optical system	
Range of angle	190°
Angle resolution	0.36°
Lateral tolerance	
• Without mounting system (with reference to rear of enclosure)	± 0.18°
• With mounting system (with reference to the mounting surface)	± 0.22°
Scan rate	25 scans/s or 40 ms/scan
Laser protection class	
• According to standard	EN 60825-1, Class 1 (safe for eyes)
Wave length	905 nm
Beam divergence	2 mrad
Time basis	100 s

SIMATIC FS600 laser scanners

ASIsafe laser scanner

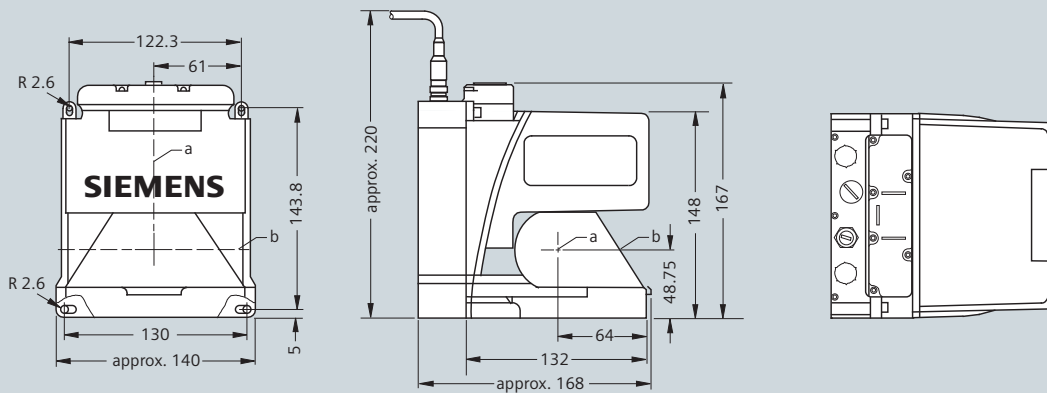
Type	ASIsafe laser scanner
Environment and material	
Degree of protection	IP65
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	-20 ... +60 °C
Housing insulation class	Type of protection 2
Humidity	according to DIN 40040, Table 10, identification letter E (fairly dry)
Dimensions (W x H x D) in mm	141 x 167 x 168
Weight	2.25 kg
Emitter	Infrared laser diode ($\lambda = 905 \text{ nm}$)
Housing	Cast aluminum, plastic, steel connection plate
Vibratory load over three axes according to IEC 60068, Part 2-6	10 ... 150 Hz, max. 5 g
Continuous shock over three axes according to IEC 60068, Part 2-29	10 g, 16 ms
Rotating mirror drive	Brushless DC motor
Rotating mirror bearings	Maintenance-free ball bearings
AS-Interface	
ID code	B
I/O code	0 (four data bits as outputs)
Slave address	Programmed by user in the range from 1 ... 31 (delivery status = 0)
Cycle time according to AS-Interface specification	5 ms
Profile	Safe slave

Selection and Ordering data	Order No.
SIMATIC FS620I ASIsafe laser scanner ▶ Including LS4soft software for securing danger zones	3SF78 34-6DD00
SIMATIC FS660I ASIsafe laser scanner with vertical security B Including LS4soft software for securing danger zones, danger points and access protection	3SF78 34-6DE00
	
Accessories	
Assembly system, hinged, for easy adjustment ▶	3RG78 38-1AA
	
Adapter plate for PLS mounting support ▶	3RG78 38-1AB
Cleaning set ▶ Includes cleaning fluid (1000 ml), cloths (x 100)	3RG78 38-7RS
Connectors and cables	
PC connection cable for AS-Interface and PROFIBUS laser scanner ▶ Includes plug (9-pole) and optical interface	3RG78 38-1DC
M12 jumper plug (suitable for protection field 1) ▶	3RG78 38-1DF
M12 adapter ▶ For AS-Interface and power supply	3RG78 38-1DG
M12 laser scanner – M12 adapter connection cable	
• 5-pole, 1 m ▶	3RG78 38-1EA
• 5-pole, 2 m ▶	3RG78 38-1EB

B: Subject to export regulations AL = N and ECCN = EAR99
 ▶ Preferred type, available from stock.

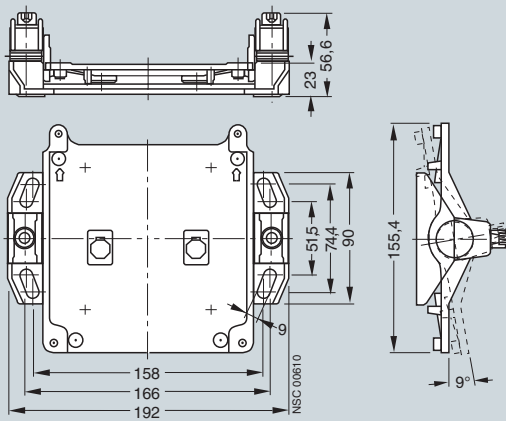
Dimensions

ASIsafe laser scanner

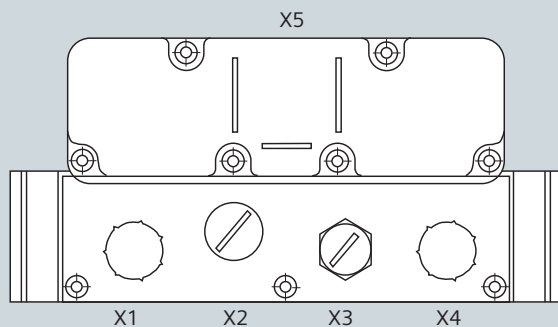


a = rotating mirror axis
b = scan level

Assembly system 3RG7 838-1AA



Schematics



- X1 AS-Interface connection (Bus connection and 24 Volt power supply)
- X2 AS-Interface connection for address programming device
- X3 Connection protective fields switchover
- X4 Connection restart button
- X5 Optical PC Interface

SIMATIC FS600 laser scanners

PROFIsafe laser scanner

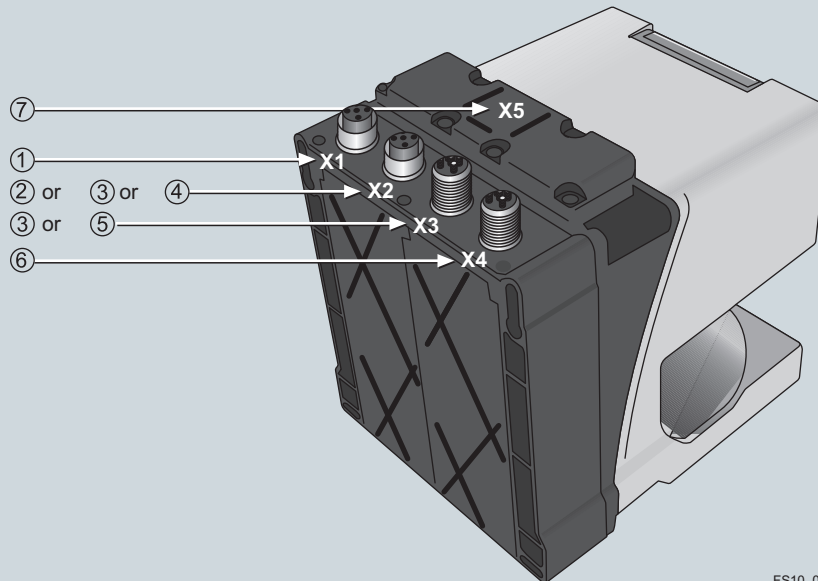
Overview



PROFIsafe laser scanner

Integration

PROFIsafe laser scanner



FS10_00137

Contact assignment

Terminal	Description	Item	Connectable accessories	Order No.
X1	M12 connector for connecting a restart button (optional)	①	M12 connector with terminal housing, 5-pole	3RX8 000-0CD55
X2	M12 socket for PROFIBUS output cable	②	Terminating resistor for PROFIBUS DP	6GK1 905-0EC00
		③	PROFIBUS M12 connecting cable, with plug and socket, 2-pole	6XV1 830-3DE50 (0.5 m) 6XV1 830-3DH15 (1.5 m) 6XV1 830-3DH30 (3.0 m) 6XV1 830-3DH50 (5.0 m) 6XV1 830-3DN10 (10.0 m) 6XV1 830-3DN15 (15.0 m)
		④	PROFIBUS M12 connecting plug with male insert	6GK1 905-0EA00
		⑤	PROFIBUS M12 connecting plug with female insert	6GK1 905-0EB00
X3	M12 plug for PROFIBUS input cable	③	PROFIBUS M12 connecting cable, with plug and socket, 2-pole	6XV1 830-3DE50 (0.5 m) 6XV1 830-3DH15 (1.5 m) 6XV1 830-3DH30 (3.0 m) 6XV1 830-3DH50 (5.0 m) 6XV1 830-3DN10 (10.0 m) 6XV1 830-3DN15 (15.0 m)
X4	M12 plug for 24 V DC power supply	⑥	M12 cable socket with terminal housing, 5-pole	3RX8 000-0CB55
X5	Optical PC interface	⑦	PC connecting cable for laser scanner with optical interface, 9-pole	3RG78 38-1DC

Technical specifications



Type	PROFIsafe laser scanner
Protection field	
Detection zone	0 ... 4 m
Degree of remission	min. 1.8%
Object size (diameter)	70 mm (cylindrical test object)
Response time	
• 2-fold evaluation (2 scans)	80 ms (laser scanner only, without PROFIBUS system times)
• Adjustable up to 16 scans	640 ms (laser scanner only, without PROFIBUS system times)
Number	4 (selectable via PROFIBUS)
Safety category	
• according to EN 954-1	Category 3
• according to IEC 61496-1 or EN 61496-3	Type 3
• according to IEC 61506	SIL 2
Output	PROFIBUS (PROFIsafe profile)
Start-up	Start-up test and start-up disable can be set separately
Warm restart	160 ms ... 10 s (settable or manually)
Protection field additional distance	
• with dust suppression deactivated	83 mm
• with dust suppression activated	
- For protection fields < 3.5 mm	83 mm
- For protection fields > 3.5 mm	100 mm
• Additional distance for retro-reflectors or strongly reflective surfaces (such as certain metals or ceramics in the scan plane)	
- Over 1.2 m behind the protection field line	0 mm
- In the protection field or up to 1.2 m behind the protection field line	110 mm
Warning zone	
Detection zone	0 ... 15 m
Degree of remission	min. 20%
Object size	150 × 150 mm
Response time	
• 2-fold evaluation (2 scans)	80 ms (laser scanner only, without PROFIBUS system times)
• Adjustable up to 16 scans	640 ms (laser scanner only, without PROFIBUS system times)
Number of warning zones	4 (selectable via PROFIBUS)
Output	PROFIBUS
Contour measurement	
Detection zone	0 ... 50 m
Degree of remission	min. 20%
Output	RS232 serial interface via infrared interface
Radial resolution	5 mm
Lateral resolution	0.36°
Supply voltage	
• via external supply	24 V DC (+20% / -30%)

Type	PROFIsafe laser scanner
• Note	The power supply unit for the external power supply must feature safe isolation from the supply according to IEC 60742 and bridge temporary power failures of up to 20 ms.
Overcurrent protection	Fuse 1.25 A, slow acting
Current consumption	typ. 350 mA
Inputs	
Restart/Reset	Connection of a command device for operating mode "With restart inhibit" and/or device reset, dynamically monitored
Signal definition	
• High (logic 1)	16 ... 30 V
• Low (logic 0)	< 3 V
Control cable	
• Length	max. 50 m (with 0.5 mm ² conductor cross-section, shielded)
Field pair switchover	Field pair switchover over PROFIBUS (PROFIsafe profile)
RS232 interfaces by means of infrared interface	For device parameterization and field function
Optical system	
Range of angle	190°
Angle resolution	0.36°
Lateral tolerance	
• Without mounting system (with reference to rear of enclosure)	± 0.18°
• With mounting system (with reference to the mounting surface)	± 0.22°
Scan rate	25 scans/s or 40 ms/scan
Laser protection class	
• According to standard	EN 60825-1, Class 1 (safe for eyes)
Wave length	905 nm
Beam divergence	2 mrad
Time basis	100 s
Environment and material	
Degree of protection	IP65
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	-20 ... +60 °C
Housing insulation class	Type of protection 2
Humidity	according to DIN 40040, Table 10, identification letter E (fairly dry)
Dimensions (W × H × D) in mm	141 × 167 × 168
Emitter	Infrared laser diode (λ = 905 nm)
Housing	Cast aluminum, plastic, steel connection plate
Vibratory load over three axes according to IEC 60068, Part 2-6	10 ... 150 Hz, max. 5 g
Continuous shock over three axes according to IEC 60068, Part 2-29	10 g, 16 ms
Rotating mirror drive	Brushless DC motor
Rotating mirror bearings	Maintenance-free ball bearings

SIMATIC FS600 laser scanners

PROFIsafe laser scanner

Selection and Ordering data Order No.

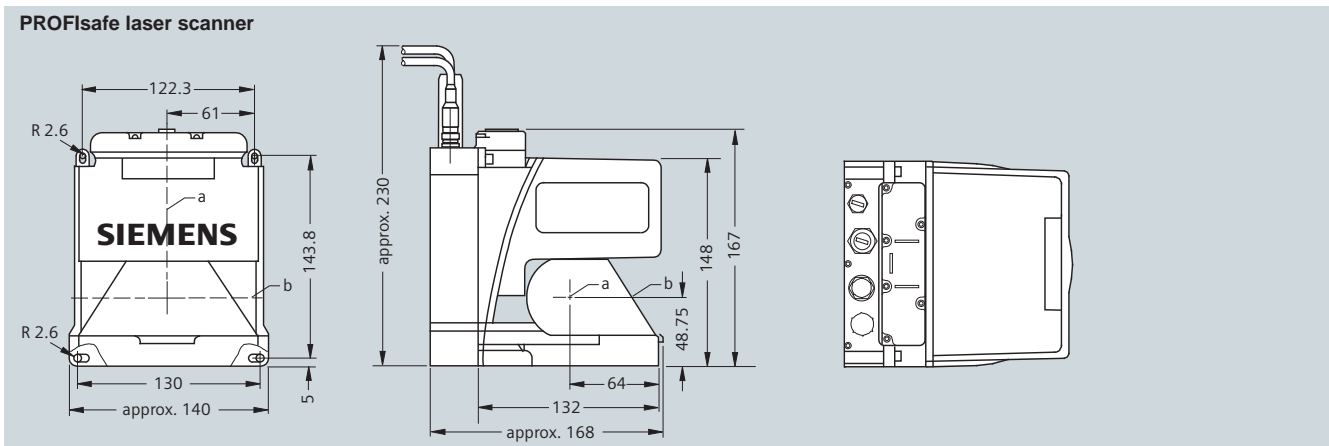
SIMATIC FS620I PROFIsafe laser scanner Including LS4soft software for securing danger zones		3SF78 34-6PB00
SIMATIC FS660I PROFIsafe laser scanner with vertical security Including LS4soft software for securing danger zones, danger points and access protection	B	3SF78 34-6PE00
		
Accessories		
Assembly system , hinged, for easy adjustment	▶	3RG78 38-1AA
		
Adapter plate for PLS mounting support	▶	3RG78 38-1AB
Cleaning set Includes cleaning fluid (1000 ml), cloths (x 100)	▶	3RG78 38-7RS
Connectors and cables		
PC connection cable for AS-Interface and PROFIBUS laser scanners including plug (9-pole), and optical interface	▶	3RG78 38-1DC
PROFIBUS M12 terminating connector For PROFIBUS DP 1 packet = 5 items	▶	6GK1 905-0EC00
PROFIBUS M12 connectors 1 packet = 5 items		
• Male insert	▶	6GK1 905-0EA00
• Socket insert	▶	6GK1 905-0EB00
PROFIBUS M12 plug-in cables 2-core (inverted coding) preassembled, with M12 connectors, in different lengths:		
• 0.5 m	▶	6XV1 830-3DE50
• 1.5 m	▶	6XV1 830-3DH15
• 3.0 m	▶	6XV1 830-3DH30
• 5.0 m	▶	6XV1 830-3DH50
• 10.0 m	▶	6XV1 830-3DN10
• 15.0 m	▶	6XV1 830-3DN15

B: Subject to export regulations AL = N and ECCN = EAR99

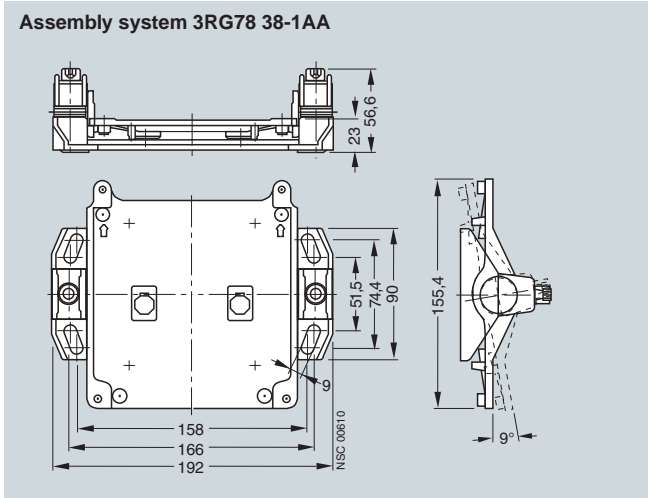
▶ Preferred type, available from stock.

PROFIsafe laser scanner

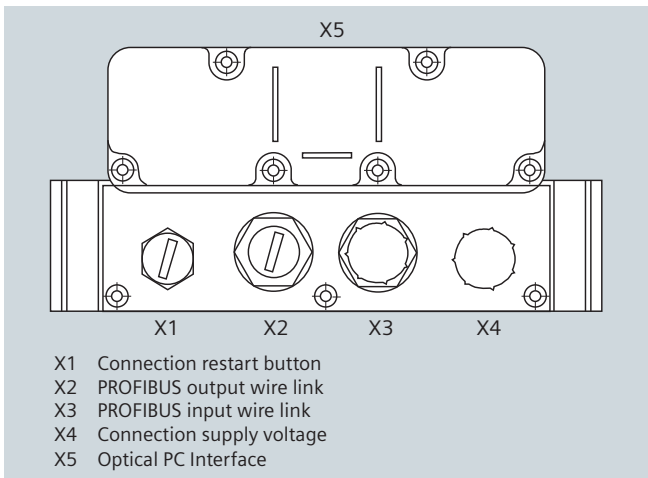
Dimensions



a = rotating mirror axis
 b = scan level



Schematics



SIMATIC FS600 laser scanners

Notes

4

RFID Systems



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RFID Systems

Introduction

RFID systems – for optimization of material flow and logistics

A constant flow of information is essential for seamless, efficient processes. In a wide range of different sectors, the intelligent RFID systems MOBY D, MOBY E, MOBY R, MOBY U, SIMATIC RF300 and RF600 ensure that you are always in the picture. This system family offers you considerable advantages over conventional identification systems.

Important data accompany a product or object from the start. Contactless data transfer provides for high levels of industrial compatibility. And the uniform system integration ensures easy and low-cost integration in the application. In short: With the RFID systems, you can perfectly control and optimize your material flow and your logistics.

Highlights

- Time savings in production and logistics
- Fully automated and rapid identification with 100% transmission reliability
- Production and quality data can be saved directly on the product
- Insensitive to temperature fluctuations and dirt
- Broad range of data memories reusable at any time – from SmartLabel up to 64 KByte tag
- Flexible system integration: Serial, via PROFIBUS or Ethernet
- Simple integration into SIMATIC reduces engineering costs
- Supports the following standards: ISO 14443, ISO 15693, ISO 18000-2, ISO 18000-4 as well as EPCglobal and ISO/IEC 18000-6



Meaningful data from the outset

The RFID systems ensure that meaningful data accompanies a product or object from the very beginning. The mobile data storage units (MDS or tag/transponder) are attached to the product, product carrier, object or its transport or packing unit and are written by non-contact methods. This means that all the application-specific data is available on the mobile data storage unit. This is true whether you are dealing with vehicle body parts in the automotive industry or order picking boxes. Up to 64 KB of data can be stored and individually read and supplemented when required at the various workstations or manufacturing stations. This all means that the flow of material and data is synchronized optimally.

Contactless data transfer and a high degree of industrial compatibility

Powerful read/write devices (SLG) in various rugged designs ensure fast and reliable data transfer between the mobile data storage units and the higher-level systems (PLC, PC, ...).

The data and power are transmitted inductively by an electromagnetic alternating field or by radio waves. This principle of contactless data transfer works reliably in the presence of contamination or through non-metallic materials.

Perfectly matched components

The RFID systems consist of perfectly matched individual components:

- Mobile data storage units (tags)
- Read/write devices and mobile hand-held terminals (readers)
- Antennas
- Interfaces for connection to the automation system (PROFIBUS, PROFINET)
- Software for system integration

Suitable for every sector

- Assembly lines
- Conveyor systems
- Industrial manufacturing
- Warehouses
- Logistics
- Distribution
- Order picking

Broad range of mobile data storage units

A wide range of different mobile data storage units is available using a variety of storage technologies (fixed code, EEPROM or FRAM/SRAM) and geometric designs. Their strength is not only their high level of data security but also the excellent high degree of protection against ambient conditions such as contamination, temperature fluctuations, washing water or shock load.

Flexible system integration

No matter what the requirements are: The RFID systems allow easy system integration into SIMATIC or SINUMERIK, in the PROFIBUS, Ethernet or a PC environment, and can be connected to any controller.

A wide range of communication modules, function blocks and powerful drivers and function libraries make integration into the application a quick and easy affair.

RFID systems for production – strong in performance and rugged

Conditions can sometimes be extremely harsh in the vicinity of assembly lines and industrial production. This is not a problem for the RFID systems and the systems specially developed for industrial applications. These are highly effective for both reading and writing as well as extremely reliable and feature high degrees of protection up to IP68.

They are characterized by a high level of data security and a large memory capacity, they can manage large volumes of data, communicate at lightning speed and are extremely resistant to interference. Because they are also especially easy to configure and install, they not only ensure reliable identification but also provide cost savings over the complete production line.

Finely graded systems are available for optimizing material flow and for controlling production to suit simple or complex tasks.

Application

- Main assembly lines in the automotive industry such as body shop, paint shop, final assembly
- Production lines for engines, gearboxes or steering gear
- Conveyor systems for the assembly of anti-skid brake systems, airbags, brake systems, doors and cockpits
- Assembly lines for household electrical appliances, consumer electronics or electronic communication equipment
- Assembly lines for PCs, low-power motors, contactors or switches
- Production lines in the glass and ceramics industry

Highlights

- Suitable for use under the harshest conditions – high degree of protection up to IP68 as well as being insensitive to interference
- Large range of data memories – from the most compact sizes for flush mounting in conveyor systems with small workpiece holders through to high-temperature versions
- Seamless integration into SIMATIC reduces engineering costs
- Production and quality data can be saved directly on the product



	Production		
	MOBY E	SIMATIC RF300	MOBY U
Read/write distance	Up to 0.1 m	Up to 0.15 m	Up to 3.0 m
Frequency	13.56 MHz	13.56 MHz	2.4 GHz
Standards	ISO 14443-A		ISO 18000-4

Note on phased-out product MOBY I

The RFID system MOBY I has been a phased-out product since October 1, 2008. It will be possible to order the products for plant expansions until September 30, 2010. The innovative, high-performance RFID system SIMATIC RF300 is available for new applications.

The main advantages of SIMATIC RF300 over MOBY I are:

- 3 x faster data transfer (typically 3 KB/s)
- Wide-ranging status and diagnostic functions, LEDs on the read/write device
- Data memory from 20 byte to 64 KB with unique serial number (UID) and OTP memory area
- Smaller connectors on the reader (M12)

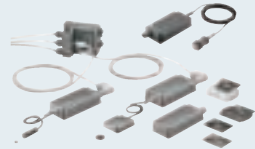
Existing MOBY I software applications (with FC45/FB45) can continue to be used.



Additional information can be found in the Internet under:
<http://www.siemens.com/simatic-sensors/rf>

RFID system for production engineering

Introduction

Technical specifications

MOBY E				
				
Read/write distance	Up to 100 mm			
Data transmission rate	≥ 2.55 ms/byte reading, ≥ 2.8 ms/byte writing			
Memory	EEPROM			
Standards	ISO 14443-A			
Approvals	ETS 300330 (Europe); FCC Part 15 (U.S.A.), UL/CSA			
Bulk capability	• (only with SSIM)			
Multitag capability	• (only with SSIM)			
Frequency	13.56 MHz			
Mobile data storage units (tags)	Name	Memory size	Operating temperature	Degree of protection
	MDS E600	752 byte	-25 ... +60 °C	IP68
	MDS E611	752 byte	-25 ... +75 °C	IP67
	MDS E623	752 byte	-25 ... +85 °C	IP67/IPX9K
	MDS E624	752 byte	-25 ... +125 °C	IP67/IPX9K
Read/write devices	Name	Operating temperature	Degree of protection	
Stationary, with detached antenna	SIM 70 with ANT 0	-25 ... +75 °C	IP65/IP67	
	SIM 70 with ANT 1	-25 ... +75 °C	IP65/IP67	
	SLG 75	-25 ... +75 °C	IP65	
Stationary, with integrated antenna	SLG 72	-25 ... +75 °C	IP65	
	SIM 72	-25 ... +75 °C	IP65	
Mobile hand-held terminal with integrated antenna	STG E	-20 ... +50 °C	IP54	
Antennas	Name	Operating temperature	Degree of protection	
	SLA 71	-25 ... +70 °C	IP65	
	ANT 1	-25 ... +70 °C	IP65	
	ANT 12	-25 ... +70 °C	IP65	
	ANT 18	-25 ... +70 °C	IP65	
	ANT 30	-25 ... +70 °C	IP65	
	ANT 4	-25 ... +70 °C	IP65	
Connection to the automation system	directly	via communication module (ASM)		
SIMATIC S7-300, S7-400			•	
PROFIBUS DP			•	
PROFINET			•	
Serial interface to other controllers, PCs, any other systems	•		•	
Page	5/6			

SIMATIC RF300					MOBY U			
								
Read/write distance	150 mm				150 ... 3000 mm			
Data transmission rate	typically 3 KB/s (with IQ-Sense 50 byte/s)				Approx. 8 or 4.8 KB/s without bulk (net)			
Memory	FRAM/EEPROM				RAM			
Standards	–				ISO 18000-4			
Approvals	CE, UL, FCC, CSA				EN 300440-2, FCC Part 15C, UL/CSA			
Bulk capability	•				• (max. 12)			
Multitag capability	• (max. 4) ¹⁾				• (max. 12)			
Frequency	13.56 MHz				2.4 GHz ... 2.4835 GHz			
Mobile data storage units (tags)	Name	Memory size	Operating temperature	Degree of protection	Name	Memory size	Operating temperature	Degree of protection
	RF320T	20 byte	-25 ... +125 °C	IP67/IPX9K	MDS U315	2 KB RAM	-25 ... +70 °C	IP65
	RF340T	8188 byte	-25 ... +85 °C	IP68/IPX9K	MDS U524	32 KB RAM	-25 ... +85 °C	IP68
	RF350T	32765 byte	-25 ... +85 °C	IP68	MDS U525	32 KB RAM	-25 ... +85 °C	IP65
	RF360T	8188 byte	-25 ... +75 °C	IP67	MDS U589	32 KB RAM	-25 ... +85 ... 220 °C cyclical	IP68
	RF370T	32765 byte	-25 ... +85 °C	IP68				
		or			MDS U	32 KB RAM		
	RF380T	65276 byte	-25 ... +85 °C	IP68	Service		-25 ... +70 °C	IP40
		32765 byte	-25 ... +110 °C (+220 °C cyclical)	IP68				
Read/write devices	Name	Operating temperature	Degree of protection	Name	Operating temperature	Degree of protection		
Stationary, with detached antenna	RF350R	-25 ... +70 °C	IP65					
Stationary, with integrated antenna	RF310R	-25 ... +70 °C	IP67	SLG U92	-25 ... +70 °C	IP65		
	RF340R	-25 ... +70 °C	IP67					
	RF380R	-25 ... +70 °C	IP67					
Mobile hand-held terminal with integrated	RF310M	-10 ... +50 °C	IP54	STG U	-20 ... +60 °C	IP54		
Antennas	Name	Operating temperature	Degree of protection					
	ANT 1	-25 ... +70 °C	IP65					
	ANT 18	-25 ... +70 °C	IP65					
	ANT 30	-25 ... +70 °C	IP65					
Connection to the automation system	directly	via communication module (ASM)		directly	via communication module (ASM)			
SIMATIC S7-300, S7-400		•			•			
PROFIBUS DP		•			•			
PROFINET		•			•			
Serial interface to other controllers, PCs, any other systems	• (via RS 422) • (via RS 232, only RF380R)				•			
Page	5/30				5/51			

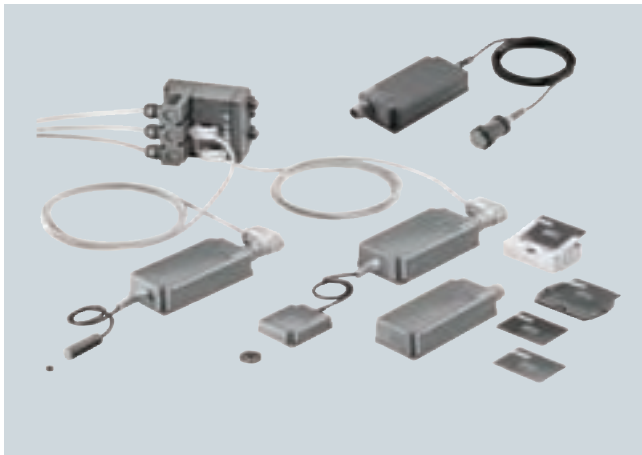
1) Available soon

RFID system for production engineering

MOBY E

Introduction

Overview



MOBY E is a contactless identification system that has been specially designed for applications in logistics, distribution and industrial production.

Depending on requirements (EEPROM, size, ambient conditions, large clearance etc.), different data memories and read/write devices are available. Thanks to their low price, these data memories can be used, for example, as an "electronic barcode substitute" or "delivery note".

The MOBY E identification system boasts the following features:

- 13.56 MHz identification system with read/write distance of up to 100 mm
- Designed for the upper and medium performance range
- Extensive range of battery-free data memories (752 byte EEPROM, up to +150 °C) including a special data memory for tool identification.
- Very high level of reliability even in the presence of contamination, temperature fluctuations and electromagnetic interference.
- Simple integration into SIMATIC and the PROFIBUS DP.
- Can be connected via serial interface to any system, e.g. PC with DOS / Windows 95/NT.

Benefits

- The standard MOBY E components permit the secure and quick construction of application specific identification systems, so that capacities are freed up for the generation of the application software.
- Worldwide support, configuration and service support.

Application

MOBY E is used wherever containers, boxes, carriers, work-piece carriers, tools and hangers have to be identified reliably, quickly, automatically and without contact.

The main applications for MOBY E are:

- Logistics (identification of pallets, charge carriers, containers etc.)
- Distribution (data memory as "electronic barcode supplement" or "delivery note")
- Parts identification (e.g. data storage is attached to products/pallets).
- Assembly lines (e.g. data memory is attached to workpiece carriers)
- Conveyor systems (e.g. data memory is attached to the hanger of an overhead conveyor).

Function

MOBY identification systems ensure that important data accompanies the product from the very beginning.

Mobile data storage units ("electronic goods notes") are used in place of barcodes and already contain all product-specific data in addition to the product number. Up to 752 byte of user data can be stored and managed in this way. Enough to enable quality data to be stored as well.

Using stationary as well as mobile read/write devices (SLGs), the necessary information (production data, transport routes, etc.) can be read without contact (inductively), and even be supplemented or modified without the need for a direct line-of-sight link. MOBY records the data of objects quickly and reliably. MOBY thereby ensures effective and cost-effective automation.

Technical specifications

Type	Contactless RF identification system for the lower and medium performance range
Transmission frequency data/energy	13.56 MHz
Memory capacity	752 byte user memory 4 byte fixed code as serial number
Memory type	EEPROM
Read/write cycles	> 1 000 000/unlimited
Data management	Bitwise access (16-byte block organization internally)
Data transmission rate from mobile data storage unit to read/write device	≥ 2.8 ms/byte
Read/write distance	Up to 100 mm
Operating temperature	-25 to +125 °C
Degree of protection	IP67, IP68
Can be connected to	SIMATIC S5/S7, PC, non-Siemens PLC, PROFIBUS DP
Special features	<ul style="list-style-type: none"> • CRC checksums for secure data transmission • High resistance to interference frequencies • Multitag and password function (SIM only)
Approvals	ETS 300330 (Europe) FCC Part 15 (U.S.A.), UL/CSA

RFID system for production engineering

MOBY E mobile data storage units

Introduction

Overview



Type	Features
MDS E600	Universal data storage unit (752 byte EEPROM) in credit card format (85 mm x 54 mm x 0.8 mm) <ul style="list-style-type: none"> • Degree of protection IP68 • Temperature range up to +60 °C • Max. read/write distance 70 mm
MDS E611	Universal data storage unit (752 byte EEPROM) in credit card format (85 mm x 54 mm x 2.5 mm) <p>This mobile data medium can also be used in harsh environments and under extreme conditions</p> <ul style="list-style-type: none"> • Degree of protection IP67 • Temperature range up to +75 °C • Max. read/write distance 100 mm
MDS E623	Small data storage unit (752 byte EEPROM, Ø 10 mm x 4.5 mm), specially for tool coding according to DIN 69873 <ul style="list-style-type: none"> • Degree of protection IP67/IPX9K¹⁾ to DIN EN 60529 / VDE 0470-1 • Temperature range up to +85 °C • Max. read/write distance 6 mm
MDS E624	Universal compact data storage unit (752 byte EEPROM), Ø 27 mm x 4 mm <ul style="list-style-type: none"> • Degree of protection IP67/IPX9K¹⁾ to DIN EN 60529 / VDE 0470-1 • Temperature range up to +125 °C • Max. read/write distance 40 mm

1) Extract:
 Test equipment: Steam jet-air ejector 0 °C, 30 °C, 60 °C, 90 °C
 Water flow: 10 ... 15 l/min at 100 bar (75 °C)
 Distance: 10 ... 15 cm

Design

The MOBY E mobile data storage units mainly comprises logic, an antenna and an EEPROM memory.

Function

If an MDS moves into the transmission field of the SLG, the necessary power for all circuit components is generated and monitored by means of the energy supply unit. The pulse-coded information is prepared in such a way that it can be processed further as pure digital signals. The handling of data, including check routines, is performed by the control unit which also manages the user memory.

RFID system for production engineering

MOBY E mobile data storage units

Introduction

Technical specifications

Field data of MDS and SLG (all dimensions in mm)

The field data for all MOBY E components of the MDS and SLG are shown in the table below. Thus it becomes particularly easy to select the right MDS and SLG. All the technical specifications listed are typical data and are applicable for an ambient temperature of between 0 °C and +50 °C and a supply voltage of between 22 V and 27 V DC.

Operating/limit distance (without influence of metal)

Type	MDS E600	MDS E611	MDS E623	MDS E624
SIM 70 with ANT 0	-	-	0 ... 4/6	0 ... 8/15
SIM 70 with ANT 1	0 ... 50/70	10 ... 70/100	-	0 ... 25/40
SLG 72 / SIM 72	0 ... 50/70	10 ... 70/100	-	0 ... 30/40
SLA 71	0 ... 50/70	10 ... 70/100	-	0 ... 25/40
SLG 75 with ANT 1	0 ... 50/70	10 ... 70/100	-	0 ... 25/40
SLG 75 with ANT 4	0 ... 50/70	10 ... 70/100	-	0 ... 25/40
SLG 75 with ANT 12	-	-	0 ... 4/5	-
SLG 75 with ANT 18	-	-	0 ... 4/6	0 ... 8/15
SLG 75 with ANT 30	-	-	-	0 ... 18/24

Distance from MDS to MDS

Type	MDS E600	MDS E611	MDS E623	MDS E624
SIM 70 with ANT 0	-	-	> 30	> 50
SIM 70 with ANT 1	> 400	> 400	-	> 250
SLG 72/SIM 72/ SLA 71	> 400	> 400	-	> 250
SLG 75 with ANT 1	> 400	> 400	-	> 250
SLG 75 with ANT 4	> 400	> 400	-	> 250
SLG 75 with ANT 12	-	-	> 20	-
SLG 75 with ANT 18	-	-	> 30	> 50
SLG 75 with ANT 30	-	-	-	> 60

RFID system for production engineering

MOBY E mobile data storage units

MDS E600

Overview



Universal data storage unit (752 byte EEPROM) in credit card format (85 mm x 54 mm x 0.8 mm), degree of protection IP68, temperature range up to +60 °C and a max. read/write distance of 70 mm.

Technical specifications

MDS E600 mobile data storage unit	
Memory size	752 byte of EEPROM available
MTBF	2×10^6 hours
Read cycles	Unlimited
Write cycles, min.	200000
• at ≤ 40 °C, typical	> 1000000
Data retention time	> 10 years (at $< +40$ °C)
Read/write distance, max.	70 mm (see field data)
Memory organization	Byte-wise access (16-byte block organization internally)
Energy source	Inductive power transmission
Shock/vibration	ISO 10373/ISO 7810
Torsion and bending load	ISO 10373/ISO 7816-1
Mounting technique	Fixing lug/adhesive
Recommended distance to metal	≥ 20 mm, e.g. using spacer 6GT2190-0AA00 in conjunction with fixing lug 6GT2190-0AB00
Degree of protection to EN 60529	IP68
Resistance to chemicals	See configuration manual
Housing	ISO card
• Dimensions (L x W x H) in mm	85.6 x 54 x 0.8
• Color/material	Anthracite/white/PVC
Ambient temperature	
• During operation	-25 ... +60 °C
• During storage and transport	-25 ... +60 °C
Weight, approx.	6 g

Field data in mm

MDS E600 to:	SIM 70 with ANT 1 SLG 75 with ANT 1	SLG 75 with ANT 4	SLG 72/SIM 72	SLA 71
Operating distance (S_a)	0 ... 50	0 ... 50	0 ... 50	0 ... 50
Limit distance (S_g)	70	70	70	70
Transmission window (L)	60	220	75 / 50	60
Minimum distance from MDS to MDS	> 400	> 400	> 400	> 400

Selection and Ordering data

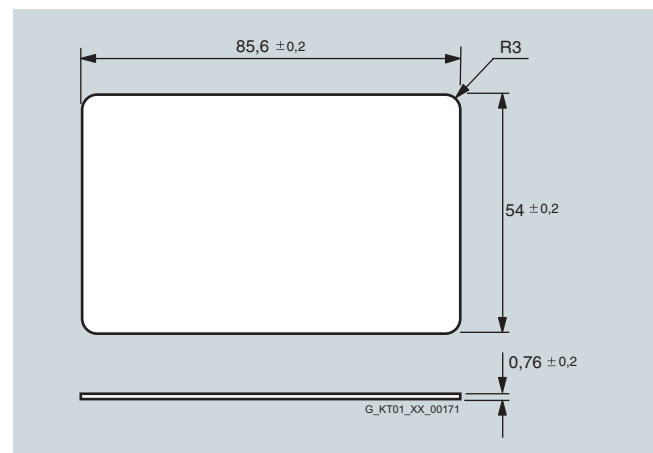
Order No.

MDS E600 mobile data storage unit	▶ A	6GT2 300-0AA00
Minimum order quantity: 50 units		
Accessories		
Fixing lug	▶ A	6GT2 390-0AA00
For MDS E600		
Fixing lug	▶	6GT2 190-0AB00
For MDS E600/E611		
Spacer	▶	6GT2 190-0AA00
For fixing lug, thickness 20 mm		

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



RFID system for production engineering

MOBY E mobile data storage units

MDS E611

Overview



Universal data memory (752 byte EEPROM) in credit card format (85 mm x 54 mm x 2.5 mm), degree of protection IP67, temperature range up to +85 °C and a max. read/write distance of 100 mm.

Technical specifications

MDS E611 mobile data storage unit	
Memory size	752 byte of EEPROM available
MTBF	2 500 000 h
Read cycles	Unlimited
Write cycles, min.	200 000
• at ≤ 40 °C, typical	> 1 000 000
Data retention time	> 10 years (at < +40 °C)
Read/write distance, max.	100 mm (see field data)
Memory organization	Byte-wise access (16-byte block organization internally)
Energy source	Inductive power transmission
Shock/vibration	50 g/20 g to EN 60721-3-7
Torsion and bending load	none
Mounting	Fixing lug/screws
Recommended distance to metal	> 20 mm
Degree of protection to EN 60529	IP67
Resistance to chemicals	See configuration manual
Enclosure	EPOXY card
• Dimensions (L x W x H) in mm	85.8 x 54.1 x 2.5
• Color/material	Anthracite/black/epoxy plate
Ambient temperature	
• Operation	-25 ... +75 °C
• Storage and transport	-40 ... +85 °C
Weight, approx.	21 g

Field data in mm

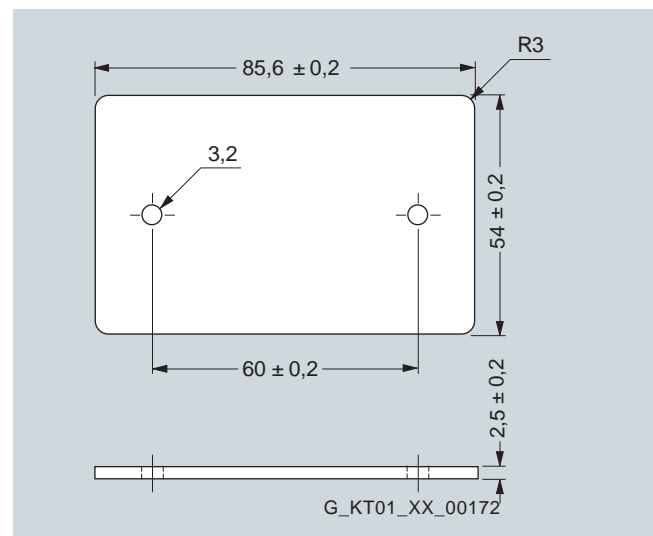
MDS E611 to:	SIM 70 with ANT 1 SLG 75 with ANT 1	SLG 75 with ANT 4	SLG 72/SIM 72	SLA 71
Operating distance (S_a)	20 ... 70	10 ... 70	20 ... 70	10 ... 70
Limit distance (S_g)	100	100	100	100
Transmission window (L)	80	250	90 / 60	80
Minimum distance from MDS to MDS	> 400	> 400	> 400	> 400

Selection and Ordering data

Order No.

MDS E600 mobile data storage unit	▶	6GT2 300-0BB00
Minimum order quantity: 50 units		
Accessories		
Fixing lug	▶	6GT2 190 0AB00
For MDS E600/E611		
Spacer	▶	6GT2 190-0AA00
For fixing lug, thickness 20 mm		
▶ Preferred type, available from stock.		

Dimensions



RFID system for production engineering

MOBY E mobile data storage units

MDS E623

Overview



Small data storage unit (Ø 10 mm x 4.5 mm, 752 byte EEPROM) specially designed for tool coding according to DIN 69873. It can be mounted flush in metal and can also be used in small workpiece holders.

Technical specifications

MDS E623 mobile data storage unit	
Memory size	752 byte of EEPROM available
MTBF	2 500 000 h
Read cycles	Unlimited
Write cycles, min.	200 000
• at ≤ 40 °C, typical	> 1 000 000
Data retention time	> 10 years (at < +40 °C)
Read/write distance, max.	6 mm (see field data)
Memory organization	Byte-oriented access (16-byte internal block organization)
Energy source	Inductive power transmission
Shock/vibration to EN 60721-3-7, Class 7 M3	100 g /20 g
Torsion and bending load	Not permissible
Fixing	Glue, e.g. UHU Plus endfest 300
Recommended distance from metal	Flush mounted
Degree of protection to	
• EN 60 529	IP67
• DIN EN 60529 / VDE 0470-1	IPX9K ¹⁾
Resistance to chemicals	See Configuration Manual
Housing	DIN pill
• Dimensions	Ø 10 mm x 4.5 mm to DIN 69873
• Color/material	Black/epoxy resin
Ambient temperature	
• During operation	-25 ... +85 °C
• During transportation and storage	-40 ... +100 °C
Weight, approx.	4 g

Field data in mm

MDS E623 to:	SIM 70 ANT 0, SLG 75 with ANT 18	SLG 75 with ANT 12
	Metal-free installation	
Operating distance (S_a)	0 ... 6	0 ... 4
Limit distance (S_g)	6	5
Transmission window (L)	4 (center deviation ±2)	8 (center deviation ±4)
	Flush-mounted in metal	
Operating distance (S_a)	0 ... 3.5	0 ... 3
Limit distance (S_g)	4	4
Transmission window (L)	3 (center deviation ±2)	4 (center deviation ±2)
Minimum distance from MDS to MDS	> 30	> 20

1) Extract:

Test equipment: Steam jet-air ejector 0 °C, 30 °C, 60 °C, 90 °C
 Water flow: 10 ... 15 l/min at 100 bar (75 °C)
 Distance: 10 ... 15 cm

Selection and Ordering data

Order No.

MDS E623
mobile data storage unit

6GT2 300-0CD00

Minimum order quantity: 10 units

▶ Preferred type, available from stock.

Dimensions



RFID system for production engineering

MOBY E mobile data storage units

MDS E624

Overview



Universal compact data memory (Ø 27 mm × 4 mm, 752 byte EEPROM) with degree of protection IP67/IP X9K 1), a temperature range of up to +125 °C and a max. read/write distance of 40 mm.

Technical specifications

MDS E624 mobile data storage unit	
Memory size	752 byte of EEPROM available
MTBF	2 500 000 h
Read cycles	Unlimited
Write cycles, min.	200 000
• at ≤ 40 °C, typical	> 1 000 000
Data retention time	> 10 years (at < +50 °C)
Read/write distance, max.	40 mm (see field data)
Memory organization	Byte-wise access (16-byte block organization internally)
Energy source	Inductive power transmission
Shock/vibration to EN 60721-3-7, Class 7 M3	100 g/20 g
Torsion and bending load	Not permissible
Mounting	Adhesive/M3 screws
Recommended distance to metal	> 20 mm
Degree of protection to	
• EN 60 529	IP67
• DIN EN 60529 / VDE 0470-1	IPX9K ¹⁾
Ex approval	ATEX Zone 2G
Resistance to chemicals	See configuration manual
Enclosure	Button
• Dimensions	Ø 27 mm x 4 mm
• Color/material	Black/epoxy resin
Ambient temperature	
• Operation	-25 ... +125 °C
• Storage and transport	-40 ... +150 °C
Weight, approx.	5 g

Field data in mm

MDS E624 to:	SIM 70 with ANT 0	SLG 75 with ANT 1	SLG 75 with ANT 4	SLG 75 with ANT 18	SIM 70 with ANT 1, SLA 71	SLG 72	SLG 75 with ANT 30
Operating distance (S_a)	0 ... 8	0 ... 25	0 ... 25	0 ... 8	0 ... 25	0 ... 30	0 ... 18
Limit distance (S_g)	15	40	35	15	40	40	24
Transmission window (L)	12	38	200	12	38	60	14
Minimum distance from MDS to MDS	> 50	> 250	> 250	> 50	> 250	> 250	> 60

1) Extract:

Test equipment: Steam emitter 0 °C, 30 °C, 60 °C, 90 °C
 Water flowrate: 10 ... 15 l/min with 100 bar (75°C)
 Spacing: 10 ... 15 cm

Selection and Ordering data

Order No.

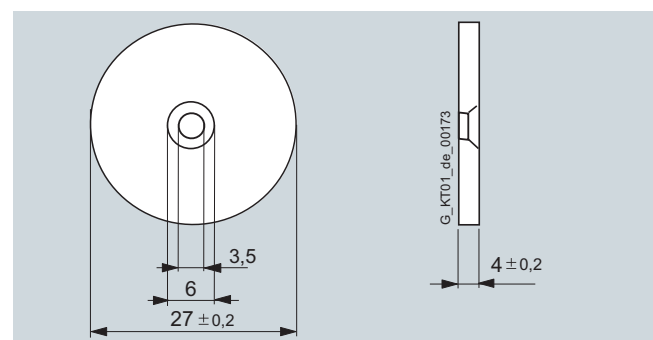
MDS E624
mobile data storage unit

▶ **6GT2 300-0CE00**

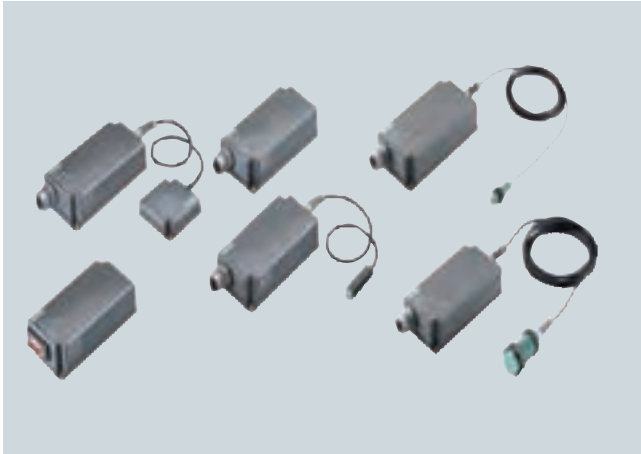
Minimum order quantity: 20 units

▶ Preferred type, available from stock.

Dimensions



Overview



The SLG/SIM ensures inductive communication and energy supply to the MDS and for the serial connection to various systems (SIMATIC, PC, etc.).

Various different SLGs/SIMs are available for small, medium and large distances to the MDS to satisfy specific customer requirements.

A rugged enclosure supports use under harsh industrial conditions and ensures high resistance to many chemical substances.

Type	Features
SIM 70 with ANT 0	<p>A read/write device with separate antenna optimized for use in small assembly lines (dimensions (mm) Ø 18 x 1 x 50)</p> <ul style="list-style-type: none"> • Max. read/write distance 15 mm • Degree of protection IP65 • Temperature range up to +70 °C • With RS 232/RS 422 interface for connection to PC/PLC
SIM 70 with ANT 1	<p>Universal read/write device with detached antenna (dimensions (mm) 75 x 75 x 20)</p> <ul style="list-style-type: none"> • Max. read/write distance 100 mm • Degree of protection IP65 • Temperature range up to +70 °C • With RS 232/RS 422 interface for connection to PC/PLC
SLA 71	<p>Universal low-cost, compact read/write antenna for connection to ASM 724/754 (dimensions (mm) 75 x 75 x 20)</p> <ul style="list-style-type: none"> • Max. read/write distance 100 mm • Degree of protection IP65 • Temperature range up to +70 °C

Type	Features
SLG 72	<p>Universal</p> <p>Universal read/write device with integrated antenna (dimensions (mm) 160 x 80 x 40)</p> <ul style="list-style-type: none"> • Max. read/write distance 100 mm • Degree of protection IP65 • Temperature range up to +70 °C • RS 422 interface for connection to ASM 475/473/452/456 ...
SIM 72	<p>Same as above but with RS 232/RS 422 interface for connection to PC/PLC</p>
SLG 75	<p>Read/write device with with connector for an external antenna, with RS 422 interface for connection to ASM 475/473/452/456 ...</p>
ANT 1	<p>Universal compact antenna (dimensions (mm) 75 x 75 x 20)</p> <ul style="list-style-type: none"> • Max. read/write distance 100 mm • Degree of protection IP65 • Temperature range up to +70 °C • Cable length 3 m
ANT 4	<p>Antenna for production systems and assembly lines (dimensions (mm) 320 x 80 x 30) For high speeds over a long transmission field</p> <ul style="list-style-type: none"> • Max. read/write distance 100 mm • Degree of protection IP65 • Temperature range up to +70 °C • Cable length 1 m, plugged in on electronics side
ANT 12	<p>Small antenna (dimensions (mm) Ø 12 x 1.5 x 40) for tool identification (with MDS E623)</p> <ul style="list-style-type: none"> • Max. read/write distance 5 mm • Degree of protection IP65 • Temperature range up to +70 °C • Cable length 3 m
ANT 18	<p>Universal compact antenna (dimensions (mm) Ø 18 x 1.5 x 58) for assembly lines with small workpiece holders</p> <ul style="list-style-type: none"> • Max. read/write distance 100 mm • Degree of protection IP65 • Temperature range up to +70 °C • Cable length 3 m
ANT 30	<p>Universal compact antenna (dimensions (mm) Ø 30 x 1.5 x 58) for assembly lines with small workpiece holders</p> <ul style="list-style-type: none"> • Max. read/write distance 24 mm • Degree of protection IP65 • Temperature range up to +70 °C • Cable length 3 m

RFID system for production engineering

MOBY E read/write devices

Introduction

Function

The SLG/SLA converts the commands (read MDS, etc.) received by the interface module (ASM) and generates via the antenna a magnetic alternating field for the contactless communication and transmission of power to the MDS. The transmittable volume of data between SLG/SLA/SIM and MDS depends on:

- the speed at which the MDS moves through the transmission window of the SLG/SLA
- the length of the transmission window

Failsafe protocols and access mechanisms achieve a high degree of data security and guarantee fast, secure and noise-resistant communication.

The SIM combines an ASM and an SLG in one rugged enclosure. It can be supplied with an RS 422/RS 232 interface so that it can be connected to any higher-level system:

- PC
- Computer
- Non-Siemens PLC

All SIM versions are operated with a 3964R procedure. The following C libraries are available on the "RFID Systems Software & Documentation" CD for quick and easy integration into the application:

- CCT32 (for Windows 95/NT 4.0), extended function range including password protection, access authorization and multitag recognition

Technical specifications

Field data

Minimum distance from SLG to SLG (antennas)		
SIM 70 with ANT 0	SIM 70 with ANT 0	> 125 mm
SIM 70 with ANT 1	SIM 70 with ANT 1	> 800 mm
SLG 72 / SIM 72	SLG 72/SIM 72	> 800 mm
SLG 75 with ANT 1	SLG 75 with ANT 1	> 800 mm
SLG 75 with ANT 4	SLG 75 with ANT 4	> 800 mm
SLG 75 with ANT 12	SLG 75 with ANT 12	> 80 mm
SLG 75 with ANT 18	SLG 75 with ANT 18	> 125 mm
SLG 75 with ANT 30	SLG 75 with ANT 30	> 200 mm

RFID system for production engineering

MOBY E read/write devices

SIM 70 with ANT 0

Overview



Optimized for use in small assembly lines, read/write device with detached antenna (dimensions (mm) $\varnothing 18 \times 1 \times 50$), max. read/write distance 15 mm, degree of protection IP65, temperature range up to +75 °C, with RS 232/RS 422 interface for connection to PC/PLC.

Selection and Ordering data

Order No.

SIM 70 with ANT 0 ▶ **6GT2 305-0AA00**

Accessories

RS 232 connecting cable ▶ A **6GT2 391-1DH50**

Between the PC and SIM 70, with connecting cable for DI/DO and 24 V connector, 5 m in length (the power supply must be ordered separately)

Connector for SIM 70 ▶ **6GT2 390-1AA00**

Degree of protection IP65, 15-pin sub D connector

CD "RFID Systems Software & Documentation" ▶ **6GT2 080-2AA10**

FB/FC for SIMATIC, 3964R driver for DOS/WINDOWS 95/NT/2000/XP, C libraries, PC presentation program. RFID documentation

A: Subject to export regulations AL = N and ECCN = EAR99H
▶ Preferred type, available from stock.

Technical specifications

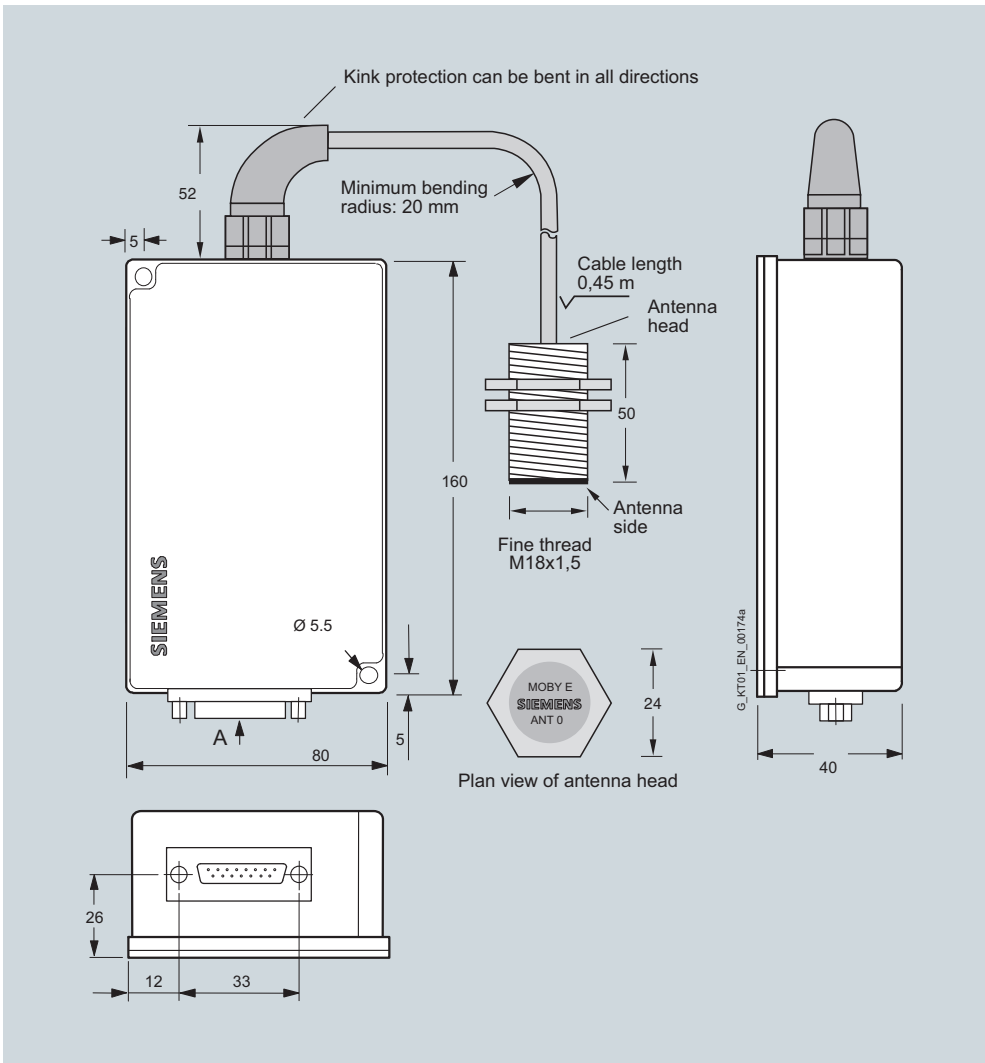
Read/write device	SIM 70 with ANT 0
Induct. interface to the MDS	Remote antenna
Read/write distance	max. 15 mm, see MDS field data
Transmission frequency (energy/data)	13.56 MHz
Serial interface	RS 232/RS 422 to PC/PLC
Max. cable length at 24 V DC	30 m (RS 232)
Connector	15-pin subminiature connector (pin)
Data transmission rate	9600 baud
Procedure	3964 R
Software functions	
• Programming	Dependent on PC/PLC etc.
• Available software (included on MOBY software CD)	C-library for PC CT32 (Windows 95/NT 4.0)
• Commands	Read, write, initialize MDS ..., multitag and password function
Digital input/output via 15-pin sub D connector	1/1, short-circuit proof
MTBF (at +25 °C)	2.5 x 10 ⁵ hours
Rated supply voltage value/permissible range	Via connectors 24 V DC / 12 ... 30 V DC
Power consumption (at room temperature)	
• Inrush current, momentary	Max. 700 mA
• During operation	typ. 180 mA
Enclosure	
• Dimensions in mm	
- For antenna head	M18 x 1.0 x 55
- For electronics without connector	160 x 80 x 40
• Color	
- Antenna/SLG housing	Anthracite/anthracite
• Material	
- Antenna/SIM/SLG housing	Krastin/PA 12
Degree of protection to EN 60529	
Enclosure/Antenna (front side)	IP65/IP67
Shock resistant to EN 60721-3-7	30 g, Class 7M2
Vibration resistant to EN 60721-3-7	1,5 g, Class 7M2
Attachment of enclosure	2 M5 screws
Attachment of the antenna	2 plastic nuts M18 x 5
Ambient temperature	
• During operation	-25 ... +75 °C
• During transportation and storage	-40 ... +85 °C
Weight, approx.	0.51 kg

RFID system for production engineering

MOBY E read/write devices

SIM 70 with ANT 0

Dimensions



SIM 70 with antenna ANT 0

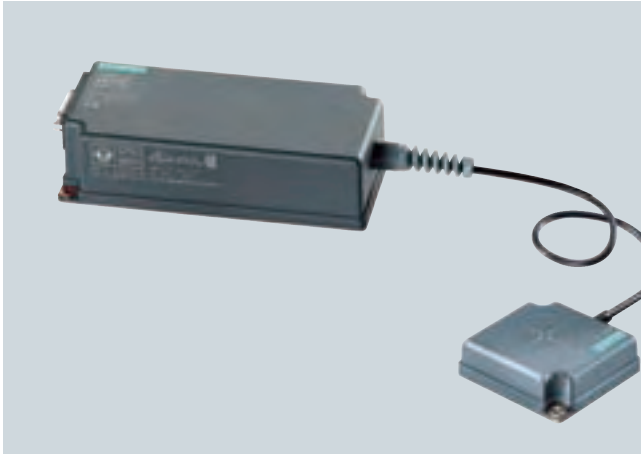
5

RFID system for production engineering

MOBY E read/write devices

SIM 70 with ANT 1

Overview



Universal read/write device with detached antenna (dimensions (mm) 75 × 75 × 20), max. read/write distance 100 mm, degree of protection IP65, temperature range up to +75 °C, with RS 232/RS 422 interface for connection to PC/PLC.

Selection and Ordering data

Order No.

Read/write device SIM 70 with ANT 1 ▶ **6GT2 305-0AB00**

Accessories

RS 232 connecting cable ▶ A **6GT2 391-1DH50**

Between the PC and SIM 70, with connecting cable for DI/DO and 24 V connector, 5 m in length (the power supply must be ordered separately)

Connector for SIM 70 ▶ **6GT2 390-1AA00**

Degree of protection IP65, 15-pin sub D connector

CD "RFID Systems Software & Documentation" ▶ **6GT2 080-2AA10**

FB/FC for SIMATIC, 3964R driver for DOS/WINDOWS 95/NT/2000/XP, C libraries, PC presentation program, RFID documentation (German + English)

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Technical specifications

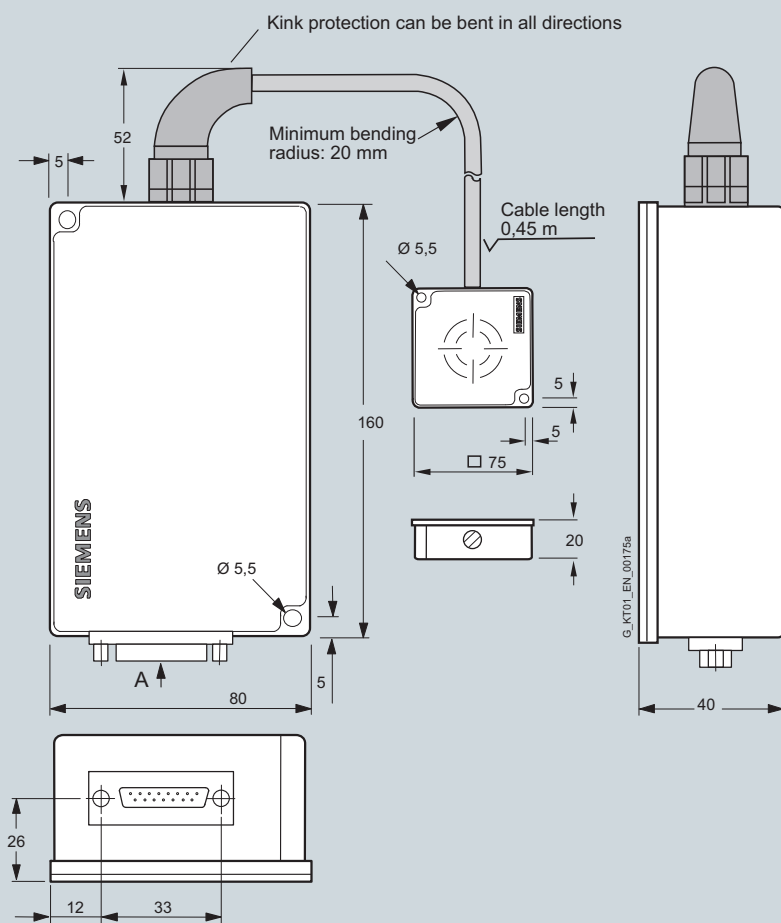
Read/write device	SIM 70 with ANT 1
Inductive interface to the MDS	Remote antenna
Read/write distance	max. 100 mm, see MDS field data
Transmission frequency (energy/data)	13.56 MHz
Serial interface	RS 232/RS 422 to PC/PLC
Max. cable length at 24 V DC	30 m (RS 232)
Connector	15-pin subminiature connector (pin)
Data transmission rate	9600 baud
Procedure	3964 R
Software functions	<ul style="list-style-type: none"> • Programming • Available software (included on MOBY software CD) • Commands
Digital input/output via 15-pin sub D connector	1/1, short-circuit proof
MTBF (at +25 °C)	2.5 × 10 ⁵ hours
Rated supply voltage value/permissible range	Via connectors 24 V DC / 12 ... 30 V DC
Current input (at room temperature)	<ul style="list-style-type: none"> • Inrush current, momentary • Operation
Enclosure	<ul style="list-style-type: none"> • Dimensions in mm - for antenna head - for electronics without connector • Color - antenna/SLG housing • Material - antenna/SIM/SLG housing
Degree of protection to EN 60529	IP67/IP67
Enclosure/antenna (front side)	IP67/IP67
Shock resistant to EN 60721-3-7	30 g, Class 7M2
Vibration resistant to EN 60721-3-7	1,5 g, Class 7M2
Attachment of enclosure	2 x M5 screws
Attachment of the antenna	2 x M5 screws
Ambient temperature	<ul style="list-style-type: none"> • Operation • Storage and transport
Weight, approx.	0.62 kg

RFID system for production engineering

MOBY E read/write devices

SIM 70 with ANT 1

Dimensions



SIM 70 with antenna ANT 1

Overview



SLG 72

Universal read/write device with integral antenna (dimensions (mm) 160 x 80 x 40), max. read/write distance 100 mm, degree of protection IP65, temperature range up to +75 °C

SIM 72

Like the SLG 72, but with RS 232/RS 422 interface for connection to PC/PLC.

Technical specifications

Read/write device	SLG 72	SIM 72
Inductive interface to the MDS		
Read/write distance	max. 100 mm, see MDS field data	
Transmission frequency (energy/data)	13.56 MHz	
Serial interface	RS 422 to ASM	RS 232/RS 422
Max. cable length at 24 V DC	1000 m (ASM-SLG)	30 m (RS 232)
Connector	6-pin SLG connector to DIN 43651	15-pin subminiature connector (pin)
Data transmission rate	19200 baud	9600 baud
Procedure	MOBY I procedure	3964 R
Software functions		Dependent on PC, PLC etc.
<ul style="list-style-type: none"> • Programming • Available software (included on MOBY software CD) 	See ASM and associated S5/S7 – FB/FC	C-library for PC CCT32 (Windows 95/NT 4.0)
<ul style="list-style-type: none"> • Commands 	Read, write, initialize MDS ..., Multitag and password function	
Digital input/output via 15-pin sub-D connector	-	1/1, short-circuit proof
MTBF (at +25 °C)	2.5 x 10 ⁵ hours	
Rated supply voltage value/permissible range	Via connectors 24 V DC / 20 ... 30 V DC	Via connectors 24 V DC / 12 ... 30 V DC
Current input (at room temperature)		
<ul style="list-style-type: none"> • Inrush current, momentary • Operating (24 V DC) 	Max. 700 mA Typ. 180 mA	Max. 700 mA Typ. 180 mA without DO
Enclosure		
<ul style="list-style-type: none"> • Dimensions in mm • Color • Material 	160 x 80 x 40 Anthracite PA 12	
Degree of protection to EM 60529	IP65	
Shock resistant to EN 60721-3-7	30 g, Class 7M2	
Vibration resistant to EN 60721-3-7	1.5 g, Class 7M2	
Attachment of enclosure	2 x M5 screws	
Ambient temperature		
<ul style="list-style-type: none"> • Operation 	-25 ... +75 °C	
Weight, approx.	0.55 kg	

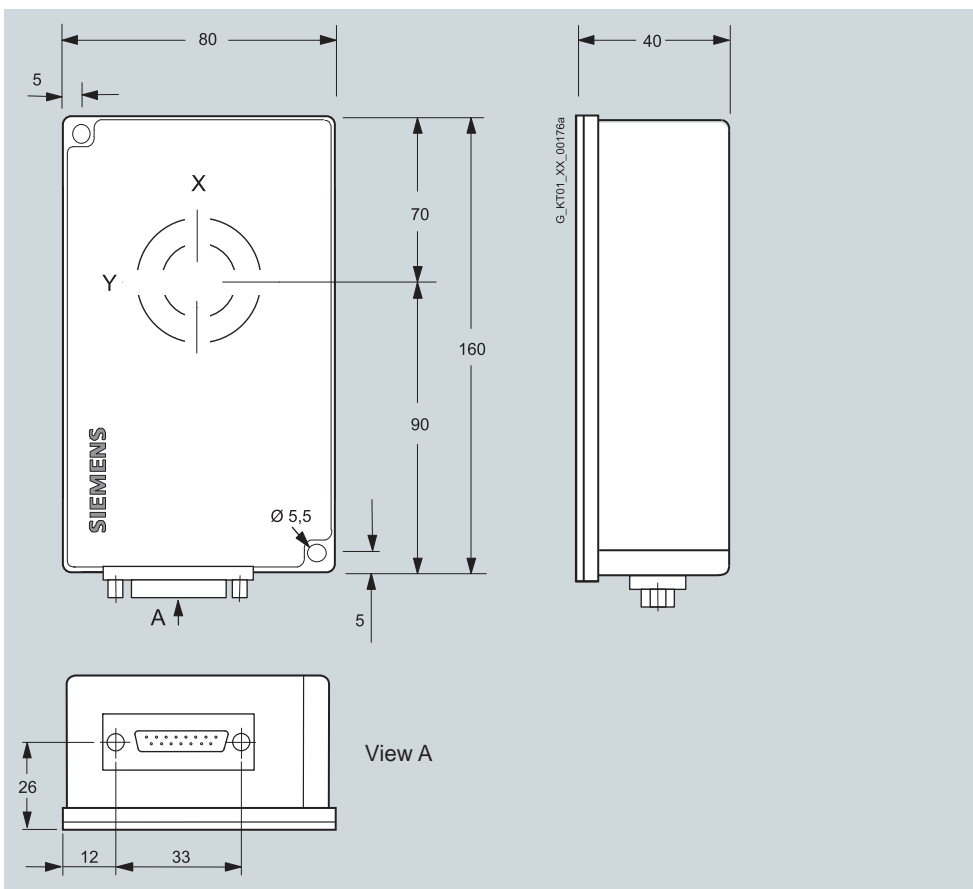
RFID system for production engineering

MOBY E read/write devices

SLG 72/SIM 72

Selection and Ordering data	Order No.	Order No.
SLG 72 ▶ With integrated antenna for connection to a communication module	6GT2 301-0CA00	
SIM 72 ▶ With integrated antenna for connection to a PC/PLC	6GT2 305-0CA00	
Accessories		
RS 232 connecting cable ▶ A Between the PC and SIM 72, with connecting cable for DI/DO and 24 V connector, 5 m in length (the power supply must be ordered separately)	6GT2 391-1DH50	
Connector for SIM 72 ▶ Degree of protection IP65, 15-pin Sub-D connector	6GT2 390-1AA00	
Connector on SLG side (MOBY E, U) 6-pin DIN 43651 connector with female contacts for crimping		
<ul style="list-style-type: none"> • with angled output, 1 piece ▶ A 6GT2 090-0BA00 • with angled output, 1 packaging unit ▶ A 6GT2 090-0BA10 (10 pieces, price per piece) • with straight output, 1 piece ▶ A 6GT2 090-0UA00 		
		SLG cable Without connector between ASM and SLG; 6 x 0.25 mm ² <ul style="list-style-type: none"> • 50 m ▶ A 6GT2 090-0AN50 • 120 m ▶ A 6GT2 090-0AT12 • 800 m A 6GT2 090-0AT80
		CD "RFID Systems Software & Documentation" ▶ FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC demonstration program. RFID documentation (German + English)
		A: Subject to export regulations AL = N and ECCN = EAR99H ▶ Preferred type, available from stock.

Dimensions



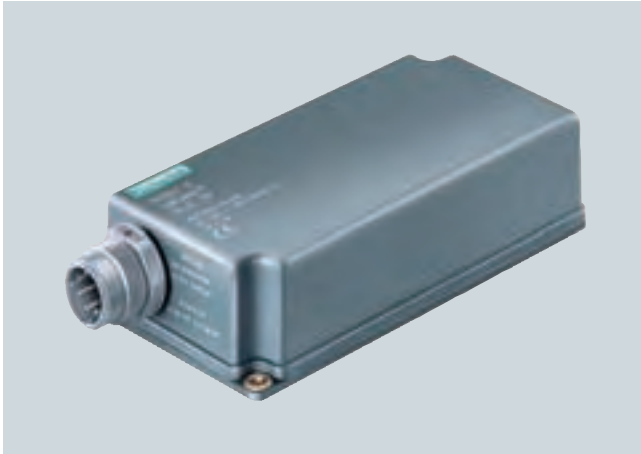
SIM 72 with integrated antenna

RFID system for production engineering

MOBY E read/write devices

SLG 75 with ANT x

Overview



Read/write device with RS 422 interface for connection to ASM, with connector for an external antenna:

- ANT 1, universal compact antenna (dimensions (mm) 75 x 75 x 20)
- ANT 4, for production plants and assembly lines. Due to the long transmission field, high speeds are possible. Dimensions (mm) 320 x 80 x 30
- ANT 12, small antenna (dimensions (mm) \varnothing 12 x 1.5 x 40) for tool identification (with MDS E623)
- ANT 18, universal compact antenna (dimensions (mm) \varnothing 18 x 1.5 x 58) for assembly lines with small workpiece holders
- ANT 30, universal compact antenna (dimensions (mm) \varnothing 30 x 1.5 x 58) for assembly lines with small workpiece holders

Technical specifications

Read/write device	SLG 75 with ANT x
Interface to remote antennas	ANT 1, ANT 4, ANT 12, ANT 18 or ANT 30
Connector	4-pin (socket)
Serial interface	RS 422 to ASM
Max. cable length at 24 V DC	1000 m (ASM-SLG)
Connector	6-pin SLG-connector to DIN 43651 (pin on device side)
Transmission rate	19200 baud
Procedure	MOBY I procedure
Software functions	
• Programming	See ASM and associated S5/S7 – FB/FC
• Commands	Read, write, initialize MDS ...
MTBF (at +25 °C)	2.5 x 10 ⁵ hours
Rated supply voltage value/permissible range	Via connectors 24 V DC / 20 ... 30 V DC
Power consumption (at room temperature)	
• Inrush current, momentary	max. 700 mA
• Operation	typ. 180 mA
Housing	
• Dimensions for electronics without connector (in mm)	160 x 80 x 40
• Color	Anthracite
• Material	PA 12
Degree of protection as per EN 60529	IP65
Shock-resistant to EN 60721-3-7, Class 7M2	30 g
Vibration-resistant to EN 60721-3-7, Class 7M2	1.5 g, 200 ... 500 Hz
Attachment of enclosure	2 x M5 screws
Ambient temperature	
• Operating	-25 ... +70 °C
• During transportation and storage	-40 ... +85 °C
Weight, approx.	0.52 kg

Antenna	ANT 1	ANT 4	ANT 12	ANT 18	ANT 30
Inductive interface to the MDS	13.56 MHz				
Max. read/write distance ANT-MDS (S _g)	100 mm		5 mm	15 mm	24 mm
Interface to SLG 75					
Plug connection	4-pin (pins on antenna side)				
Antenna cable length (cannot be changed)	3 m	1 m	3 m		
Enclosure dimensions in mm	75 x 75 x 20 (L x W x H)	320 x 80 x 30 (L x W x H)	M12 x 1.0 x 40 (\varnothing x thread x L)	M18 x 1.0 x 55 (\varnothing x thread x L)	M30 x 1.5 x 58 (\varnothing x thread x L)
Color	Anthracite		Pale turquoise		
Material	Plastic PA 12		Plastic Krastin		
Degree of protection as per EN 60 529	IP67		IP67 (front)		
Shock-resistant to EN 60 721-3-7, Class 7M2	50 g maximum value, no continuous load				
Vibration-resistant to EN 60 721-3-7, Class 7M2	20 g (3 ... 500 Hz) maximum value, no continuous load				
Ambient temperature					
• in operation	- 25 ... + 70 °C				
• During transportation and storage	- 40 ... + 85 °C				
MTBF (at 40 °C)	2.5 x 10 ⁵ hours				
Weight, approx.	80 g	950 g	45 g	120 g	150 g

RFID system for production engineering

MOBY E read/write devices

SLG 75 with ANT x

Field data SLG 75 with antenna

SLG 75	ANT 1	ANT 4	ANT 12	ANT 18	ANT 30
Operating distance (S_a), MDS-dependent	0 ... 70 mm	0 ... 70 mm	0 ... 4 mm	0 ... 8 mm	0 ... 18 mm
Limit distance (S_g), MDS-dependent	100 mm	100 mm	5 mm	15 mm	24 mm
Transmission window	MDS-dependent	MDS-dependent	Ø 8 mm	MDS-dependent	Ø 14 mm
Minimum distance from SLG to SLG (D)	> 800 mm	> 800 mm	> 80 mm	> 125 mm	> 200 mm

Selection and Ordering data

Selection and Ordering data	Order No.	Order No.
SLG 75 ▶	6GT2 398-1AF00	
Without antenna		
Antenna ANT 1 ▶	6GT2 398-1CB00	
For SLG 75		
Antenna ANT 4 ▶ A	6GT2 398-1CE00	
For SLG 75		
Antenna ANT 12 ▶	6GT2 398-1CC00	
For SLG 75		
Antenna ANT 18 ▶	6GT2 398-1CA00	
For SLG 75		
Antenna ANT 30 ▶	6GT2 398-1CD00	
For SLG 75		
SLG cable		
Without connector between ASM and SLG; 6 x 0.25 mm ²		
• 50 m ▶ A		6GT2 090-0AN50
• 120 m ▶ A		6GT2 090-0AT12
• 800 m A		6GT2 090-0AT80
CD "RFID Systems Software & Documentation" ▶		6GT2 080-2AA10
FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC demonstration program. RFID documentation		

A: Subject to export regulations AL = N and ECCN = EAR99H
▶ Preferred type, available from stock.

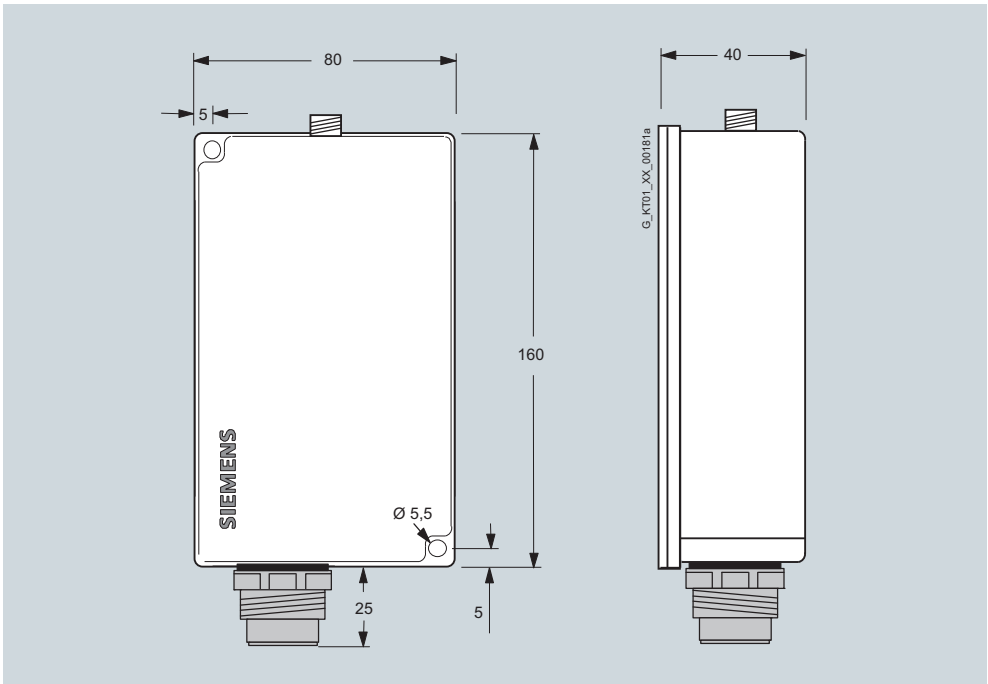
Accessories

Connector on SLG side (MOBY E, U)

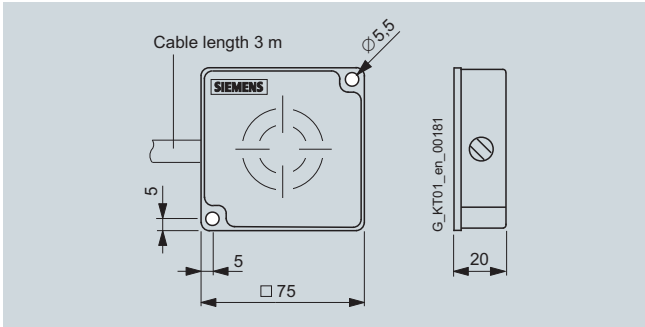
6-pin DIN 43651 connector with female contacts for crimping

- with angled output, 1 piece ▶ A **6GT2 090-0BA00**
- with angled output, 1 packaging unit (10 pieces, price per piece) ▶ A **6GT2 090-0BA10**
- with straight output, 1 piece ▶ A **6GT2 090-0UA00**

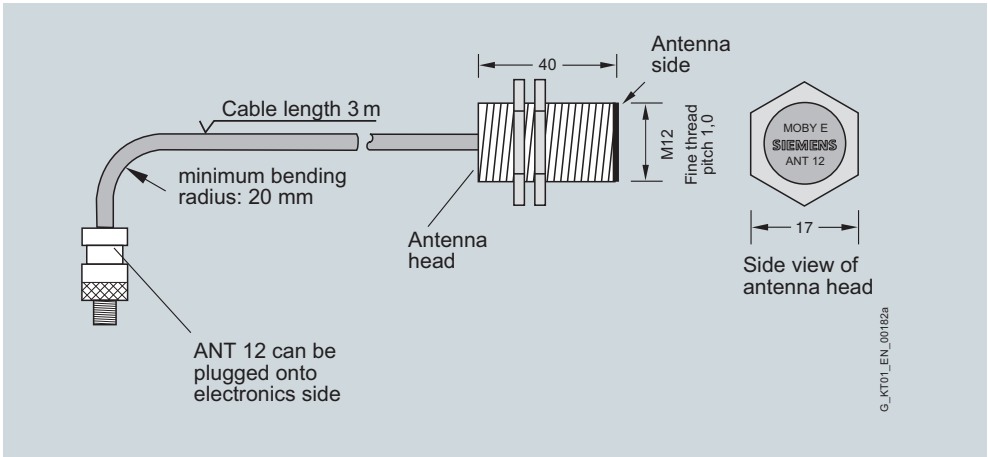
Dimensions



Read/write device SLG 75 without antenna



ANT 1 antenna

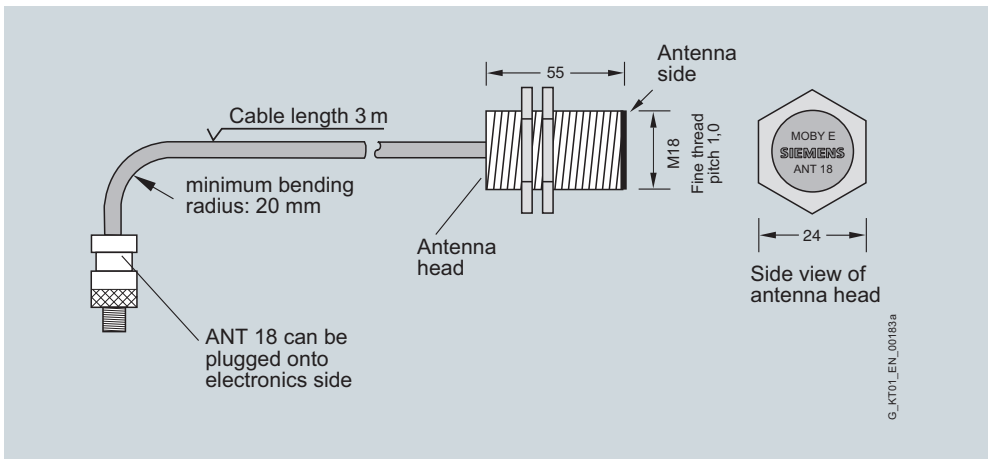


ANT 12 antenna

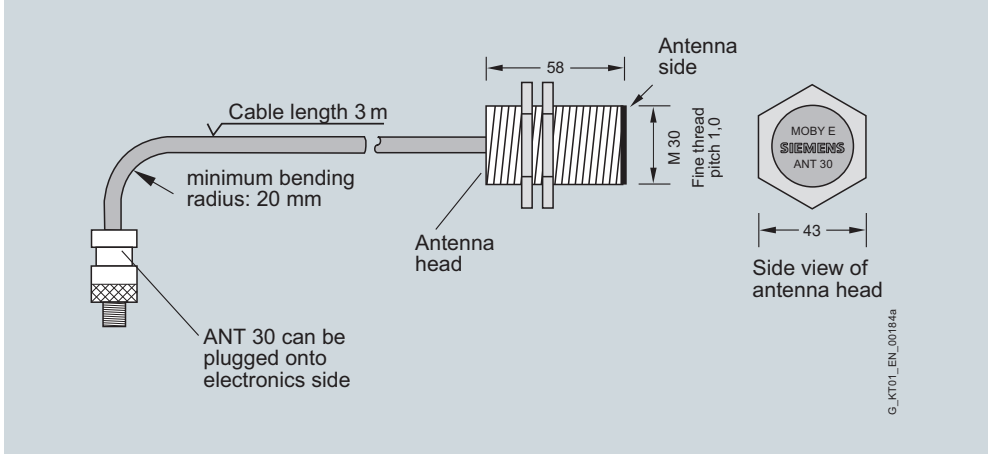
RFID system for production engineering

MOBY E read/write devices

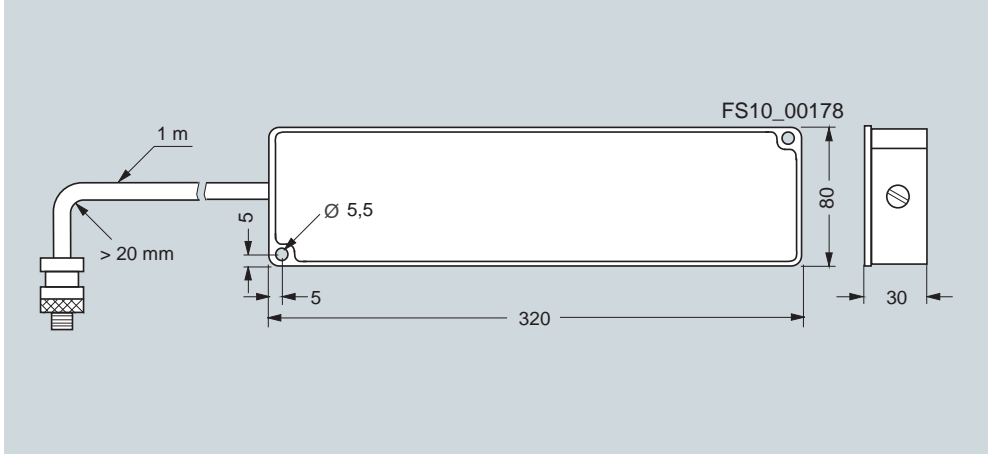
SLG 75 with ANT x



ANT 18 antenna



ANT 30 antenna



ANT 4 antenna

5

Overview



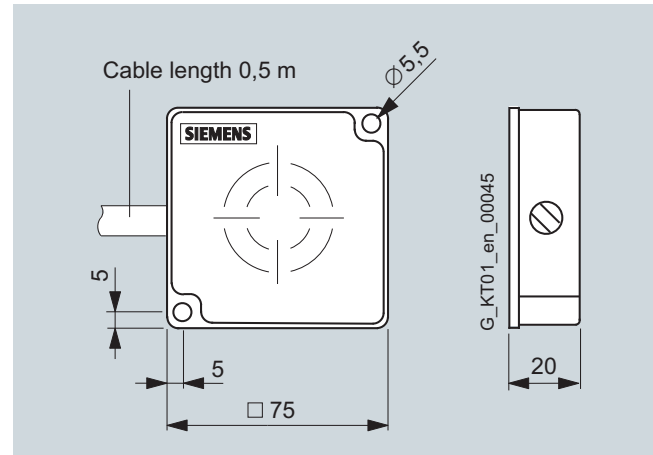
The SLA 71 is a low-cost and compact MOBY E read/write antenna with a maximum read/write distance of 100 mm. The SLA 71 is connected to the interface modules ASM 724 or ASM 754 by means of an additional connecting cable (5 m). The maximum cable length between SLA 71 and ASM can be extended to 55 m by means of two 25 m extension cables.

Due to the compact design and the high degree of protection (IP65), the SLA 71 can be used universally.

Technical specifications

Read/write antenna	SLA 71
Inductive interface to the MDS	
Data transmission frequency (energy/data)	13.56 MHz
Read/write distance to MDS, max.	100 mm (see field data under "Read/write Devices")
Serial interface, connectable to	ASM 724/754
Max. cable length to SLA 71	55 m
Plug connection	0.5 m cable with 8-pin M12 connector (pin on device side); 5 m connecting cable 6GT2391-1AH50 required
Software functions	See ASM page 5/128
Power supply	Via ASM
Enclosure	
• Dimensions (W x H x D) in mm	75 x 75 x 20
• Color	Anthracite
• Material	PA12
Degree of protection to EN 60 529	IP65
MTBF (at 40 °C)	1 x 10 ⁵ hours
Mounting	2 x M5 screws
Ambient temperature	
• Operation	-25 ... + 70 °C
• Storage and transport	-40 ... +85 °C
Weight, approx.	0.15 kg

Dimensions



Selection and Ordering data

Order No.

SLA 71	6GT2 301-2BB00
Read/write antenna	
Accessories	
Extension connecting cable	
For antenna cable	
10 m	▶ 6GT2 391-1BN10
25 m	▶ 6GT2 391-1BN25
CD "RFID Systems Software & Documentation"	▶ 6GT2 080-2AA10
FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program RFID documentation	

▶ Preferred type, available from stock.

RFID system for production engineering

MOBY E read/write devices

STG E mobile hand-held terminal

Overview



The STG E is a powerful mobile hand-held terminal with integral read/write antenna for applications in the field of production logistics, distribution and service. In addition, it is an indispensable tool for commissioning and testing.

Design

The STG E mobile hand-held terminal consists of one basic unit (Basis PSION Workabout PRO) and a removable compact read/write head. It has a splashwater-proof enclosure (IP54), LCD color monitor 1/4 VGA, 320 x 240 pixels, TFT portrait format, alphanumeric keyboard and various interfaces (for SD memory card, charging batteries, USB, Bluetooth, etc.).

Function

The pre-installed MOBY software provides service and test functions for reading, writing, etc. of the MOBY data memory:

- Reading data from the data memory
- Writing data to the data memory
- Reading and displaying the ID number of the data memory (to the extent available)
- Displaying and editing the data in hexadecimal, ASCII, decimal and binary formats
- Activate/deactivate password

User applications that were developed for the predecessor model Workabout MX can be transferred to this terminal with little effort. For this purpose, various optional development tools for the PC are available directly from PSION. This is opening up new applications in the field of logistics and distribution, for example, the hand-held terminal enables commissioning data to be recorded or processed offline and forwarded to the PC/computer with a time delay.

Technical specifications

STG E mobile hand-held terminal	
Processor	400 MHz Intel Xscale PXA255
Operating system	Microsoft Windows CE .NET 4.20
RAM/Flash EEPROM memory	128 MB/32 MB
User program	MOBY standard application
Screen	TFT color touch display, 1/4 VGA 320 x 240 (portrait format); adjustable backlighting
Keyboard	alphanumeric
Sound	Piezo signal transmitter
Power supply	<ul style="list-style-type: none"> • Lithium-ion battery (3.7 V; 3000 mAh) • Quick charging possible (automatic shut-off) or 3 x 1.5 V type AA • Backup battery: 3 V ML 2032 lithium cell
Interfaces	<ul style="list-style-type: none"> • LIF interface (low insertion force interface) for battery charging and communication with the PC using a docking and loading station (USB) • CF interface for expansion cards (e.g. WLAN)
Dimensions	305 x 90 x 44 [mm]
Weight (incl. battery)	Approx. 0.5 kg
Ambient temperature	<ul style="list-style-type: none"> • During operation -10 ... +50 °C • Storage (without batteries) -25 ... +60 °C
Relative humidity, non-condensing	5 ... 90%
Degree of protection	IP54 (splashwater proof)
EMC	EN 55022, EN 55024

Integral read/write head, inductive interface to MDS

Read/write distance to MDS	up to 30 mm, depending on MDS
Energy/data transmission frequency	13.56 MHz
Serial interface (to basic unit)	TTL, 3964R protocol
Functionality of the SW application	Standard user interface for reading/writing of data memories, etc.

RFID system for production engineering

MOBY E read/write devices

STG E mobile hand-held terminal

Selection and Ordering data	Order No.
STG E mobile hand-held terminal with MOBY E read/write head ▶ D Basic unit (PSION Workabout PRO) with MOBY E read/write, battery, standard software pre-installed, without loading/docking station	6GT2 303-0AA10
Accessories	
Loading/docking station ▶ A For a mobile hand-held terminal as well as a spare battery, incl. wide-range plug-in power supply 100 ... 240 V AC and country-specific adapters as well as USB cable	6GT2 898-0BA00
MOBY E read/write head ▶ A For basic unit (PSION Workabout mx and PSION Workabout PRO)	6GT2 303-1AA00
Basic unit ▶ D Basic unit (PSION Workabout PRO) with adapter for MOBY RFID read/write heads	6GT2 003-0AA10
Spare battery ▶ A For basic unit (PSION Workabout PRO), High Capacity 3000 mAh, Li-ion	6GT2 898-0CA00
"RFID Systems Software & Documentation" CD ▶ FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program. MOBY documentation	6GT2 080-2AA10

A: Subject to export regulations AL = N and ECCN = EAR99H

D: Subject to export regulations AL = N and ECCN = 4A994X

▶ Preferred type, available from stock.

For optional components, please visit

<http://www.pSIONteklogix.com>

For example:

- SD expansion cards
- Handles, belt loops
- Vehicle holder with charging function

RFID system for production engineering

MOBY E read/write devices

Configuring instructions

Overview

Note

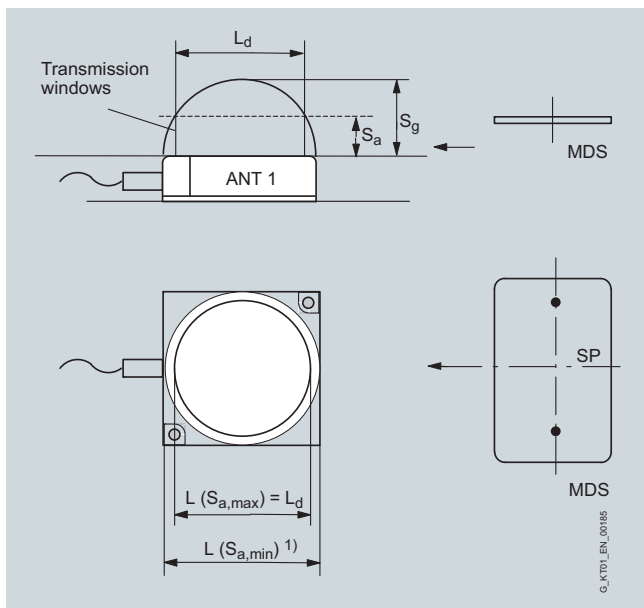
Detailed configuration and commissioning data is contained in the "Manual for Configuration, Assembly and Service".

Transmission window

The read/write device generates an inductive alternating field. The field is at its strongest near the SLG and declines rapidly as the distance from the SLG increases. The distribution of the field depends on the structure and geometry of the antennas in the read/write device and MDS.

A prerequisite for the function of the MDS is a minimum field strength at the MDS that is achieved at a distance S_g from the read/write device.

The picture below shows the transmission window between MDS and SLG:



S_a : Operating distance between MDS and SLG

S_g : Limit distance (maximum clear distance between upper surface of SLG and MDS at which transmission can still function under normal conditions)

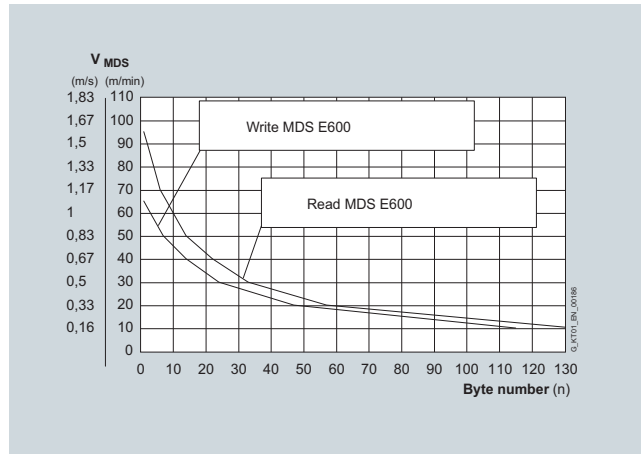
L : Length of a transmission window

SP: Intersection of the axes of symmetry of the MDS

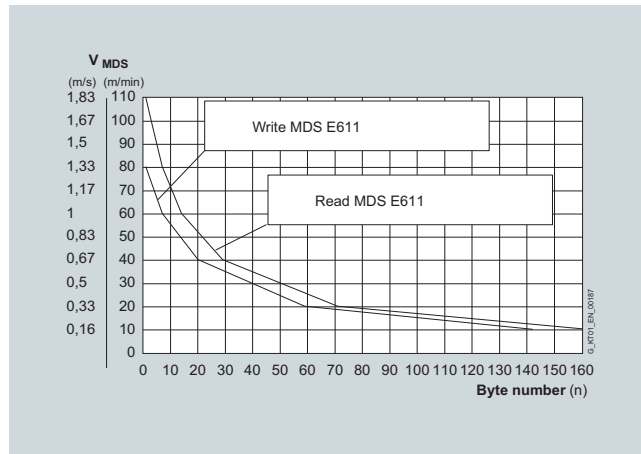
The active field for the MDS consists of a circle (see plan view). The MDS can be used as soon as the intersection of the MDS enters the circle of the transmission window. The direction of movement and rotation of the MDS has no effect.

Representation of speed relative to data quantity

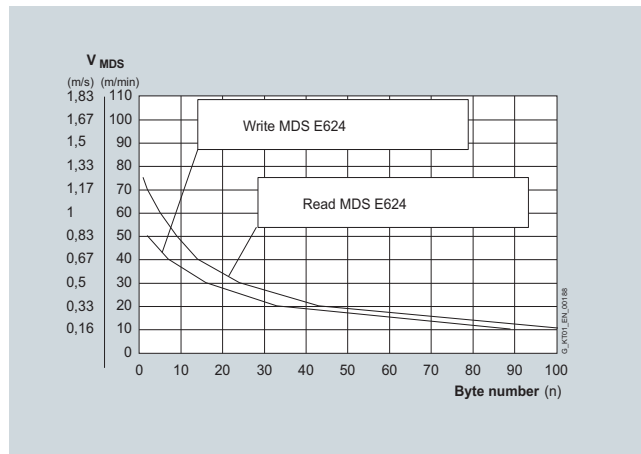
The characteristics shown here should make it easier to pre-select the MOBY E components MDS and SLG for dynamic use. The characteristics apply for operation within the transmission window (L) and the operating distance (S_a).



SLG 75 ANT 1/SLA 71/SLG 72 with MDS E600



SLG 75 ANT 1/SLG 72 with MDS E611

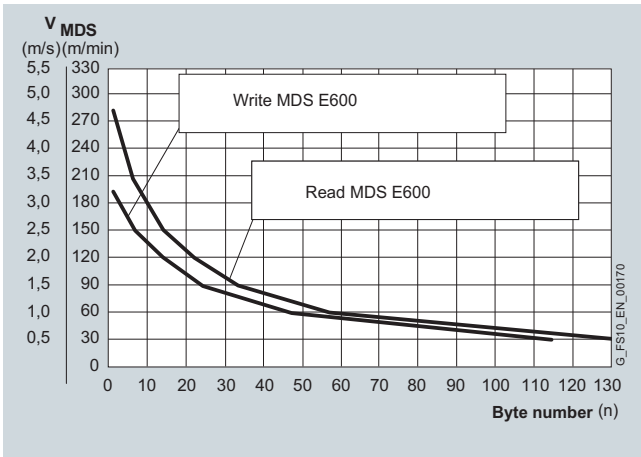


SLG 75 ANT 1/SLG 72 with MDS E624

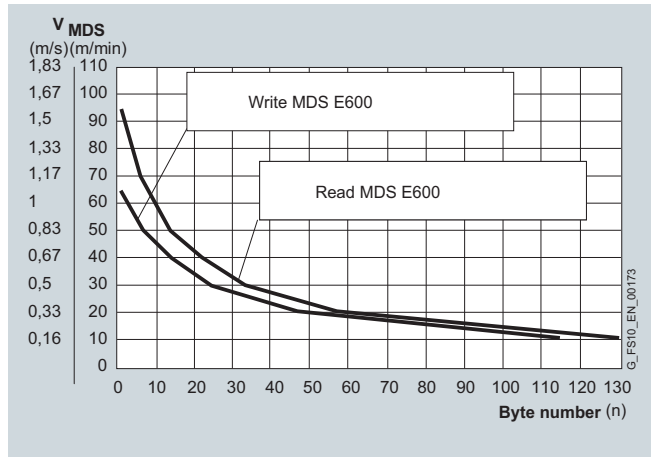
Read transmission time of the ID number

Type	Size of ID number	Read ID no.
MDS E6xx	4 byte	20 ms

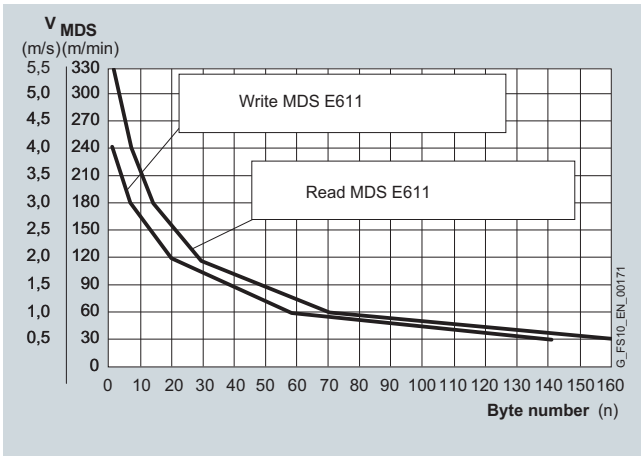
Configuring instructions



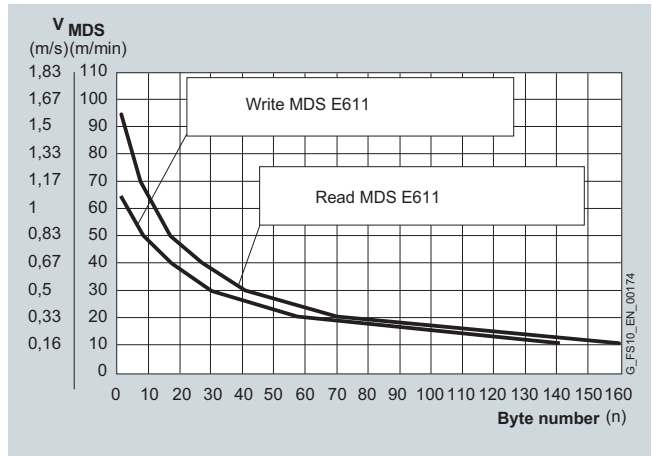
SLG 75 ANT 4 with MDS E600



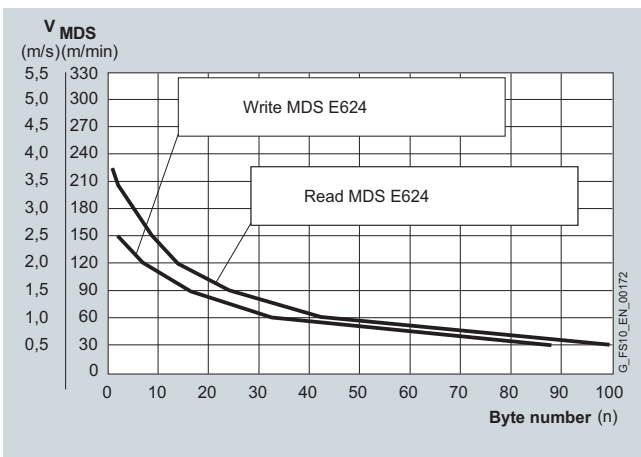
SLG 72 with MDS E600



SLG 75 ANT 4 with MDS E611



SLG 72 with MDS E611



SLG 75 ANT 4 with MDS E624

RFID system for production engineering

SIMATIC RF300

Introduction

Overview



SIMATIC RF 300 is a non-contact identification system specially designed for use in industrial production for the control and optimization of the material flow. Thanks to its compact modular structure, it is particularly suited for small assembly lines and conveyor systems with restricted space for installation. The rugged components feature an attractive price/performance ratio.

Depending on the demands on the identification system, two versions of the system are available:

- A particularly economical solution with a link to SIMATIC S7-300 over the IQ-Sense interface for low requirements in terms of speed and data volume
- Read/write devices for high demands in terms of speed and data volume for connection to SIMATIC, PROFIBUS, PROFINET or PC or non-Siemens controllers

The SIMATIC RF300 identification system boasts the following features:

- 13.56 MHz operating frequency
- Passive (without battery) transponders (tags)
- Rugged, compact components
- Very high immunity to noise
- Extensive diagnostic functions
- Extremely fast data transmission
- Simple integration into SIMATIC, PROFIBUS DP and PROFINET

Benefits

Minimization of commissioning time by direct connection of system to SIMATIC S7-300, PROFIBUS, PROFINET and non-Siemens PLC or PC.

Minimization of downtimes thanks to:

- Fault-resistant data transmission
- Specific diagnostics information
- High data security under critical operating conditions

High-speed data processing thanks to high data transfer rates on the "air interface".

SIMATIC RF300 records the data of objects quickly and reliably. SIMATIC RF300 thereby ensures effective and cost-effective automation.

Application

The RFID system SIMATIC RF300 is used primarily for contact-free identification of containers, pallets and workpiece holders in a closed production cycle. This means that the data carriers (transponders, tags) remain in the production chain and are not shipped out with the products. Thanks to the compact enclosure dimensions of the transponders as well as of the read/write devices, SIMATIC RF300 is particularly suitable for (small) assembly lines where space is at a premium.

The main application areas of SIMATIC RF300 are:

- Assembly and handling systems, assembly lines (identification of workpiece carriers)
- Production logistics (material flow control, identification of containers and other vessels)
- Parts identification (e.g. transponder is attached to product or pallet)
- Conveyor systems (e.g. overhead monorail conveyors)

Function

The MOBY and SIMATIC RF300 RFID systems ensure that highly-informative data accompany a product right from the start.

Tags

Tags ("electronic delivery notes") are used in place of barcodes and contain all production-specific data in addition to the product number. Up to 64 KB of user data can be stored and managed in this way. Enough to enable quality data to be stored as well.

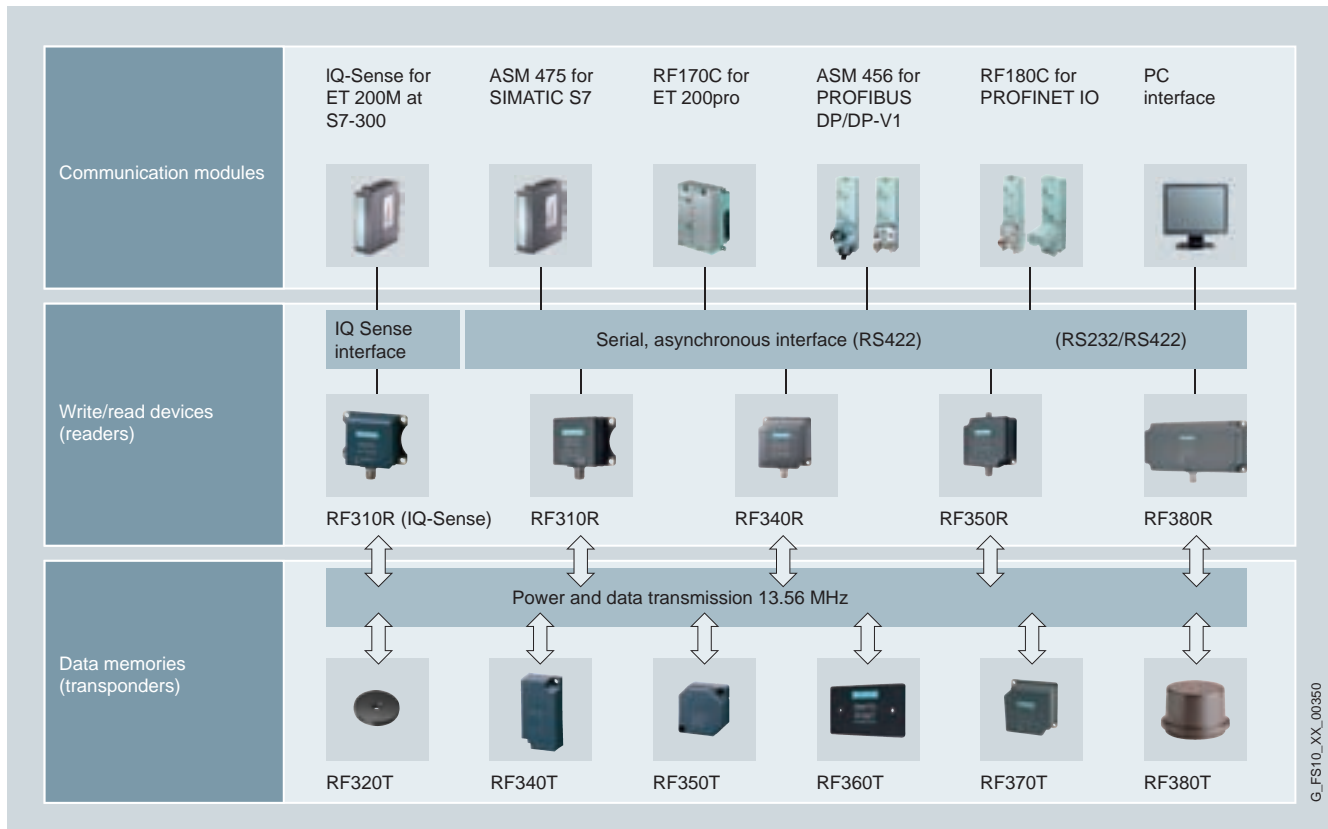
Read/write devices

Using stationary as well as mobile read/write devices, the necessary information (production data, transport routes, etc.) can be read from the tag without contact (inductively) and can even be added to or modified without the need for a direct line-of-sight link.

Communication modules

Communication modules integrate SIMATIC RF300 RFID systems into the automation world. For this purpose, a broad spectrum of communication modules is available for simple system integration into the SIMATIC S7 as well as into the PROFIBUS, PROFINET or Ethernet networks.

Integration



Technical specifications

Type	Contactless, inductive RF identification system for industrial applications
Transmission frequency data/energy	13.56 MHz
Memory capacity	<ul style="list-style-type: none"> • 20 byte ... 64 KB user memory (r/w) • 4 byte fixed code as serial number (ro)
Memory type	EEPROM / FRAM
Write cycles	> 1000000 (at 40 °C)
• EEPROM	unlimited
• FRAM	
Read cycles	unlimited
Data management	Byte-oriented access
Data transfer rate, reader tag	max. 7 KByte/s, typ. 3 KByte/s (IQ sense: 50 byte/s)
Read/write distance (system limit)	up to 0.15 m
Operating temperature range	
• Read/write device (reader)	-25 ... +70 °C
• Mobile data storage units (tags)	-25 ... +125 °C (+220 °C cyclic)
Degree of protection	
• Read/write device (reader)	up to IP67
• Mobile data storage units (tags)	up to IPX9K/IP68

Type	Contactless, inductive RF identification system for industrial applications
Can be connected to	<ul style="list-style-type: none"> • SIMATIC S7-300 • PROFIBUS DP V1 • PROFINET • PC • Non-Siemens PLC
Special features	<ul style="list-style-type: none"> • high noise immunity • compact components • extensive diagnostic options • Reader with IQ-Sense interface
Approvals	<ul style="list-style-type: none"> • ETS 300330 (Europe) • FCC Part 15 (U.S.A.) • UL/CSA CE

RFID system for production engineering

SIMATIC RF300 mobile data storage units

Introduction

Overview



Design

A SIMATIC RF 300 data storage unit essentially consists of an electronic module, an antenna and an EEPROM or FRAM memory built into a rugged plastic enclosure.

Function

If a tag moves into the transmission field of the reader, the necessary power for all circuit components is generated and monitored by means of the energy supply unit. The pulse-coded information is prepared in such a way that it can be processed further as pure digital signals. The handling of data, including check routines, is performed by the control unit which also manages the user memory.

Type	Features
SIMATIC RF320T	Universal, compact data storage unit (20 + 4 byte EEPROM) Ø 27 mm x 4 mm, not suitable for mounting directly on metal <ul style="list-style-type: none"> • Degree of protection IP67/IPX9K¹⁾ • Temperature range up to +85 °C
SIMATIC RF340T	Universal data storage unit (8 KB FRAM + 24 byte EEPROM), 48 mm x 25 mm x 15 mm <ul style="list-style-type: none"> • Degree of protection IP68/IPX9K¹⁾ • Temperature range up to +85 °C
SIMATIC RF350T	Universal data storage unit (32 KB FRAM + 24 byte EEPROM), 50 mm x 50 mm x 20 mm <ul style="list-style-type: none"> • Degree of protection IP68 • Temperature range up to +85 °C
SIMATIC RF360T	Universal data storage unit in credit card format (8 KB FRAM + 24 byte EEPROM), 85.5 mm x 54.1 mm x 2.5 mm <ul style="list-style-type: none"> • Degree of protection IP67 • Temperature range up to +75 °C
SIMATIC RF370T	Universal data storage unit (32 or 64 KB FRAM + 24 byte EEPROM), 75 mm x 75 mm x 40 mm <ul style="list-style-type: none"> • Degree of protection IP68 • Temperature range up to +85 °C
SIMATIC RF380T	Heat-resistant data storage unit, designed for skid identification in paint shops (32 KB FRAM + 24 byte EEPROM), housing dimensions (mm) Ø 114 x 83 <ul style="list-style-type: none"> • Degree of protection IP68 • Temperature range up to +220 °C (cyclic)

1) Extract:

Test equipment: steam jet-air ejector 0 °C, 30 °C, 60 °C, 90 °C
 Water flow rate: 10 ... 15 l/min at 100 bar (75 °C)
 Distance: 10 ... 15 cm

RFID system for production engineering

SIMATIC RF300 mobile data storage units

SIMATIC RF320T

Overview



Universal, compact tag (20 + 4 byte EEPROM) in button format (Ø 27 mm x 4 mm), not suitable for mounting directly on metal.

Technical specifications

Mobile data storage unit	SIMATIC RF320T
Memory size	20 byte EEPROM (r/w), 4 byte UID (ro)
MTBF	1.6×10^7 h
Read cycles	Unlimited
Write cycles, min.	100000
• at ≤ 40 °C, typical	> 1000000

Mobile data storage unit	SIMATIC RF320T
Data retention time	> 10 years (at < +40 °C)
Read/write distance	(see field data)
Memory organization	Byte-oriented access, write protection possible in 4-byte blocks
Energy source	Inductive power transmission
Shock/vibration to EN 60721-3-7, Class 7 M3	100 g/20 g
Torsion and bending load	Not permissible
Mounting	Adhesive/M3 screws
Recommended distance to metal	> 20 mm
Degree of protection to	• EN 60529
Enclosure	Button
• Dimensions	Ø 27 mm x 4 mm
• Color/material	Black/epoxy resin
Ambient temperature	
• During operation	-25 ... +125 °C
• During transportation and storage	-40 ... +150 °C
Weight, approx.	5 g

1) Extract:

Test equipment: Steam jet-air ejector 0 °C, 30 °C, 60 °C, 90 °C
 Water flow rate: 10 ... 15 l/min at 100 bar (75 °C)
 Distance: 10 ... 15 cm

Field data in mm

SIMATIC RF320T to:	SIMATIC RF310R	SIMATIC RF340R	SIMATIC RF350R with ANT 1	SIMATIC RF350R with ANT 18	SIMATIC RF350R with ANT 30	SIMATIC RF380R
Operating distance (S_a)	2 ... 10	2 ... 20	2 ... 20	2 ... 8	2 ... 11	2 ... 30
Limit distance (S_g)	16	25	25	10	15	47
Transmission window (L)	30	45	45	10	15	100

Selection and Ordering data

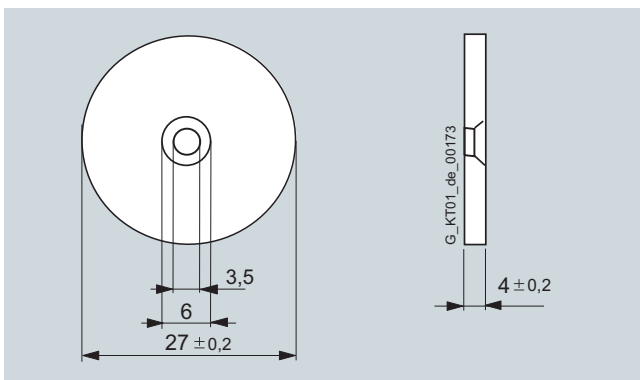
Order No.

SIMATIC RF320T tag ▶ A **6GT2 800-1CA00**

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



RFID system for production engineering

SIMATIC RF300 mobile data storage units

SIMATIC RF340T

Overview



Universal data memory (8 KB FRAM + 24 byte EEPROM + 4 byte serial number), particularly suitable for small workpiece carriers.

Technical specifications

Mobile data storage unit	SIMATIC RF340T
Memory size	8 KB FRAM (r/w), 20 byte EEPROM (r/w), 4 byte UID (ro)
MTBF	1.1×10^7 h
Read cycles	Practically unlimited ($>10^{10}$)
Write cycles	Practically unlimited ($>10^{10}$)
Data retention time	> 10 years (at $< +40^\circ\text{C}$)
Read/write distance	(see field data)
Memory organization	Byte-oriented access, write protection possible in 4-byte blocks for the 20-byte EEPROM area
Energy source	Inductive power transmission
Shock/vibration to EN 60721-3-7	50 g / 20 g
Torsion and bending load	Not permissible
Mounting	2 x M3 screws
Degree of protection to EN 60529	IP68/IPX9K ¹⁾
Dimensions in mm	48 x 25 x 15
Color/material	Anthracite/polyamide 12
Ambient temperature	<ul style="list-style-type: none"> • During operation: $-25 \dots + 85^\circ\text{C}$ • During transportation and storage: $-40 \dots + 85^\circ\text{C}$
Weight, approx.	25 g

1) Extract:

Test equipment:	Steam jet-air ejector 0°C , 30°C , 60°C , 90°C
Water flow rate:	10 ... 15 l/min at 100 bar (75°C)
Distance:	10 ... 15 cm

Field data in mm

SIMATIC RF340T to:	SIMATIC RF310R	SIMATIC RF340R	SIMATIC RF350R with ANT 1	SIMATIC RF350R with ANT 18	SIMATIC RF350R with ANT 30	SIMATIC RF380R
Operating distance (S_a)	2 ... 20	5 ... 25	5 ... 25	2 ... 10	5 ... 15	20 ... 70
Limit distance (S_g)	26	35	35	13	20	90
Transmission window (L)	38	60	60	20	25	115

Selection and Ordering data

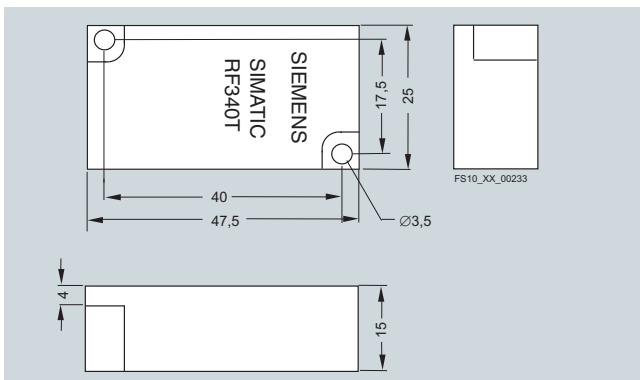
Order No.

SIMATIC RF340T tag ▶ A **6GT2 800-4BB00**

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



RFID system for production engineering

SIMATIC RF300 mobile data storage units

SIMATIC RF350T

Overview



Universal data memory (32 KB FRAM + 24 byte EEPROM)

Technical specifications

Mobile data storage unit	SIMATIC RF350T
Memory size	32 KB FRAM (r/w), 20 byte EEPROM (r/w), 4 byte UID (ro)
MTBF	1.1 x 10 ⁷ h
Read cycles	Practically unlimited (>10 ¹⁰)
Write cycles	Practically unlimited (>10 ¹⁰)
Data retention time	> 10 years (at < +40°C)
Read/write distance	(see field data)
Memory organization	Byte-oriented access, write protection possible in 4-byte blocks for the 20-byte EEPROM area
Energy source	Inductive power transmission
Shock/vibration to EN 60721-3-7, Class 7 M3	50 g/20 g
Torsion and bending load	Not permissible
Mounting	2 x M4 screws
Recommended distance to metal	Can be directly mounted on metal
Degree of protection to EN 60529	IP68
Enclosure	8-sided, with mounting frame
L x W x H, in mm	50 x 50 x 20
Color/material	Anthracite/polyamide 12
Ambient temperature	<ul style="list-style-type: none"> • During operation -25 ... + 85 °C • During transportation and storage -40 ... + 85 °C
Weight, approx.	25 g

Field data in mm

SIMATIC RF350T to:	SIMATIC RF310R	SIMATIC RF340R	SIMATIC RF350R with ANT 1	SIMATIC RF350R with ANT 18	SIMATIC RF350R with ANT 30	SIMATIC RF380R
Operating distance (S _a)	5 ... 22	5 ... 35	5 ... 35	-	5 ... 16	35 ... 70
Limit distance (S _g)	30	50	50	-	22	105
Transmission window (L)	45	60	60	-	25	120

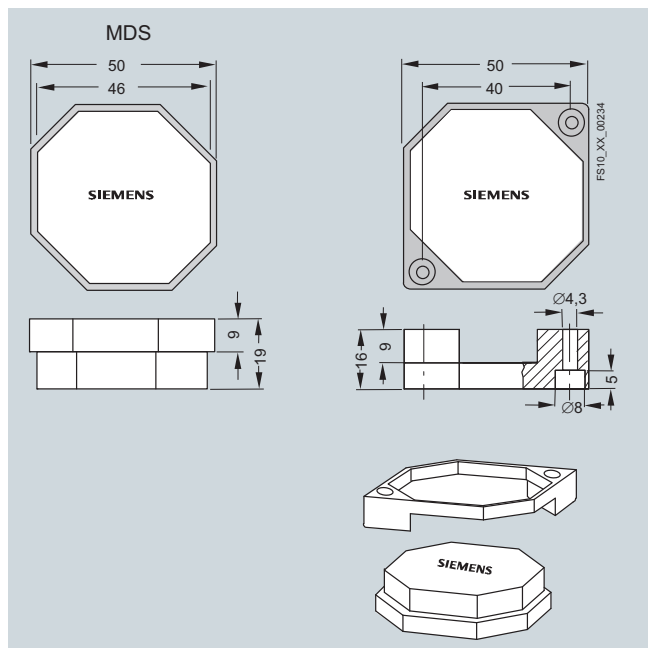
-: Combination reader tag not released

Selection and Ordering data

SIMATIC RF350T tag ▶ A **6GT2 800-5BD00** Order No.

A: Subject to export regulations AL = N and ECCN = EAR99H
 ▶ Preferred type, available from stock.

Dimensions



Left: Mobile data storage unit.
 Upper right: Mounting frame.
 Lower right: Installation diagram. The MDS can be mounted with the mounting frame as shown.

RFID system for production engineering

SIMATIC RF300 mobile data storage units

SIMATIC RF360T

Overview



Universal data memory in credit card format (8 KB FRAM + 24 byte EEPROM).

Technical specifications

Mobile data storage unit	SIMATIC RF360T
Memory size	8 KB FRAM (r/w), 20 byte EEPROM (r/w), 4 byte UID (ro)
MTBF	1.1×10^7 h
Read cycles	Practically unlimited ($>10^{10}$)
Write cycles	Practically unlimited ($>10^{10}$)
Data retention time	> 10 years (at $< +40$ °C)
Read/write distance	(see field data)
Memory organization	Byte-oriented access, write protection possible in 4-byte blocks for the 20-byte EEPROM area
Energy source	Inductive power transmission
Shock/vibration to EN 60721-3-7	50 g/20 g
Torsion and bending load	Not permissible
Mounting	2 screws M3 or with mounting lug 6GT2190-0AB00
Recommended distance to metal	> 20 mm; e.g. using spacer 6GT2190-0AA00 in conjunction with mounting lug 6GT2190-0AB00
Degree of protection to EN 60529	IP67
Enclosure	Credit card format
L x W x H, in mm	85.8 x 54.8 x 2.5
Color/material	Anthracite / epoxy resin
Ambient temperature	
• During operation	-25 ... + 75 °C
• During transportation and storage	-40 ... + 85 °C
Weight, approx.	25 g

5

Field data in mm

SIMATIC RF360T to:	SIMATIC RF310R	SIMATIC RF340R	SIMATIC RF350R with ANT 1	SIMATIC RF350R with ANT 18	SIMATIC RF350R with ANT 30	SIMATIC RF380R
Operating distance (S_a)	5 ... 26	8 ... 40	8 ... 40	-	-	40 ... 120
Limit distance (S_g)	35	60	60	-	-	140
Transmission window (L)	45	70	70	-	-	145

-: Combination reader tag not released

Selection and Ordering data

Order No.

SIMATIC RF360T tag ▶ A **6GT2 800-4AC00**

Accessories

Fixing lug ▶ **6GT2 190 0AB00**

For SIMATIC RF360T

Spacers ▶ **6GT2 190-0AA00**

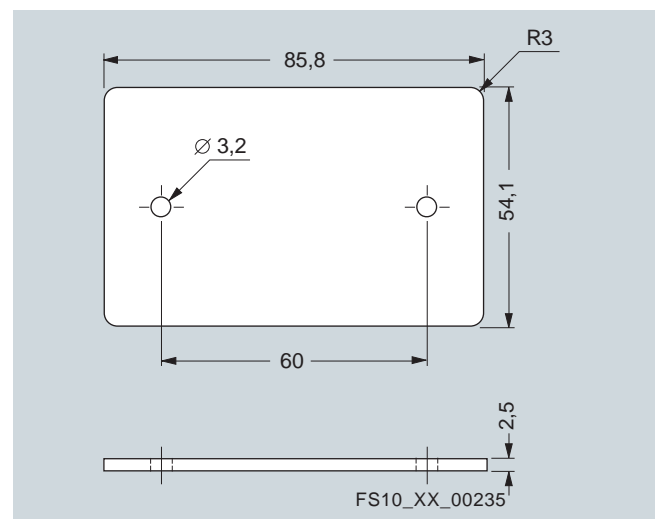
For fixing lug, thickness 20 mm

The purpose of the spacer is to maintain the recommended distance to the metal when installing the tag.

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



RFID system for production engineering

SIMATIC RF300 mobile data storage units

SIMATIC RF370T

Overview



Universal data storage unit in square format (32 or 64 KB FRAM + 24 byte EEPROM), 75 mm x 75 mm x 40 mm.

Technical specifications

Mobile data storage unit	SIMATIC RF370T
Memory size	32 or 64 KB FRAM (r/w), 20 byte EEPROM (r/w), 4 byte UID (ro)
MTBF	1.0×10^7 h
Read cycles	Practically unlimited ($>10^{10}$)
Write cycles	Practically unlimited ($>10^{10}$)
Data retention time	> 10 years (at $< +40$ °C)
Read/write distance	(see field data)
Memory organization	Byte-oriented access, write protection possible in 4-byte blocks for the 20-byte EEPROM area
Energy source	Inductive power transmission
Shock/vibration to EN 60721-3-7, Class 7 M3	50 g/20 g
Torsion and bending load	Not permissible
Mounting	2 M5 screws
Recommended distance to metal	Can be directly mounted on metal
Degree of protection to EN 60529	IP68
Enclosure	Square format
L x W x H, in mm	75 x 75 x 40
Color/material	Anthracite/polyamide 12
Ambient temperature	
• During operation	-25 ... + 85 °C
• During transportation and storage	-40 ... + 85 °C
Weight, approx.	200 g

Field data in mm

SIMATIC RF370T to:	SIMATIC RF310R	SIMATIC RF340R	SIMATIC RF350R with ANT 1	SIMATIC RF350R with ANT 18	SIMATIC RF350R with ANT 30	SIMATIC RF380R
Operating distance (S_a)	*	15 ... 36	15 ... 45	-	-	35 ... 85
Limit distance (S_g)	*	52	65	-	-	125
Transmission window (L)	*	75	70	-	-	135

-: Combination reader tag not released

*: The combination of RF370T to RF310R is possible in principle, but it is not recommended because the antenna geometry between the reader and antenna is not optimal.

Selection and Ordering data

Order No.

SIMATIC RF370T tag ▶ A **6GT2 800-5BE00**

With 32 KB FRAM

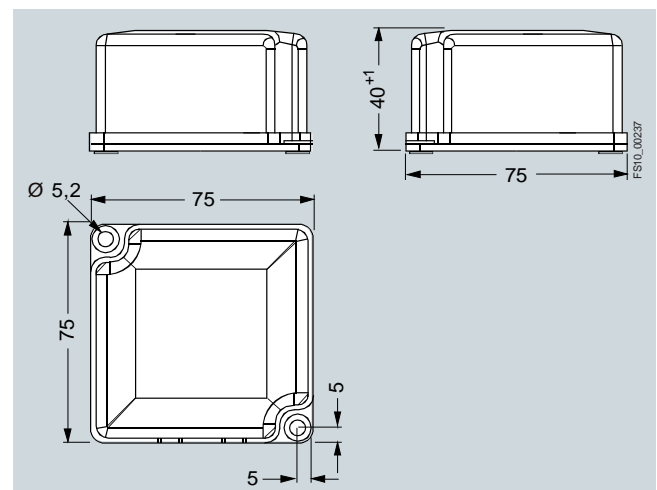
SIMATIC RF370T tag ▶ A **6GT2 800-6BE00**

With 64 KB FRAM

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions

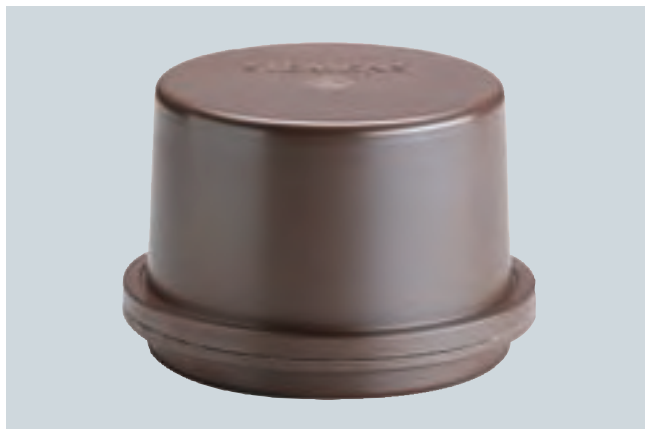


RFID system for production engineering

SIMATIC RF300 mobile data storage units

SIMATIC RF380T

Overview



Heat-resistant data memory, designed for skid identification in paint shops (32 KB FRAM + 24 byte EEPROM), housing dimensions (mm) Ø 114 x 83, temperature range up to +220 °C (cyclic).

Application

Typical applications are:

- Primer application, cataphoresis with the associated drying ovens
- Outer paint coating area with drying ovens
- Washing area with temperatures > +85°C

Technical specifications

Heat-resistant data storage unit	SIMATIC RF380T
Memory size	32 KB FRAM (r/w), 20 byte EEPROM (r/w), 4 byte UID (ro)
MTBF	1.0 x 10 ⁷ h
Read cycles	Practically unlimited (>10 ¹⁰)
Write cycles	Practically unlimited (>10 ¹⁰)
Data retention time	> 10 years (at < +40 °C)
Read/write distance	(see field data)
Memory organization	Byte-oriented access, write protection possible in 4-byte blocks for the 20-byte EEPROM area
Energy source	Inductive power transmission
Shock/vibration to EN 60721-3-7	50 g/5 g
Torsion and bending load	Not permissible
Mounting	With special support (to be ordered separately)
Recommended distance to metal	Can be directly mounted on metal
Degree of protection to EN 60529	IP68
Enclosure	Round type
• Dimensions (Ø x H, in mm)	114 x 83
• Color/material	Brown / PPS
Ambient temperature	
• In operation (permanent)	-25 ... + 110 °C
• In operation (cyclic)	-25 ... + 220 °C
• During transportation and storage	-40 ... + 110 °C
Weight, approx.	900 g

Field data in mm

SIMATIC RF380T to:	SIMATIC RF310R	SIMATIC RF340R	SIMATIC RF350R with ANT 1	SIMATIC RF350R with ANT 18	SIMATIC RF350R with ANT 30	SIMATIC RF380R
Operating distance (S _a)	*	15 ... 47	15 ... 53	-	-	25 ... 85
Limit distance (S _g)	*	55	65	-	-	125
Transmission window (L)	*	85	88	-	-	155

-: Combination reader tag not released

*: The combination of RF380T to RF310R is possible in principle, but it is not recommended because the antenna geometry between the reader and antenna is not optimal.

Cyclic operation of the MDS at temperatures > 100 °C

At ambient temperatures between +110 °C and +220 °C, care must be taken to ensure that the internal temperature of the SIMATIC RF380T does not exceed the critical threshold of +110 °C. Each heating phase must therefore be followed by a cooling phase. Some limit cycles are listed in the table below.

A temperature calculation tool calculates the temperature curve for the heat-proof MDS SIMATIC RF380T (see CD "RFID Systems Software & Documentation", Order No. 6GT2 080-2AA10).

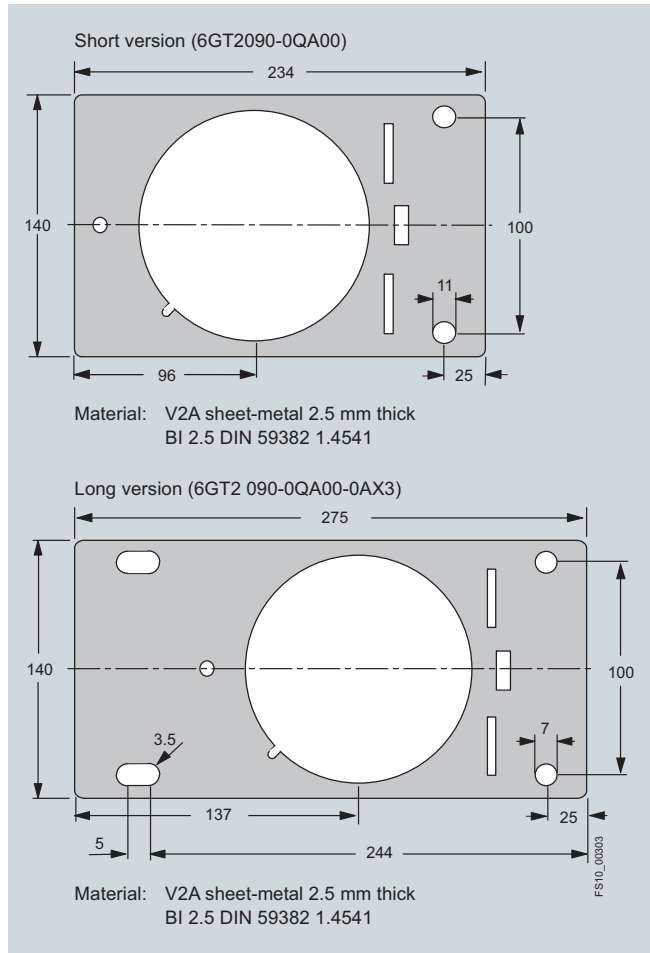
Heating up		Cooling down	
Temperature	Time	Temperature	Time
200 °C	2 h	25°C	> 8 h
200 °C	1 h	25°C	> 2 h
190 °C	2 h	25°C	> 7 h
190 °C	1 h	25°C	> 1 h 45 min
180 °C	2 h	25°C	> 5 h 30 min
180 °C	2 h	25°C	> 4 h 30 min

RFID system for production engineering

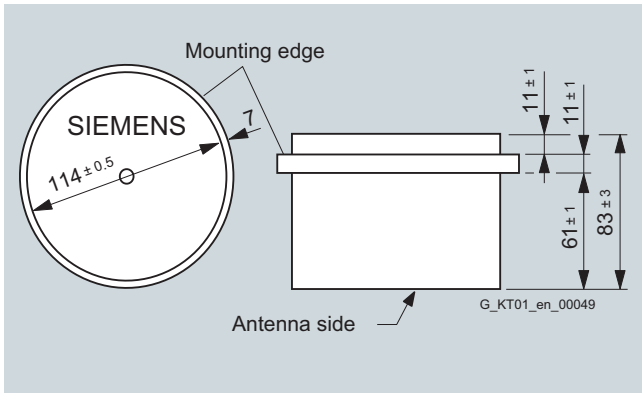
SIMATIC RF300 mobile data storage units

SIMATIC RF380T

Selection and Ordering data		Order No.
SIMATIC RF380T tag	▶ A	6GT2 800-5DA00
With 32 KB FRAM		
Accessories		
Skid support for RF380T		
• Short type	▶ A	6GT2 090-0QA00
• Long type	A	6GT2 090-0QA00-0AX3
Universal support		
For RF380T, e.g. for attachment to the body with a customer-specific adapter	▶	6GT2 590-0QA00
Cover	▶ A	6GT2 090-0QB00
For skid support		
A: Subject to export regulations AL = N and ECCN = EAR99H		
▶ Preferred type, available from stock.		

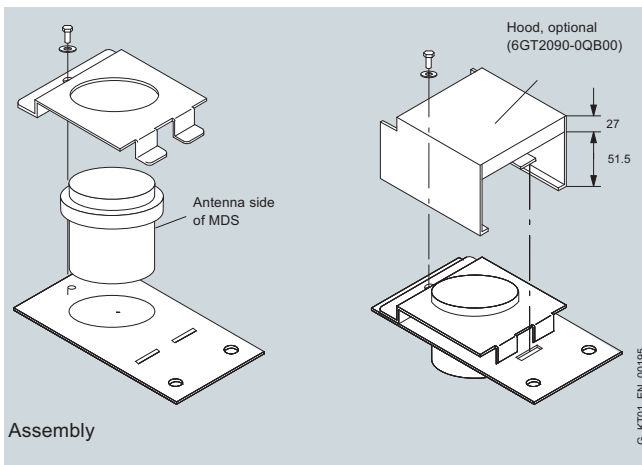


Dimensions

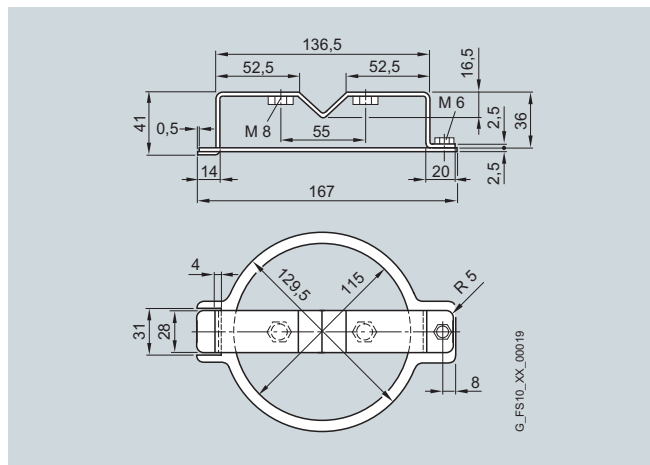


SIMATIC RF380T data carrier

Support for RF380T



Skid support, cover



Universal support



Universal holder with heat-proof data carrier RF380T

RFID system for production engineering

SIMATIC RF300 read/write devices

Introduction

Overview



Function

The reader implements the commands received from the communication module or the host system. These commands and the data to be written or read are processed by a corresponding digital/analog circuit in the reader and control communication with the tag.

The communication between tag and reader takes place over inductive alternating fields. The transmittable quantity of information between reader and tag depends on:

- the speed at which the tag moves through the transmission window of the reader
- the length of the transmission window
- the tag type (FRAM, EEPROM).

Type	Features
SIMATIC RF310R	<p>Ideal for use on small assembly lines. Reader with integrated antenna.</p> <ul style="list-style-type: none"> • Degree of protection IP67 • Temperature range up to +70 °C • Dimensions 55 mm x 75 mm x 30 mm • 2 interface variants (IQ-Sense and RS 422)
SIMATIC RF340R	<p>Ideal for use on assembly lines. Reader with integrated antenna.</p> <ul style="list-style-type: none"> • Degree of protection IP67 • Temperature range up to +70 °C • Dimensions 75 mm x 75 mm x 40 mm • Interface RS 422
SIMATIC RF350R	<p>Ideal for use on assembly lines. Reader for the connection of external MOBY E antennas (ANT1, ANT18, ANT30).</p> <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to +70 °C • Dimensions 75 mm x 75 mm x 40 mm • Interface RS 422
SIMATIC RF380R	<p>Ideal for use in assembly lines in which long ranges are required. Reader with integrated antenna.</p> <ul style="list-style-type: none"> • Degree of protection IP67 • Temperature range up to +70 °C • Dimensions 160 mm x 80 mm x 40 mm • Interface RS 422 / RS 232

Overview



The SIMATIC RF310R is a read/write device (reader) in the lower performance range and can be used to great advantage in assembly lines thanks to its small, compact design.

This reader is available in two interface variants:

- With IQ-Sense interface for the 8xIQ-Sense module SM338 on S7-300/ET200M
- With RS 422 interface for the RFID communication modules ASM 456, 475, RF170C and RF180C

Thanks to the high degree of protection and the use of high-quality materials, the SIMATIC RF310R ensures problem-free use even under the toughest industrial conditions. Connection is either over a 4-pin M12 plug-in connector (IQ-Sense variant) or over an 8-pin M12 plug-in connector (RS 422 variant).

Technical specifications

SIMATIC RF310R reader	6GT2801-0AA00 (for IQ-Sense)	6GT2801-1AA10 (for RS 422)
Inductive interface to the tag		
• Transmission frequency (energy/data)	13.56 MHz	13.56 MHz
• Read/write distance to the tag	Max. 35 mm (see tag field data)	Max. 35 mm (see tag field data)
Port		
• to SIMATIC S7-300	8-IQ-Sense, 2-wire pole-independent; max. 2 readers on one module	-
• to RFID communication modules	-	RS 422 (3964R protocol)
Baud rates	-	19200, 57600, 115200 bit/s
Cable length reader-master module	Max. 50 m (unshielded cable)	Max. 1000 m (shielded cable)
Data transfer rate, reader-tag		
• Writing, approx.	40 byte/s	3100 byte/s
• Reading, approx.	50 byte/s	3100 byte/s
Functions	Read, write, initialize tag	Read/write/initialize tag, scan status and diagnostics information, switch antenna on/off, repeat command, scan tag serial numbers (UID)
Multi-tag	No	Available soon
Power supply	Via IQ-Sense master module (24 V DC)	24 V DC
Display elements	2-color LEDs (operating voltage, presence, error)	2-color LEDs (operating voltage, presence, error)
Plug-in connector	M12, 4-pin	M12, 8-pin
Enclosure		
• Dimensions in mm	55 x 75 x 30 (without connector)	55 x 75 x 30 (without connector)
• Color	Anthracite	Anthracite
• Material	PA 12	PA 12
Degree of protection to EN 60529	IP67	IP67
Shock-resistant to EN 60721-3-7, Class 7 M2	50 g	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M2	20 g	20 g
Mounting	4 x M5 screws	4 x M5 screws
Tightening torque (at room temperature)	≤ 2 Nm	≤ 2 Nm
Ambient temperature		
• During operation	-25 ... + 70 °C	-25 ... + 70 °C
• During transportation and storage	-40 ... + 85 °C	-40 ... + 85 °C
MTBF (at 40 °C)	1.3 x 10 ⁶ h	1.5 x 10 ⁶ h
Weight, approx.	200 g	200 g

RFID system for production engineering

SIMATIC RF300 read/write devices

SIMATIC RF310R

Field data in mm

Reader	SIMATIC RF310R
Minimum distance from reader to reader	≥ 100 mm

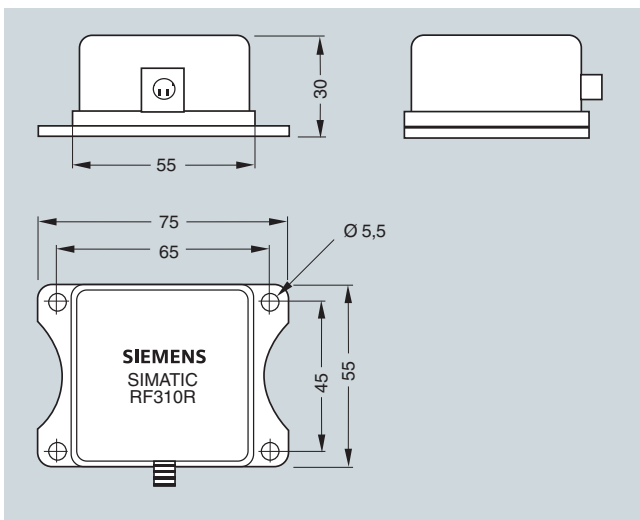
Selection and Ordering data

Selection and Ordering data	Order No.
SIMATIC RF310R reader	
• With IQ-Sense interface ▶	6GT2 801-0AA00
• With RS 422 interface (3964R protocol) ▶ A	6GT2 801-1AA10
Accessories	
IQ-Sense module SM 338 for S7-300 and ET 200M ▶	6ES7 338-7XF00-0AB0
CD "RFID Systems Software & Documentation" ▶	6GT2 080-2AA10
FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC demonstration program. MOBY documentation	
M12 cable plug	
PUR cable 4 x 0.34 mm ² , straight connector for SIMATIC RF310R (IQ sense)	
5 m ▶	3RX8 000-0CB42-1AF0
10 m ▶	3RX8 000-0CB42-1AL0

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



RFID system for production engineering

SIMATIC RF300 read/write devices

SIMATIC RF340R

Overview



The SIMATIC RF340R is a read/write device (reader) with integrated antenna for the medium performance range and can be used to great advantage in assembly lines thanks to its compact design. This reader is also particularly suitable for dynamic applications, in which the data carrier does not stop during the read/write process.

This reader has an RS 422 interface with transmission procedure 3964R for connection to the RFID communication modules ASM 456, 475, RF170C, RF180C.

Thanks to the high degree of protection and the use of high-quality materials, the SIMATIC RF340R ensures problem-free use even under the toughest industrial conditions. It is connected by means of an 8-pin M12 connector.

Technical specifications

Reader	SIMATIC RF340R
Inductive interface to the tag	
• Transmission frequency (energy/data)	13.56 MHz
• Read/write distance to the tag	See mobile data storage units field data
Port	RS 422 (3964R protocol)
Transmission rates	19200, 57600, 115200 bit/s
Cable length reader-master module	Max. 1000 m (shielded cable)
Data transfer rate, reader-tag	Read/write: approx. 3,100 byte/s
Functions	Read/write/initialize tag, scan status and diagnostics information, switch antenna on/off, repeat command, scan tag serial numbers (UID)
Multi-tag	Available soon
Power supply	24 V DC
Display elements	2-color LEDs (operating voltage, presence, error)
Plug-in connector	M12, 8-pin
Enclosure	
• Dimensions in mm	75 x 75 x 40 (without device connector)
• Color	Anthracite
• Material	PA 12
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M2	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M2	20 g

Reader	SIMATIC RF340R
Mounting	2 M5 screws
Tightening torque (at room temperature)	≤ 2 Nm
Ambient temperature	
• During operation	-25 ... + 70 °C
• During transportation and storage	-40 ... + 85 °C
MTBF (at 40 °C)	1.2 x 10 ⁶ hours
Weight, approx.	250 g

Field data in mm

Reader	SIMATIC RF340R
Minimum distance from reader to reader	≥ 500 mm

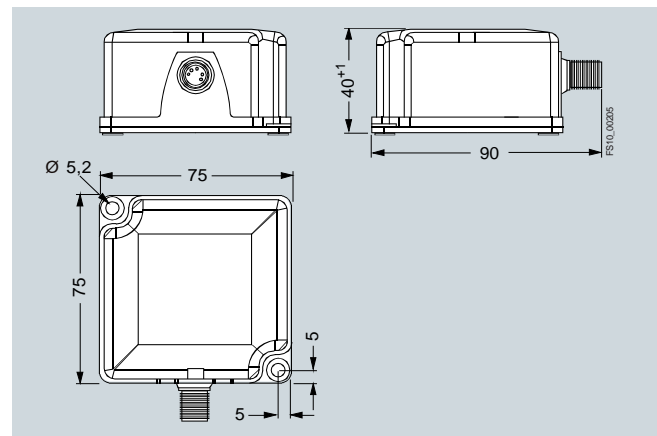
Selection and Ordering data

	Order No.
SIMATIC RF340R reader ▶ A with integrated antenna	6GT2 801-2AA10
Accessories	
CD: "RFID Systems Software & Documentation" ▶	6GT2 080-2AA10
FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program. MOBY documentation	

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



SIMATIC RF340R reader

RFID system for production engineering

SIMATIC RF300 read/write devices

SIMATIC RF350R

Overview



The SIMATIC RF350R is a universal read/write device (reader) for use with external antennas. Due to the different, pluggable antenna designs (flat antenna, round antennas), there are many possible applications in the area of industrial production, especially in assembly lines.

This reader has an RS 422 interface with transmission procedure 3964R for connection to the RFID communication modules ASM 456, 475, RF170C, RF180C.

Thanks to the high degree of protection and the use of high-quality materials, the SIMATIC RF350R ensures problem-free use even under the toughest industrial conditions. It is connected by means of an 8-pin M12 connector.

One of each of the following antennas from the MOBY E spectrum can be operated on an RF350R:

- ANT 1, universal flat antenna, also for dynamic applications size (L x W x H in mm): 75 x 75 x 20
- ANT 18, universal round antenna in M18 design for assembly lines with small workpiece holders size (Ø x L in mm) M18 x 55
- ANT 30, universal round antenna for assembly lines with small workpiece holders size (Ø x L in mm) M30 x 58

Technical specifications

Reader	SIMATIC RF350R
Inductive interface to the tag	
• Transmission frequency (energy/data)	13.56 MHz
• Port	RS 422 (3964R protocol)
• Transmission rates	19200, 57600, 115200 bit/s
Cable length reader-master module	Max. 1000 m (shielded cable)
Data transfer rate, reader-tag	Read/write: approx. 3,100 byte/s
Functions	Read/write/initialize tag, scan status and diagnostics information, switch antenna on/off, repeat command, scan tag serial numbers (UID)
Multi-tag	Available soon
Power supply	24 V DC
Display elements	2-color LEDs (operating voltage, presence, error)
Plug-in connector	M12, 8-pin
Enclosure	
• Dimensions in mm	75 x 75 x 40 (without device connector)
• Color	Anthracite
• Material	PA 12
Degree of protection to EN 60529	IP65
Shock-resistant to EN 60721-3-7, Class 7 M2	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M2	20 g
Mounting	2 M5 screws
Tightening torque (at room temperature)	≤ 2 Nm
Ambient temperature	
• During operation	-25 ... + 70 °C
• During transportation and storage	-40 ... + 85 °C
MTBF (at 40 °C)	1.2 x 10 ⁶ hours
Weight, approx.	250 g

Connectable antenna	ANT 1	ANT 18	ANT 30
Inductive interface to the tag	13.56 MHz		
Max. read/write distance ANT tag (S _g)	See "Mobile data storage units" field data		
Port to RF350R			
• Plug connection	4-pin (pins on antenna side)		
• Antenna cable length (cannot be changed)	3 m		
Enclosure dimensions in mm	75 x 75 x 20 (L x W x H)	M18 x 55 (Ø x L)	M30 x 58 (Ø x L)
Color	Anthracite	Pale turquoise	
Material	Plastic PA 12	Plastic Krastin	
Degree of protection to EN 60529	IP67	IP67 (front)	
Shock-resistant to EN 60721-3-7, Class 7M2	50 g maximum value, no continuous load		
Vibration-resistant to EN 60721-3-7, Class 7M2	20 g (3 ... 500 Hz) maximum value, no continuous load		
Ambient temperature			
• During operation	-25 ... + 70 °C		
• During transportation and storage	-40 ... + 85 °C		
MTBF (at 40 °C)	2.5 x 10 ⁶ hours		
Weight, approx.	80 g	120 g	150 g

Field data

RF350R with Antenne	ANT 1	ANT 18	ANT 30
Operating distance (S_a)	See "Mobile data storage units" field data		
Limit distance (S_g)			
Diameter of the transmission window (L_d)			
Minimum distance from antenna to antenna (D)			
• ANT1	800	400	400
• ANT18	400	125	200
• ANT30	400	200	200

Selection and Ordering data

Order No.

Reader SIMATIC RF350R ▶ A **6GT2 801-4AA10**

Without antenna

ANT 1 antenna ▶ **6GT2 398-1CB00**

for RF350R and SLG 75 (MOBY E)

ANT 18 antenna ▶ **6GT2 398-1CA00**

for RF350R and SLG 75 (MOBY E)

ANT 30 antenna ▶ **6GT2 398-1CD00**

for RF350R and SLG 75 (MOBY E)

Accessories

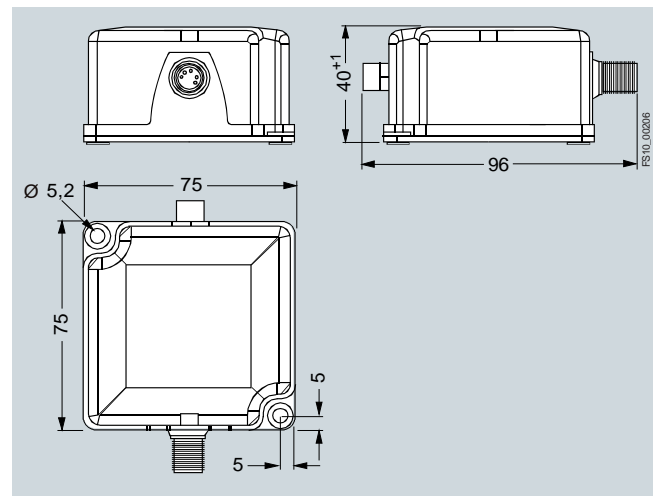
CD: "RFID Systems Software & Documentation" ▶ **6GT2 080-2AA10**

FB/FC for SIMATIC,
3964R driver for DOS/Windows
95/NT/2000/XP, C libraries,
PC presentation program.
RFID documentation

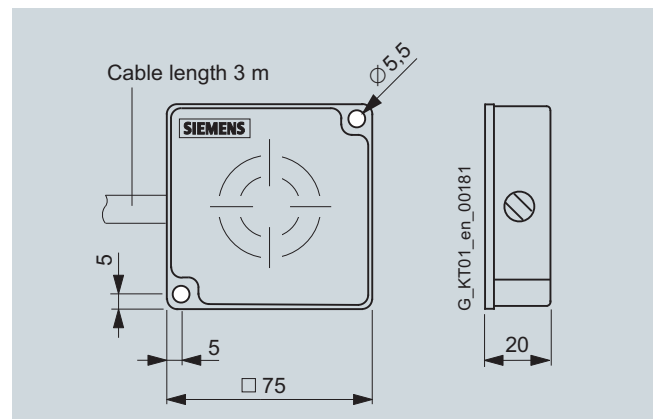
A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



SIMATIC RF350R reader

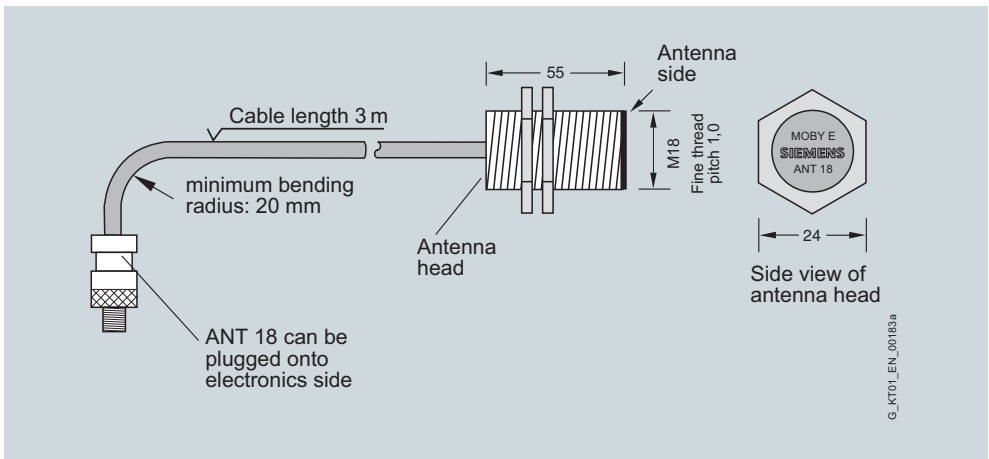


ANT 1 antenna

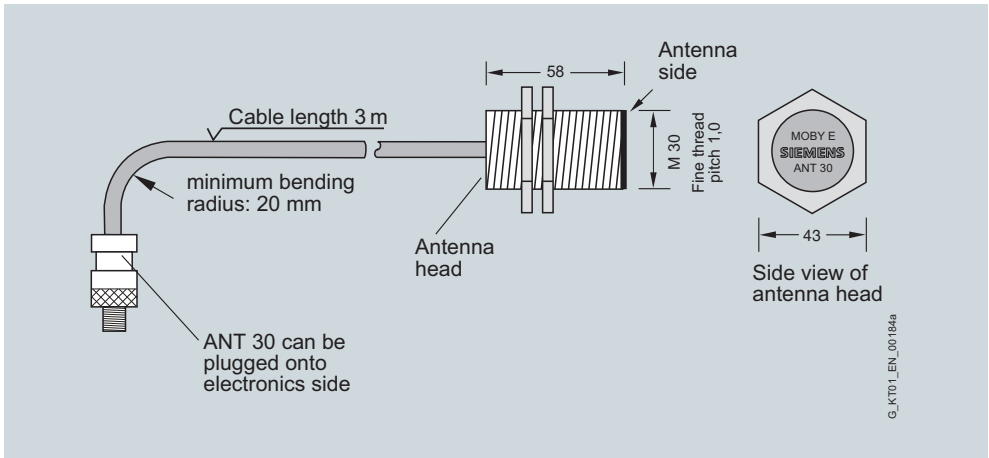
RFID system for production engineering

SIMATIC RF300 read/write devices

SIMATIC RF350R



ANT 18 antenna



ANT 30 antenna

5

Overview



SIMATIC RF380R is a read/write device with an integrated antenna for the top-end performance range and its compact construction makes it ideal for implementation in assembly lines in which long ranges are required (e.g. bodyshop/paintshop in the automotive industry). This reader is also particularly well-suited to dynamic applications in which the data storage unit is not stopped during the read/write process (e.g. baggage conveyors in airports).

This reader has both an RS 422 and an RS 232 interface with a 3964R transmission procedure for connection to RFID communication modules ASM 452, 456, 473, 475, RF170C and RF180C as well as to non-Siemens PLCs or a PC.

Due to the high degree of protection and the use of high-quality materials, the SIMATIC RF380R ensures problem-free operation even under the harshest industrial conditions. It is connected via an 8-pole M12 plug connector.

Technical specifications

SIMATIC RF380R reader	
Inductive interface to the tag	
• Transmission frequency (energy/data)	13.56 MHz
• Read/write distance to the tag	See "Mobile data storage units" field data
• Port	RS 422 / RS 232 (3964R protocol)
• Baud rates	19200, 57600, 115200 bit/s
Max. cable length reader-master module	1000 m for RS 422 (shielded cable)
Data transfer rate, reader-tag	Read / write: approx. 3,100 byte/s
Functions	Read/write/initialize tag, scan status and diagnostics information, switch antenna on/off, repeat command, scan tag serial numbers (UID)
Multi-tag	Available soon
Power supply	24 V DC
Display elements	2-color LEDs (operating voltage, presence, error)
Plug-in connector	M12, 8-pin
Enclosure	
• Dimensions in mm (without plug connector)	160 x 80 x 40
• Color	Anthracite
• Material	PA 12
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M2	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M2	20 g
Mounting	4 x M5 screws
Tightening torque (at room temperature)	≤ 2 Nm
Ambient temperature	
• During operation	-25 ... + 70 °C
• During transportation and storage	-40 ... + 85 °C
MTBF (at 40 °C)	9.5 x 10 ⁵ hours
Weight, approx.	600 g

Field data

Minimum distance from reader to reader	
SIMATIC RF380R	≥ 500 mm

RFID system for production engineering

SIMATIC RF300 read/write devices

SIMATIC RF380R

Selection and Ordering data Order No.

SIMATIC RF380R reader ▶ A **6GT2 801-3AA10**

Accessories

RS 232 connecting cable ▶ A **6GT2 891-0KH50**

Between the PC and RF380R,
with a connecting cable for a 24 V
connector (M12 socket), straight
connector, 5 m

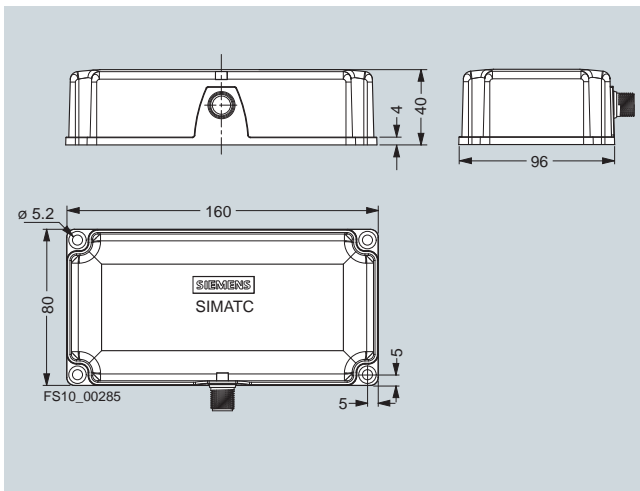
**CD "RFID Systems Software &
Documentation"** ▶ **6GT2 080-2AA10**

FB/FC for SIMATIC,
3964R driver for DOS/
Windows 95/NT/2000/XP,
C libraries, PC demonstration
program.
RFID documentation

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



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RFID system for production engineering

SIMATIC RF300 read/write devices

SIMATIC RF310M mobile hand-held terminal

Overview



SIMATIC RF310M with loading/docking station

The SIMATIC RF310M is a powerful mobile hand-held terminal with integral read/write antenna for applications in the field of production logistics, distribution and service. In addition, it is an indispensable tool for commissioning and testing.

Design

The SIMATIC RF310M mobile hand-held terminal consists of one basic unit (Basis PSION Workabout PRO) and an integrated read/write unit for RF300 transponders (mobile data storage unit). It has a splashwater-proof enclosure (IP54), LCD color monitor 1/4 VGA, 320 x 240 pixels, TFT portrait format, alphanumeric keyboard and various interfaces (for SD memory card, battery charging, USB, Compact Flash for expansion modules, Bluetooth, etc.).

Function

The supplied and pre-installed RF300 software provides service and test functions for reading, writing, etc. of the RF300 data memory:

- Reading data from the data memory
- Writing data to the data memory
- Reading and displaying the ID number of the data memory
- Displaying and editing the data in hexadecimal, ASCII, decimal and binary formats
- Activate/deactivate password

Based on the operating system and communication standard (WIN CE), the unit ensures simple integration into existing or planned infrastructures. Various optional development tools for the PC and a wide selection of accessories are available for this direct from PSION or Microsoft.

Technical specifications

Mobile hand-held terminal	SIMATIC RF310M
Processor	400 MHz Intel Xscale PXA255
Operating system	Microsoft Windows CE .NET 4.20
RAM/Flash EEPROM memory	128 MB/64 MB
User program	RF300 application RF310M.EXE
Screen	TFT color touch display , 1/4 VGA 320 x 240 (portrait format); adjustable backlighting
Keyboard	alphanumeric
Sound	Piezo signal transmitter
Power supply	<ul style="list-style-type: none"> • Lithium-ion battery (3.7 V; 3000 mAh) • Quick charging possible (automatic shut-off) or 3 x 1.5 V type AA • Backup battery: 3 V lithium cell ML 2032
Interfaces	<ul style="list-style-type: none"> • LIF interface (low insertion force interface) for battery charging and communication with the PC, USB and Ethernet using a loading station (USB) • SD card slot for memory card • CF interface for expansion cards (e.g. WLAN)
Ambient temperature	<ul style="list-style-type: none"> • During operation -10 ...+50 °C • Storage (without batteries) -25 ...+60 °C
Relative humidity, non-condensing	5 ... 95%
Degree of protection	IP54 (splashwater proof)
EMC	EN 55022
Electrostatic; RF; EFT	IEC 801-2; IEC 801-3; IEC 801-4
Dimensions (mm)	280 x 92 x 42
Weight (incl. battery)	Approx. 0.5 kg

Integral read/write head, inductive interface to transponder	For SIMATIC RF300
Read/write distance to MDS	up to 20 mm, depending on MDS
Energy/data transmission frequency	13.56 MHz
Serial interface (internal, to basic unit)	RS 232, 3964R protocol
Functionality of the SW application	Standard user interface for reading/writing of data memories, etc.

RFID system for production engineering

SIMATIC RF300 read/write devices

SIMATIC RF310M mobile hand-held terminal

Selection and Ordering data	Order No.
SIMATIC RF310M mobile hand-held terminal ▶ A Basic unit (PSION Workabout PRO) with integrated read/write unit for RF300, battery, standard software pre-installed, without loading/docking station	6GT2 803-0AA00
Accessories	
Loading/docking station ▶ A For a mobile hand-held terminal as well as a spare battery, incl. wide-range plug-in power supply 100 ... 240 V AC and country-specific adapters as well as USB cable	6GT2 898-0BA00
Spare battery ▶ A For basic unit (PSION Workabout PRO), High Capacity 3000 mAh, Li-ion	6GT2 898-0CA00
CD: "RFID Systems Software & Documentation" ▶ FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program. MOBY documentation	6GT2 080-2AA10

A: Subject to export regulations AL = N and ECCN = EAR99H
 ▶ Preferred type, available from stock.

For optional components, please visit
<http://www.pSIONteklogix.com>

For example:

- SD expansion cards
- CF WLAN adapter
- Handles, belt loops
- Vehicle holder with charging function

Overview



MOBY U from Siemens is an identification system with excellent properties for use in industry and logistics. On the one hand it combines the performance of innovative HF technologies and, on the other hand, it ensures continuity for the user thanks to extensive compatibility with the tried and tested MOBY I identification system. Rugged housings and power-saving circuit logic permit many years of maintenance-free operation even in the toughest production environments.

MOBY U eliminates familiar sources of interference during UHF transmissions, such as reflections, electromagnetic interference and overreach, by means of appropriate technical measures.

Correspondingly constructed antennas ensure a homogeneous transmission field to guarantee reliable recognition of the mobile data storage units (MDS) even from unfavorable locations.

In addition, special coding procedures ensure that the data transmission functions without errors and the data integrity is guaranteed. To this end, methods and algorithms that have been tried and tested in mobile radio technology (GSM, UMTS) have been transferred to the identification technology.

The MOBY U UHF identification system boasts the following features:

- 2.4 MHz identification system with read/write distance of up to 3,000 mm
- Designed for the upper and medium performance range
- Innovative technology (GSM/UMTS technology) guarantees simple installation/migration and maintenance-free operation for many years:
 - Active suppression of overreach
 - Automatic frequency hopping
 - Homogeneous transmission field with circular polarization
 - Multitag-capability, max. 12 mobile data storage units (MDS)
 - Automatic synchronization of up to 3 read/write devices
 - Service functions for fast error analysis
 - MOBY I call-compatible
- Extensive range of rugged data memories for a vast range of applications
- Special heat-resistant data storage unit for use in automotive industry (paintshops)
- Very high level of reliability even in the presence of contamination, temperature fluctuations and electromagnetic interference
- Simple Integration into SIMATIC/PROFIBUS DP-V1 and Industrial Ethernet
- Can be connected via serial interface to any system, e.g. PC with Windows 98/NT/2000/XP
- Mobile hand-held terminal

Benefits

- MOBY U standard components ensure that application-specific identification systems can be built up quickly and reliably and guarantee fast replacement under servicing conditions even many years later.
- Worldwide support, configuration and service support.

Application

The MOBY U identification system has been specially designed for applications in automobile production, logistics etc., where considerable demands are made, for example, in terms of immunity to noise, large read/write distance in the case of a mobile data storage unit, fast and secure data transmission, simple installation and reliable functioning even in harsh environments. It used the universally approved ISM frequency band at 2.4 GHz and the radiated power is well below the limits recommended by major health authorities from around the world.

MOBY U covers a transmission range from a few centimeters to three meters and thus creates the requirement for an integrated identification solution, e.g. in automotive production.

Depending on the requirement, various data memories (max. 32 KB RAM) and read/write devices are available for connection to SIMATIC, PROFIBUS, Industrial Ethernet and PCs/PLCs.

The main applications for MOBY U are:

- Main assembly lines in the automotive industry (body in white, surface and assembly)
- Vehicle identification/access control in transport companies, vehicle depots, etc.
- Container/ carrier identification in transport logistics and distribution
- Traffic control systems
- Assembly lines

Function

Mobile data storage units ensure that important data (e.g. production/quality data) accompanies the product from the very beginning.

Mobile data storage units are first attached to the product or its transport or packing unit (e.g. container, pallet, chassis) then inscribed, modified and read using non-contact methods. All the information that is important, e.g. for manufacturing and material flow control, is thus available on the product. A rugged enclosure supports use under harsh industrial conditions and makes the MDS resistant to many chemical substances.

Using stationary as well as mobile read/write devices (SLGs), the necessary information (production data, transport routes, etc.) can be read without contact from a mobile data storage unit and even be supplemented or modified without the need for a direct line-of-sight link.

RFID system for production engineering

MOBY U

Introduction

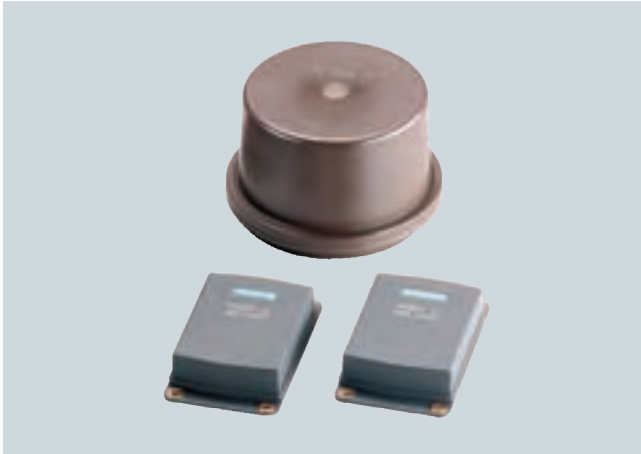
Technical specifications

Type	Contact-free UHF identification system for the medium to upper performance range
Transmission frequency	2.4 ... 2.4835 GHz in the ISM band
Transmit power	< 10 mW EIRP
Memory capacity (MDS) <ul style="list-style-type: none"> • Fixed code memory • Read-only memory • Memory size 	32-bit serial number 128 bit, to be written once by user Up to 32 KB RAM
Read/write cycles (MDS)	Unlimited/ 10 ⁹ at +25 °C
Data management (MDS)	Byte or file-oriented access
Bulk capability, multitag capability	Yes, up to 12 MDS
Multi-SLG	Yes, up to 3 SLGs side by side (can be synchronized by cable)
Data transmission rate MDS – SLG (read/write)	Approx. 8 / 4.8 KB/s without bulk (net)
Read/write distance	150 ... 3000 mm
Operating temperature (MDS)	-25 ... +85 °C/+220 °C cyclic
Degree of protection (MDS)	Up to IP68
Can be connected to	SIMATIC S7, PROFIBUS DP V1, Industrial Ethernet, PC, non-Siemens PLC, computer
Approvals ²⁾	RF: EN 300 440-2 SAR: EN 50 371 Safety: EN 60 950-1 <u>EMC:</u> • EN 301 489-01 • EN 301 489-03 • ENV 50 204 FCC Part 15C ¹⁾ UL/CSA No effect on heart pacemakers
Special features	Innovative technology ensures simple installation/migration and maintenance-free operation: <ul style="list-style-type: none"> • Active suppression of overreach • Automatic frequency hopping • MOBY I call-compatible

1) See SLG U92 – Ordering data (page 5/60).

2) Also refer to the "Configuration, Assembly and Service Manual"

Overview



MOBY U records the data of objects quickly and reliably. MOBY U thereby ensures efficient and cost-effective automation.

Type	Features
MDS U315	Mobile data storage unit (2 KB RAM) for universal applications, preferably in transport and logistics applications, enclosure dimensions 111 mm x 67 mm x 23.5 mm Degree of protection IP65, operating temperature -25 ... +70 °C with replaceable battery
MDS U524	Rugged and mobile data storage unit (32 KB RAM) for universal use, enclosure dimensions 111 mm x 67 mm x 23.5 mm, degree of protection IP68, operating temperature -25 ... +85 °C
MDS U525	Same as MDS U524, but with degree of protection IP65 and replaceable battery
MDS U589	<ul style="list-style-type: none"> • Heat-resistant and rugged data memory for use in paint shops (automotive industry, priming/finishing coats) or applications with similarly high temperature requirements. • Memory capacity 32 KB RAM, temperature range -25 ... +85 °C, up to +220 °C cyclically, degree of protection IP68, enclosure dimensions (mm) Ø 114 x 83 • Silicone-free Options: <ul style="list-style-type: none"> • Universal installation kit • Support for attachment to skid • Cover for support • Additional supports available on request
MDS U Service	The MDS U Service is an MDS for use in the start-up phase and during servicing in the automotive industry and other industrial production plants with similar requirements. Memory capacity 32 KB RAM, two LED displays for communication, replaceable battery. With On/Off switch. Enclosure dimensions 111 mm x 67 mm x 23.5 mm, degree of protection IP40, operating temperature -25 ... +70°C

Technical specifications

Field data (all dimensions in mm)

	MDS U315, MDS U524, MDS U525 MDS U589, MDS U Service
Operating/limit distance to SLG U92	150 to 2100/3000, adjustable in 500 mm steps

Note:

The listed field data are typical values and are valid for a room temperature of +25 °C (77 °F) and a supply voltage of 24 V DC.

RFID system for production engineering

MOBY U mobile data storage units

MDS U315/MDS U524/MDS U525

Overview



MDS U315

Mobile data storage unit (2 KB RAM) for universal applications, preferably in transport and logistics applications, enclosure dimensions 111 mm x 67 mm x 23.5 mm, degree of protection IP65, operating temperature -25 °C to +70 °C, with replaceable battery

MDS U524

Rugged and mobile data storage unit (32 KB RAM) for universal use, enclosure dimensions 111 mm x 67 mm x 23.5 mm, degree of protection IP68, operating temperature -25 °C to +85 °C

MDS U525

Same as MDS U524, but with degree of protection IP65 and replaceable battery.

Technical specifications

Mobile data storage unit	MDS U315	MDS U524	MDS U525
Memory size			
• Fixed code memory	32-bit serial number		
• Read-only memory	128 bit, to be written once by user		
• Application memory	2 KB RAM	32 KB RAM	
MTBF (at +40 °C)	2 400 000 h (without taking battery into account)		
Read/write cycles	unlimited / 10 ⁹ at +25 °C		
Read/write distance	150 ... 3,000 mm		
Bulk and multitag capability	yes		
Power supply	Replaceable battery	Battery	Replaceable battery
Battery lifetime	≥ 5 years ¹⁾	≥ 8 years ¹⁾	
Shock/vibration-resistant to DIN EN 60721-3-7, Class 7M3	50 g / 10 g		
Free fall height to DIN EN 60068-2-32	1 m		
Torsion and bending load	Not permissible		
Suggested attachment	4 x M4 screws		
Recommended distance to metal	Can be directly mounted on metal		
Degree of protection to EN 60529	IP65	IP68	IP65
Resistance to chemicals	See configuration manual		
Enclosure			
• Dimensions (L x W x H)	111 x 67 x 23.5 mm		
• Color/material	Anthracite / plastic PA 12 GF 25		
Ambient temperature			
• During operation	-25 ... +70 °C	-25 ... +85 °C	
• During transportation and storage	-40 ... +85 °C		
Weight, approx.	100 g		
Special features	Universal mobile data storage unit for the preferred deployment in transport and logistics	Rugged and mobile data storage unit for universal use	

1) The service life depends on the temperature, the time in which the MDS is located within the antenna field of the SLG (Zone 1 and 2) and the volume of data that is read/written.

Field data (all dimensions in mm)

MDS U315/MDS U524/MDS U525 to SLG U92

Ranges (S_g) of the SLG can be limited in 500 mm steps up to 3500 mm

	minimal	Standard	maximal
Limit distance (S_g), approx.	500	2000	3000
Operating distance (S_a)	350	1400	2100
Transmission window at S_a length / width	700	2400	3000
	700 (with FCC approval)	2000 (with FCC approval)	2100 (with FCC approval)

The field data apply to write and read operations of the MDS.

Selection and Ordering data

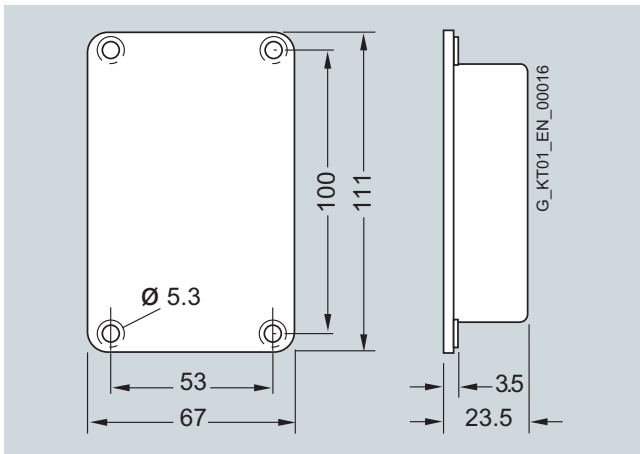
Order No.

Mobile data storage unit MDS U315 2 KB RAM	▶ A	6GT2 500-3BF10
Mobile data storage unit MDS U524 32 KB RAM	▶ A	6GT2 500-5CE10
Mobile data storage unit MDS U525 32 KB RAM, replaceable battery	▶ A	6GT2 500-5CF10

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions

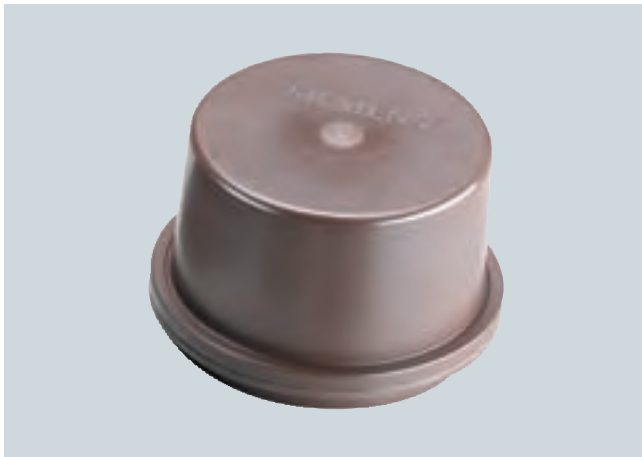


RFID system for production engineering

MOBY U mobile data storage units

MDS U589

Overview



Heat-proof, rugged data storage unit for use in paintshops (automotive industry, primer/top coat) or applications with similar temperature requirements, memory capacity 32 KB RAM, temperature range -25 °C to + 85 °C, up to +220 °C cyclically, IP68 degree of protection, enclosure dimensions (mm) Ø 114 x 83

Technical specifications

MDS U589 (heat-resistant) mobile data storage unit	
Memory size	
• Fixed code memory	32-bit serial number
• Read-only memory	128 bits, to be written once by user
• Application memory	32 KB RAM
MTBF (at +40 °C)	2,400,000 h (not taking the battery into account)
Read/write cycles	Unlimited/ 10 ⁹ at +25 °C
Read/write distance	150 ... 3000 mm
Multitag capability	Yes
Power supply	Battery
Battery life	≥5 years ¹⁾
Shock/vibration-resistant to DIN EN 60721-3-7, Class 7 M3	50 g / 5 g ²⁾
Free fall height to DIN EN 60068-2-32	1000 mm
Torsion and bending load	not permissible
Suggested attachment	See universal installation kit or skid support
Recommended distance from metal	Can be directly mounted onto metal
Degree of protection per EN 60529	IP68
Chemical stability	See Configuration Manual
Casing	
• Dimensions (ø x H)	114 mm x 83 mm
• Color/material	Brown/PPS
Ambient temperature	
• During operation	-25 ... +85 °C, up to +220 °C cyclic
• During transportation and storage	-40 ... +85 °C
Weight, approx.	600 g
Special features	Designed for integrated use in body-in-white and paintshops (KTL, top coat, ...)

1) The service life depends on the temperature, the length of time the MDS is located within the antenna field of the read/write device (Zones 1 and 2) and the volume of data that is read/written.

2) Applies only in connection with original bracket.

Field data (all dimensions in mm)

MDS U589 to SLG U92

Ranges (S_g) of the read/write device can be limited in 500 mm steps up to 3000 mm

	minimal	Standard	maximal
Limit distance (S _g), approx.	500	2000	3000
Operating distance (S _a)	350	1400	2100
Transmission window at S _a length / width	700	2400	3000
	700 (with FCC approval)	2000 (with FCC approval)	2100 (with FCC approval)

Cyclic operation of the MDS at temperatures > 85 °C

At temperatures up to +85 °C, cyclic operation is not necessary, i.e. up to this temperature, the MDS can be in constant operation

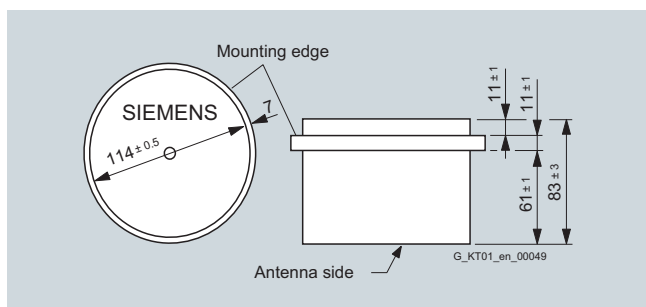
Heating up		Cooling down	
Temperature	Time	Temperature	Time
220 °C	Momentary	25 °C	> 30 min
200 °C	1 h	25 °C	> 4 h
200 °C	0.5 h	25 °C	> 1 h
180 °C	1 h	25 °C	> 3 h

Selection and Ordering data	Order No.
Mobile data storage unit MDS U589 32 KB RAM, up to 220 °C cyclic	6GT2 500-5JK10
Accessories	
Skid-support for MDS U589 Short version	▶ A 6GT2 090-0QA00
Cover For skid support	▶ A 6GT2 090-0QB00
Universal support For MDS U589, e.g. for attachment to the body with a customer-specific adapter	▶ 6GT2 590-0QA00

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

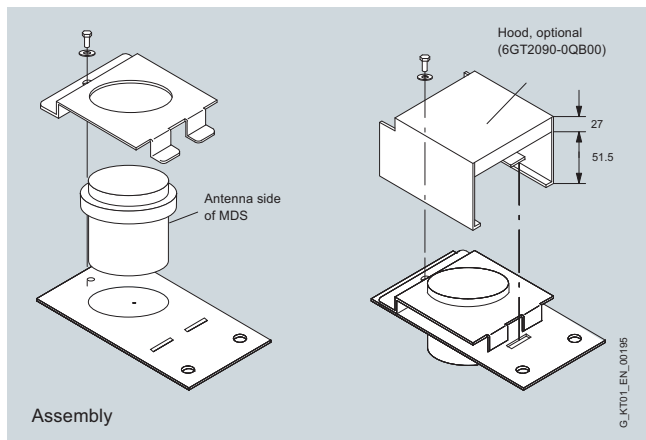
Dimensions



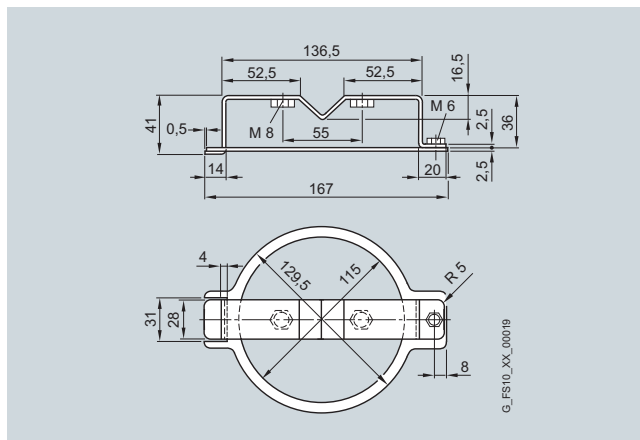
Data carrier MDS U589



Universal support with heat-proof data carrier MDS U589



Skid support, Cover



Universal support

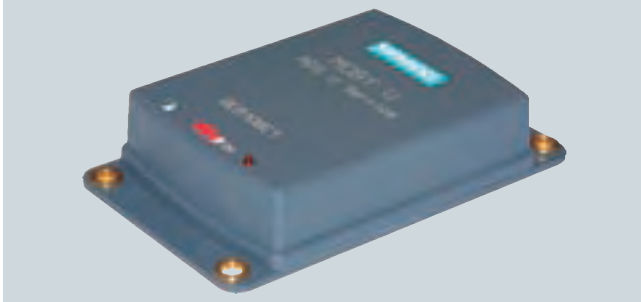
5

RFID system for production engineering

MOBY U mobile data storage units

MDS U Service

Overview



MDS U Service

The MDS U Service is an MDS for use in the start-up phase and during servicing in the automotive industry and other industrial production plants with similar requirements.

Memory capacity 32 KB RAM, two LED displays for communication, replaceable battery. With On/Off switch. Enclosure dimensions 111 mm x 67 mm x 23.5 mm, degree of protection IP40, operating temperature -25 °C to +70 °C.

Technical specifications

Mobile data storage unit	MDS U Service
Memory size	
<ul style="list-style-type: none"> Fixed code memory Read-only memory Application memory 	32-bit serial number 128 bit, to be written once by user ¹⁾ 32 KB RAM
Read/write cycles	Unlimited/ 10 ⁹ at +25 °C
Read/write distance	150 ... 3000 mm
Bulk and multitag capability	Yes
Power supply	Replaceable battery
Battery life	
<ul style="list-style-type: none"> MDS switched on, no communication and MDS outside antenna range MDS switched on, with communication MDS switched off 	approx. 1 year ²⁾ < 1 year ³⁾ ≥ 10 years
On/Off switch	Voltage on/off
Indicators	2 LEDs
<ul style="list-style-type: none"> Orange flashing Green 	Voltage On Communication
Torsion and bending load	Not permissible
Suggested attachment	4 x M4 screws
Recommended distance from metal	Can be directly mounted onto metal
Degree of protection as per EN 60529	IP40
Resistance to chemicals	See Configuration Manual
Housing	
<ul style="list-style-type: none"> Dimensions (L x W x H) Color/material 	111 mm x 67 mm x 23.5 mm Anthracite / plastic PA 12 GF 25
Ambient temperature	
<ul style="list-style-type: none"> During operation During transportation and storage 	-25 ... +70 °C -40 ... +85 °C
Weight, approx.	120 g
Special features	MDS service for assignments during the start-up phase and for servicing. For implementation in the automotive industry and other industrial production plants with similar requirements.

- 1) After "voltage off" the information in the read-only memory is lost and must/can be written again.
- 2) The service life depends on the temperature.
The MDS must not be located within the antenna range of the SLG (Zones 1 and 2).
- 3) The service life depends on the temperature, the length of time the MDS is located within the antenna field of the read/write device (Zones 1 and 2) and the volume of data that is read/written.

Field data (all dimensions in mm)

MDS U Service

Ranges (S_g) of the SLG can be limited in 500 mm steps up to 3500 mm

	minimal	Standard	maximal
Limit distance (S_g), approx.	500	2000	3000
Operating distance (S_a)	350	1400	2100
Transmission window at S_a length / width	700	2400	3000
	700 (with FCC approval)	2000 (with FCC approval)	2100 (with FCC approval)

The field data apply to write and read operations of the MDS.

Selection and Ordering data

Order No.

MDS U Service
mobile data storage

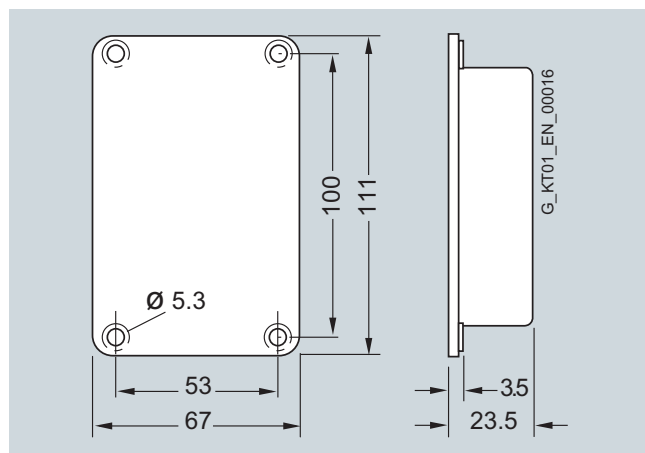


6GT2 500-5BF20

32 KB RAM

▶ Preferred type, available from stock.

Dimensions



RFID system for production engineering

MOBY U read/write devices

SLG U92

Overview



The compact and low-cost SLG U92 is a universal read/write device (SLG) with an integral antenna for applications where read/write distances of up to 3000 mm are required. Thanks to the automatic SLG synchronization via cable, it is possible to install up to three SLGs in a very small space.

Two different interfaces are available for the connection to a wide variety of systems:

- RS 232; serial interface for connection to any system (PC/PLC)
- RS 422; serial interface to the PC/PLC or to the MOBY interface modules (SIMATIC RF170C, SIMATIC RF180C, ASM 475, ASM 456) for integration into SIMATIC S7, PROFIBUS, or Industrial Ethernet

Software tools such as the SIMATIC S7 functions (FB/FC45 / FC46 / FC55 / FC56) and the C library MOBY API for applications under Windows 98/NT/2000/XP allow for easy implementation in the respective application.

The integrated file management system (compatible with the familiar MOBY I file handler and supplemented with multitag-handling commands) ensures simple and user-friendly management of data on the mobile data storage unit.

Type	Features
SLG U92	Compact and low-cost read/write device with integral antenna for universal applications, read/write distances of up to 3000 mm (adjustable by software in 500 mm steps to 3500 mm) incl. file handler, degree of protection IP65, enclosure dimensions (mm) 290 x 135 x 42
SLG U92 with RS 232	As above, but with RS 232 interface for connection to PC/PLC
SLG U92 with RS 422	As above, but with RS 422 interface for connection to ASM (e.g. ASM 456, SIMATIC RF170C, ASM 475) or PC/PLC

For use in the U.S.A. and Canada, a version with FCC PART 15C radio approval is available.

Function

The SLG U92 operates with a transmission frequency in the ISM band between 2.4 and 2.4835 GHz. This supports transmission ranges from a few centimeters up to three meters for an extremely low transmit power of < 10 mW EIRP and high net transmission rates up to 8 KB/s. Thanks to the selected transmission frequency, rugged modulation technique and appropriate check mechanisms, sources of electromagnetic interference can be disregarded and fault-free data transmission and data integrity are assured. MOBY U technology blocks the types of fault sources familiar in UHF transmissions such as reflections, interference and overrange. Matching antennas provide a homogeneous transmission field and ensure a detection rate of 100% for mobile data storage units (MDS). There is no need for time-consuming shielding measures and antenna alignment.

The antenna field of the SLG can be activated and deactivated with a function call or triggered automatically by a sensor (BERO) for the duration of communication with an MDS.

For management of the data on the mobile data storage unit, there are two possibilities, as follows:

- Byte-oriented addressing via absolute addresses (start address, length)
- Conveniently in a file management system (compatible with the MOBY I file handler)

In file handler mode, the MOBY U read/write device always fetches the necessary file management information directly from the MDS and it can be operated in three steps:

1. For existing system solutions with MOBY I, MOBY U can be operated with the default settings and unmodified file handler functions without the MOVE and LOAD commands that are no longer required.
2. The default settings and requests for diagnostic data can be easily changed with just a few additional commands.
3. Utilization of all features including multitag processing. In this step, the commands and/or useful data can be uniquely assigned as well as the relevant MDS number.

Two LEDs indicate the current status (e.g. MDS in the field) and make start-up easier.

For easy start-up and diagnostics during normal operation, a separate service and diagnostics interface (RS 232) is available. This interface can also be used by the service function "Load software in the SLG" to integrate future function expansions into existing applications without the need to replace the SLG.

The system interface (RS 232 or RS 422) can be used for serial connection to any other system (PC/PLC).

Technical specifications

SLG U92 read/write device	
Air interface to the MDS	Integrated antenna
Transmission frequency	2.4 ... 2.4835 GHz in the ISM band
Bandwidth	2 x 1 MHz within 83 MHz
Check mechanisms	Forward-correction by means of systematic block code (CRC), ARQ procedure
Error rate	< 1 reading error per 10 ⁶ transactions
Data rate (read/write) (net)	approx. 8 / 4.8 KB/s without bulk approx. 4 / 2.4 KB/s for bulk size 2
Range (read/write)	150 ... 3000 mm, see MDS field data
Local resolution	Range can be limited in steps of between 500 mm and 3500 mm
Radiant power / intensity	<ul style="list-style-type: none"> • for SLG U92 version without FCC approval < 10 mW EIRP / <0.5 μW/cm² (at a distance of 1 m) • for SLG U92 version with FCC approval < 50 mV/m at a distance of 3 m
Beam angle	approx. 70° horizontal/vertical
Polarization	Circular
Multi-identification capability	up to 12 MDS
MDS recording time	> 2 s for 12 MDS
Object speed (MDS)	< 2 m/s if S _a = 1.5 m and reading/writing ≤ 2.5 KB data
SLG-SLG synchronization	by means of semaphore control via second interface; max. 3 SLGs with one another
Minimum distance between two SLGs	> 6 m; if synchronized directly side by side
Serial interface to ASM or PC	RS 232 or RS 422 (SLG U92 variant), 6-pin SLG connector according to EN 175201-804
Data transmission rate	Automatic baud rate recognition 19.2 to 115.2 kbit/s (depending on cable length)
Transmission protocol	3964 R
Cable length, SLG – ASM/PC	max. 1000 m (RS 422, shielded)
Cable length, SLG – PC	max. 30 m / 300 m (RS 422, shielded)
Software functions	
Commands	MOBY file handler: Format data memory, create/delete file, write data to file, define access rights, etc. Direct reading/writing: read / write data, etc.
Programming	FC45/FC46/FC55/FC56, see ASM C library for PC with Windows 98/NT/2000/XP

SLG U92 read/write device	
Service interface	RS 232, 11-pin connector to DIN EN 175201-804
Data transmission rate	19.2 kbit/s
Cable length SLG – PC (shielded)	max. 20 m
Transmission protocol	Terminal, ASCII characters
2 DI for BERO	Triggering antenna field on/off
Cable length SLG – BERO (shielded)	max. 50 m
Interface for SLG-SLG synchronization (shielded)	max. cable length 30 m
Display elements	2 LEDs (data memory in field, errors, etc.)
MTBF (at +40 °C)	0.4 x 10 ⁶ hours
Power supply	24 V DC (rated value), 20 ... 30 V DC
Power consumption (transmitting)	< 300 mA
Enclosure	<ul style="list-style-type: none"> • Dimensions (L x W x H) in mm 290 x 135 x 42 (without connector) • Color/material anthracite / plastic PA 12 • Mounting 4 x M6 screws
Shock/vibration-resistant to DIN EN 60721-3-7, Class 7 M3	30 g / 1.5 g
Degree of protection to EN 60529	IP65
Ambient temperature	<ul style="list-style-type: none"> • Operation -25 ... +70 °C • Transport and storage -40 ... +85 °C
Weight, approx.	900 g
Special features	<ul style="list-style-type: none"> • Active suppression of overreach • Automatic frequency hopping • Service functions for fast error analysis • MOBY I – call-compatible (FC)

RFID system for production engineering

MOBY U read/write devices

SLG U92

Selection and Ordering data

Order No.

SLG U92 with RS 422

Integrated antenna	▶	6GT2 501-0CA00
Integrated antenna, FCC approval		6GT2 501-0BA00

SLG U92 with RS 232

Integrated antenna	▶	6GT2 501-1CA00
Integrated antenna, FCC approval		6GT2 501-1BA00

Accessories

RS 232 connecting cable

Between the PC and SLG U92,
with a connecting cable for a 24
V connector (M12 socket),
angled connector

5 m	▶	6GT2 591-1CH50
20 m	▶	6GT2 591-1CN20

Connector for SLG U92 service interface

11-pin, with angled output

Connector on SLG side (MOBY E, U)

6-pin DIN 43651 connector with
female contacts for crimping

• with angled output, 1 piece	▶ A	6GT2 090-0BA00
• with angled output, 1 packaging unit (10 pcs., price per piece)	▶ A	6GT2 090-0BA10
• with straight output, 1 piece	▶ A	6GT2 090-0UA00

SLG cable

Without connector between ASM
and SLG; 6 x 0.25 mm²

• 50 m	▶ A	6GT2 090-0AN50
• 120 m	▶ A	6GT2 090-0AT12
• 800 m	A	6GT2 090-0AT80

Wide-range power supply

Primary side: 100 ... 240 V AC,
120 ... 353 V DC, secondary
side: 24 V DC, 3 A, with no-load
protection, with continuous
short-circuit protection

• EU connector version	▶ A	6GT2 898-0AA00
• UK connector version	▶ A	6GT2 898-0AA10
• US connector version	▶ A	6GT2 898-0AA20

Cable for wide-range power supply

24 V DC, length 5 m

24 V connector (M12 socket)

For ASM 424/724/754, SLG Ux
(over PC connecting cable)

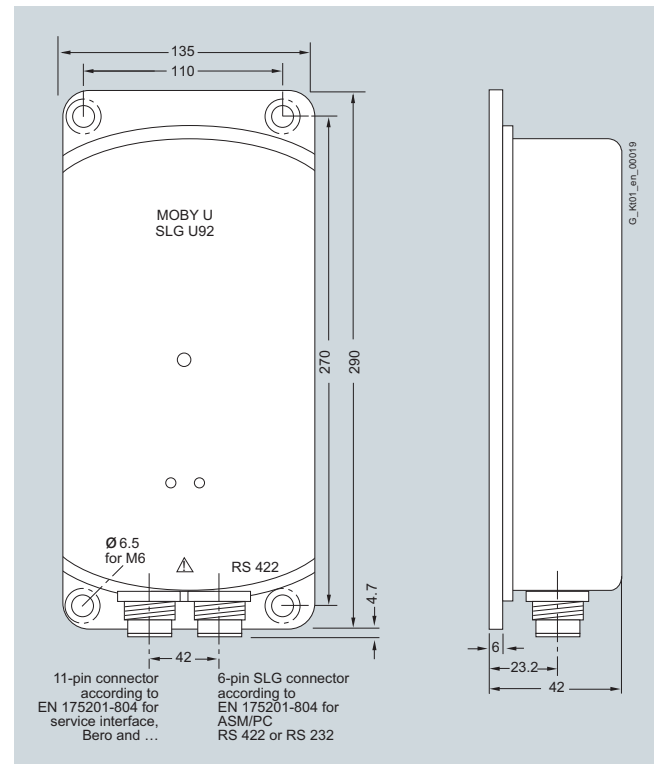
CD "RFID Systems Software & Documentation"

FB/FC for SIMATIC, 3964R driver
for DOS/WINDOWS
95/NT/2000/XP, C libraries, PC
presentation program.
RFID documentation

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



RFID system for production engineering

MOBY U read/write devices

STG U mobile hand-held terminal

Overview



The STG U is a powerful mobile hand-held terminal with integral read/write antenna for applications in the field of production, logistics and service. In addition, it is an indispensable tool for commissioning and testing.

Design

The STG U mobile hand-held terminal comprises a basic unit (based on the PSION Workabout^{mx}) and an antenna of the MOBY U type. It has a splash-proof housing (IP54), LCD display with 240 × 100 pixels, alphanumeric keypad and various interfaces (for EEPROM card, charging the battery, RS 232/TTL for the MOBY U antenna, battery charger interface incl. RS 232 for connecting to the PC, etc.).

Function

The supplied MOBY software (memory card) provides service and test functions for reading, writing, etc. of the MOBY U data memory:

- Reading data from the data memory
- Writing data to the data memory
- Reading and displaying the ID number of the data memory
- Reading MDS status
- Reading data from OTP memory
- Writing data to OTP memory
- Displaying and editing the data in hexadecimal, ASCII, decimal and binary formats
- Activating/deactivating password protection

On the basis of the optional C library, custom applications including a customized mask interface for the reading/writing of data memories can be very easily programmed. Various optional development tools for the PC and a wide selection of accessories are available directly from PSION. This solution opens up new applications in the field of logistics and distribution. The hand-held terminal for example allows for the offline recording and processing of commissioning data, which can then be forwarded to a PC/computer with a defined time delay.

Selection and Ordering data

Order No.

STG U mobile hand-held terminal ▶ D 6GT2 503-0AA00

MOBY U hand-held terminal STG U, complete (PSION Workabout^{mx}), antenna STG U, battery, EEPROM card. With MOBY software, operating instructions, without power pack for STG U

Accessories

STG U antenna ▶ 6GT2 503-1AA00

For basic unit (PSION Workabout^{mx})

STG U power supply unit ▶ 6GT2 503-1DA00

Wide-range power supply unit 90 ... 264 V AC, with cable switch, for the antenna STG U and the mobile hand-held terminal STG U, with charging adapter

STG software ▶ A 6GT2 303-1CA00

For MOBY D, E, F, I and U, incl. operating instructions, 1 MB EEPROM card

CD: "RFID Systems Software & Documentation" ▶ 6GT2 080-2AA10

FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program. MOBY documentation

A: Subject to export regulations AL = N and ECCN = EAR99H

D: Subject to export regulations AL = N and ECCN = 4A994X

▶ Preferred type, available from stock.

For optional components
visit <http://www.psionteklogix.com>

- "3link" connecting cable to the PC for easy exchange of data between the PC and PSION Workabout^{mx}
- PSION Workabout^{mx} basic unit with large-area function keys and number pad
- Additional memory card with up to 8 MB memory
- Docking station including rapid charger and software for convenient exchange of data between the PSION Workabout^{mx} and the PC.

Technical specifications: See following page.

RFID system for production engineering

MOBY U read/write devices

STG U mobile hand-held terminal

Technical specifications

STG U mobile hand-held terminal	
RAM/ROM	2 MB/2 MB
User program	1 MB (with MOBY service and test program)
Screen	Graphic LCD screen with 240 × 100 pixels; gray scale; selectable backlighting
Keyboard	Alphanumeric with 57 keys
Sound	Piezzo signal transmitter
Power supply	NiCd battery pack with 2 type AA cells (850 mAh); fast-charging; automatic shutdown Operating time: approx. 20 hours (antenna inactive, display unlit)
Dimensions	282 mm x 235 mm x 93 mm (incl. MOBY U antenna)
Weight	Approx. 1450 g (incl. MOBY U antenna)
Operating/storage temperature	-20 ... +60 °C/ -25 ... +70 °C (without battery)
Relative humidity	0 ... 90%, no condensation
Degree of protection	IP54 (splashproof); for STG U only as complete unit
Impact resistance	Max. drop onto concrete: 0.5 m
EMC	EN 55022
Electrostatic; RF; EFT	IEC 801-2; IEC 801-3; IEC 801-4

MOBY U antenna	Air interface to the MDS
Transmission frequency	2.4 to 2.4835 GHz in the ISM band
Bandwidth	2 x 1 MHz within 83 MHz
Gross bit rate of the radio channel	384 Kbit/s
Data rate (read/write) (net)	Approx. 8 / 4.8 KB/s without bulk
Antenna	
• Direction of radiation	Perpendicular to the rear panel of the MOBY U antenna
• Aperture angle	Approx. 70° (conical antenna field)
• Polarization	Circular
• Radiant power	< 50 mV/m at a distance of 3 m
• Radiation density	< 0.5 μW/cm ² at a distance of 1 m
Range (read/write)	150 ... 3,000 mm
Local resolution	Adjustable in steps of 0.5 m by means of range limitation
MDS recording time	Approx. 3 s for 1 MDS (after actuation of the communication key)
Power supply	<ul style="list-style-type: none"> Lithium-ion battery pack 2SIP CGR18650 HG 7.2 V 1.8 Ah Fast charging, automatic cutout, Service life approx. 500 charging cycles
Power consumption (antenna on)	• < 800 mA

MOBY U antenna	Air interface to the MDS
Operating time	> 2 months (antenna inactive) 2 hours (antenna active) The antenna is switched on by means of the communication key only for communication and automatically switched off after the function has been performed.
Operating modes	Antenna switched off
• Off	Ready to receive and evaluate search information sent by the MDS
• Search	Communication with the MDS: Write, read or initialize
• Communication	
Minimum distance to an SLG U92 or another STG U	> (set range + 0.5 m)
Serial interface (to basic unit)	RS 232/115.2 Kbaud/3964R
Interface for battery charging	4-pin socket for connecting the STG U power supply unit
• Voltage / current	12 V DC / 1.225 A
• Charging period	> 1.5 h (Lion battery pack 2SIP CGR18650 HG)
Control element	Communication key (for triggering the communication)
Display elements	LEDs
• LED for loading the batteries	
- Lights up	Power supply unit connected
	<ul style="list-style-type: none"> Red: device is defective Yellow: batteries are being charged Green: batteries are fully charged
- Does not light up	Power supply unit is not connected
• LEDs for communication	
- Lights up	Communication key pressed and communication not complete
	<ul style="list-style-type: none"> Red: battery capacity insufficient for communication Yellow: antenna is switched to active
- Does not light up	Communication terminated or not yet started
Enclosure	
• Color	Black
• Material	VALOX® 357X
Approvals	RF: EN 300 440-2 SAR: EN 50 371 Safety: EN 60 950-1 <u>EMC:</u> • EN 301 489-01 • EN 301 489-03 • ENV 50 204 FCC Part 15C UL/CSA Not critical with regard to heart pacemakers
Programming	Standard user interface for reading/writing of data memories, etc.

Overview

Note

Detailed information (clearance from metal, SLG – SLG clearance etc.) can be found in the "MOBY U Manual for Configuration, Assembly and Service".

Field characteristics (battery-saving mode)

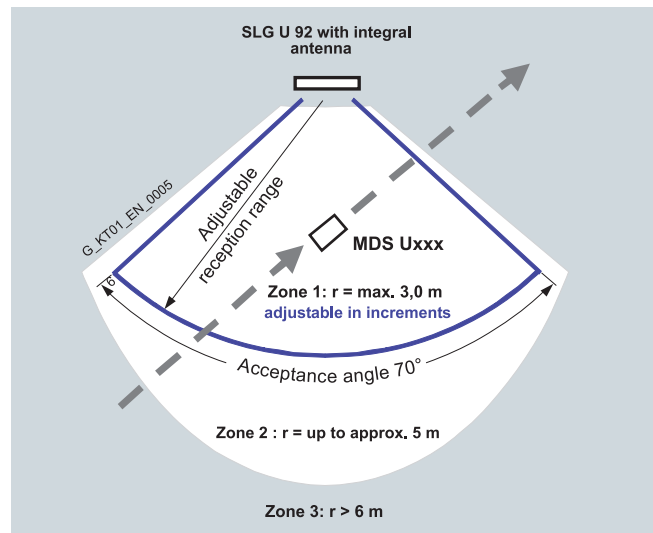
In contrast to the inductive RFID systems, UHF systems exhibit transmission behavior like electromagnetic waves. The wave length is approx. 13 cm. Metal surfaces reflect the waves and cannot be penetrated.

Despite a low radiation output, UHF systems have a relatively long range. The emission field has a directional characteristic which depends, however, on the antenna design. In order to keep the energy requirement low for the MDS and to make the determination of the location comprehensible, MOBY U has various function areas that are dependent on direction and distance. The three different zones of the transmission field are identified by different states and reactions of the components affected.

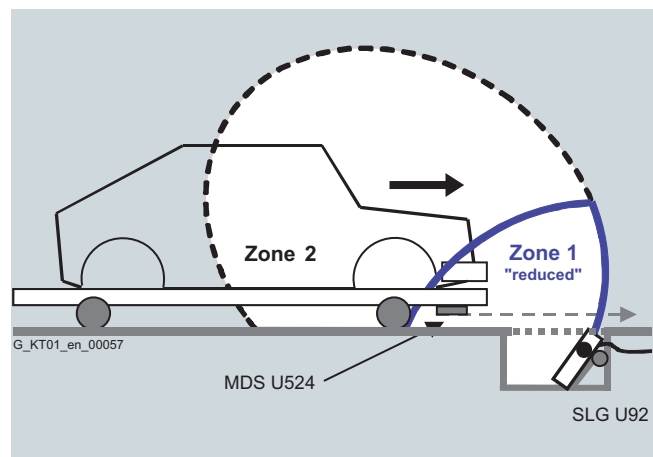
Put simply, Zone 3 is an SLG-field-free area. The MDS "sleeps" and only listens momentarily every 0.5 s for a sign of life from an SLG. This means that the power consumption is very low. If other UHF users in the vicinity are occupying the same frequency band, it has no effect on the MDS, as the latter requires a special code to wake it up. If the MDS in the vicinity of an active SLG then receives this special code, it enters Zone 2 (see Fig.). It immediately accepts the SLG and responds briefly with its own identification. The SLG however ignores every MDS unless it is in Zone 1, whose radius parameter can be set in stages in the SLG. The power consumption in Zone 2 is not significantly higher than in Zone 3.

If the MDS enters Zone 1, it is duly registered by the SLG and the data exchange can begin. Now all read and write functions can be performed. However, as the transmission rate at the air interface is very high (80 Kbit/s), the overall communication time is very short. For example, all bytes of the 32 KB memory are read in about 8 seconds. This means that the data exchange imposes hardly any load on the battery.

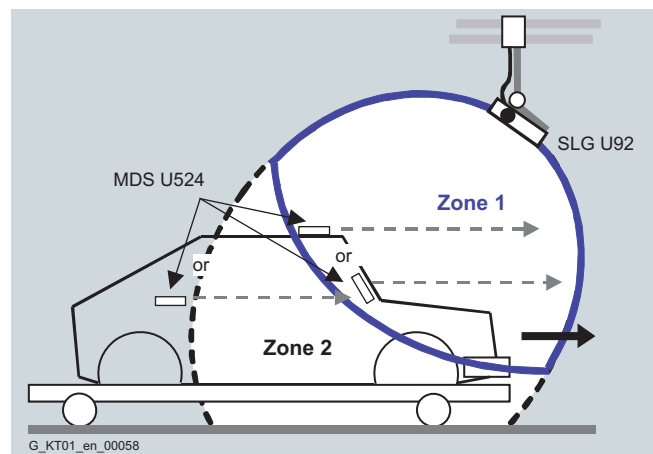
SLG U92 with integral antenna



Example: Car body identification



Example: Skid identification



RFID systems for logistics

Introduction

RFID systems for logistics – Identifying potential for optimization

RFID systems have been setting new standards in control and management tasks in distribution and logistics for a number of years, especially in terms of reliability with applications ranging from the identification of containers and recognition of textiles in dispatch centers and even in frozen storage. The rewritable, low-cost data memories as well as SmartLabels can be reliably identified and read, even through dirt.

Systems are based on the ISO 15693 standard as well as EPCglobal and ISO/IEC 18000-6, so SmartLabels from different manufacturers can be used. With the "electronic delivery note", you always have all the information at hand. Simple as well as complex tasks are performed quickly and reliably. Whatever the requirements, the optimal system is available. Additional equipment such as a mobile hand-held terminal provide additional flexibility in operation.

Application

- Dispatch warehouse including order picking ("brown goods", foodstuffs, tires, etc.).
- Cold-storage depots (including order picking)
- Container or vessel identification
- Identification of load carriers, pallets, cases or mini-load containers
- Distribution and loading control with electronic delivery note
- Parts identification for textiles (e.g. professional rental clothing, operating room textiles) in laundries
- Identification of window parts, items of furniture etc. in the logistics chain
- Parts identification in the clothing industry (e.g. shirts, suits, medical stockings)
- Production and shipping
- Goods distribution in open distribution chains, e.g. in parcel and postal services, mail order companies or freight forwarders
- Luggage transport and tracking
- Machine and plant construction
- Industrial production
- Laboratory and test equipment



Highlights

- Manage your procedures with rewritable electronic data storage units/SmartLabels
- Wide range of data storage units
- Mobile and flexible with hand-held terminals
- Customized SmartLabel/Antenna for high-volume applications



Logistics		
	MOBY D	SIMATIC RF600
Read/write distance	Up to 0.9 m	Up to 5.0 m (two antennas side by side) Up to 10.0 m (antennas in gate arrangement)
Frequency	13.56 MHz	865 ... 868 MHz (Europe) 902 ... 928 MHz (North America)
Standards	ISO 15693 ISO 18000-3	EPCglobal ISO 18000-6B, ISO 18000-6C

Technical specifications

MOBY D					SIMATIC RF600			
								
Read/write distance	Up to 680 mm (900 mm with customer-specific antenna)				Up to 5 m (up to 10 m for gate arrangement)			
Data transmission rate	≥ 3.5 ms/byte reading, ≥ 9.5 ms/byte writing				Up to 320 KB/s reading, up to 128 KB/s writing			
Memory	EEPROM							
Standards	ISO 15693				EPC Gen 1, EPC Gen 2, ISO 18000-6B, ISO 18000-6C			
Approvals	EN 300330 (Europa), FCC, IC				ETSI EN 302208, FCC			
Bulk capability	• (PC version with RS 232)				•			
Multitag capability	• (PC version with RS 232)				•			
Frequency	13.56 MHz				adjustable: 865 ... 868 MHz (Europe), 902 ... 928 MHz (U.S.A.)			
Mobile data storage units (tags/labels)	Name	Memory size	Operating temperature	Degree of protection	Name¹⁾	Memory size	Operating temperature	Degree of protection
	MDS D160	112 byte	-25 ... +175 °C	IP68	RF620L	EPC 96 Bit	-20 ... +70 °C	none
	MDS D100	112 byte	-25 ... +80 °C	IP68	RF630L	EPC 96 Bit	-40 ... +85 °C (+80 °C cycl.)	Accord- ing to ver- sion, none or IP65
	MDS D124	112 byte	-25 ... +125 °C	IP67				
	MDS D139	44 byte	-25 ... +200 °C	IP68				
	MDS D324	992 byte	-25 ... +125 °C	IP67				
	Smart Label	112/256 byte	-25 ... +85 °C	IP68	RF640T	216 byte	-25 ... +85 °C	IP68
Read/write devices	Name	Operating temperature	Degree of protection	Name	Operating temperature	Degree of protection		
Stationary, with detached antenna	SLG D10	-20 ... +55 °C	IP65	RF660R	-25 ... +55 °C	IP65		
	SLG D10S	-20 ... +55 °C	IP65					
	SLG D11 ANT D5	-25 ... +70 °C	IP65					
	SLG D11S ANT D5	-25 ... +70 °C	IP65					
Stationary, with integrated antenna	SLG D12	-25 ... +70 °C	IP65					
	SLG D12S	-25 ... +70 °C	IP65					
Mobile hand-held terminal with integrated antenna	STG D	-20 ... +50 °C	IP54					
Antennas	Name	Operating temperature	Degree of protection	Name	Operating temperature	Degree of protection		
	ANT D2	-20 ... +70 °C	IP65	RF660A	-25 ... +75 °C	IP67		
	ANT D5	-20 ... +55 °C	IP65					
	ANT D6	-20 ... +55 °C	IP65					
	ANT D10	-20 ... +55 °C	IP65					
Connection to the automation system	directly			via communication module (ASM)		directly		via communications module (ASM)²⁾
SIMATIC S7-300, S7-400				•				•
PROFIBUS DP				•				•
PROFINET				•				
Ethernet (TCP/IP)						•		
Serial interface to other controllers, PCs, any other systems	•					•		
Page	5/68				5/97			

1) Further tags and SmartLabels will be available soon

2) This feature will be available in the future

RFID systems for logistics

MOBY D

Introduction

Overview



MOBY D is a new RF identification system based on the Standard 15693 in the 13.56 MHz range. For the first time, the standard creates a common basis for SmartLabels from different manufacturers (e.g. I-Code, Tag-it).

Due to the reasonable prices of the SmartLabels in large volume applications and the simple system integration, MOBY D is the ideal identification system for the above applications.

Depending on the read/write distance, various read/write devices are available with integral or separate antennas.

The MOBY D identification system boasts the following features:

- 13.56 MHz identification system for SmartLabels/data storage based on I-Code 1 or ISO/IEC 15693 (I-Code SLI, Tag-it HFI) with a read/write clearance of up to 900 mm (MDS-/SLG-dependent)
- Special heat-resistant data storage (44-byte EEPROM) for paintshops up to +200 °C
- Very high level of reliability even in the presence of contamination, temperature fluctuations and electromagnetic interference
- Can be connected via serial interface to any system, e.g. PC with Windows 9x/NT
- Simple integration into SIMATIC and the PROFIBUS DP

Benefits

Worldwide support, configuration and service support.

Application

Main applications of MOBY D:

Applications extend from simple identification, such as electronic barcode substitution, supplementation, or delivery note in harsh environments, storage and distribution logistics, right up to product identification.

The design of the transponder permits a variety of flexible designs, guaranteeing optimum dimensioning for the widest variety of applications.

Low-cost SmartLabels for large volume applications:

- Container and box identification in open systems
- Distribution logistics and goods identification
- Parcel and mail services, mail order businesses and freight carriers
- Baggage check-in and baggage tracking
- Protection against plagiarism and theft

Advantages of SmartLabels over conventional barcode labels

- Rugged and reliably recognizable, even when contaminated (moisture, dust, etc.)
- Maintenance-free and resistant to aging
- Identification even of packages made of non-metallic materials
- Rewritable (unlimited read cycles, write cycles typically 1 000 000)

As many as 20 SmartLabels per second can be detected simultaneously (serial numbers in the case of bulk recognition). The data can be processed selectively in multitag mode.

Hardened data stores (closed systems)

- Container and box identification in logistics and distribution
- Production logistics and in assembly lines with higher temperature requirements (e.g. paintshops, temperature range up to +200°C)
- Parts identification (e.g. data storage is attached directly to product/pallet).

Function

MOBY identification systems ensure that important data accompanies a product from the very start.

Due to their extremely attractive price, SmartLabels can be universally implemented as "an electronic barcode substitute" or as a "delivery note".

Using stationary as well as mobile read/write devices (SLGs), the necessary information (production data, transport routes, etc.) can be read without contact (inductively), and even be supplemented or modified without the need for a direct line-of-sight link.

Technical specifications

MOBY D	
Type	Contactless RF identification system
Transmission frequency data/energy	13.56 MHz
Memory capacity	Dependent on chip used: <ul style="list-style-type: none"> • I-Code 1: 44-byte user memory • I-Code SLI: 112 byte user memory (ISO 15693) • my-d 992 byte user memory (ISO 15693) 8 byte fixed code as serial number
Memory type	EEPROM
Read/write cycles	> 1 000 000/unlimited
Data management	4 byte, block by block
Data transmission rate MDS – SLG	Approx. 3.5 ms/byte (reading); approx. 9.5 ms/byte (writing)
Read/write distance	Up to 680 mm (900 mm with customer-specific antenna ¹⁾)
Operating temperature (MDS)	-25 ... +80 °C, +125 °C, +175 °C, +200 °C
Degree of protection	up to IP68
Can be connected to	PC with Windows 98/NT, PLC SIMATIC S7, PROFIBUS DP
Special features	<ul style="list-style-type: none"> • For SmartLabels/data storage based on I-Code 1 or ISO/IEC 15693, e.g. I-Code SLI, Tag-it HFI • CRC checksums for secure data transmission • Bulk recognition and multitag function
Approvals	CE, EN 300330, FCC, IC

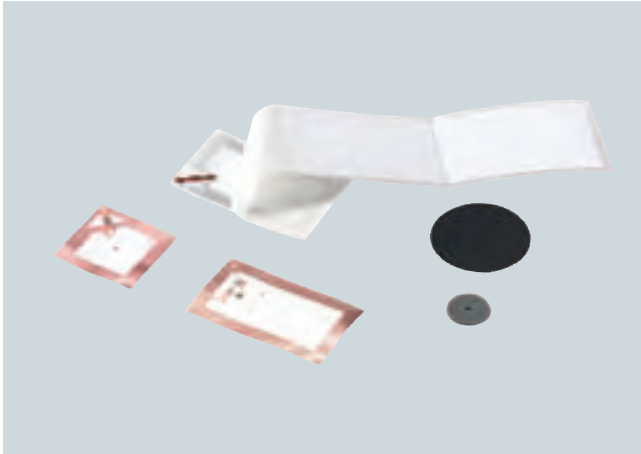
1) On request

RFID systems for logistics

MOBY D mobile data storage unit

Introduction

Overview



Type	Features
MDS D...	Customer-specific SmartLabel, e.g. in check card format: <ul style="list-style-type: none"> • 112/256 byte EEPROM • Degree of protection up to IP68 • Temperature range up to +80 °C • Typ. dimensions in mm: 55 x 55, 86 x 54 • Max. read/write distance up to 900 mm (large customer-specific antenna/SmartLabel)
MDS D100	Universally usable data storage in check card format: <ul style="list-style-type: none"> • 112 byte EEPROM • Degree of protection IP68 • Temperature range up to +80 °C • Max. read/write distance: 650 mm
MDS D124	Rugged data memory for deployment in harsh industrial environments and under extreme environmental conditions: <ul style="list-style-type: none"> • 112 byte EEPROM • Degree of protection IP67 • Temperature range up to +125 °C • Max. read/write distance: 180 mm
MDS D139	Re-usable data memory for use in paintshops or applications with high temperatures (44 byte EEPROM (Ø 85 mm x 15 mm)): <ul style="list-style-type: none"> • 44 byte EEPROM • Degree of protection IP68 • Temperature range up to +200 °C • Max. read/write distance: 550 mm

Type	Features
MDS D160	The EEPROM data memory (Ø 16 mm x 3 mm) has been specially designed for harsh environments in the laundry and cleaning industry. <ul style="list-style-type: none"> • Main applications include: <ul style="list-style-type: none"> - Rented work clothing - Rented laundry - OP textiles, hospital clothing - Hotel laundry - Dirt collection mats • 112 byte EEPROM • Degree of protection IP68 • Temperature range up to +175 °C • Max. read/write distance 160 mm
MDS D324	Rugged data memory for deployment in harsh industrial environments and under extreme environmental conditions: <ul style="list-style-type: none"> • 992 byte EEPROM • Degree of protection IP67 • Temperature range up to +125 °C • Max. read/write distance: 180 mm

Customer-specific data memory

Customer-specific data memory (packaging, temperature range, geometry etc.) on request.

Design

The MOBY D data storage unit/SmartLabel mainly comprises logic with an integrated EEPROM memory and an antenna.

Function

If an MDS moves into the transmission field of the SLG, the necessary power for all circuit components is generated and monitored by means of the energy supply unit. The pulse-coded information is prepared in such a way that it can be processed further as pure digital signals. The handling of data, including check routines, is performed by the control unit (SLG) which also manages the user memory.

Technical specifications

Field data (operating/limit distance) of MDS and SLG (all dimensions in mm)

The field data (unaffected by metal) for all MOBY D components of the MDS and SLG are shown in the table below. Thus it becomes particularly easy to select the right MDS and SLG. The listed technical data are typical values and are valid for a room temperature of +25 °C and a supply voltage of 24 V DC.

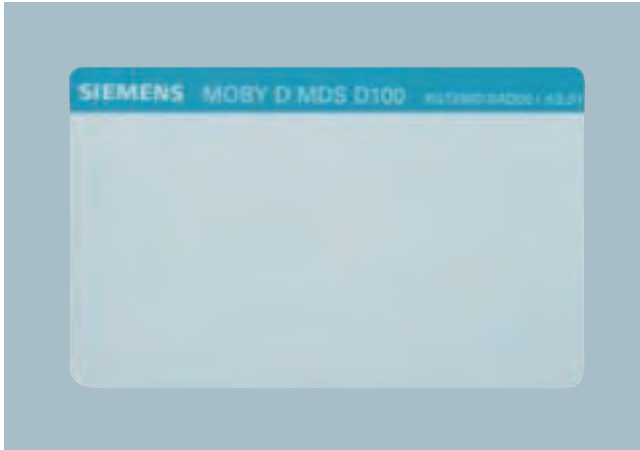
Type	MDS D... customer-specific, e.g. with SmartLabel 86 x 54	MDS D100	MDS D124	MDS D139	MDS D160	MDS D324
SLG D12/D12S	0 ... 150	0 ... 120 / 160	0 ... 50 / 70	0 ... 120 / 150	0 ... 45 / 65	0 ... 60 / 80
SLG D11/D11S ANT D5	0 ... 300	0 ... 300 / 380	0 ... 70 / 110	0 ... 240 / 300	0 ... 65 / 90	0 ... 100 / 150
SLG D10/D10S ANT D5	0 ... 500	0 ... 400 / 480	0 ... 130 / 180	0 ... 380 / 450	0 ... 120 / 160	0 ... 160 / 220
SLG D10/D10S ANT D6	0 ... 650	0 ... 550 / 650	0 ... 130 / 180	0 ... 480 / 550	0 ... 120 / 160	0 ... 160 / 220
SLG D10/D10S ANT D10	0 ... 500	0 ... 400 / 480	0 ... 130 / 180	0 ... 380 / 450	0 ... 120 / 160	0 ... 160 / 220

RFID systems for logistics

MOBY D mobile data storage unit

MDS D100

Overview



This mobile data storage unit is a passive, maintenance-free transponder based on ISO 15693 with I-Code SLI technology.

Application

Applications extend from simple identification, such as electronic bar code substitution or supplementation, over storage and distribution logistics, to product identification.

This mobile data storage unit can also be used without any difficulty under harsh environmental conditions (e.g. at a temperature up to +80 °C).

Technical specifications

MDS D100 mobile data storage unit	
Memory size	112 byte EEPROM available 8-byte serial number (read-only code)
Protocol	to ISO 15693
MTBF at +40 °C	2000000 h
Read cycles	Unlimited
Write cycles, min.	100000
Write cycles, typical	1000000
Data retention time	10 years (at < +40 °C)
Read/write distance, max.	650 mm (see field data)
Memory organization	4 byte, block by block
Multitag capability	Yes, depending on SLG
Energy source	Inductive power transmission (without battery)
Vibration	ISO 10 373/ISO 7810
Torsion and bending load	ISO 10 373/ISO 7816-1
Mounting	Fixing lug/adhesive
Recommended spacing from metal	25 mm (approx. 30% reduction of the field data)
Degree of protection to EN 60529	IP68
Enclosure	Laminated plastic card, printable on both sides
• Dimensions (L x W x H) in mm	85.6 x 54 x 0.9
• Color/material	White/petrol / PC
Ambient temperature	
• Operation	-25 ... +80 °C
• Transport and storage	-25 ... +80 °C
Weight, approx.	5 g

Field data in mm – without metallic influence

MDS D100 to:	SLG D12/D12S	SLG D11/D11S ANT D5	SLG D10/D10S ANT D5	SLG D10/D10S ANT D6	SLG D10/D10S ANT D10
Operating distance (S_a)	0 ... 120	0 ... 300	0 ... 400	0 ... 550	0 ... 400
Limit distance (S_g)	160	380	480	650	480
Transmission window (L)	120	∅ 300	∅ 320	520	1050
Minimum distance from MDS to MDS	≥ 500	≥ 1000	≥ 1000	≥ 1500	≥ 200

Selection and Ordering data

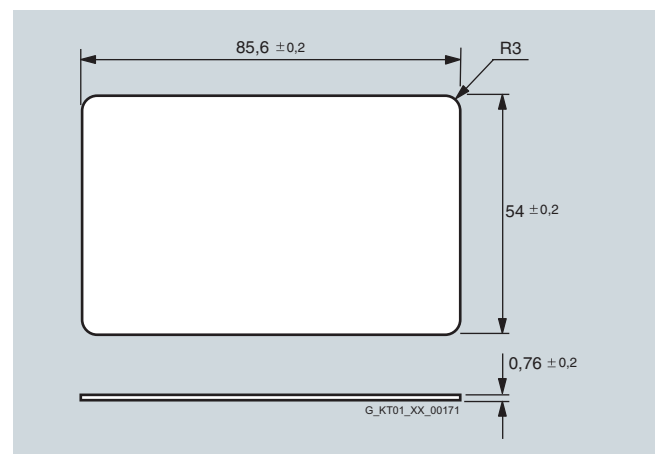
Order No.

MDS D100 mobile data storage unit	▶ A	6GT2 600-0AD10
112 byte EEPROM; IP68, max. + 80 °C		
Accessories		
Fixing lug	▶	6GT2 190 0AB00
for MDS D100		
Spacers	▶	6GT2 190-0AA00
For fixing lug, thickness 20 mm The purpose of the spacer is to maintain the recommended distance to the metal when installing the tag.		

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



RFID systems for logistics

MOBY D mobile data storage unit

MDS D124

Overview



The MDS D124 is a passive, maintenance-free transponder based on ISO 15693 with I-Code SLI technology.

Application

This mobile data storage can also be used without any difficulty under harsh environmental conditions (e.g. at a temperature up to +125 °C).

Technical specifications

MDS D124 mobile data storage unit	
Memory size	112 byte EEPROM available 8-byte serial number
Protocol	to ISO 15693
MTBF	1500000 hours
Read cycles	Unlimited
Write cycles, at +70 °C min.	100000
• at ≤ 40 °C, typical	1000000
Data retention time	> 10 years (at < +40 °C)
Read/write distance, max.	180 mm (see field data)
Memory organization	Block by block access
Multitag capability	Yes, depending on SLG
Energy source	Inductive power transmission (without battery)
Shock/vibration-resistant to EN 60721-3-7, Class 7 M3	See configuration manual
Torsion and bending load	Not permissible continuously
Mounting	Adhesive, screws
Recommended spacing from metal	> 25 mm
Degree of protection to EN 60529	IP67
Resistance to chemicals	See configuration manual
Enclosure	
• Dimensions	Ø 27 mm x 4 mm
• Color/material	Black/epoxy resin
Ambient temperature	
• Operation	-25 ... +125 °C
• Transport and storage	-40 ... +150 °C
Weight, approx.	5 g

Field data in mm – without metallic influence

MDS D124 to:	SLG D12/D12S	SLG D11/D11S ANT D5	SLG D11/D11S ANT D2	SLG D10/D10S ANT D5	SLG D10/D10S ANT D6	SLG D10/D10S ANT D10
Operating distance (S_a)	0 ... 50	0 ... 70	30 ... 50	0 ... 130	0 ... 130	0 ... 130
Limit distance (S_g)	70	110	60	180	180	180
Transmission window (L)	120	Ø 300	50	Ø 320	440	980
Minimum distance from MDS to MDS	≥ 300	≥ 800	≥ 400	≥ 800	≥ 1200	≥ 1800

Selection and Ordering data

Order No.

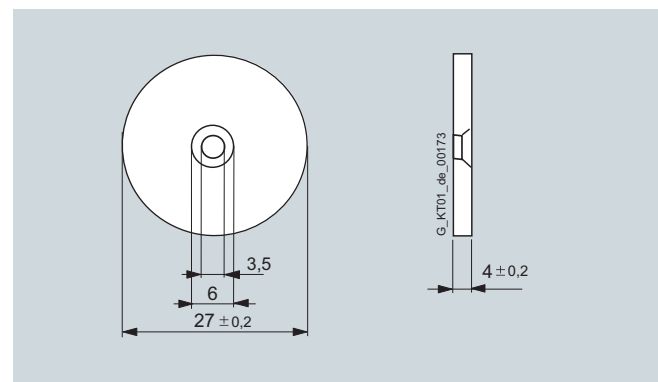
MDS 124 mobile data storage unit

112 byte EEPROM, IP67,
max. +150 °C

► Preferred type, available from stock.

► **6GT2 600-0AC00**

Dimensions



RFID systems for logistics

MOBY D mobile data storage unit

MDS D139

Overview



The MDS D139 is a passive, maintenance-free transponder based on the I-Code 1 technology.

Application

Low-cost, heat-resistant transponder for use in production logistics and assembly lines with high temperatures (max. +200 °C, e.g. in paintshops).

Technical specifications

MDS D139 mobile data storage unit	
Memory size	44 byte EEPROM available 8-byte serial number
Protocol	I-Code 1
MTBF	2,000,000 h
Read cycles	Unlimited
Write cycles, at +70 °C min.	10000
• at ≤ 40 °C, typical	500000
Data retention time	> 10 years (at < +40 °C)
Read/write distance, max.	550 mm (see field data)
Memory organization	Block by block access
Multitag capability	Yes, depending on SLG
Energy source	Inductive power transmission (without battery)
Shock/vibration-resistant to EN 60721-3-7, Class 7 M3	50 g/20 g
Torsion and bending load	Not permissible
Mounting	M5 screw
Recommended distance to metal	> 30 mm
Degree of protection to EN 60529	IP68
Ex approval	ATEX Zone 2G
Resistance to chemicals	See configuration manual
Enclosure	
• Dimensions	Ø 85 mm x 15 mm
• Color/material	Black/plastic PPS
Ambient temperature	
• During operation	-25 ... +140 °C ¹⁾
	• +200 °C max. (tested up to 4000 h continuous temperature, 1500 temperature cycles)
	• +220 °C temporarily
• During transportation and storage	-40 ... +100 °C
Weight, approx.	50 g
Special features	No silicone

Field data in mm – without metallic influence

MDS D139 to:	SLG D12/D12S	SLG D11/D11S ANT D5	SLG D10/D10S ANT D5	SLG D10/D10S ANT D6	SLG D10/D10S ANT D10
Operating distance (S_a) ¹⁾	0 ... 120	0 ... 240	0 ... 380	0 ... 480	0 ... 380
Limit distance (S_g) ¹⁾	150	300	450	550	450
Transmission window (L)	120	Ø 300	Ø 320	520	1050
Minimum distance from MDS to MDS	≥ 500	≥ 1000	≥ 1000	≥ 1500	≥ 2000

1) Reduction of the operating/limit distance by about 20% above 100 °C.
At 200 °C processing is not possible.

Selection and Ordering data

Order No.

MDS 139
mobile data storage unit ▶ **6GT2 600-0AA00**

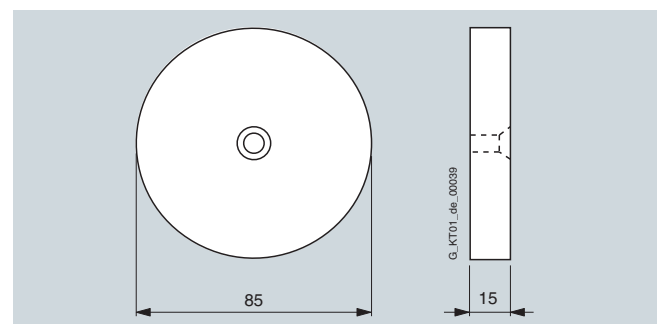
44 byte EEPROM, IP68,
max. +200 °C

Accessories

Spacer ▶ **6GT2 690-0AA00**

▶ Preferred type, available from stock.

Dimensions



RFID systems for logistics

MOBY D mobile data storage unit

MDS D160

Overview



Application

Typical applications include:

- Rented work clothing
- Hotel laundry
- Surgical textiles
- Hospital clothing
- Dirt collection mats
- Clothing for nursing homes/hostels

Technical specifications

MDS D160 mobile data storage unit	
Memory size	112 byte EEPROM available 8-byte serial number
Protocol	to ISO 15693
MTBF	2,500,000 h
Read cycles	unlimited
Write cycles, at +70°C min.	10000
• at ≤ 40 °C, typical	1000000
Data retention time	> 10 years (at < +40 °C)
Read/write distance, max.	160 mm (see field data)
Memory organization	Block by block access
Multitag capability	Yes, depending on SLG
Energy source	Inductive power transmission (without battery)
Shock/vibration to EN 60721-3-7, Class 7 M3	See configuration manual
Torsion and bending load	Not permitted continuously
Mounting	Patch, sew, glue
Recommended distance to metal	> 25 mm
Degree of protection to EN 60529	IP68 (2 m, 24 hours)
Resistance to chemicals	All chemicals normally used in the washing process
Enclosure	
• Dimensions	Ø 16 mm x 3 mm ± 0.1 mm
• Color/material	Beige/PPA
Ambient temperature	
• During operation	-25 ... +85 °C • Up to +120°C ¹⁾ for 1000 h • Up to +160 °C ¹⁾ for 35 h • Up to +175 °C for 10 minutes
• During transportation and storage	-40 ... + 85 °C
Weight, approx.	1.2 g
Special features	at least 100 wash cycles 24 hour regeneration time required between wash cycles

Field data in mm – without metallic influence

MDS D160 to:	SLG D12/D12S	SLG D11/D11S ANT D5	SLG D11/D11S ANT D2	SLG D10/D10S ANT D5	SLG D10/D10S ANT D6	SLG D10/D10S ANT D10
Operating distance (S_a) ¹⁾	0 ... 45	0 ... 65	35 ... 55	0 ... 120	0 ... 120	0 ... 100
Limit distance (S_g) ¹⁾	65	90	65	160	160	160
Transmission window (L)	120	280	50	Ø 300	480	980
Minimum distance from MDS to MDS	≥ 300	≥ 800	≥ 400	≥ 800	≥ 1200	≥ 1800

1) Reduction of the operating/limit distance by about 20% above 100 °C.
At 140 °C processing is not possible.

Selection and Ordering data

Order No.

MDS D160 mobile data storage unit

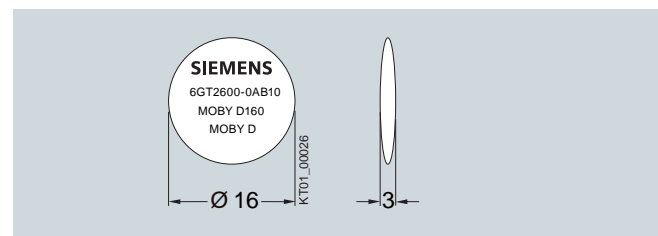
▶ A **6GT2 600-0AB10**

112 byte EEPROM, IP68,
max. +175 °C, momentary

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



RFID systems for logistics

MOBY D mobile data storage unit

MDS D324

Overview



The MDS D324 is a passive, maintenance-free transponder based on the ISO standard 15693 with my-d technology. It was developed for the application areas in production and distribution logistics as well as product identification.

For the user, the usable application memory amounts to 992 byte.

This mobile data storage unit can also be easily used in harsh environments under extreme environmental conditions (e.g. with higher temperature load).

Technical specifications

MDS U324 mobile data storage unit	
Memory size	992 byte EEPROM available 8 byte serial number
Protocol	According to ISO 15693
MTBF	1500000 h
Read cycles	unlimited
Write cycles, at +70 °C, min.	10000
• at ≤ 40 °C, typical	1000000
Data retention time	> 10 years (at < +40 °C)
Read/write distance, max.	220 mm (see field data)
Memory organization	Block-by-block access
Multitag capability	Yes, depending on SLG
Energy source	Inductive energy transfer (without battery)
Shock/vibration to EN 60721-3-7, Class 7 M3	See configuration manual
Torsion and bending load	No continuous load permissible
Mounting	glue, screw
Recommended distance to metal	> 25 mm
Degree of protection to EN 60529	IP67
Resistance to chemicals	See configuration manual
Enclosure	
• Dimensions	Ø 27 mm x 4 mm
• Color/material	Black/epoxy resin
Ambient temperature	
• During operation	-25 ... +125 °C
• During transportation and storage	-40 ... +150 °C
Weight, approx.	5 g

Field data in mm – without metallic influence

MDS D324 to:	SLG D12/D12S	SLG D11/D11S ANT D5	SLG D11/D11S ANT D2	SLG D10/D10S ANT D5	SLG D10/D10S ANT D6	SLG D10/D10S ANT D10
Operating distance (S_a)	0 ... 60	0 ... 100	35 ... 60	0 ... 160	0 ... 160	0 ... 160
Limit distance (S_g)	80	150	70	220	220	220
Length of transfer window (L or L_x/L_y)	120/60	Ø 300	50	Ø 320	500/400	1000/280
Width of transfer window (B or B_x/B_y)	48/24	120	50	128	200/160	400/112
Minimum distance from MDS to MDS	≥ 300	≥ 800	≥ 400	≥ 800	≥ 1200	≥ 1800

Selection and Ordering data

Order No.

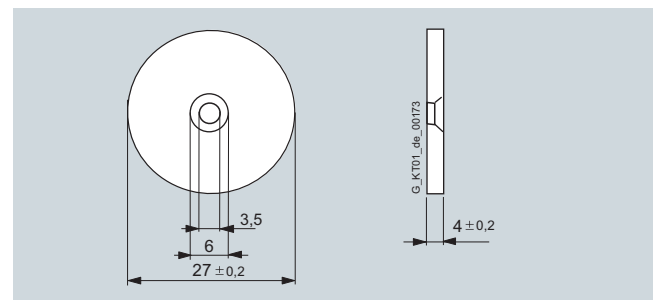
MDS U324 mobile data storage unit

Button, 992 byte EEPROM user
memory, max. +125 °C

► Preferred type, available from stock.

► **6GT2 600-3AC00**

Dimensions

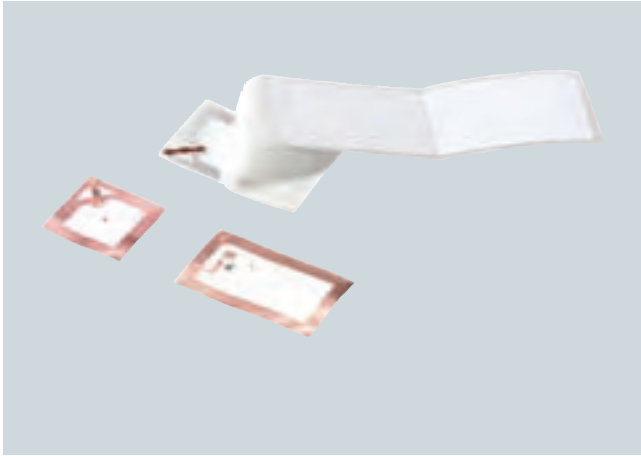


RFID systems for logistics

MOBY D mobile data storage unit

SmartLabel

Overview



Application

Thanks to their very reasonable price, the SmartLabels can be used universally as electronic "barcode substitutes" or "delivery notes".

Design

The design of the customer-specific SmartLabels permits a variety of flexible designs, ensuring optimum dimensioning for the widest variety of applications.

Technical specifications

SmartLabel	
Memory size (for I-code), e.g.	112 or 256 byte EEPROM available 8-byte serial number
Protocol	to ISO 15693
Read cycles	Unlimited
Write cycles at ≤ 40 °C, typical	> 1000000
Data retention time	> 10 years (at < +40 °C)
Read/write distance, max.	900 mm (see field data)
Memory organization	Block by block access
Multitag capability	Yes, depending on SLG
Energy source	Inductive power transmission
Mounting	E.g. single-sided adhesive attachment
Recommended spacing from metal	> 10 mm
Degree of protection to EN 60529	Up to IP68
Resistance to chemicals	On request
Enclosure	
• Dimensions in mm	E.g. 86 x 54 or 55 x 55
• Color/material	E.g. upper side plastic Lower side double-sided transfer adhesive on silicon Paper
Ambient temperature	
• Operation	E.g. -25 ... +85 °C
• Storage temperature	+20 ... +30 °C
Weight, approx.	E.g. 3 g
Special features	<ul style="list-style-type: none"> • Temperature range, size, degree of protection, mounting, operating distance etc. all depend on the customer-specific design of the SmartLabels • High-volume applications • On request

Selection and Ordering data

	Order No.
MDS D261 SmartLabel ▶ PET, 256 byte, -25 ... 85 °C, dimensions in mm: 55 x 55 x 0.3 Price valid for one piece. Packaging volume is 1,250 pcs.	6GT2600-1AA00-0AX0
MDS D165 SmartLabel ▶ 112 byte, -25 ... 85 °C, Dimensions in mm: 86 x 54 x 0.3 Price valid for one piece. Packaging volume is 1,250 pcs.	6GT2600-1AB00-0AX0

▶ Preferred type, available from stock.

RFID systems for logistics

MOBY D read/write devices

Introduction

Overview



The read/write device (SLG) ensures inductive communication and power supply to the MDS and for the serial connection (RS 232 or RS 422) to various systems (PC, PLC).

Read/write devices in the upper, medium and lower performance ranges are available to users for integration into SIMATIC S7 and PROFIBUS DP V1. The MOBY communication modules are used for connecting the read/write devices to SIMATIC and PROFIBUS DP V1.

Various different SLGs are available for small, medium and large distances to the MDS to satisfy customer requirements.

A rugged housing or antenna enclosure and a high degree of protection allow the use under tough environmental conditions and guarantees a high resistance to many chemical substances. New applications are opened up by the support of SmartLabels on the basis of the ISO/IEC 15693 standard, multitag capability, etc.

Type	Features
SLG D10 basic unit	Read/write device with plug for connection of an external antenna (ANT D5 / ANT D6 / ANT D10) <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to +55 °C • RS 232 interface for connection to PC/PLC
SLG D10 ANT D5	Universal read/write device with detached antenna ANT D5 (340 mm x 325 mm x 38 mm) <ul style="list-style-type: none"> • Max. read/write distance: 480 mm • Degree of protection IP65 • Temperature range up to +55 °C • With RS 232 interface for connection to PC/PLC
SLG D10S basic unit	Read/write device with plug for connection of an external antenna (ANT D5 / ANT D6 / ANT D10) <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to 55 °C • RS422 interface for connection to SIMATIC S7/ PROFIBUS via ASM 452, ASM 456, ASM 473 or ASM 475

Type	Features
SLG D10S ANT D5	Like SLG D10 ANT D5, but with RS422 interface for connection to SIMATIC S7/ PROFIBUS via ASM 452, ASM 456, ASM 473 or ASM 475
SLG D11 basic unit	Read/write device with plug for connection of an external antenna (ANT D2 / ANT D5) <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to 55 °C • RS232 interface for connection to a standard PC or external controllers
SLG D11 ANT D5	Universal read/write device with detached antenna ANT D5 (340 mm x 325 mm x 38 mm) <ul style="list-style-type: none"> • Max. read/write distance: 380 mm • Degree of protection IP65 • Temperature range up to +55 °C • With RS 232 interface for connection to PC/PLC
SLG D11S basic unit	Read/write device with plug for connection of an external antenna (ANT D2 / ANT D5) <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to 55 °C • RS422 interface for connection to SIMATIC S7 / PROFIBUS DP-V1 / PROFINET via ASM 452, ASM 456, ASM 473 or ASM 475, RF170C, RF180C
SLG D11S ANT D5	Like SLG D11 ANT D5, but with RS422 interface for connection to SIMATIC S7/ PROFIBUS via ASM 452, ASM 456, ASM 473 or ASM 475
SLG D12	Universal read/write device with integral antenna (160 mm x 80 mm x 40 mm) <ul style="list-style-type: none"> • Max. read/write distance: 160 mm • Degree of protection IP65 • Temperature range up to +55 °C • With RS 232 interface for connection to PC/PLC
SLG D12S	Like SLG D12, but with RS422 interface for connection to SIMATIC S7/ PROFIBUS via ASM 452, ASM 456, ASM 473 or ASM 475
ANT D2	Universal antenna (75 mm x 75 mm x 40 mm), connectable to basic units SLG D11/SLG D11S <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to 70 °C • Cable length 3.3 m (for plugging in at both ends)
ANT D5	Universal antenna (340 mm x 325 mm x 38 mm), connectable to basic units SLG D10/SLG D10S <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to 55 °C • Cable length 3.6 m (permanently connected on antenna side)
ANT D6	Universal antenna (580 mm x 480 mm x 110 mm), connectable to basic units SLG D10/SLG D10S <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to 55 °C • Cable length 3.3 m (connectable at both ends, included in scope of delivery)

Type	Features
ANT D10	<p>Antenna (1150 mm x 365 mm x 115 mm) for storage, logistics and distribution. Ideally suited to the clothing industry/laundries. For connection to SLG D10 and D10S. Advantageous geometry for small tags and a long transmission field.</p> <p>Main areas of application: Container identification, goods identification, package and postal services, dispatch, haulage, clothing industry, laundries</p> <ul style="list-style-type: none"> • Degree of protection IP65 • Temperature range up to 55 °C • Cable length 3.3 m (connectable at both ends, included in scope of delivery) • Cover included in scope of supply

Design

The following serial interfaces including software tools (on the "RFID-Systems Software & Documentation" CD) are available for quick and easy integration into the application:

- RS232 with binary protocol
 - For serial interface to any system (PC/PLC)
 - C++ library MDWAPI (for Windows 9x/2000/NT) with extended range of functions including password protection, access authorization and multitag operation
- RS422 with 3964R protocol
 - For serial interface to the MOBY interface modules (ASM 450, ASM 452, ASM 473, ASM 475, RF170C and RF180C) or any systems, e.g. gateways
 - FC45 (without multitag, etc.) for SIMATIC S7-300/400, S7 PROFIBUS master

Function

The SLG converts the commands (read MDS etc.) received by the PC or interface module (ASM) and generates by means of the antenna a magnetic alternating field for the contactless communication and power transmission to the MDS.

Failsafe protocols and access mechanisms achieve a high degree of data security and guarantee fast, secure and noise-resistant communication. The transmittable volume of data between SLG/antenna and MDS depends on:

- the speed at which the MDS moves through the transmission window of the antenna
- the length of the transmission window

Technical specifications

Field data

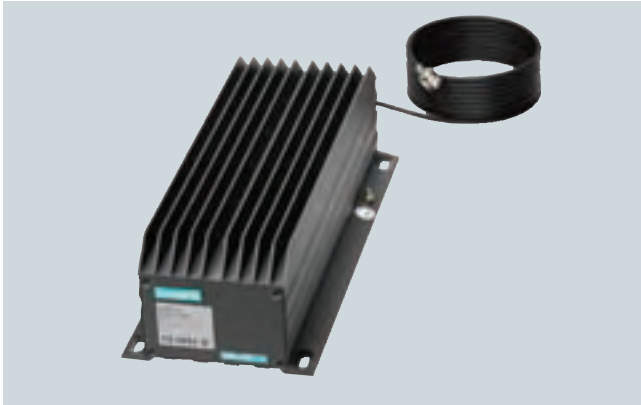
Minimum distance from SLG to SLG		
SLG D12 / SLG D12S	SLG D12 / SLG D12S	> 600 mm
SLG D11 ANT D5 / SLG D11S ANT D5	SLG D11 ANT D5 / SLG D11S ANT D5	> 1,200 mm
SLG D11 ANT D2 / SLG D11S ANT D2	SLG D11 ANT D2 / SLG D11S ANT D2	> 500 mm
SLG D10 ANT D5 / SLG D10S ANT D5	SLG D10 ANT D5 / SLG D10S ANT D5	> 2000 mm
SLG D10 ANT D6 / SLG D10S ANT D6	SLG D10 ANT D6 / SLG D10S ANT D6	> 2000 mm
SLG D10 ANT D10 / SLG D10S ANT D10	SLG D10 ANT D10 / SLG D10S ANT D10	> 2000 mm

RFID systems for logistics

MOBY D read/write devices

SLG D10/SLG D10S basic unit for ANT D5, ANT D6 and ANT D10 antennas

Overview



The SLG D10 / SLG D10S basic units are read/write devices in the upper performance range and can be operated with the ANT D5, ANT D6 and ANT D10 antennas.

The read/write devices are equipped with an RS232 serial interface for connection to PCs/PLCs or RS422 interface which permits communication via the communications modules ASM 456, ASM 475, RF170C and RF180C to SIMATIC S7 or PROFIBUS/PROFINET.

Connectable switch and antennas:

Antenna switch

The antenna switch enables several individual antennas or portal solutions to be operated with only one read/write device (SLG D10 / SLG D10S).

ANT D5

An antenna for universal applications designed for warehouse, logistics and distribution applications. The high degree of protection (IP65) enables the antenna to be used under harsh industrial conditions.

ANT D6

An antenna in the upper performance range, designed for warehouse, logistics and distribution applications. It can be used wherever high speeds are required together with a large read/write distance.

ANT D10

The ANT D10 is suitable for use in warehouses, logistics and distribution. An antenna with this geometry is required in the clothing industry and laundries in particular.




Technical specifications

Basic units	SLG D10	SLG D10S
Inductive interface to the MDS	Remote antenna	
Transmission frequency (energy/data)	13.56 MHz; ISO/IEC 15693	
Data memories / transponders supported	For SmartLabels based on standard ISO/IEC 15693 e.g.: I Code SII, Tag-it Hfi, plus I-Code 1	
Multitag capability	Yes, approx. 20 data memories/s	No
Read/write distance, max.	see MDS field data	
Transmit power	Up to 10 W	
Serial interface	RS232 to PC/SPS	RS422 to ASM 475
Max. cable length at 24 V DC	30 m	300 m
Connector	9-pin subminiature connector (pin)	
Data transmission rate	1200 baud ... 115.2 Kbaud (adjustable)	Up to 115.2 Kbaud (depending on ASM)
Procedure	Binary with CRC 16-security	3964R protocol
Software functions		
• Programming	C library for PCs with Windows 9x/2000 and NT	FB/FC45 for S7
• Commands	Read data from MDS, write data to MDS, access rights, multitag, etc.	Read data from MDS, write data to MDS
Rated supply voltage value/missible range	via 4-pin connector M12 (IP65) 24 V DC/20 V – 30 V DC	
Power consumption (at room temperature)		
• Inrush current, momentary	Up to 2.8 A/50 ms	
• Operation	Typ. 0.9 A	
Enclosure		
• Dimensions (in mm) for electronics without connector	320 x 145 x 100	
• Color/Material	Anthracite/Aluminum	
Degree of protection to EN 60529	IP65	
Shock-resistant acc. to EN 60721-3-7, Class 7M2	30 g	
Vibration-resistant acc. to EN 60721-3-7, Class 7M2	1 g (9 ... 200 Hz), 1.5 g (200 ... 500 Hz)	
Attachment of enclosure	4 x M6 screws	
Ambient temperature		
• Operation	-20 ... +55 °C	
• Transport and storage	-25 ... +70 °C	
MTBF	75000 h	
Weight	3.5 kg	

RFID systems for logistics

MOBY D read/write devices

SLG D10/SLG D10S basic unit for ANT D5, ANT D6 and ANT D10 antennas

Antenna	ANT D5	ANT D6	ANT D10
			
Inductive interface to the MDS	13.56 MHz		
Read/write distance, max.	See field data		
Interface to SLG D10 / SLG D10S	TNC		
• Plug connection	3.6 m (plugs into SLG)		
• Antenna cable length (included in scope of delivery)	3.3 m (connectable on both sides)		
Antenna dimensions in mm	340 x 325 x 38 (without range adjustment kit)	580 x 480 x 110 (without cover)	1150 x 365 x 115 (with cover)
• Antenna color	Black	Black/gray	Pastel turquoise
• Antenna material	Plastic ASA	Aluminum/plastic	
Degree of protection to EN 60529	IP65		
Shock-resistant acc. to EN 60721-3-7, Class 7M2	30 g		
Vibration-resistant acc. to EN 60721-3-7, Class 7M2	1 g (9 ... 200 Hz); 1.5 g (200 ... 500 Hz)		
Attachment of the antenna	4 x M5 screws	4 x M6 screws	
Ambient temperature			
• Operation	-20 ... +55 °C		
• Transport and storage	-25 ... +70 °C		
MTBF	300000 h		
Weight	1.0 kg	3.3 kg	10 kg

Antenna switch



Max. input power	10 W
Transmission frequency	13.56 MHz
Power supply	Not required
Connector (inputs and outputs)	TNC
Dimensions (L x W x H) in mm	160 x 80 x 40 without connector
• Color	Anthracite
• Material	Plastic PA 12
• Mounting	2 x M5 screws
Vibration-resistant to EN 60721-3-7, Class 7 M2	1 g (9 ... 200 Hz) 1.5 g (200 ... 500 Hz)
Shock-resistant to EN 60721-3-7, Class 7 M2	30 g
Degree of protection to EN 60529	IP65
Resistance to chemicals	On request
Ambient temperature	
• Operation	-25 ... +65 °C
• Transport and storage	-25 ... +75 °C
MTBF	300000 h
Weight, approx.	400 g
Approval	CE

RFID systems for logistics

MOBY D read/write devices

SLG D10/SLG D10S basic unit for ANT D5, ANT D6 and ANT D10 antennas

Selection and Ordering data	Order No.
SLG D10 read/write device ▶ A Basic unit (without antenna) with RS 232 serial interface for connection to PC/PLC	6GT2 698-1AA00
SLG D10S read/write device ▶ A Basic unit (without antenna) with RS 422 serial interface for connection to SIMATIC S7/PROFIBUS via ASM 456 or ASM 475	6GT2 698-2AA00
Accessories	
Antenna ANT D5 ▶ A For SLG D10 / SLG D10S basic units	6GT2 698-5AA00
Range adjustment kit for ANT D5 ▶ A	6GT2 690-0AB00
Antenna ANT D6 ▶ A For SLG D10 / SLG D10S basic units	6GT2 698-5AB00
Covering hood for ANT D6 ▶ A Serves as protection against contact	6GT2 690-0AD00
Antenna ANT D10 ▶ A For SLG D10 / SLG D10S basic units, cover and antenna cable included in scope of supply	6GT2 698-5AF00
Antenna switch ▶ A For connecting several antennas (ANT D5 or ANT D6) to one SLG D10 / SLG D10S, IP65, -25 ... +65 °C	6GT2 690-0AC00
MOBY D cables	
<ul style="list-style-type: none"> • Cable between ANT D6 and SLG D10/SLG D10S, antenna switch; length 3.3 m 	▶ A 6GT2 691-0CH33
<ul style="list-style-type: none"> • Cable between ANT D6 and SLG D10/SLG D10S, antenna switch; length 10 m 	▶ A 6GT2 691-0CN10
<ul style="list-style-type: none"> • Cable extension between ANT D6 and SLG D10/SLG D10S, antenna switch; length 7.2 m 	▶ A 6GT2 691-0DH72
RS232 connecting cable	
Between the PC and SLG D10	
<ul style="list-style-type: none"> • 5 m 	▶ 6GT2 691-0BH50
<ul style="list-style-type: none"> • 20 m 	▶ 6GT2 691-0BN20
Connector for SLG and SIM of MOBY D ▶ A Degree of protection IP65, 9-pin sub D connector	6GT2 490-1AA00
SLG cable	
Without connector between ASM and SLG; 6 x 0.25 mm ²	
<ul style="list-style-type: none"> • 50 m 	▶ A 6GT2 090-0AN50
<ul style="list-style-type: none"> • 120 m 	▶ A 6GT2 090-0AT12
<ul style="list-style-type: none"> • 800 m 	A 6GT2 090-0AT80

Varying-voltage power supply

Primary side: 100 ... 240 V AC, 120 ... 353 V DC, secondary side: 24 V DC, 3 A, with no-load protection, with continuous short-circuit protection

- EU connector version ▶ A **6GT2 898-0AA00**
- UK connector version ▶ A **6GT2 898-0AA10**
- US connector version ▶ A **6GT2 898-0AA20**

Cable for varying-voltage power supply

24 V DC, 5 m in length

24 V connector (M12 socket) ▶ A

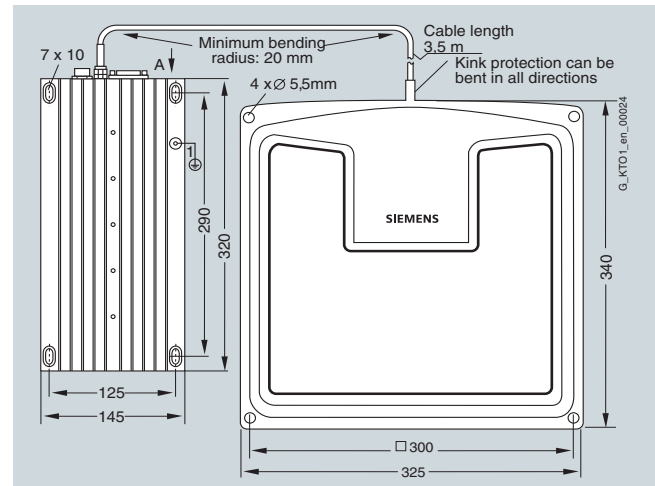
For ASM 424/724/754, SLG Ux (over PC connecting cable)

CD "RFID Systems Software & Documentation" ▶ A

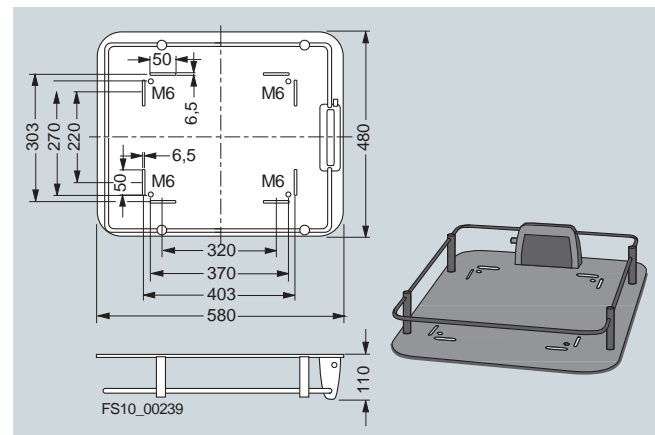
FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program. RFID documentation

- A: Subject to export regulations AL = N and ECCN = EAR99H
- ▶ Preferred type, available from stock.

Dimensions



Basic unit (left), antenna ANT D5 (right)

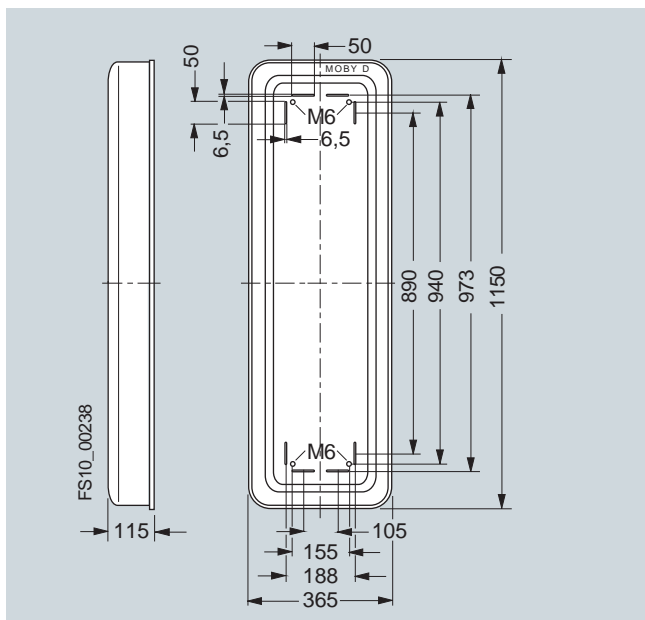


Antenna ANT D6

RFID systems for logistics

MOBY D read/write devices

SLG D10/SLG D10S basic unit for ANT D5, ANT D6 and ANT D10 antennas



Antenna ANT D10

RFID systems for logistics

MOBY D read/write devices

SLG D10 ANT D5/SLG D10S ANT D5

Overview



Technical specifications

Type	SLG D10 ANT D5	SLG D10S ANT D5
Inductive interface to the MDS	Remote antenna	
Transmission frequency (energy/data)	13.56 MHz; ISO/IEC 15693	
Data memories / transponders supported	For SmartLabels based on standard ISO/IEC 15693 e.g.: 1 Code Sli, Tag-it HFi	
Multitag capability	Yes, approx. 20 data memories/s	Available soon
Read/write distance, max. ¹⁾	480 mm, see MDS field data	
Antenna cable length (included in scope of delivery)	3.6 m	
Transmit power	Up to 4 W	
Serial interface	RS232 to PC/SPS	RS422 to ASM 456, ASM 475, RF170C, RF180C
Max. cable length at 24 V DC	30 m	300 m
Connector	9-pin subminiature connector (pin)	
Data transmission rate	1200 baud ... 115.2 Kbaud (adjustable)	Up to 115.2 Kbaud (depending on ASM)
Procedure	Binary with CRC 16-security	3964R protocol
Software functions		
• Programming	C library for PCs with Windows 9x/2000 and NT	FB/FC45 for S7
• Commands	Read data from MDS, write data to MDS, access rights, multitag, etc.	Read data from MDS, write data to MDS
Rated supply voltage value/permissible range	Via 4-pin device connector M12 (IP65) 24 V DC/20 V – 30 V DC	
Power consumption (at room temperature)		
• Inrush current, momentary	Up to 2.8 A/50 ms	
• Operation	Typ. 0.9 A	
Enclosure		
• Dimensions in mm		
- For antenna	340 x 325 x 38	
- For electronics without connector	320 x 145 x 100	
• Color of antenna/SLG enclosure	Black/anthracite	
• Material antenna/SLG enclosure	Plastic ASA/aluminum	
Degree of protection to EN 60529, enclosure/antenna (front)	IP65/IP65	
Antenna connector (connectable to SLG)	TNC connector	
Shock resistant to EN 60721-3-7	30 g, Class 7M2	
Vibration resistant to EN 60721-3-7	1 g (9 ... 200 Hz) 1.5 g (200 ... 500 Hz), Class 7M2	
Attachment of enclosure	4 x M6 screws	
Attachment of the antenna	4 x M5 screws	

RFID systems for logistics

MOBY D read/write devices

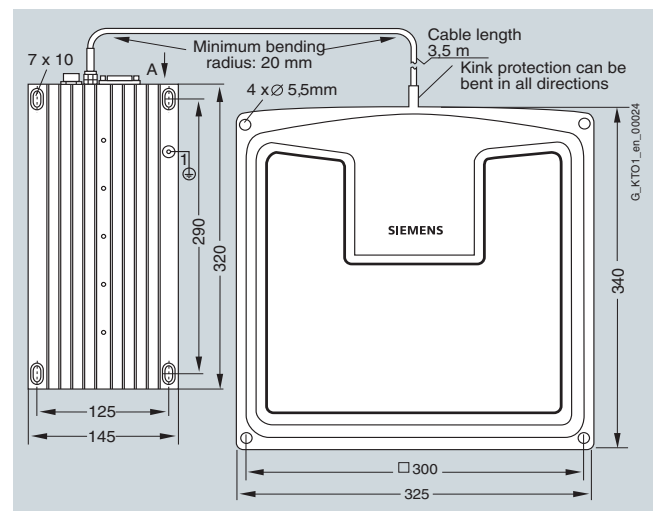
SLG D10 ANT D5/SLG D10S ANT D5

Type	SLG D10 ANT D5	SLG D10S ANT D5
Ambient temperature		
• Operation	-20 ... + 55 °C	
• Transport/storage	-25 ... + 70 °C	
MTBF		
• Readers	75000 h	
• Antenna	300000 h	
Weight		
• Basic unit	3.5 kg	
• Antenna	1 kg	

1) In order to guarantee optimum field data in metallic environments, the antenna is calibrated at the factory at a distance of 100 mm from metal (see clearance kit 6GT2 690-0AB00).

Selection and Ordering data	Order No.	Order No.
SLG D10 ANT D5 read/write device ▶ A	6GT2 601-0AA00	Varying-voltage power supply Primary side: 100 ... 240 V AC, 120 ... 353 V DC, secondary side: 24 V DC, 3 A, with no-load protection, with continuous short-circuit protection • EU connector version ▶ A 6GT2 898-0AA00 • UK connector version ▶ A 6GT2 898-0AA10 • US connector version ▶ A 6GT2 898-0AA20 Cable for varying-voltage power supply ▶ 6GT2 491-1HH50 24 V DC, 5 m in length 24 V connector (M12 socket) ▶ A 6GT2 390-1AB00 For ASM 424/724/754, SLG Ux (over PC connecting cable) CD "RFID Systems Software & Documentation" ▶ 6GT2 080-2AA10 FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program. RFID documentation A: Subject to export regulations AL = N and ECCN = EAR99H ▶ Preferred type, available from stock.
With RS 232 serial interface		
SLG D10S ANT D5 read/write device ▶ A	6GT2 602-0AA00	
With RS 422 serial interface		
Accessories		
Range adjustment kit for ANT D5 ▶	6GT2 690-0AB00	
Antenna switch ▶ A	6GT2 690-0AC00	
For connecting several antennas (ANT D5 or ANT D6) to one SLG D10 / SLG D10S, IP65, -25 ... +65 °C		
RS232 connecting cable		
Between the PC and SLG D10		
• 5 m ▶	6GT2 691-0BH50	
• 20 m ▶	6GT2 691-0BN20	
Connector for SLG and SIM of MOBY D ▶	6GT2 490-1AA00	
IP65 degree of protection, 9-pin sub D connector		
SLG cable		
Without connector between ASM and SLG; 6 x 0.25 mm ²		
• 50 m ▶ A	6GT2 090-0AN50	
• 120 m ▶ A	6GT2 090-0AT12	
• 800 m A	6GT2 090-0AT80	

Dimensions



RFID systems for logistics

MOBY D read/write devices

SLG D11/SLG D11S basic unit
for ANT D2 and ANT D5 antennas

Overview



The SLG D11/SLG D11S basic units are read/write devices in the mid-performance range and can be operated with the ANT D2 and ANT D5 antennas.

SLG D11

Equipped with RS232 serial interface for connection to PC/PLC

SLG D11S

Equipped with a serial RS422 interface that permits communications with SIMATIC S7 and PROFIBUS/PROFINET by means of the ASM 452, ASM 456, ASM 473, ASM 475, RF170C and RF180C.

Connectable antennas:

ANT D2

Designed for transponders that are directed sideways past the antenna. This antenna is specially designed for high speeds, e.g. in overhead conveyors, assembly lines, production and order picking. It can be mounted directly onto metal surfaces.

ANT D5

An antenna for universal applications designed for warehouse, logistics and distribution applications. The high degree of protection (IP65) enables the antenna to be used under harsh industrial conditions. A range adjustment kit is required for mounting on metal surfaces.

Technical specifications

Basic units	SLG D11	SLG D11S
Inductive interface to the MDS	Separate antenna ANT D2 or ANT D5 (to be ordered separately)	
Transmission frequency (energy/data)	13.56 MHz, ISO/IEC 15693	
Data memories/transponders supported	For SmartLabels based on the ISO/IEC 15693 standard, e.g. I-Code SLI, Tag-it HFI, Tag-it; additionally I-Code 1	
Multitag capability	Yes, approx. 20 data memories/s	No
Read/write distance, max. ¹⁾	see MDS field data	
Antenna cable length		
• ANT D2	3.3 m	
• ANT D5	3.6 m	
Transmit power		
• ANT D2	max. 4 W	
• ANT D5	1 W	
Serial interface	RS232 to PC/PLC	RS422 to ASM 452, ASM 456, ASM 473, ASM 475, RF170C, RF180C
Communication	with a PC or third-party controllers	with communication modules for SIMATIC S7 and PROFIBUS DP-V1/PROFINET
Max. cable length for 24 V DC	30 m	300 m
Connector	9-pin subminiature connector (pin)	
Transfer rate	1200 baud ... 38.4 Kbaud (adjustable)	Up to 38.4 Kbaud
Procedure/data backup	Binary with CRC 16-security	3964R protocol
Software functions		
• Programming	C library for PCs with Windows 9x/2000, NT or XP	FB/FC45 for S7
• Commands	Read data from MDS, write data to MDS, access rights, multitag, etc.	Read data from MDS, write data to MDS
Rated supply voltage value/permissible range	via 4-pin connector M12 (IP65) 24 V DC / 20 V – 30 V DC	
Power consumption (at room temperature)		
• Starting current, momentary	Up to 600 mA/50 ms	
• Operation	typ. 150 mA	

RFID systems for logistics

MOBY D read/write devices

SLG D11/SLG D11S basic unit
for ANT D2 and ANT D5 antennas

Basic units	SLG D11	SLG D11S
Housing		
• Dimensions in mm		
- For antenna ANT D2	75 x 75 x 40	
- For antenna ANT D5	340 x 325 x 38	
- For basic unit	160 x 80 x 40 (without connector)	
• Color of antenna/SLG enclosure	Black/anthracite	
• Material antenna/SLG enclosure	Plastic ASA/plastic PA 12	
Antenna connector (connectable to SLG)	TNC connector	
Degree of protection to EN 60529, enclosure/antenna (front)	IP65	
Shock resistant to EN 60721-3-7, Class 7M2 Total shock response spectrum, Type II	30 g	
Vibration-resistant according to EN 60721-3-7, Class 7M2	1 g (9 ... 200 Hz); 1.5 g (9 ... 500 Hz)	
Mounting of enclosure	2 x M5 screws	
Attachment of the antenna		
• ANT D2	2 x M5 screws	
• ANT D5	4 x M5 screws	
Ambient temperature		
• Operation	-25 ... +55 °C	
• Storage and transport	-25 ... +70 °C	
MTBF		
• Reader	200000 h	
• Antenna ANT D2	2 x 10 ⁷ h	
• Antenna ANT D5	300000 h	
Weight		
• Basic unit	Approx. 0.6 kg	
• Antenna ANT D2	260 g	
• Antenna ANT D5	Approx. 1 kg	

1) In order to guarantee optimum field data in metallic environments, the antenna is calibrated at the factory at a distance of 100 mm from metal (see range adjustment kit 6GT2 690-0AB00).

Antenna	ANT D2	ANT D5
Inductive interface to the MDS	13.56 MHz	13.56 MHz
Read/write distance, max.	See field data for the respective data memories	
Interface to SLG D10/SLG D10S		
• Plug connection	TNC	TNC
• Antenna cable length (included in scope of delivery)	3.3 m (connectable on both sides)	3.6 m (plugs into SLG)
Antenna dimensions in mm	75 x 75 x 40	340 x 325 x 38 (without range adjustment kit)
Antenna color	Anthracite	Black
Antenna material	Plastic PA 12	Plastic ASA
Degree of protection according to EN 60529		IP65
Shock-resistant according to EN 60721-3-7, Class 7M2	50 g	30 g
Vibration-resistant according to EN 60721-3-7, Class 7M2	10 g	1 g (9 ... 200 Hz); 1.5 g (200 ... 500 Hz)
Attachment of the antenna	2 x M5 screws	4 x M5 screws
Mounting directly on metal surfaces	permitted	Mounting on metal surfaces with range adjustment kit only
Ambient temperature		
• Operation	-20 ... +70 °C	-20 ... + 55 °C
• Storage and transport	-25 ... +85 °C	-25 ... + 70 °C
MTBF	2 x 10 ⁷ h	300000 h
Weight	260 g	1.0 kg

RFID systems for logistics

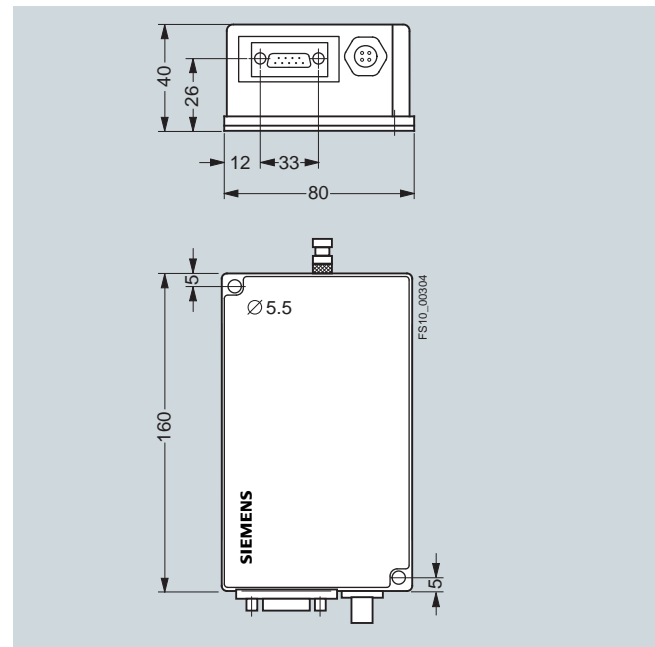
MOBY D read/write devices

SLG D11/SLG D11S basic unit for ANT D2 and ANT D5 antennas

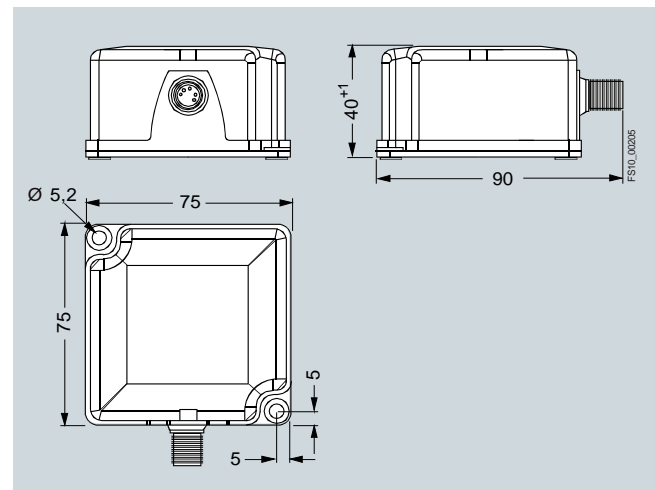
Selection and Ordering data	Order No.
SLG D11 read/write device ▶ A Basic unit (without antenna) with RS 232 serial interface for connection to PC/PLC	6GT2 698-1AC00
SLG D11S read/write device ▶ A Basic unit (without antenna) with RS 422 serial interface for connection to SIMATIC S7/ PROFIBUS/PROFINET via ASM	6GT2 698-2AC00
Accessories	
Antenna ANT D2 ▶ A For SLG D11 / SLG D11S basic units incl. antenna cable (3.3 m)	6GT2 698-5BB00
Antenna ANT D5 ▶ A For SLG D11 / SLG D11S basic units	6GT2 698-5AA00
Wide-range power supply 100 ... 240 V AC / 24 V DC, 3 A	
<ul style="list-style-type: none"> • With EU plug ▶ A 6GT2 898-0AA00 • With UK plug ▶ A 6GT2 898-0AA10 • With US plug ▶ A 6GT2 898-0AA20 	
Connecting cable for 24 V DC ▶ For wide-range power supply unit, 5 m	6GT2 491-1HH50
RS232 cable for SLG D11	
5 m ▶	6GT2 691-0BH50
20 m ▶	6GT2 691-0BN20
ASM – SLG D11S connecting cables	
<ul style="list-style-type: none"> • ASM 456, RF170C, RF180C, 2 m ▶ A 6GT2 891-0JH20 • ASM 475, 2 m ▶ A 6GT2 891-0EH20 • ASM 475, 5 m ▶ A 6GT2 891-0EH50 • ASM 473, ASM 452, 2 m ▶ A 6GT2 891-1CH20 • ASM 473, ASM 452, 5 m ▶ A 6GT2 891-1CH50 	
Extension cable for ASM 456	
<ul style="list-style-type: none"> • 2 m ▶ A 6GT2 891-0FH20 • 5 m ▶ A 6GT2 891-0FH50 • 10 m ▶ A 6GT2 891-0FN10 • 20 m ▶ A 6GT2 891-0FN20 • 50 m ▶ A 6GT2 891-0FN50 	
CD "RFID Systems Software & Documentation" ▶	6GT2 080-2AA10
FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC demonstration program. RFID documentation	

A: Subject to export regulations AL = N and ECCN = EAR99H
 ▶ Preferred type, available from stock.

Dimensions



SLG D11/SLG D11S basic unit



Antenna ANT D2

Dimensions for antenna ANT D5 refer to "SLG D10/D10S basic unit for antenna ANT D5", page 5/82.

Overview



Technical specifications

Type	SLG D11 ANT D5	SLG D11S ANT D5
Inductive interface to the MDS	Remote antenna ANT D5	
Transmission frequency (energy/data)	13.56 MHz; ISO/IEC 15693	
Data memories / transponders supported	For SmartLabels based on the ISO/IEC 15693 standard, e.g. I Code Sli, Tag-it HFI, Tag-it, additional I-Code 1	
Multitag capability	Yes, approx. 20 data memories/s	no
Read/write distance, max. ¹⁾	380 mm, see MDS field data	
Antenna cable length	3.6 m	
Transmit power	1 W	
Serial interface	RS232 to PC/SPS	RS422 to ASM 452, ASM 456, ASM 473, ASM 475, RF170C, RF180C
Max. cable length at 24 V DC	30 m	300 m
Connector	9-pin subminiature connector (pin)	
Data transmission rate	1200 baud ... 38.4 Kbaud (adjustable)	Up to 38.4 Kbaud
Procedure/data backup	Binary with CRC 16-security	3964R protocol
Software functions		
• Programming	C library for PCs with Windows 9x/2000 and NT	FB/FC45 for S7
• Commands	Read data from MDS, write data to MDS, access rights, multitag, etc.	Read data from MDS, write data to MDS
Rated supply voltage value/permissible range	Via 4-pin device connector M12 (IP65) 24 V DC/20 V – 30 V DC	
Power consumption (at room temperature)		
• Inrush current, momentary	Up to 600 mA/50 ms	
• Operation	Typ. 150 mA	
Enclosure		
• Dimensions in mm		
- For antenna	340 x 325 x 38	
- For the electronics	160 x 80 x 40 without connector	
• Color of antenna/SLG enclosure	Black/anthracite	
• Material antenna/SLG enclosure	Plastic ASA/plastic PA 12	
Antenna connector (connectable to SLG)	TNC connector	
Degree of protection to EN 60529, enclosure/antenna (front)	IP65	
Shock resistant to EN 60721-3-7, Class 7M2 Total shock response spectrum, Type II	30 g	
Vibration-resistant acc. to EN 60721-3-7, Class 7M2	1 g (9 ... 200 Hz); 1.5 g (9 ... 500 Hz)	

RFID systems for logistics

MOBY D read/write devices

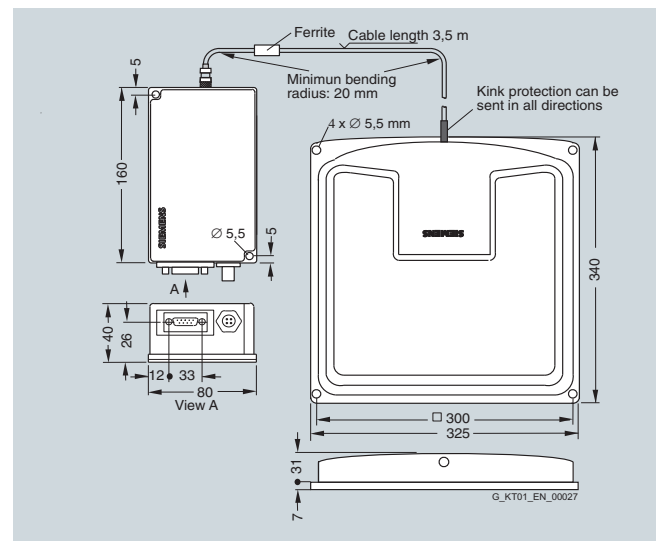
SLG D11 ANT D5/SLG D11S ANT D5

Type	SLG D11 ANT D5	SLG D11S ANT D5
Attachment of enclosure	2 x M5 screws	
Attachment of the antenna	4 x M5 screws	
Ambient temperature		
• Operation	-25 ... +55 °C	
• Transport and storage	-25 ... +70 °C	
MTBF		
• Readers	200000 h	
• Antenna	300000 h	
Weight		
• Basic unit	Approx. 0.6 kg	
• Antenna	Approx. 1 kg	

1) In order to guarantee optimum field data in metallic environments, the antenna is calibrated at the factory at a distance of 100 mm from metal (see clearance kit 6GT2 690-0AB00).

Selection and Ordering data	Order No.	Order No.
SLG D11 read/write device ▶ A	6GT2 601-0AC00	Cable for varying-voltage power supply ▶
With remote antenna ANT D5 With RS232 serial interface		6GT2 491-1HH50
SLG D11S read/write device ▶ A	6GT2 602-0AC00	24 V DC, 5 m in length
With remote antenna ANT D5 With RS422 serial interface		24 V connector (M12 socket) ▶ A
Accessories		6GT2 390-1AB00
Range adjustment kit for ANT D5 ▶	6GT2 690-0AB00	For ASM 424/724/754, SLG Ux (over PC connecting cable)
RS232 connecting cable		CD "RFID Systems Software & Documentation" ▶
Between the PC and SLG D11		6GT2 080-2AA10
• 5 m ▶	6GT2 691-0BH50	FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program. RFID documentation
• 20 m ▶	6GT2 691-0BN20	
Connector for SLG and SIM of MOBY D ▶	6GT2 490-1AA00	A: Subject to export regulations AL = N and ECCN = EAR99H ▶ Preferred type, available from stock.
Degree of protection IP65, 9-pin Sub-D connector		
SLG cable		
Without connector between ASM and SLG; 6 x 0.25 mm ²		
• 50 m ▶ A	6GT2 090-0AN50	
• 120 m ▶ A	6GT2 090-0AT12	
• 800 m A	6GT2 090-0AT80	
Varying-voltage power supply		
Primary side: 100 ... 240 V AC, 120 ... 353 V DC, secondary side: 24 V DC, 3 A, with no-load protection, with continuous short-circuit protection		
• EU connector version ▶ A	6GT2 898-0AA00	
• UK connector version ▶ A	6GT2 898-0AA10	
• US connector version ▶ A	6GT2 898-0AA20	

Dimensions



Overview



Technical specifications

Type	SLG D12	SLG D12S
Inductive interface to the MDS	Integrated antenna	
Transmission frequency (energy/data)	13.56 MHz; ISO/IEC 15693	
Data memories / transponders supported	For SmartLabels based on the ISO/IEC 15693 standard e.g. I-Code SLI, Tag-it HFI, additional I-Code 1	
Multitag capability	Yes, approx. 20 data memories/s Max. 160 mm, see MDS field data	Yes, available soon
Serial interface	RS232 to PC/SPS	RS422 to ASM 456, ASM 475, RF170C, RF180C
Max. cable length at 24 V DC	30 m	300 m
Connector	9-pin subminiature connector (pin)	
Data transmission rate	1200 baud ... 38.4 Kbaud (adjustable)	Up to 38.4 Kbaud
Procedure	Binary with CRC 16-security	3964R protocol
Software functions		
• Programming	C library for PCs with Windows 9x/2000 and NT	FB/FC45 for S7
• Commands	Read data from MDS, write data to MDS, access rights, multitag, etc.	Read data from MDS, write data to MDS
Rated supply voltage value/permissible range	Via 4-pin device connector M12 (IP65) 24 V DC/20 V – 30 V DC	
Power consumption (at room temperature)		
• Inrush current, momentary	Max. 600 mA	
• Operation	Typ. 150 mA	
Enclosure		
• Dimensions in mm	160 x 80 x 40	
• Color	Anthracite	
• Material	Plastic PA 12	
• Attachment of enclosure	2 x M5 screws	
Degree of protection to EN 60529	IP65	
Shock-resistant acc. to EN 60721-3-7, Class 7M2	30 g	
Vibration-resistant to EN 60721-3-7, Class 7M2	1,0 g (9 ... 200 Hz); 1.5 g (200 ... 500 Hz)	
Ambient temperature		
• Operation	-25 ... +55 °C	
• Transport and storage	-25 ... +70 °C	
MTBF	200000 h	
Weight, approx.	0.5 kg	

RFID systems for logistics

MOBY D read/write devices

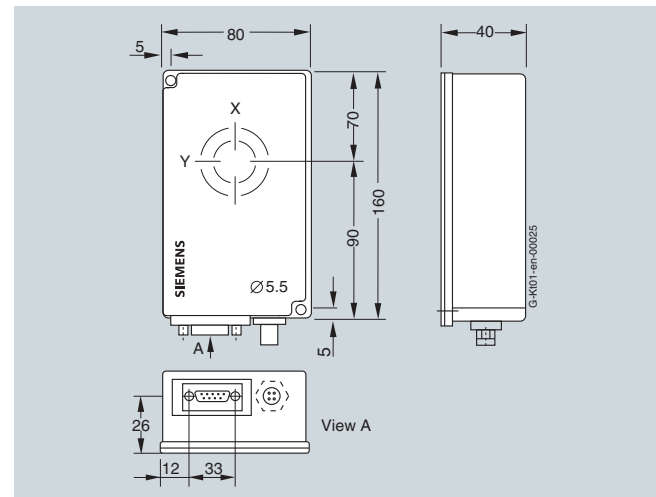
SLG D12/SLG D12S

Selection and Ordering data	Order No.
SLG D12 read/write device ▶ A With RS232 serial interface and integrated antenna	6GT2 601-0AB00
SLG D12S read/write device ▶ A With RS422 serial interface and integrated antenna	6GT2 602-0AB00
SLG D12S read/write device, for direct ASM connection A With RS422 serial interface and integrated antenna. Only one connector for data and voltage supply. Power supply via interface module (ASM). Connector: 8-pin M12 connector (pin)	6GT2602-0AB10-0AX0
Accessories	
RS232 connecting cable Between the PC and SLG D12	
<ul style="list-style-type: none"> • 5 m ▶ 6GT2 691-0BH50 • 20 m ▶ 6GT2 691-0BN20 	
Connector for SLG and SIM of MOBY D ▶ IP65 degree of protection, 9-pin sub D connector	6GT2 490-1AA00
SLG cable Without connector between ASM and SLG; 6 x 0.25 mm ²	
<ul style="list-style-type: none"> • 50 m ▶ A 6GT2 090-0AN50 • 120 m ▶ A 6GT2 090-0AT12 • 800 m A 6GT2 090-0AT80 	
Wide-range power supply Primary side: 100 ... 240 V AC, 120 ... 353 V DC, secondary side: 24 V DC, 3 A, with no-load protection, with continuous short-circuit protection	
<ul style="list-style-type: none"> • EU connector version ▶ A 6GT2 898-0AA00 • UK connector version ▶ A 6GT2 898-0AA10 • US connector version ▶ A 6GT2 898-0AA20 	
Cable for wide-range power supply ▶ 24 V DC, length 5 m	6GT2 491-1HH50
24 V connector (M12 socket) ▶ A For ASM 424/724/754, SLG Ux (over PC connecting cable), SLG D1x	6GT2 390-1AB00
CD "RFID Systems Software & Documentation" ▶ FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC demonstration program. RFID documentation	6GT2 080-2AA10

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



Read/write device SLG D12

RFID systems for logistics

MOBY D read/write devices

STG D mobile hand-held terminal

Overview



The STG D is a powerful mobile hand-held terminal with integrated read/write antenna for applications in the field of production logistics, distribution and service. In addition, it is an indispensable tool for commissioning and testing.

Design

The STG D mobile hand-held terminal consists of one basic unit (Basis PSION Workabout PRO) and a removable compact read/write head. It has a splashwater-proof enclosure (IP54), LCD color monitor 1/4 VGA, 320 x 240 pixels, TFT portrait format, alphanumeric keyboard and various interfaces (for SD memory card, charging batteries, USB, Bluetooth, etc.).

Function

The pre-installed MOBY software provides service and test functions for reading, writing, etc. of the MOBY data memory:

- Reading data from the data memory
- Writing data to the data memory
- Reading and displaying the ID number of the data memory (to the extent available)
- Displaying and editing the data in hexadecimal, ASCII, decimal and binary formats
- Activate/deactivate password

User applications that were developed for the predecessor model Workabout MX can be transferred to this terminal with little effort. For this purpose, various optional development tools for the PC are available directly from PSION. This is opening up new applications in the field of logistics and distribution, for example, the hand-held terminal enables commissioning data to be recorded or processed offline and forwarded to the PC/computer with a time delay.

Technical specifications

STG D mobile hand-held terminal	
Processor	400 MHz Intel Xscale PXA255
Operating system	Microsoft Windows CE .NET 4.20
RAM/Flash EEPROM memory	128 MB/32 MB
User program	MOBY standard application
Screen	TFT color touch display, 1/4 VGA 320 x 240 (portrait format); adjustable backlighting
Keyboard	alphanumeric
Sound	Piezo signal transmitter
Power supply	<ul style="list-style-type: none"> • Lithium-ion battery (3.7 V; 3000 mAh) • Quick charging possible (automatic shut-off) or 3 x 1.5 V type AA • Backup battery: 3 V ML 2032 lithium cell
Interfaces	<ul style="list-style-type: none"> • LIF interface (low insertion force interface) for battery charging and communication with the PC using a docking and loading station (USB) • CF interface for expansion cards (e.g. WLAN)
Ambient temperature	<ul style="list-style-type: none"> • During operation -10 ... +50 °C • Storage (without batteries) -25 ... +60 °C
Relative humidity, non-condensing	5 ... 90 %
Degree of protection	IP54 (splashwater proof)
EMC	EN 55022, EN 55024
Dimensions	305 x 90 x 44 [mm]
Weight (incl. battery)	Approx. 0.5 kg

Integral read/write head, inductive interface to MDS	for MOBY D
Read/write distance to MDS	up to 80 mm, depending on MDS
Energy/data transmission frequency	13.56 MHz
Serial interface (to basic unit)	TTL, 3964R protocol
Functionality of the SW application	Standard user interface for reading/writing of data memories, etc.

RFID systems for logistics

MOBY D read/write devices

STG D mobile hand-held terminal

Selection and Ordering data Order No.

STG D mobile hand-held terminal with MOBY D read/write head ▶ D **6GT2 603-0AA10**

Basic unit (PSION Workabout PRO) with MOBY D read/write, battery, standard software pre-installed, without loading/docking station

Accessories

Loading/docking station ▶ A **6GT2 898-0BA00**

For a mobile hand-held terminal as well as a spare battery, incl. wide-range plug-in power supply 100 ... 240 V AC and country-specific adapters as well as USB cable

MOBY D read/write head ▶ A **6GT2 603-1AA10**

For basic unit (PSION Workabout mx and PSION Workabout PRO)

Basic unit ▶ D **6GT2 003-0AA10**

Basic unit (PSION Workabout PRO) with adapter for MOBY RFID read/write heads

Spare battery ▶ A **6GT2 898-0CA00**

For basic unit (PSION Workabout PRO), High Capacity 3000 mAh, Li-ion

CD "RFID Systems Software & Documentation" ▶ **6GT2 080-2AA10**

FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC demonstration program. RFID documentation

A: Subject to export regulations AL = N and ECCN = EAR99H

D: Subject to export regulations AL = N and ECCN = 4A994X

▶ Preferred type, available from stock.

Accessories

For optional components, please visit
<http://www.pSIONteklogix.com>

For example:

- SD expansion cards
- Handles, belt loops
- Vehicle holder with charging function

Overview

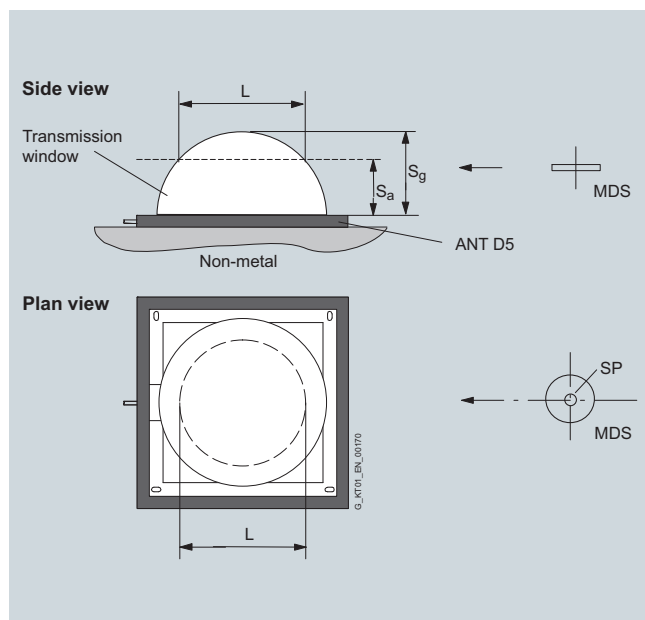
Note

Detailed configuration and commissioning data is contained in the "Manual for Configuration, Assembly and Service".

Transmission window

The read/write device generates an inductive alternating field. The field is at its strongest near the antenna and declines considerably as the distance from the antenna increases. The distribution of the field depends on the structure and geometry of the antennas in the read/write device and MDS.

A prerequisite for the function of the MDS is a minimum field strength at the MDS that is achieved at a distance S_g from the read/write device. The picture below shows the transmission window between MDS and SLG:



S_a : Operating distance between MDS and SLG

S_g : Limit distance (maximum clear distance between upper surface of antenna and MDS, at which the transmission can still function under normal conditions)

L: Length of a transmission window

SP: Intersection of the axes of symmetry of the MDS

The transmittable quantity of information between SLG and MDS depends on:

- the speed at which the MDS passes the antenna ("passing speed")
- Length of the inductive alternating field of the SLG, through which the MDS moves ("transmission window").

Communication between SLG and MDS

The communication between SLG and MDS is asynchronous.

SLG – MDS data transmission rate	
Read	≥ 3.5 ms/byte
Write	≥ 9.5 ms/byte
Transmission time of ID number	
• SLG D10 ANT D5, ANT D6, ANT D10	30 ms (8 byte at 115.2 kbit/s)
• SLG D11S ANT D5	
• SLG D12S ANT D5, ANT D6, ANT D10	90 ms (8 byte at 19.2 kbit/s)
• SLG D11S ANT D5	
• SLG D12 ANT D5, ANT D6, ANT D10	60 ms (8 byte at 38.4 kbit/s)
• SLG D11 ANT D5	

RFID systems for logistics

MOBY D read/write devices

Configuring instructions

*Speed at which SLG passes over
(for a transponder in the field)*

Type	SLG D10 ANT D10	SLG D10 ANT D6	SLG D10 ANT D5	SLG D11 ANT D5	SLG D12
UID number (8 byte)	≤ 15 m/s	≤ 8.0 m/s	≤ 5.0 m/s	≤ 3.5 m/s	≤ 2.5 m/s

I-Code 1, e.g. MDS D139

Read (with 4 byte of user data)	≤ 10 m/s	≤ 6.5 m/s	≤ 3.5 m/s	≤ 3.0 m/s	≤ 2.0 m/s
Write (with 4 byte of user data)	≥ 7.5 m/s	≤ 5.0 m/s	≤ 2.8 m/s	≤ 2.5 m/s	≤ 1.5 m/s
Read (with 44 byte of complete user data)	≤ 6 m/s	≤ 3.8 m/s	≤ 2.0 m/s	≤ 1.8 m/s	≤ 1.0 m/s
Write (with 44 byte of complete user data)	≤ 2.5 m/s	≤ 1.4 m/s	≤ 0.8 m/s	≤ 0.6 m/s	≤ 0.3 m/s

I-Code SLI, e.g. MDS D100

Read (with 4 byte of user data)	≤ 10 m/s	≤ 6.0 m/s	≤ 3.5 m/s	≤ 1.6 m/s	≤ 1.4 m/s
Write (with 4 byte of user data)	≤ 9 m/s	≤ 5.5 m/s	≤ 3.0 m/s	≤ 1.2 m/s	≤ 1.2 m/s
Read (with 112 byte of complete user data)	≤ 7.5 m/s	≤ 4.0 m/s	≤ 2.4 m/s	≤ 1.4 m/s	≤ 1.0 m/s
Write (with 112 byte of complete user data)	≤ 2 m/s	≤ 1.0 m/s	≤ 0.6 m/s	≤ 0.4 m/s	≤ 0.2 m/s

Type	SLG D10S ANT D10	SLG D10S ANT D6	SLG D10S ANT D5	SLG D11S ANT D5	SLG D12S
UID number (8 byte)	≤ 6 m/s	≤ 3.8 m/s	≤ 2.0 m/s	≤ 1.0 m/s	≤ 0.8 m/s

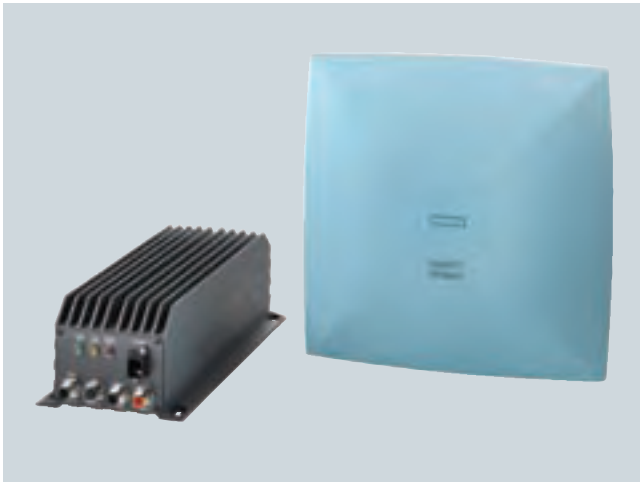
I-Code 1, e.g. MDS D139

Read (with 4 byte of user data)	≤ 5.5 m/s	≤ 3.5 m/s	≤ 1.8 m/s	≤ 1.0 m/s	≤ 0.8 m/s
Write (with 4 byte of user data)	≤ 4.5 m/s	≤ 2.5 m/s	≤ 1.4 m/s	≤ 0.8 m/s	≤ 0.6 m/s
Read (with 112 byte of complete user data)	≤ 4.5 m/s	≤ 2.8 m/s	≤ 1.5 m/s	≤ 0.7 m/s	≤ 0.6 m/s
Write (with 112 byte of complete user data)	≤ 2.2 m/s	≤ 1.2 m/s	≤ 0.7 m/s	≤ 0.5 m/s	≤ 0.3 m/s

I-Code SLI, e.g. MDS D100

Read (with 4 byte of user data)	≤ 6.5 m/s	≤ 4.0 m/s	≤ 2.2 m/s	≤ 3.0 m/s	≤ 1.2 m/s
Write (with 4 byte of user data)	≤ 5.5 m/s	≤ 3.4 m/s	≤ 1.8 m/s	≤ 2.8 m/s	≤ 1.0 m/s
Read (with 112 byte of complete user data)	≤ 5.0 m/s	≤ 3.0 m/s	≤ 1.6 m/s	≤ 2.2 m/s	≤ 0.8 m/s
Write (with 112 byte of complete user data)	≤ 2.0 m/s	≤ 1.0 m/s	≤ 0.6 m/s	≤ 0.5 m/s	≤ 0.2 m/s

Overview



SIMATIC RF600 is a contact-free operating RFID system (RFID: Radio Frequency Identification), which was designed both for use in logistics and supply chain management applications as well as for production-specific logistics and materials flow applications. Different readers are available for varying applications.

SIMATIC RF600 works in the UHF frequency range and is designed, among others, for identifying tags according to the EPCglobal standard. It is therefore the ideal system for storing, reading and transferring information in the EPC format (EPC: Electronic Product Code) on inexpensive SmartLabels (one-time data carriers) for further processing to higher-ranking software systems or directly to the automation environment (PLC).

Benefits

The discontinuation of manual counting, recording and downstream processes has resulted in cost benefits with a simultaneous reduction in detection errors.

Using inexpensive, passive SmartLabels allows the goods to be identified automatically along the entire logistics chain. This means incorrect information on the goods transfers can be avoided and the consistency of data and information ensured.

By simultaneously detecting numerous items, the flow rate in the supply chain increases and leads to greater productivity.

SIMATIC RF600 opens up opportunities for integration into downstream software systems. This means the link between goods and information flows is made possible "in real time". As soon as data belonging to a product are read, e.g. when the product has passed a loading gate, the Supply Chain Management information can be automatically updated and, for example, a repeat order issued.

By tracking and tracing products, transparency increases throughout the entire flow of goods: the path of any product can be tracked at any time.

By integrating SIMATIC RF communication modules, applications in the material flow control system or production-specific logistics applications that require a controller (PLC) can be efficiently realized.

Application

SIMATIC RF600 is primarily used for the contact-free identification of containers or pallets and to identify goods in bulk. As a rule, these applications are open loops in which passive SmartLabels on goods, products, bulk containers or transport units are used. In this case, the system distinguishes itself due to its high reading speeds, large data transmission rates and the fact that it can handle long reading distances.

In addition, the system is suitable for reading and writing reusable data carriers (industrial tags) as they are used in closed loops.

The main applications range from the recognition of goods at loading gates to goods receipt and dispatch, through product flow control on conveyor belts, up to deployment in warehouses or distribution centers and high-bay inventory control. Industrial use in factories, e.g. in paintshops or on assembly lines in the automotive industry, is also possible. Connecting to a controller (PLC) is no problem thanks to the connection ports on the SIMATIC RF communication modules.

Function

SIMATIC RF identification systems ensure that important data accompanies the product from the very beginning.

Different tags are used to store product-specific data and information: depending on the field of application, SmartLabels or Industrial Tags.

In the case of tags to the EPCglobal standard, information regarding the manufacturer of the goods, the article class and the respective serial number is coded in 96 bits (EPC Gen1). Tags of the second generation of the EPCglobal standard (EPC Gen2) allow customer or product information to be stored additionally.

In the case of tags based on the ISO 18000-6B standard (reusable data carriers), data volumes up to 216 byte can be stored which can be freely defined by the user.

In the case of tags according to the EPC Global Class 1 Gen 2 or ISO 18000-6C standard, a data volume of up to 96 bits + 64 byte user memory (e.g. for SIMATIC RF640T Gen2 Tool Tags, SIMATIC RF630T Powertrain Tags and SIMATIC RF680T Heat Resistant Tags equipped with NXP UCODE G2XM chips).

Technical specifications

Type	SIMATIC RF600
Conformity	ETSI EN 302208, FCC
Area of application	Europe, U.S.A.
Frequency range (adjustable)	<ul style="list-style-type: none"> • 865 ... 868 MHz (Europe) • 902 ... 928 MHz (U.S.A.)
Transmit power (adjustable)	<ul style="list-style-type: none"> • 0.1 ... 2 W ERP (Europe) • 0.4 ... 4 W EIRP (U.S.A.)
Tag read range	Up to 5 m Up to 10 m (with portal arrangement)
Standards supported	EPC Gen 1, EPC Gen 2, ISO 18000-6B
Interfaces	RS232, RS422 ¹⁾ , ETHERNET, DI/DO
Certification	CE, UL, FCC

1) This interface will only be available in the future.

RFID systems for logistics

SIMATIC RF600 mobile data storage units

SIMATIC RF620L

Overview



The SIMATIC RF620L Smartlabel is passive and maintenance-free based on UCODE technology (EPC V1.19).

Selection and Ordering data

Order No.

Smartlabel SIMATIC RF620L ▶

6GT2810-1AB00

for paper and cardboard
Minimum order quantity 1500
pieces (500 pieces on one roll)

▶ Preferred type, available from stock.

Application

Due to their structure, the Smartlabels are suitable for different applications. The application areas range from simple identification such as electronic barcode replacement/supplementation, through warehouse and distribution logistics, right up to product identification.

Function

The purpose of the Smartlabel is to save the "Electronic Product Code" (EPC).

Technical specifications

Type	SmartLabel SIMATIC RF620L
IC type	UCODE EPC V1.19
Frequency	<ul style="list-style-type: none"> • Europe 865 ... 668 MHz • U.S.A. 902 ... 928 MHz
EPC code	96 bit
Protocol	as per ISO18000-6B
Multitag	Yes
Data retention	10 years
Power supply	Electromagnetic emission, power transmission without battery
Typical read/write distance	0 ... 4 m
Created for fixing on	Paper, box Not suitable for fixing on metal or liquid containers
Type of installation	Adhesive on one side (self-adhesive labels)
Antenna size	20 x 88 mm
Antenna material	Copper
Dimensions	101 x 152 mm (4" x 6")
Material	Paper
Color	White
Printability	with thermotransfer procedure
Delivery format	Minimum order amount 1500 items (500 on one roll)
Operating temperature	-20 ... +70 °C
Storage temperature	+15 ... +25 °C
Storage life	< 2 years, determined by the shelf life of the adhesive
Degree of protection	None, Smartlabel should be protected from humidity

RFID systems for logistics

SIMATIC RF600 mobile data storage units

SIMATIC RF620T

Overview



The SIMATIC RF620T transponder is passive and maintenance-free on the basis of UHF Class 1 Gen2 technology for saving the "Electronic Product Code" (EPC) of 96 bit.

This container tag is designed for the 868 MHz frequency band (Europe) / 915 MHz (U.S.A.).

Benefits

The container tag for industrial applications is rugged and highly resistant to cleaning agents.

It is designed for application to plastic, wood, glass; e.g. containers, pallets, drums and trolleys.

It will also function on metal and plastic ESD containers if a spacer is used.

Application

- RF identification of pallets and containers in the warehouse and transport field
- Can be mounted on metal, ideally with spacer (up to 4 m)
- Due to the plastic's compliance with food hygiene regulations, it is also suitable for the food & beverage sector

Technical specifications

Container tag	SIMATIC RF620T
IC type	EPC Glass 1 Gen2
European frequency band (865 ... 868 MHz)	•
U.S.A. frequency band (902 ... 928 MHz)	•
Protocol	according to ISO 18000-6C
Memory	EPC 96 bit
Read cycles	unlimited
Write cycles	min. 100,000
Data retention time	10 years
With SIMATIC RF660R reader and SIMATIC RF660A antenna	
• Reading distance	0.2 ... 6 m (see field data)
• Write distance	0.2 ... 4 m (see field data)
Designed for application on	<ul style="list-style-type: none"> • non-metallic carriers (e.g. plastic, dry wood, glass, etc.) • Conductive plastic using spacers • Metal using spacers
Multitag	Yes
Mechanical stress in accordance with EN 60721-3-7 Class 7 M3	
• Shock	100 g
• Vibration	50 g
Torsion and bending stress	Not permitted continuously
Mounting	Gluing, screwing
Material	PP (polypropylene)
Color	Anthracite
Ambient temperature	
• During operation	-25 ... +80 °C
• During transportation and storage	-40 ... +80 °C
Dimensions (L x W x H)	
• Transponder	127 x 38 x 6
• Spacer	155 x 39 x 12
Degree of protection to EN 60529	IP67
Resistance to chemicals	See configuration manual
Weight	
• Transponder	Approx. 18 g
• Spacer	Approx. 22 g
Approvals	CE/FCC

RFID systems for logistics

SIMATIC RF600 mobile data storage units

SIMATIC RF620T

Selection and Ordering data Order No.

SIMATIC RF620T container tag ▶ A **6GT2810-2HC80**

Accessories

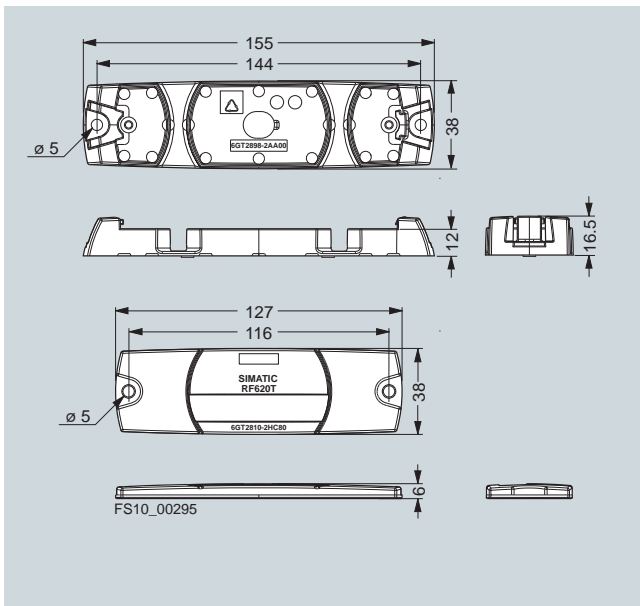
Spacer for SIMATIC RF620T ▶ A **6GT2898-2AA00**

For mounting on metal;
dimensions (L x W x H in mm)
155 x 38 x 12

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

Dimensions



Overview



6GT2810-2AB00

The SIMATIC RF630L smart labels are designed to be passive and maintenance-free based on the UHF Class 1 Gen2 technology.



6GT2810-2AB01



6GT2810-2AB02



6GT2810-2AB03

Application

The application areas range from simple identification, such as an electronic substitute for a barcode or supplement to a barcode through storage and distribution logistics as far as product identification.

Function

The Smartlabel is used to save the "Electronic Product Code" (EPC).

Technical specifications

IC type /technology	EPC Class 1 Gen2	EPC Class 1 Gen2	EPC Class 1 Gen2	EPC Class 1 Gen2
Order No.	6GT2810-2AB00	6GT2810-2AB01	6GT2810-2AB02	6GT2810-2AB03
Frequency for Europe (865-868 MHz)	•			
Frequency for U.S.A. (902-928 MHz)	•			
Protocol acc. to ISO 18000-6C	•			
EPC code	96 bit			
Additional user memory	No			
Multitag	Yes			
Write cycles	100000			
Data retention at +25 °C	10 years			
Power supply	Electromagnetic emission, power transfer without battery			

RFID systems for logistics

SIMATIC RF600 mobile data storage units

SIMATIC RF630L

IC type /technology	EPC Class 1 Gen2		EPC Class 1 Gen2	
Order No.	6GT2810-2AB00	6GT2810-2AB01	6GT2810-2AB02	6GT2810-2AB03
Typical read/write distance				
• Paper/cardboard	0.2 ... 8 m			0.2 ... 3 m
• Plastic sheet	0.2 ... 8 m			0.2 ... 3 m
• Plastic (boxes, surface resistance >10 MOhm)	0.2 ... 4 m			0.2 ... 2 m
• Wood (dry, < 30% residual moisture)	0.2 ... 4 m			0.2 ... 2 m
• Glass	0.2 ... 4 m			0.2 ... 2 m
Designed for mounting on	Paper/cardboard (not suitable for fixing directly onto metal)		Plastic/foil (not suitable for fixing directly onto metal)	
Type of mounting	Single-sided adhesive (self-adhesive label)		Single-sided adhesive (self-adhesive inlay)	
Type of antenna	Shortened dipole			
Antenna material	Aluminium			
Dimensions	101 mm x 152 mm (4" x 6")	101 mm x 50 mm (approx. 4" x 2")	97 mm x 27 mm (approx. 3.8" x 1.1")	54 mm x 34 mm (approx. 2.1" x 1.3")
Material surface	Paper		Plastic PET	
Color	White		Clear	
For printing	Yes, heat transfer method		Yes, heat transfer method (currently only using Toshiba B-SX4T)	Non-printing
Type of delivery	Min. order quantity 1600 units (800 units on a roll)	Min. order quantity 1000 units (1000 units on a roll)	Min. order quantity 2000 units (2000 units on a roll)	
Operating temperature	-40 ... +65 °C, up to +80 °C (200 cycles)			
Storage temperature, recommended	+15 ... +25 °C			
Storage humidity, recommended	40 ... 60%			
Storage capability	2 years, determined by durability of the adhesive			
Degree of protection	The label must be protected from damp		IP65	

5

Selection and Ordering data

Order No.

SIMATIC RF630L Smarttable

For storing the "Electronic Product Code" (EPC).
Prices apply to one Smarttable.

- | | | |
|---|-----|----------------------|
| • Paper, glued on one side, 100 mm x 150 mm (4" x 6"); minimum order quantity 1600 units (800 units on a roll) | ▶ A | 6GT2810-2AB00 |
| • Paper, glued on one side, 101 mm x 55 mm (4" x 2"); minimum order quantity 1000 units (1000 units on a roll) | ▶ A | 6GT2810-2AB01 |
| • Plastic PET, glued on one side, 97 mm x 27 mm (3.8" x 1.1"); Minimum order quantity 2000 units (2000 units on a roll) | ▶ A | 6GT2810-2AB02 |
| • Plastic PET, glued on one side, non-printing, 54 mm x 34 mm (2.1" x 1.3"); minimum order quantity 2000 units (2000 units on a roll) | ▶ A | 6GT2810-2AB03 |

A: Subject to export regulations AL = N and ECCN = EAR99H

▶ Preferred type, available from stock.

RFID systems for logistics

SIMATIC RF600 mobile data storage units

SIMATIC RF640T

Overview



The target applications for SIMATIC RF640T are industrial asset management, RF identification of tools, containers and metallic equipment.

This tool tag is available in two frequency variants: 868 MHz (Europe) and 915 MHz (U.S.A.).

Benefits

- Small, intelligent and rugged for industrial applications
- Ideal for attaching directly to metal surfaces, without spacer (e.g. containers, boxes, tools and toolholders)
- High degree of protection and resistant to mineral oils, lubricants and cleaning solvents

Application

- For direct mounting onto metal surfaces with a typical detection range of 1.8 m. Up to 216 byte of user data can be stored in addition to 8-byte ID numbers.
- Machine and plant construction
- Industrial production
- Laboratory and test equipmen

Technical specifications

Type	RF640T
IC type	UCODE HSL
Frequency	<ul style="list-style-type: none"> • Version for Europe 865 ... 868 MHz • Version for U.S.A. 902 ... 928 MHz
Serial number UID	8 byte
User memory	216 byte
Lock information (write protection)	28 byte
Protocol	in acc. with ISO 18000-6B
Data retention	10 years
Read cycles	unlimited
Write cycles	<ul style="list-style-type: none"> • minimum 100000 • typical 500000
Read distance (with reader RF660R and antenna RF660A)	<ul style="list-style-type: none"> • minimum 0.2 ... 1.5 m • typical 0.2 ... 2.0 m
write distance (with reader RF660R and antenna RF660A)	<ul style="list-style-type: none"> • minimum 0.2 ... 1.2 m • typical 0.2 ... 1.5 m
Designed for attaching to	Metal
Mounting	2 x M4 screws
Dimensions (H x D)	50 x 8
Material	Plastic PA12
Color	anthracite
Ambient temperature	<ul style="list-style-type: none"> • Operation -25 ... 85 °C • Storage -40 ... +125 °C
Mechanical stress (to EN 60721-3-7, class 7 M3)	<ul style="list-style-type: none"> • Shock 100 g • Vibration 20 g • Torsion not permissible
Degree of protection to DIN EN 60529 (45 min immersion in water; water depth 1 m from top edge of housing at +20°C)	IP68
Resistance to chemicals	as for PA 12
Ex approval	ATEX Zone II 2GD; Ex ib IIC T6 to T3
Approvals	CE/FCC

Selection and Ordering data

SIMATIC RF640T

For attaching to metal surfaces

- for Europe (868 MHz frequency) ▶ A **6GT2 810-0DC00**
- for the U.S.A. (915 MHz frequency) ▶ A **6GT2 810-0DC10**

A: Subject to export regulations AL = N and ECCN = EAR99H
▶ Preferred type, available from stock.

RFID systems for logistics

SIMATIC RF600 read/write devices

SIMATIC RF660R
SIMATIC RF660A

Overview



The UHF portal reader SIMATIC RF660R uses the two, three or four SIMATIC RF660A antennas connected to read the tag data and supplies it to downstream systems through the system interfaces (Ethernet or RS422¹⁾). Alternatively, XML command sequences can be used to instruct the reader to pass the data on to a client application. For further details on configuration and the runtime response of the SIMATIC RF660R, please refer to the associated documentation.

At least two, but up to four, SIMATIC RF660A antennas must be connected for correct operation of the SIMATIC RF660R. Different antennas must be used depending on the installation location (U.S.A. or Europe):

- Europe: SIMATIC RF660A (EU) Order No. 6GT2812-0AA00
- U.S.A.: SIMATIC RF660A (U.S.A.) Order No. 6GT2812-0AA01



Optional: Flexible installation of antenna with articulated bracket thanks to the Antenna Mounting Kit. The package includes a 75 mm x 75 mm Vesa adapter.

The frequency bands approved for the respective region must be set on the reader by means of software configuration.

The reader can be easily configured using the SIMATIC RF660R configuration software. This is available on the CD "RFID Systems Software & Documentation" that can be ordered separately (Order No. 6GT2080-2AA10).

For proper functioning of the SIMATIC RF660R, the corresponding SIMATIC RF660A antennas and the appropriate Siemens antennas and interface cables must be used (see ordering data).

Benefits

Technical characteristics of the SIMATIC RF660 system:

- UHF frequencies support new applications in logistics and throughout the complete delivery chain.
- The standards implemented in the system in accordance with EPCglobal and ISO 18000-6B allow different protocols to be used between the reader and tag. Tags based on different standards can, at the same time, also be detected and processed by the system.
- Implementation of the EPCglobal standards of Generation 2 (EPC Gen2) provides investment security and high performance.
- Large read distances, high tag detection rates despite high traversing speeds of the goods to be identified in the field secures SIMATIC RF660 a place in the high-end range of today's RFID systems.
- Thanks to problem-free bulk detection of tagged goods, SIMATIC RF660 is suitable for identification tasks in non-homogeneous goods flows.
- The two serial interfaces and Ethernet ensure that it can be integrated into different system landscapes (IT and automation).
- Three digital inputs and outputs support the direct connection of process-related devices such as optical and acoustic signal encoders, proximity switches, light barriers, etc.
- The ruggedness of the overall system guarantees problem-free, flexible operation under a wide range of different ambient conditions.
- For companies globally active in manufacturing, logistics and trade, the ability to operate the system in both the European and US UHF frequency bands means easier implementation and less complexity in the system landscape

Application

The stationary UHF portal reader SIMATIC RF660R complete with up to four antennas of the SIMATIC RF660A type is suitable for applications in logistics and supply chain management.

The system operates in the European and US UHF frequency band and is designed for identifying tags based on the EPCglobal standard

Function

SIMATIC RF660 allows rewritable data carriers to be read and written which, in accordance with the UCODE specification, can also store large volumes of data. The system is therefore also suitable for use in so-called closed applications that are found typically in the industrial environment. The high degree of protection of the complete system ensures problem-free operation even under harsh industrial conditions.

Thanks to the two system interfaces (Ethernet and RS422¹⁾) and the RS232 interface that is intended for configuration and diagnostic purposes, SIMATIC RF660 is a universally implementable system. Easy connection to LAN networks with the TCP/IP protocol is just as possible as integration in an existing Siemens automation landscape.

SIMATIC RF Communication Modules are used to connect to SIMATIC controllers and they can be directly connected to the system through the RS422 interface²⁾.

1) This interface will be available in the future.

2) This feature will be available in the future.

Technical specifications

UHF stationary portal reader	SIMATIC RF600R
Frequency range (adjustable)	
• Europe	865 ... 868 MHz
• U.S.A.	902 ... 928 MHz
Transmit power (adjustable in steps of 100 mW)	
• Europe	0.1 ... 2 W ERP
• U.S.A.	0.4 ... 4 W ERP
Tag read range	
• With 2 x 2 antennas, mounted opposite each other	10 m max.
• With 2 antennas, antennas mounted side by side	5 m max.
Number of antennas	2 ... 4 (configurable)
Impedance (nominal)	50 Ω
Standards	<ul style="list-style-type: none"> • EPC Gen 1 • EPC Gen 2 • ISO 18000-6B / ISO 18000-6C • Mixed mode operation
Number of tags read per second	
• EPC Gen 2	100 read actions/s
• ISO 18000-6B	> 50 read actions/s
Simultaneous reading of several tags (bulk reading capacity), number of tags	
• EPC Gen 2	max. 110 tags
• ISO 18000-6B	max. 75 tags
Data transmission rate for reading	
• EPC Gen 2	max. 160 Kbit/s
• ISO 18000-6B	max. 160 Kbit/s
Data transmission rate for writing	
• EPC Gen 2	max. 128 Kbit/s
• ISO 18000-6B	max. 40 Kbit/s
Tag reading rate (%)	
• EPC Gen 2	> 99,9%
• ISO 18000-6B	> 99,9%
Additional functions	<ul style="list-style-type: none"> • Read triggered through digital input • Data buffer • Configuration by means of software • Firmware update
Interfaces	
• Antenna	2 ... 4
• RS232	1
• RS422	1
• Ethernet RJ 45	1 (according to IEC 24702)
• Digital in/out	3 x 24 V DC, 0.5 A each
Certification	<ul style="list-style-type: none"> • CE • UL
Conformity	ETSI EN 302208, FCC
Area of application	Europe, U.S.A.
Antenna connection	4 antennas, reverse polarity TNC

UHF stationary portal reader	SIMATIC RF600R
Ambient temperature	
• During operation	-25 ... +55 °C
• During transportation and storage	-40 ... +85 °C
Degree of protection	IP65
Dimensions L x B x H (in mm)	320 x 145 x 100

Antenna for use in Europe	SIMATIC RF660A-UHF antenna
Impedance (nominal)	50 Ohm
Polarization	Circular
Frequency band	865 ... 868 MHz
Conformity	ETSI ES 302208
Mounting	Optional: Flexible mounting with jointed arm by means of antenna mounting kit Various mounting possibilities with supplied mounting adapter plate Vesa 75 x 75 mm
Color	Pastel turquoise
Ambient temperature	
• During operation	-25 ... +75 °C
• During transportation and storage	-40 ... +85 °C
Degree of protection	IP67
Dimensions L x H x B (in mm)	313 x 313 x 80
Weight	1.6 kg

Antenna for use in U.S.A.	SIMATIC RF660A-UHF antenna
Impedance (nominal)	50 Ohm
Polarization	Circular
Frequency band	902 ... 928 MHz
Wiring	Reverse polarity TNC
Conformity	FCC Title 47, Part 15.247
Mounting	Optional: Flexible mounting with jointed arm by means of antenna mounting kit Various mounting possibilities with supplied mounting adapter plate Vesa 75 x 75 mm
Color	Pastel turquoise
Ambient temperature	
• During operation	-25 ... +75 °C
• During transportation and storage	-40 ... +85 °C
Degree of protection	IP67
Dimensions L x B x H (in mm)	313 x 313 x 80
Weight	1.5 kg

RFID systems for logistics

SIMATIC RF600

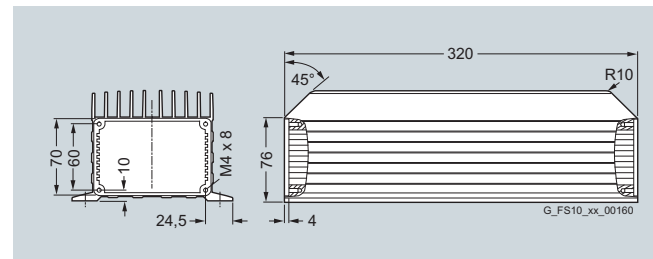
SIMATIC RF660R
SIMATIC RF660A

Selection and Ordering data

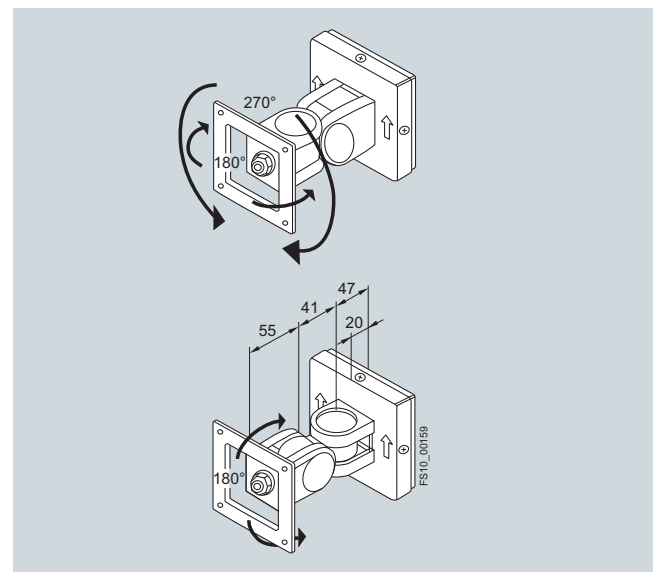
	Order No.
SIMATIC RF660R reader ▶ A UHF stationary portal reader for UHF frequencies 865 ... 868 MHz and 902 ... 928 MHz	6GT2 811-0AA00
SIMATIC RF660A antenna for Europe ▶ A Circular polarized antenna for UHF frequency 865 ... 868 MHz	6GT2 812-0AA00
SIMATIC RF660A antenna for U.S.A. ▶ A Circular polarized antenna for UHF frequency 902 ... 829 MHz	6GT2 812-0AA01
Accessories Note: For proper functioning of the SIMATIC RF660R reader and the SIMATIC RF660A antenna, the appropriate antenna and interface cables must be used as well as the corresponding power supply.	
Antenna cable PE material, UV-resistant, halogen-free, 50 Ω impedance, reverse polarity TNC, internal contact as socket	
<ul style="list-style-type: none"> Length 10 m, Ø 5 mm, UL certified ▶ A Length 20 m, Ø 7.6 mm ▶ A Length 20 m, Ø 7.6 mm, UL certified, exclusively for U.S.A. ▶ A 	6GT2 815-0BN10 6GT2 815-0AN20 6GT2 815-0BN20
Interface cable RS232, RS422 Material PUR, UV-resistant, halogen-free, PVC-free, with UL approval, M12 socket, 8-pole to sub-D socket, 9-pole	
<ul style="list-style-type: none"> RS232, length 5 m, Ø 5.3 mm ▶ A RS232, length 10 m, Ø 5.3 mm ▶ A RS422, length 2 m, Ø 5.3 mm ▶ A RS422, length 5 m, Ø 5.3 mm ▶ A RS422, length 10 m, Ø 5.3 mm ▶ A RS422, length 20 m, Ø 5.3 mm ▶ A RS422, length 50 m, Ø 5.3 mm ▶ A 	6GT2 891-0GH50 6GT2 891-0GN10 6GT2 891-0FH20 6GT2 891-0FH50 6GT2 891-0FN10 6GT2 891-0FN20 6GT2 891-0FN50
Interface cable Ethernet Material PVC, UV-resistant, halogen-free, impedance 100 Ω ± 15 Ω, symmetrical (1 ... 100 MHz), RJ45 to RJ45, IP67, CAT5e	
<ul style="list-style-type: none"> Ethernet length 10 m, Ø 6.5 mm ▶ A Ethernet, length 20 m, Ø 6.5 mm ▶ A 	6GT2 891-0HN10 6GT2 891-0HN20
DI/DO cable, PUR material, black, shielded, M12, 8 x 0.25 mm ² , length 5 m	3RX8000-0CD81-1GF0

	Order No.
Antenna mounting kit ▶ A For flexible mounting with articulated bracket, VESA adapter 75 x 75 mm is supplied	6GT2 890-0AA00
Wide-range power supply Primary side: 100 ... 240 V AC, 120 ... 353 V DC, secondary side: 24 V DC, 3 A, with no-load protection, with continuous short-circuit protection	
<ul style="list-style-type: none"> EU connector version ▶ A UK connector version ▶ A US connector version ▶ A 	6GT2 898-0AA00 6GT2 898-0AA10 6GT2 898-0AA20
Cable for wide-range input power supply ▶ 24 V DC, length 5 m	6GT2 491-1HH50
Tags Customized variant for high-volume applications	On request
CD "RFID Systems Software & Documentation" ▶ SIMATIC RF660R configuration software, RFID documentation	6GT2 080-2AA10
A: Subject to export regulations AL = N and ECCN = EAR99H. ▶ Preferred type, available from stock.	

Dimensions



Reader SIMATIC RF660R



Antenna Mounting Kit

SIMATIC RF610M mobile hand-held terminal

Overview



SIMATIC RF610M is a high-performance, mobile, hand-held terminal with a read/write antenna that has been adapted for applications in the fields of production logistics, warehouse management, inventories and service. It is also an important tool for commissioning and testing of RFID systems.

Design

The SIMATIC RF610M mobile hand-held terminal comprises a basic unit (based on the PSION Workabout PRO) and a read/write unit for RF600 transponders and SmartLabels. It has a rugged, splashproof housing, an LCD color display with touch functionality and an alphanumeric keyboard with function keys.

Function

The supplied and pre-installed RF600 software provides service and test functions for reading and writing the RF600 data storage units and Smart Labels. Data that have been read can be saved in file structures.

In addition, an already installed API library is included. This allows the customer to program his/her own RFID applications for the mobile hand-held terminal. For the actual programming, a Software Development Kit (SDK) can be ordered from PSION Teklogix.

Based on the operating system and communication standards (WIN CE), the device ensures easy integration in existing or planned IT networks or in the process infrastructure. For this purpose, various optional development tools are available for the PC as well as a wide range of accessories directly from PSION Teklogix and MICROSOFT.

Technical specifications

Mobile hand-held terminal	SIMATIC RF610M
Processor	PXA270, 32 bit RISC CPU
Operating system	Microsoft Windows. CE 5.0
RAM/Flash EEPROM memory	128 MB / 128 MB
User program	RF610M application and API interface
Screen	Color display TFT, ¼ VGA 320 x 240 (portrait format) with touch function and adjustable backlighting
Keyboard	Alphanumeric plus function keys and touch screen
Sound	Piezo sensor
Power supply	<ul style="list-style-type: none"> Lithium-ion battery (3.7 V; 3000 mAh), fast charging capability (automatic shutdown) or 3 x 1.5 V batteries of Type AA Back-up battery: 3 V lithium cell ML 2032
Interfaces	LIF interface (LIF: Low Insertion Force) for battery charging and communication with the PC over a USB interface; additional CF slot for expansion cards (e.g. WLAN)
Dimensions (in mm) without barcode scanner	265 x 92 x 42
Weight (incl. battery)	approx. 0.6 kg
Temperature	
• Operation	-10 ... +50 °C
• Storage	-25 ... +60 °C (without batteries)
Relative humidity, non-condensing	5 ... 95 %
Degree of protection	IP54 (splashwater proof)
EMC	EN 55022; FCC Part 15
Electrostatic; RF; EFT	IEC 801-2; IEC 801-3; IEC 801-4

RFID systems for logistics

SIMATIC RF600

SIMATIC RF610M mobile hand-held terminal

Mobile hand-held terminal	SIMATIC RF610M
Integrated read/write unit UHF module with antenna	
Read/write distance	Up to 600 mm depending on the transponder type
Transmission frequency energy/data, UHF frequency band	
<ul style="list-style-type: none"> • Europe • U.S.A. 	868 MHz 912,5 ... 917 MHz
Functionality of the SW application	Standard user interface for reading/writing data storage units and for saving the data

Selection and Ordering data	Order No.
RF610M mobile hand-held terminal (Europe) ▶ A Basic unit (PSION Workabout PRO) with adapted UHF module (ISO 18000-6B/ -6C), battery, standard software pre-installed, without loading/docking station European frequency band (868 MHz)	6GT2813-0AB00
RF610M mobile hand-held terminal (U.S.A.) ▶ A Basic unit (PSION Workabout PRO) with adapted UHF module (ISO 18000-6B/ -6C), battery, standard software pre-installed, without loading/docking station Frequency band U.S.A./Canada (912.5 ... 917 MHz)	6GT2813-0AB10
Accessories	
Barcode scanner with pistol grip ▶ A Barcode module for mounting on RF610M with pistol grip and release button.	6GT2898-0DB00
WLAN module ▶ A WLAN interface for mounting in the CF slot. Communication to IEEE 802.11 b/g	6GT2898-0DA00
Loading/docking station ▶ A For a mobile hand-held terminal as well as for spare batteries. Including a plug-in power supply with a wide-range input of 100 ... 240 V AC and country-specific adapters as well as USB interface and USB cable.	6GT2898-0BA00
"RFID Systems Software & Documentation" CD ▶ FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C libraries, PC presentation program. MOBY documentation	6GT2080-2AA10

A: Subject to export regulations AL = N and ECCN = EAR99H.

▶ Preferred type, available from stock.

Additional accessories

For information about optional components, see the Internet at www.pSIONteklogix.com

RFID systems for locating – Localizing, responding and optimizing in real-time

From vehicle location in the automotive industry to tracking and separating materials in the chemical industry to complex materials management and shipping systems in logistics: The MOBY R RFID System gives you an overview in any industry. This real-time detection and localization system in the field of identification systems opens up for you completely new options in shaping your process flows economically.

You can find the best ordering options for MOBY R products in the Mall

www.siemens.com/automation/mall

and in the CA01 electronic catalog.

Application

- Transparent localization in real-time
- Wireless material call system
- Stacker/vehicle localization and control
- Localization of maintenance personnel
- Localization of boxes of materials and containers
- Tracking of supplier vehicles, e.g. haulage vehicles
- Safety functions such as access control
- Vehicle or personnel tracking

Highlights

- Fast, up-to-date and precise: Localization in realtime mode
- Limitless overview: Visualization online
- More efficient process procedures for greater efficiency
- For large areas indoors and outdoors




	Location
	MOBY R
Read/write distance	Up to 300 m
Frequency	2.4 GHz
Standards	FCC Part 15 Class B EN 55022, EN 55024 German Technical Inspectorate GS acc. to EN 60950 EMC Guideline 89/336/EEC

RFID systems for locating

Introduction

Technical specifications

MOBY R				
				
Locating distance	100 m indoors, 300 m outdoors			
Max. locating accuracy	3 m			
Reading distance	200 m indoors, 1000 m outdoors			
Read cycles	unlimited			
Memory	32 bits			
Approvals	FCC Part 15 Class B, EN 55022, EN 55024, TÜV GS to EN 60950, EMC Guideline 89/336/EEC			
Frequency	2.4 ... 2.483 GHz			
Mobile data storage units (tags)	Name	Memory size	Operating temperature	Degree of protection
Standard data storage	MDS R202	32-bit fixed code	-25 ... +65 °C	IP67
Pushbutton data storage	MDS R207	32-bit fixed code	-25 ... +50 °C	IP54
Reference/wireless time data storage	MDS R200	–	-25 ... +65 °C	IP67
Read/write devices	Name	WLAN integrated	Operating temperature	Degree of protection
	SLG R21	–	-40 ... +50 °C	IP55 NEMA 3 and NEMA 12
	SLG R23	•		
Mobile hand-held terminal with integrated antenna	STG R2		-20 ... +50 °C	IP64
Traverse sensor	TRIG R201		-30 ... +60 °C	IP65
Write distance	Selectable in 8 steps from 1.1 ... 7.5 m			
Approvals	FCC Part 15 Class B; EN 55022 Class B; EN 55024; TÜV GS to EN 60950; EMC guideline 89/336/EEC; ETS 300683; EN 300330			
Software	Visibility server software			
Required basic software	Microsoft Server operating system and Microsoft SQL database			
Antenna	Outdoors	Indoors	Transmission angle	
Circular beam antenna set outdoors	•		•	360°
Circular beam antenna set, indoors	–		•	360°
Flat beam antenna set	•		•	180°
Connection to the automation system	directly			
SIMATIC S7-300, S7-400				
PROFIBUS DP				
Ethernet (TCP/IP)	•			
WLAN	•			

Overview



MOBY R is a real-time locating system with a range of up to 300 m in the open and 100 m in buildings, with an accuracy of up to 3 m for identifying and locating objects.

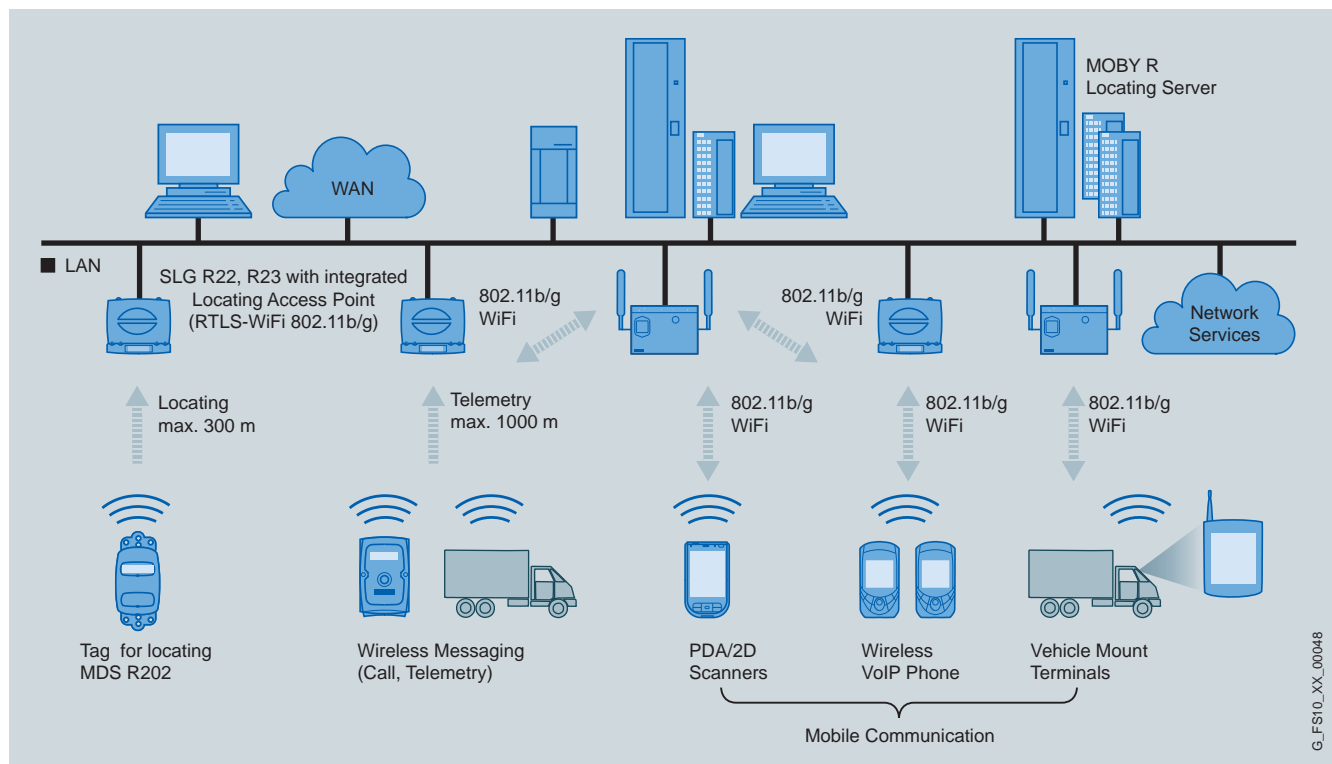
Application

The MOBY R system is suitable not only for real-time locating of the widest variety of objects of almost any quantity and the widest range of different formats (e.g. material boxes, containers, etc.), but also for large areas (e.g. airports, rental car operators, car manufacturers, etc.).

Main applications of MOBY R:

- Vehicles -> locating, tracking
- Containers -> locating, tracking, protection against theft
- Access and vehicle access control
- Loading monitoring
- Trucks, semitrailers -> locating
- Vehicle control
- Material tracking/requirements -> hospitals, production lines

Integration

**The road to a functioning real-time locating system with MOBY R**

A real-time-locating application requires a certain degree of technical knowledge for successful implementation and start-up throughout all phases of the project. Reading the technical documentation with product introduction is not sufficient for acquiring the necessary technical knowledge. For this reason, a MOBY R project sequence is broken down into three steps:

1. Creation of a proposal for the system design

This is a qualified assessment of the customer requirements and their fulfillment with MOBY R. Several discussions with the customer are necessary for this purpose. A CAD drawing of the area to be covered is necessary. If environmental conditions are ambiguous, an on-site visit is necessary. Charging for the travel costs for an on-site visit has to be clarified in advance with A&D SC SM (Regions Manager) After this work, an approx. estimate of the project costs (budget plan) can be passed on to the customer. A proposal for the system design is also prepared. The system design (2nd step) has to be ordered by the customer.

RFID systems for locating MOBY R

Introduction

2. System design

For the system design, the areas where the hardware has to be mounted have to be defined right down to the exact centimeter in a plan and per photo. Locating accuracy, cabling, and connection of the software to the company network are also clarified. All relevant information is compiled into one document and serves as a basis for system implementation (3rd step). For larger systems, under certain circumstances, a period of several weeks is necessary for the system design. Once the system design is completed, a precise proposal of the total costs can be prepared for the customer. The system design is also the basis of a project contract with the customer. That is particularly important because later structural changes can lead to delicate cost changes.

3. System implementation (assembly and commissioning)

During installation, it is particularly important to implement the system design correctly. On the software side, verification is provided to the customer that localization in the defined areas functions with guaranteed reliability and precision.

Order and project execution

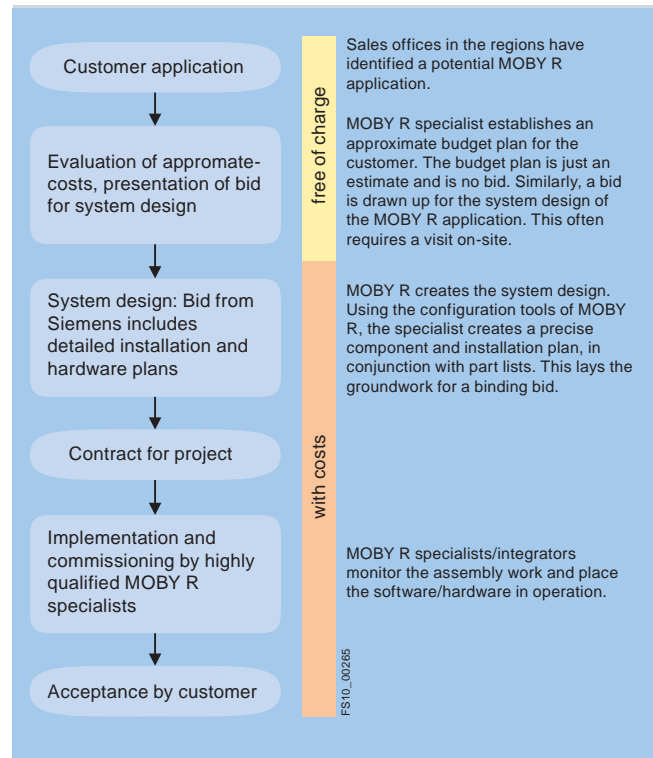
To ensure that MOBY R projects are successfully completed, we place the highest value on MOBY R specialists being informed of the real-time-locating projects. They also initiate the internal order process and the delivery of MOBY R components and provide support with technical clarifications.

Specialists for MOBY R

Below you will find the address of our MOBY R specialist. It is essential that the MOBY R projects are communicated and released through this address, otherwise the components will not be delivered.

I IA AS MES DS DI 4
Hans-Jürgen Buchard
Tel.: +49 (0) 911 895-2068
hans-juergen.buchard@siemens.com

Roadmap for a MOBY R application



National certification and operation of MOBY R components:

Certifications for the MOBY R system are available for the following countries:





Austria, Belgium, Canada, Czech Republic, Denmark, France, Germany, Hungary, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, UK, U.S.A..

MOBY R components are only permitted to be operated in the countries listed.

Technical specifications

Data transmission frequency	2.4 ... 2.483 GHz
Memory capacity	32 bit
Read cycles	unlimited
Locating distance	100 m indoors – 300 m outdoors
Max. locating accuracy	3 m
Reading distance	200 m indoors – 1000 m outdoors
Operating temperature range	-25 ... +65 °C
Degree of protection	IP67
Can be connected to	10BT / 100 BTx / Wireless LAN
Special features	User-configurable flashing rate Flashing activation can be changed by means of MDS trigger 128 barcode with fixed code no.
Approvals	FCC Part 15 Class B EN 55022, EN 55024 TÜV GS to EN 60950 EMC Guideline 89/336/EEC

Selection and Ordering data

MOBY R components and accessories		Order No.
Mobile data storage unit		
	MDS R200 mobile data storage unit consisting of two MDS R202 and an aluminum bracket One MDS R200 works as a reference data memory, the second as a time-synchronization data memory of the SLG R21 / R22 / R23 antennas in order to synchronize them in terms of time via the air interface.	F 6GT2 700-0FE10
	MDS R202 mobile data storage unit 32-bit fixed code, silicon-free, IP67, with battery, housing type W. Typical read distance in buildings of 200 m, outside 1000 m. User-configurable blink rate between 5 s and 9 h.	F 6GT2 700-0FE00
	MDS R207 mobile data storage unit 32-bit fixed code, mobile data storage unit with call button and display for the time since the last activation. Typical read distance in buildings 100 m, outside 300 m. User-configurable blink rate between 5 s and 1 h.	F 6GT2 700-0FH43
Accessories for mobile data storage units		
	MOBY R mirror clamp for secure attachment of the MDS R202	A 6GT2 790-0AD00
Read/write devices		
	SLG R21 read/write device for 802.3 LAN cabling, incl. power pack and license	F 6GT2 701-1AA10
	SLG R23 read/write device for 802.3 LAN cabling and CISCO 802.11B/G wireless LAN, incl. power pack and license	F 6GT2 701-1AF10
	Trig R201 read/write device The TRIG R201 field is almost sphere-shaped and can be adjusted up to a range of 6 meters in stages. For very long transitions, it is possible to interconnect up to 3 TRIG R201. The TRIG R201 MDS Trigger momentarily trips pre-defined blinking in an MDS R202.	F 6GT2 704-1AA10
	STG R2 Mobile Hand-held Terminal with barcode reader for configuring MDS R202, TRIG R201 and SLG	F 6GT2703-0AA10
Accessories for read/write devices		
	Universal omni-directional antenna set for SLG R21/R23, for indoor and outdoor use	F 6GT2 701-0AC00
	Omni-directional antenna set for SLG R21/R23, for indoor use only	F 6GT2 701-0AD00
	Flat panel directional antenna set for SLG R21/R23, for indoor and outdoor use	F 6GT2 701-0AE00
	Antenna support for SLG R21/R23 on masts	F 6GT2 790-0AE00
	Extension cable 15 m for SLG R21/R23 power supply	F 6GT2 791-0AN15
	CD MOBY R Visibility Server Software	6GT2 781-1AE00
	CD MOBY R development software (SDK)	G 6GT2 781-0BE00
	CD MOBY R Trigger XML Publisher	G 6GT2 781-0CE00
MOBY R services		
	MOBY R services <ul style="list-style-type: none"> • MOBY R DEMO Test setting • MOBY R SD system design; price is per person and day • MOBY R SI system implementation; price applies per SLG 	6GT2 794-0AC00 6GT2 794-0AB00 6GT2 794-0AB01
	MOBY R training	6GT2 794-0AD00

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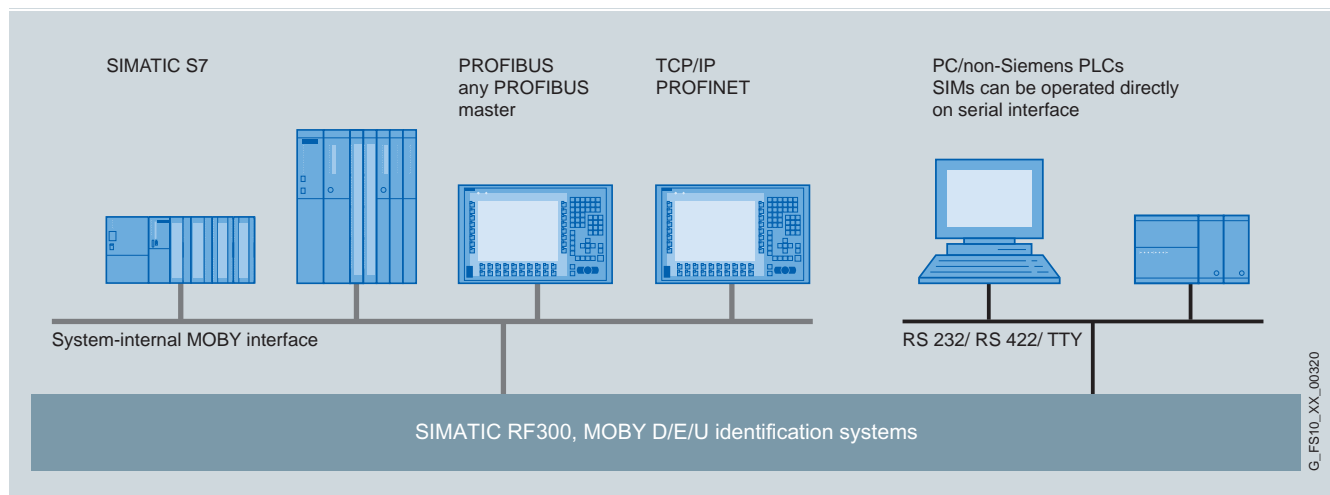
F: Subject to export regulations AL = N and ECCN = 5A991X

G: Subject to export regulations AL = N and ECCN = 5D991A1

RFID systems

Communication modules

Introduction



There are various powerful communication modules (ASM) for integrating MOBY identification systems in SIMATIC, SINUMERIK, SIMOTION, PROFIBUS and PROFINET.

Selection assistance for communication modules and software

System	ASM without file handler	RFID system	Available software
SIMATIC S7-300 (direct), S7-300/400, PC with SIMATIC WinAC via ET 200M, SINUMERIK 840D/810D Serial link ¹⁾ , to PCs, PLCs, any other systems	ASM 475	RF300, E, U, D	FC/FB45; FC55 (multitag)
	ASM 470	E	FC47
	Direct via SLG Dx,	D	MOBY D MDWAPI, MOBY API, C library incl. drivers for Windows 98/NT/2000/XP
	Direct via SIM 7x,	E	
	Direct via SLG U92	U	
	directly via RF3xxR (RS 422)	RF 300	
ASM 424	E	MOBY API, C library incl. drivers for Windows 98/NT/2000/XP	
ASM 724	E (SLA7x only)		
PROFIBUS DP ¹⁾ (SIMATIC S7; PC, any systems)	ASM 450	E	FC44 for S7-300/400, PC with SIMATIC WinAC
SIMATIC S7-300/-400, PC with SIMATIC WinAC, via ET 200pro	RF170C	RF300, E, U, D	FC/FB45; FC55 (multitag)
	ASM 456	RF300, E, U, D	FC/FB45 for S7-300/400, PC with SIMATIC WinAC, FC55 (multitag, ASM 456), FB101/116/132 (ASM 456 only)
PROFIBUS DP-V1 ¹⁾ (SIMATIC S7; PC, any systems)	ASM 754	E (SLA7x only)	
PROFINET IO	RF180C	RF300, E, U, D	FB45

System	ASM with file handler	MOBY system	Available software
SIMATIC S7; PC, any system, SIMOTION SCOUT	ASM 456	U	FC56/FB101/116/132
SIMATIC S7-300 (direct), SIMATIC S7-300/400, via ET 200M	ASM 475	U	FC56
SIMATIC S7-300/400, PC with SIMATIC WinAC, via ET 200pro	RF170C	U	FC56

1) The programming interface is described for connecting to any system.

Function

Corresponding software blocks (FB, FC, libraries) ensure simple and quick integration into the application.

As many as four read/write devices can be connected in series to one ASM communication module (depending on the type of ASM), with a maximum connecting cable length of 1000 m (depending on the ASM, SLG, etc.). Corresponding procedures guarantee a very high reliability of data transmission.

The following options exist for the serial connection of MOBY to any system (PC, PLC, etc.):

- Via a communication module to which the read/write devices (SLG) or read/write antenna (SLA) are connected.
- Direct via a read/write device with a serial interface (SIM or SLG Ux, SLG Dx)

Notes on software and licensing:

When purchasing a communication module or SIM x/SLG x, no software or documentation is supplied. The CD "RFID systems Software & Documentation" contains all the available FBs/FCs for SIMATIC, C libraries for Windows 95/98/NT/2000/XP, demo programs, etc. and is to be ordered separately. In addition, the CD contains the complete RFID documentation (German and English) in PDF format.

The purchase of a communication module or SIM/SLG includes a payment for the use of the software, including documentation, on the CD "RFID Systems Software&Documentation" and the purchaser acquires the right to make copies (copy license) insofar as they are required as part of the project for the plant.

The contract pertaining to the use of software products against a one-off payment shall apply.

RFID systems

Communication modules

ASM 450

Overview

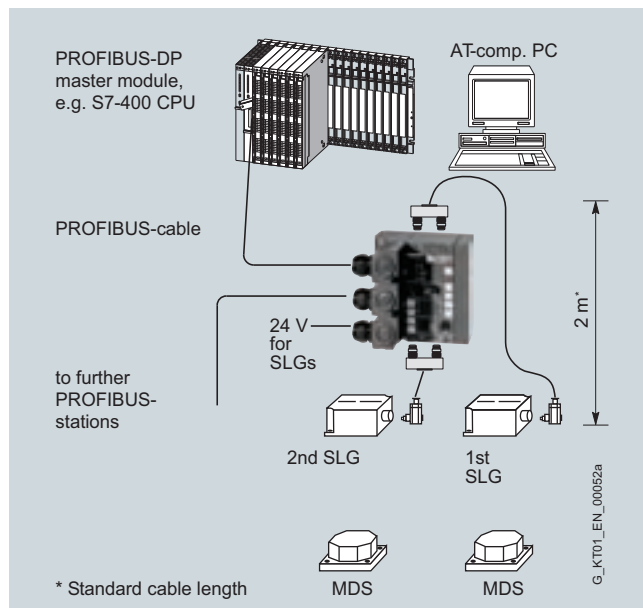


The low-cost communications module ASM 450 is an autonomous PROFIBUS DP slave for the operation of MOBY components via the PROFIBUS DP:

- SIMATIC S7 (including FB/FC software)
- SINUMERIK
- SICOMP IMC, PC, PLC

Thanks to their high degree of protection and ruggedness, they are particularly suitable for machine-level use.

Design



Configuration

The ASM communications modules are mounted on the ET 200X standard module. The relevant configuration and mounting instructions should be referred to in the ET 200X manual. Expansion modules from the ET 200X spectrum cannot be used.

Function

The PROFIBUS DP procedure according to EN 50170 Vol. 2 PROFIBUS for the communication between ASM and SIMATIC S5/S7 (or any PROFIBUS master) and the MOBY-specific procedures for communication between ASM and SLG are implemented on the ASMs.

The data in the MDS is accessed as follows:

- Direct addressing via absolute addresses

On the PROFIBUS DP, the ASM occupies a node address on the bus that is set on the basic module. The ASM is integrated into the hardware configuration by means of a device master (GSD) file. Then the ASM can be configured by means of the software tool HW_Config of the SIMATIC Manager or another PROFIBUS tool.

Error messages and operating states (MDS in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

For the connection to any PROFIBUS DP master, the software interface is disclosed in the documentation.

The **IP67 connectors (Order No. 6ES7194-1AA01-0XA0)** are to be ordered separately!

ASM 450 (for MOBY E)

The ASM 450 has two SLG interfaces. When using two SLG interfaces, the module operates in multiplex mode so that the MDS can only be read reliably when it is not moving. The data in the MDS is accessed direct by means of absolute addresses.

Using the software functions FC44 for the SIMATIC S7, the ASM operates in cyclic mode, i.e. the data throughput depends among other things on the size of the address window (max. 208 byte), number of slaves, etc.

Technical specifications		Selection and Ordering data		Order No.
Communication modules	ASM 450	ASM 450 communication module	▶	6GT2 002-0EB00
Serial interface to user	PROFIBUS DP	Max. 2 SLGs can be connected in multiplex mode, without connectors		
Procedure conforms to:	EN 50170 Vol. 2 PROFIBUS	Accessories		
Connection to PROFIBUS	PG 11 gland (3 x 6ES7194-1AA01-0XA0, not included in scope of delivery)	Connector	▶	6ES7194-1AA01-0XA0
Data transmission rate	9.6 Kbaud to 12 Mbaud (automatic detection)	For ASM 450 for the PROFIBUS DP interface and 24 V supply, 3 units per ASM 450 are necessary		
Max. block length	208 byte	Integrated plug connector	▶	6ES7 194-1FC00-0XA0
Serial interface to SLG	M12 connector	for ASM 450; T functionality; spare part		
Max. cable length	500 m, SLG-dependent, (standard length 2 m)	MOBY M12 dual-pin connector for ASM 450	▶	6GT2 090-0BC00
Connectable SLGs	SLG 7x or SLG 4x; in multiplex mode	For mounting individual ASM SLG, without cable		
Data transmission rate	19.2 Kbaud ... 57.6 Kbaud (depending on the MOBY family)	MOBY E, U connecting cable		
Programming	Depending on the PROFIBUS DP master	Preassembled, between ASM 450 and SLG, angled connector, in the following lengths:		
Function blocks		2 m (preferred length)	▶	6GT2 091-1CH20
SIMATIC S7	FC44	5 m	▶ A	6GT2 091-1CH50
MDS addressing	Direct via addresses	10 m	▶ A	6GT2 091-1CN10
Commands	Initialize MDS, read data, write data, etc.	20 m	▶ A	6GT2 091-1CN20
Digital inputs/outputs	2/2	50 m	▶	6GT2 091-1CN50
Galvanic isolation	Yes	Preassembled, between ASM 450 and SLG, angled connector 2 m long	▶ A	6GT2 091-2CH20
Power supply		MOBY D connecting cable for SLG D1xS		
Permissible range	20 ... 30 V DC (rated value 24 V DC)	2 m	▶ A	6GT2 491-1CH20
Current consumption	Max. 180 mA; typ. 130 mA (without SLG)	5 m	▶	6GT2 491-1CH50
Ambient temperature		20 m	▶ A	6GT2 491-1CN20
Operation	0 ... +55 °C	CD "RFID Systems Software & Documentation"	▶	6GT2 080-2AA10
Transport and storage	-40 ... +70 °C	FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C-libraries, PC presentation program, RFID documentation		
Degree of protection	IP67			
Dimensions (W x H x D) in mm	134 x 110 x 55 (without bus connector)			
Weight, approx.	0.5 kg			

A: Subject to export regulations AL = N and ECCN = EAR99H
▶ Preferred type, available from stock.

RFID systems

Communication modules

ASM 456

Overview



The cost-effective ASM 456 communication module is a stand-alone PROFIBUS DP slave used to operate the RFID systems MOBY D/E/U and SIMATIC RF300 via PROFIBUS DP/DP-V1:

- SIMATIC S7 (including FB/FC software)
- SINUMERIK
- SICOMP IMC, PC, PLC
- SIMOTION (with integrated software library)

Thanks to their high degree of protection and ruggedness, they are particularly suitable for machine-level use. The modular structure with different PROFIBUS connection systems allows them to be used in all applications. The system-wide, plug-in connection technique ensures rapid start-up.

Benefits

- Two parallel MOBY channels ensure real-time mode at dynamic read points.
- Modular design with different bus interfacing possibilities ensures universal implementation.
- SLG connection using an 8-pin M12 connector for quick mounting of all components.
- Easy changeover from ASM 452 to ASM 456 thanks to 100% software compatibility.
- High-performance hardware ensures fast data exchange with the SLG (reader). Consequently the data are available for the application even faster.
- Easy downloading of firmware via SIMATIC Manager for function expansions and error rectification ensure high-availability of the RFID system.
- The parameterizable MOBY-specific PROFIBUS diagnostics facilitate start-up and troubleshooting.
- A wide selection of pre-assembled PROFIBUS connecting cables can be ordered for ASM 456. This saves time and money during installation and assures better quality.

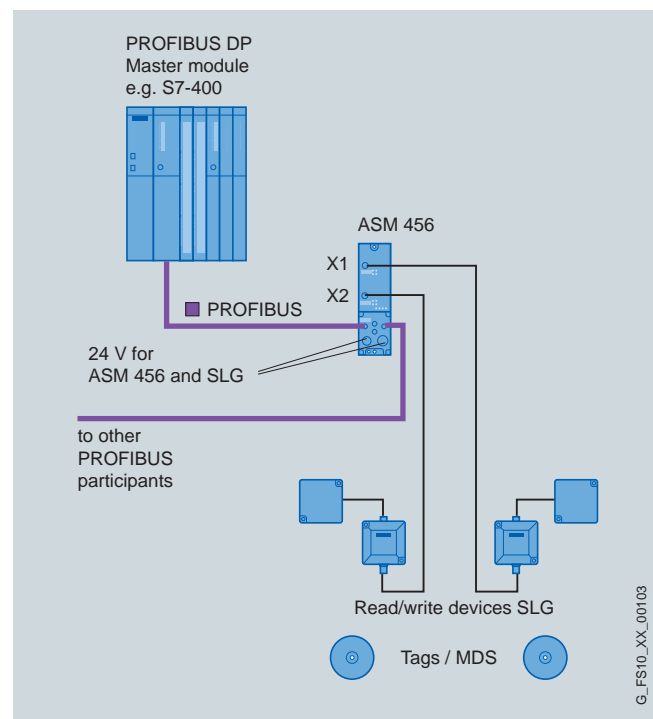
Application

The ASM 456 communication module has been specially designed for a wide range of applications in industrial automation and logistics. Thanks to the high degree of protection of IP67, the ASM 456 can be installed in the process without a control cabinet.

Used primarily for the ASM 456:

- Mechanical engineering, automation systems, conveyor systems
- Ancillary assembly lines in the automobile industry/suppliers
- Small assembly lines
- Production, packaging, textile, plastics and printing machines SIMOTION

Design



Function

The ASM 456 comprises a basic module and a connection block that must be ordered separately. When connecting PROFIBUS, the customer can choose between ECOFAST connections and M12, 7/8" connections.

One or two read/write devices are connected to the ASM with a read/write device cable pre-assembled and ready to use. The standard length of the cable is 2 m. If other cable lengths to the SLG are required, an extension cable measuring between 2 m and 50 m can be used. The cable can also be assembled by the customer as required.

The PROFIBUS DP procedure according to EN 50170 Vol. 2 PROFIBUS for the communication between ASM and SIMATIC S5/S7 (or any PROFIBUS master) and the MOBY-specific procedures for communication between ASM and SLG are implemented on the ASMs.

In principle, access to the data in the MDS can take place as follows:

- Direct addressing via absolute addresses
- Conveniently via the MOBY file handler (MOBY I/U only) using file names

On the PROFIBUS DP/DP-V1, the ASM occupies a node address on the bus that is set on the connection block. The ASM is integrated into the hardware configuration by means of a device master (GSD) file. Then the ASM can be configured by means of the software tool HW_Config of the SIMATIC Manager or another PROFIBUS tool.

Error messages and operating states (MDS in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

The ASM 456 has two SLG interfaces. The data in the MDS can be directly accessed by means of absolute addresses (FB/FC45, FC55) or more conveniently using the MOBY file handler (FC 56) by means of the file names. The ASM is operated in non-cyclic mode over PROFIBUS DP V1. Consequently, a very large amount of data can be transferred to/from the ASM without overloading the PROFIBUS cycle. This has advantages when transferring large volumes of data. In addition, the ASM can process concatenated MDS commands very quickly in this mode.

Function blocks FB101/116/132 in the SIMATIC S7 are available for the "RFID standard profile" mode. The data in the MDS can be addressed either via absolute addresses or via the file handler. This mode additionally integrates the communication module in SIMOTION.

Technical specifications

Communication module	ASM 456
Ambient temperature	
• During operation	• 0 ... 55 °C temperature change 10 K/h, all mounting positions
• Storage	• Or -25 ... 60 °C
Relative humidity	
• During operation	15 up to max. 95 %, no condensation
• Storage	5 up to max. 95 %, no condensation
Atmospheric pressure	
• During operation	1080 ... 795 hPa (corresponds to altitude of -1000 ... 2000 m)
• Storage	1080 to 660 hPa (corresponds to altitude of -1000 ... 3500 m)
Contaminant concentration	
	SO ₂ : < 0.5 ppm (rel. humidity < 60 %, no condensation)
	H ₂ S: < 0.1 ppm (rel. humidity < 60 %, no condensation)
Power supply	
	Rated value: 24 V DC
	Permissible range: 20 ... 30 V DC
Current consumption	
	• Max. 200 mA without read/write device
	• Typ. 80 mA without read/write device
	• Max. 800 mA with two read/write devices
Degree of protection	IP67
Housing color	IP Basic 714
Dimensions (W x H x D) in mm	
• ASM 456 only	60 x 210 x 30
• ASM 456 with ECOFAST connection block	60 x 210 x 60
Weight (without connection block)	Approx. 210 g
Fixing	2 screws M5 x 20 mm
PROFIBUS	EN 50170
• Transmission rate	9.6 kbit/s ... 12 Mbit/s
• Protocol	DP-V1
Serial SLG interface (gross transmission rate)	
	• MOBY I/E: 19200 bit/s
	• MOBY U/D: 19200, 38400, 57600, 115200 bit/s
	• SIMATIC RF300: 19200, 57600, 115200 bit/s
Cable length to read/write device	
• Standard length	2 m
• Optional preassembled cable	5 m, 10 m, 20 m, 50 m
• Cable for self-assembly	Depending on read/write device, up to 1000 m
Supply voltage to read/write device	24 V / up to 0.3 A per read/write device

RFID systems

Communication modules

ASM 456

Selection and Ordering data

	Order No.
ASM 456 communication module ▶ A	6GT2002-0ED00
For connection of 2 read/write devices	
Accessories ECOFAST Anschluss	
ECOFAST connection block ▶ A	6ES7194-3AA00-0AA0
PROFIBUS ECOFAST HYBRID plug 180	
• With male insert (5 per pack) ▶	6GK1 905-0CA00
• With socket insert (5 per pack) ▶	6GK1 905-0CB00
PROFIBUS ECOFAST termination plug with terminating resistors ▶	6GK1 905-0DA10
ECOFAST hybrid cable (pre-assembled)	6XV1 830-7Bxxx¹⁾
ECOFAST hybrid cable ▶	6XV1 830-7AH10
Accessories M12, 7/8" connection	
M12, 7/8" connection block ▶	6ES7194-3AA00-0BA0
M12 terminating resistor for PROFIBUS (5 per pack) ▶	6GK1 905-0EC00
PROFIBUS cable with pre-assembled M12 connectors	6XV1 830-3Dxxx¹⁾
Cable for supply voltage with pre-assembled 7/8" connectors	6XV1 822-5Bxxx¹⁾
PROFIBUS FC standard cable ▶	6XV1 830-0EH10
PROFIBUS M12 connecting plug (5 per pack)	
• With pin insert ▶	6GK1 905-0EA00
• With socket insert ▶	6GK1 905-0EB00
Connecting plug 7/8" for voltage (5 per pack)	
• With pin insert ▶	6GK1 905-0FA00
• With socket insert ▶	6GK1 905-0FB00
Sealing caps 7/8" for unused 24 V loop-through (1 pack = 10 units) ▶	6ES7 194-3JA00-0AA0

Order No.

Accessories

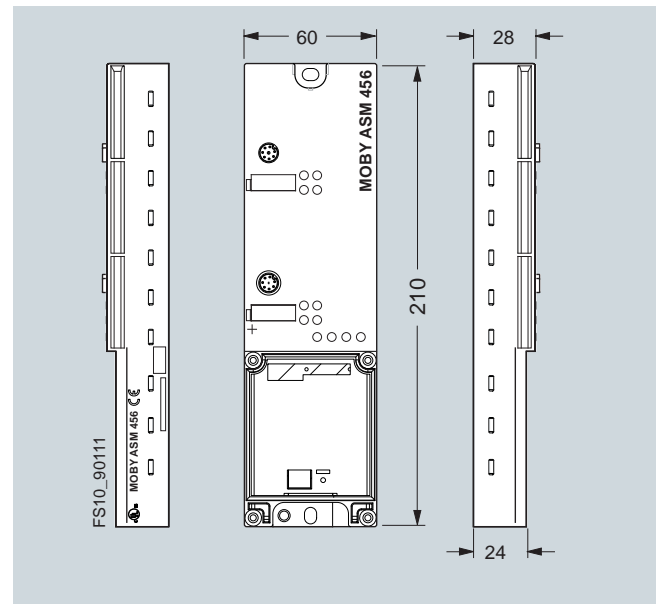
SLG cable for MOBY E/U; 2 m ▶ A	6GT2091-0FH20
SLG cable for MOBY E/U; 5 m ▶ A	6GT2091-0FH50
SLG cable for MOBY D; 2 m ▶ A	6GT2691-0FH20
SLG cable RF300 Extension cable MOBY E/U/D and SIMATIC RF300; 2 m ▶ A	6GT2891-0FH20
SLG cable RF300 Extension cable MOBY E/U/D and SIMATIC RF300; 5 m ▶ A	6GT2891-0FH50
SLG cable RF300 Extension cable MOBY E/U/D and SIMATIC RF300; 10 m ▶ A	6GT2891-0FN10
SLG cable RF300 Extension cable MOBY E/U/D and SIMATIC RF300; 20 m ▶ A	6GT2891-0FN20
SLG cable RF300 Extension cable MOBY E/U/D and SIMATIC RF300; 50 m ▶ A	6GT2891-0FN50
M12 connecting cable, pre-assembled, between ASM 456 and SIMATIC RF300 reader, 2 m, plug on reader angled ▶ A	6GT2 891-0JH20
M12 sealing caps, for unused reader connections (10 units) ▶	3RX9 802-0AA00

1) This cable is available in different lengths (see FDB or Catalog IK PI).

▶ Preferred type, available from stock.

A: Subject to export regulations AL = N and ECCN = EAR99H

Dimensions



Overview



The SIMATIC RF180C is a communication module for direct connection of Siemens RFID systems to PROFINET IO. The readers (SLGs) of the RFID systems MOBY E, D, U and SIMATIC RF300 can be operated on the SIMATIC RF180C.

Due to the high degree of protection and its ruggedness, SIMATIC RF180C is ideally suited to use at machine level. The uniform plug-in connection system ensures rapid commissioning.

Benefits

- Two parallel MOBY channels ensure real-time operation of the dynamic read points
- Reader connection with an 8-pole M12 connector for rapid assembly of all components
- Different connection systems to suit any application
 - M12, 7/8", the well-proven round connectors
 - Push-pull connectors for quick assembly with RJ45 data connectors
- Easy changeover from PROFIBUS applications to PROFINET with SIMATIC RF180C thanks to software compatibility
- The integrated switch allows several PROFINET modules to be installed in star or bus topology. Each application can then be built up quickly and inexpensively
- Powerful hardware ensures rapid data communication with the reader (SLG). So that the data are available to the application more quickly
- Simple firmware downloading in the case of function expansions and error rectification ensures high availability of the RFID system
- Adjustable and parameterizable RFID-specific diagnostics facilitate commissioning and troubleshooting
- A broad selection of pre-assembled connecting cables can be ordered for connecting PROFINET and readers to SIMATIC RF180C. This saves time and money during installation and increases the quality

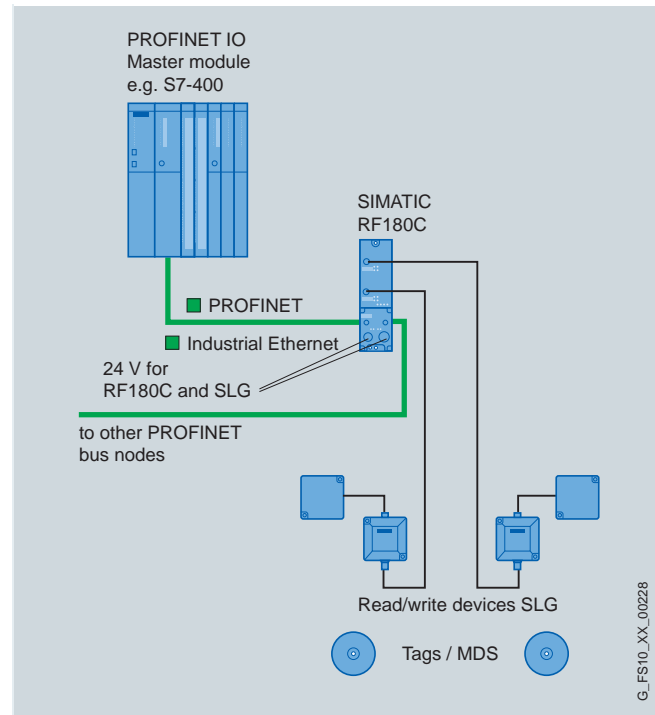
Application

The PROFINET communication module SIMATIC RF180C has been specially designed for a wide range of applications in industrial automation and logistics. Due to the high degree of protection IP67, SIMATIC RF180C can be installed in the process outside the control cabinet.

Main applications for SIMATIC RF180C:

- Machine manufacturing, automation systems, conveyor systems
- Ancillary assembly lines in the automotive industry / suppliers
- Small assembly lines

Design



Function

The SIMATIC RF180C comprises a basic module and a connection block that must be ordered separately.

The connection block is available in two versions:

- M12, 7/8": PROFINET is connected through an M12 plug, the supply voltage is connected through a 7/8" plug. There are 2 connections for PROFINET as well as for the power supply. This ensures that SIMATIC RF180C can be connected to additional bus stations without the need for external distribution devices. The removable connection block allows a base module to be replaced without interrupting the supply voltage to other bus stations.
- Push-pull connector: PROFINET and the power supply are connected over a push-pull connector. There are 2 connections for PROFINET as well as for the power supply. This ensures that SIMATIC RF180C can be connected to additional bus stations without the need for external distribution devices. The supply voltage connectors can conduct currents of up to 12 A (1L+ and 2L+). The removable connection block allows a base module to be replaced without interrupting the supply voltage to other bus stations.

SIMATIC RF180C is integrated in SIMATIC STEP 7 via the GSDML file. SIMATIC RF180C can then be configured via the SW tool HW Config of SIMATIC Manager or another PROFINET tool.

RFID systems

Communication modules

SIMATIC RF180C

A pre-assembled reader cable is used to connect one or two readers to the communication module. The standard cable length is 2 m. If other reader cable lengths are required, an extension cable from 2 to 50 m in length can be used. The cable can also be assembled by the customer as required.

The data in the transponder can be accessed in the following manner: Direct addressing via absolute addresses.

Error messages and operating states (tag in field, transfer, etc.) are also displayed on LEDs and support commissioning and service.

SIMATIC RF180C has two reader interfaces from which the readers are also supplied with voltage. There is a solid-state fuse in SIMATIC RF180C for the reader power supply. The maximum current permitted for the readers per SIMATIC RF180C is 1 A. It is not important here whether the current is drawn by 1 or 2 readers.

The application accesses the tag via FB45. FB45 accesses the tag via absolute addresses. For large volumes of data and complex tag operations, the FB45 can process chained commands.

Data is exchanged between SIMATIC RF180C and the application by means of acyclic data records. This ensures that a large quantity of data can be transferred from/to SIMATIC RF180C without loading the bus cycle. This is advantageous when large volumes of data are being transferred. SIMATIC RF180C can also process chained tag commands in this mode extremely quickly.

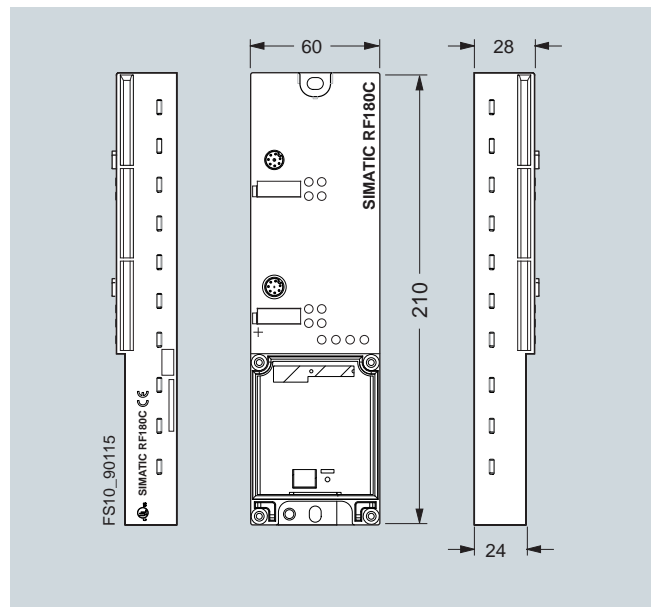
Technical specifications

Type	SIMATIC RF180C
Supply voltage	
• Nominal value	24 V DC
• Permissible range	20 ... 30 V DC
Current consumption	
• Without reader, typ.	100 mA
• With two readers, max.	1000 mA
Serial reader interface (gross transmission rate)	
• MOBY E	19200 bit/s
• MOBY U/D, RF300	19200, 57600, 115200 bit/s
Cable connector for reader	2 x connector plug M12, 8-pin
Cable length to reader	
• Standard length	2 m
• Optional preassembled cables	5 m, 10 m, 20 m, 50 m
Self-assembled cables	Reader/SLG-dependent. Up to 1000 m
Supply voltage to reader	24 V
Max. current per reader	
• 2 readers connected	0.5 A
• 1 reader connected	1.0 A
Ambient temperature	
• Operation	-0 ... 60 °C
• Storage	-40 ... +70 °C, 20 K/h
Shock load during operation acc. to IEC 61131-2	30 g
Vibratory load during operation acc. to IEC 61131-2	0.75 mm (10 ... 58 Hz) 10 g (58 ... 150 Hz)
Enclosure	
• Material	Thermoplastic (fiberglass reinforced)
• Color	IP Basic 714
• Degree of protection	IP67
Dimensions (W x H x D) in mm	
• SIMATIC RF180C without connection block	60 x 210 x 30
• SIMATIC RF180C with M12, 7/8" connection block	60 x 210 x 54
• SIMATIC RF180C with push pull connection block	60 x 216 x 100
Weight	
• Base module only	210 g
• M12, 7/8" connection block only	230 g
• Push pull connection block only	120 g

Selection and Ordering data	Order No.	Order No.
SIMATIC RF180C communication module ▶ A For PROFINET, for connecting 2 readers; without a connection block	6GT2 002-0JD00	Cover caps for push pull sockets (1L+/ 2L+), 5 units per pack 6ES7 194-4JA50-0AA0
PROFINET connection block for SIMATIC RF180C, M12 d-coded, 7/8" ▶ A	6GT2 002-1JD00	Cover caps for push pull sockets RJ45, 5 units per pack, 6ES7 194-4JD50-0AA0
PROFINET connection block for SIMATIC RF180C, push pull RJ45 ▶ A	6GT2 002-2JD00	Accessories for network connection cable PROFINET standard cable 2x2, ▶ Type A, not pre-assembled; minimum order quantity 20 m 6XV1 840-2AH10
Accessories MOBY SLG cable for MOBY E/U; 2 m ▶ A	6GT2 091-0FH20	Energy cable 5 x 1.5; ▶ not pre-assembled, stranded wire, trailing capability; minimum order quantity 20 m 6XV1 830-8AH10
SLG cable for MOBY E/U; 5 m ▶ A	6GT2 091-0FH50	
SLG cable for MOBY D; 2 m ▶ A	6GT2 691-0FH20	
SLG cable RF300 Extension cable MOBY E/U/D, SIMATIC RF300; 2 m ▶ A	6GT2 891-0FH20	
SLG cable RF300 Extension cable for MOBY I/E/U/D/RF300; 5 m ▶ A	6GT2 891-0FH50	
SLG cable RF300 Extension cable MOBY E/U/D, SIMATIC RF300; 10 m ▶ A	6GT2 891-0FN10	
SLG cable RF300 Extension cable MOBY E/U/D, SIMATIC RF300; 20 m ▶ A	6GT2 891-0FN20	
SLG cable RF300 Extension cable MOBY E/U/D, SIMATIC RF300; 50 m ▶ A	6GT2 891-0FN50	
SLG cable RF300 Connector on reader angled; 2 m ▶	3RX9 802-0AA00	
Accessories for M12, 7/8" network connection PROFINET cable with M12 connectors, pre-assembled; for trailing	6XV1 870-8Axxx¹⁾	
Cable for supply voltage pre-assembled with 7/8" connectors	6XV1 822-5Bxxx¹⁾	
PROFINET M12 plug connector; rugged metal housing; fast connect system; D-coded (pack of 1) ▶	6GK1 901-0DB10-6AA0	
7/8" cable connector; for voltage (pack of 5)		
• With pin insert ▶	6GK1 905-0FA00	
• With socket insert ▶	6GK1 905-0FB00	
IE M12 cabinet bushing for conversion from M12 (D-coded) to RJ45; (pack of 5) ▶ A	6GK1 901-0DM20-2AA5	
IE FC RJ45 PLUG 180 RJ45 plug connector with rugged metal housing and FC connection system; straight cable outlet (pack of 1) ▶	6GK1 901-1BB10-2AA0	
Sealing caps 7/8" (10 units) ▶	6ES7 194-3JA00-0AA0	
Accessories for push pull RJ45 network connection Push-pull cable connector for 1L+/ 2L+, not pre-assembled ▶	6GK1 907-0AB10-6AA0	
Push-pull cable connector for RJ45, not pre-assembled ▶	6GK1 901-1BB10-6AA0	

1) This cable is available in different lengths (see key length in the appendix or IK PI Catalog)
 A: Subject to export regulations AL = N and ECCN = EAR99H
 ▶ Preferred type, available from stock.

Dimensions

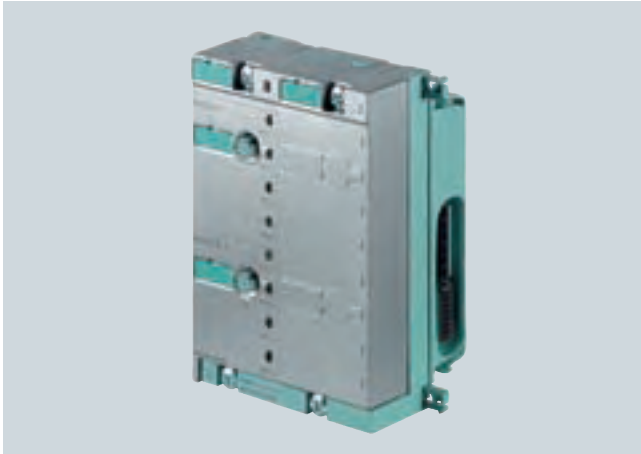


RFID systems

Communication modules

SIMATIC RF170C

Overview



The SIMATIC RF170C is a communication module for connecting the Siemens RFID systems to the ET 200pro distributed I/O system. The readers (SLGs) of all RFID systems can be operated on the SIMATIC RF170C.

Thanks to its high degree of protection and ruggedness, ET 200pro is particularly suitable for machine-level use. The modular structure with PROFIBUS and PROFINET connection systems allows them to be used in all applications. The system-wide, plug-in connection technique ensures rapid start-up.

Benefits

- Two parallel MOBY channels ensure real-time mode at dynamic read points.
- By selecting the relevant header module, the RFID systems can be connected via PROFIBUS or PROFINET.
- The modular design with interface modules for PROFIBUS and PROFINET supports universal implementation.
- Reader connection using an 8-pin M12 connector for fast installation of all components.
- Easy changeover from ET 200X with ASM 473 to ET 200pro with SIMATIC RF170C thanks to 100% software compatibility.
- High-performance hardware ensures fast data exchange with the SLG (reader). Consequently the data are available for the application even faster.
- Easy downloading of firmware via SIMATIC Manager for function expansions and error rectification ensure high-availability of the RFID system.
- The parameterizable RFID-specific diagnostics support start-up and troubleshooting
- A wide selection of pre-assembled connecting cables can be ordered for ET 200pro and SIMATIC RF170C. This saves time and money during installation and assures better quality.

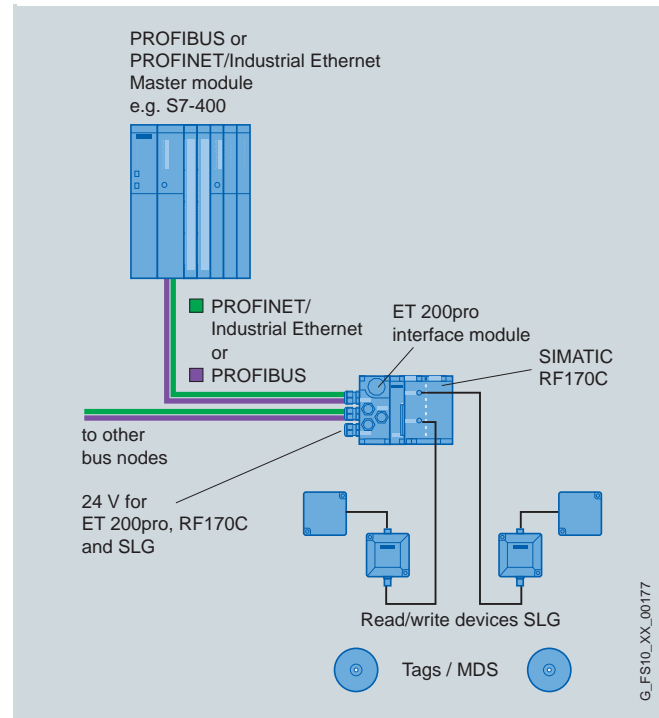
Application

The ET 200pro distributed I/O system with the SIMATIC RF170C communication module has been specially designed for a wide range of applications in industrial automation and logistics. Thanks to the high degree of protection of IP67, the SIMATIC RF170C can be installed without a control cabinet.

Used primarily for the SIMATIC RF170C:

- Mechanical engineering, automation systems, conveyor systems
- Ancillary assembly lines in the automobile industry/suppliers
- Small assembly lines

Design



G_FS10_XX_00177

Function

The SIMATIC RF170C comprises an electronics module and a connection block that must be ordered separately. The interface module is available in the PROFIBUS or PROFINET variants. For the PROFIBUS connection, you can choose from the connection systems of ECOFAST, M12, 7/8", or screwed cable gland. For the PROFINET interface module, M12, 7/8" connection is available.

Integration of SIMATIC RF170C into SIMATIC STEP 7 is achieved by means of an object manager (OM). The GSD file of the ET 200pro system is available for integration into non-Siemens systems. Then the SIMATIC RF170C can be configured by means of the software tool HW_Config of the SIMATIC Manager or another PROFIBUS/PROFINET tool.

A pre-assembled reader cable is used to connect one or two readers to the communication module. The standard length of the cable is 2 m. If other cable lengths to the reader are required, an extension cable measuring between 2 m and 50 m can be used. The cable can also be assembled by the customer as required.

In principle, access to the data in the transponder can take place as follows.

- Direct addressing via absolute addresses
- Conveniently via the MOBY file handler (MOBY U only) using file names

Error messages and operating states (tag in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

The SIMATIC RF170C has two reader interfaces from which the readers are also supplied with power. In the SIMATIC RF170C, the power supply for the readers has an electronic fuse. The maximum permissible current per SIMATIC RF170C for the readers is 0.8 A. It is of no importance here whether the current is drawn by one or two readers.

The data in the MDS can be directly accessed by means of absolute addresses (FB/FC45, FC55) or more conveniently using the MOBY file handler (FB, FC 56) by means of the file names. When the ET 200pro is operated with a PROFINET interface, use of the FB (FB45, FB56) is mandatory.

Communication between the SIMATIC RF170C and the controller is acyclic. Consequently, a very large amount of data can be transferred to/from the SIMATIC RF170C without overloading the bus cycle. This has advantages when transferring large volumes of data. In addition, the SIMATIC RF170C can process concatenated tag commands very quickly in this mode.

Technical specifications

Communication module	SIMATIC RF170C
Ambient temperature	
• During operation	-25 ... +55 °C
• During storage	-40 ... +70 °C 20 K/h
Relative humidity	5 ... max. 100%
Atmospheric pressure	from 795 ... 1080 hPa
Resistance to shock	as for ET 200pro
Vibration	as for ET 200pro
Power supply	
• Nominal value	24 V DC
• Permissible range	20.4 ... 28.8 V DC
Current consumption	
• Without reader	Typ. 130 mA
• With 2 readers	Max. 1000 mA
Enclosure	
• Degree of protection	IP67
• Enclosure material	Thermoplastic (fiberglass reinforced)
• Housing color	IP Basic 714
Dimensions (W x H x D) in mm	
• SIMATIC RF170C without connection block	90 x 130 x 35
• SIMATIC RF170C with connection block	90 x 130 x 60
Weight	
• Without connection block	Approx. 270 g
• With connection block	Approx. 770 g
Serial reader interface (gross transmission rate)	MOBY E: 19200 baud MOBY U/D, RF300: 19200, 57600, 115200 baud
Connectors	2 x connector plug M12, 8-pin
Cable length to reader	
• Standard length	2 m
• Optional preassembled cables	5 m, 10 m, 20 m, 50 m
• Self-assembled cables	Depends on SLG, up to 1000 m
Supply voltage to reader	24 V
Max. current; 2 readers connected	0.4 A per reader
Max. current; 1 readers connected	0.8 A per reader

Selection and Ordering data

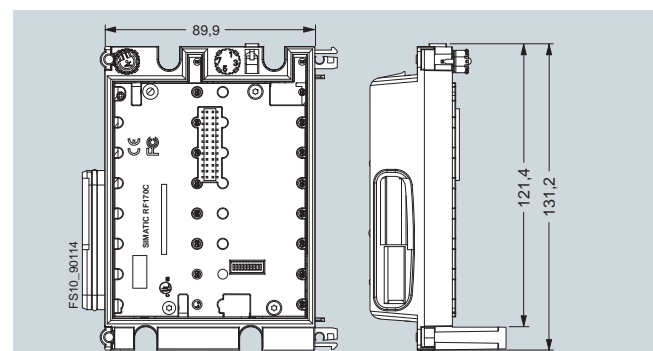
Order No.

SIMATIC RF170C communication module	▶ A	6GT2 002-0HD00
For connecting to the distributed I/O system ET 200pro		
Accessories		
Connection block for SIMATIC RF170C, for connection of 2 readers using M12 connectors	▶ A	6GT2 002-1HD00
SLG cable for MOBY I/E/U; 2 m	▶ A	6GT2 091-0FH20
SLG cable for MOBY I/E/U; 5 m	▶ A	6GT2 091-0FH50
SLG cable for MOBY D; 2 m	▶ A	6GT2 691-0FH20
SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300; 2 m	▶ A	6GT2891-0FH20
SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300; 5 m	▶ A	6GT2891-0FH50
SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300; 10 m	▶ A	6GT2891-0FN10
SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300; 20 m	▶ A	6GT2891-0FN20
SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300; 50 m	▶ A	6GT2891-0FN50
M12 connecting cable, pre-assembled, between SIMATIC RF170C and SIMATIC RF300 reader; 2 m, angled plug on the reader	▶ A	6GT2 891-0JH20
M12 sealing caps for unused reader connections (10 units)	▶	3RX9 802-0AA00

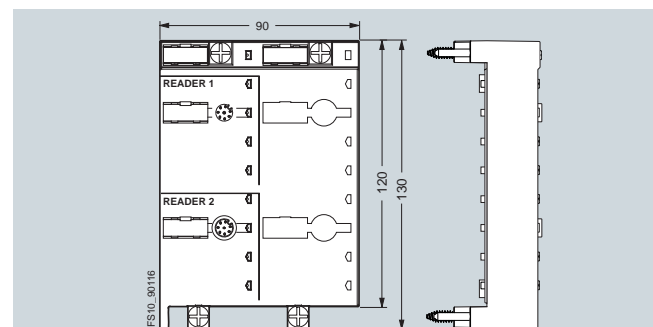
A: Subject to export regulations AL = N and ECCN = EAR99H.

▶ Preferred type, available from stock.

Dimensions



SIMATIC RF170C communication module



Connector block for SIMATIC RF170C

RFID systems

Communication modules

ASM 470/475

Overview



The ASM 470 and 475 are low-cost modules for connecting the MOBY D, E, U and RF300 identification systems to the S7-300 and ET 200M.

Application

The ASM 470 and ASM 475 communications modules integrate the MOBY identification systems into the following systems:

- SIMATIC S7-300
- S7-400, PC (CP5412 (A2)) via ET 200M
- SINUMERIK 840D/810D

A maximum of two SLGs can be connected and operated in parallel mode (ASM 470 only in multiplex mode).

Function

As many as eight ASM communication modules can be plugged into one SIMATIC S7-300 rack and operated. In a configuration with several racks (max. 4), the ASMs can be plugged into and operated on any rack. This means that as many as 32 ASMs can be operated in the maximum configuration of a SIMATIC S7-300. The electrical isolation between SLG and SIMATIC S7-300 bus ensures a noise-resistant setup.

Error messages and operating states (MDS in field, command active etc.) are indicated using LEDs.

Communication between the ASM 475 and S7-CPU takes place by means of acyclic message frames of the P-bus, so that the useful data (max. 238 byte) is transmitted very quickly and effectively. The ASM 475 is fully integrated into the diagnostics of the SIMATIC Manager by means of an Object Manager (OM). Depending on the PROFIBUS master, as many as 126 ET 200M modules can be operated on one PROFIBUS line.

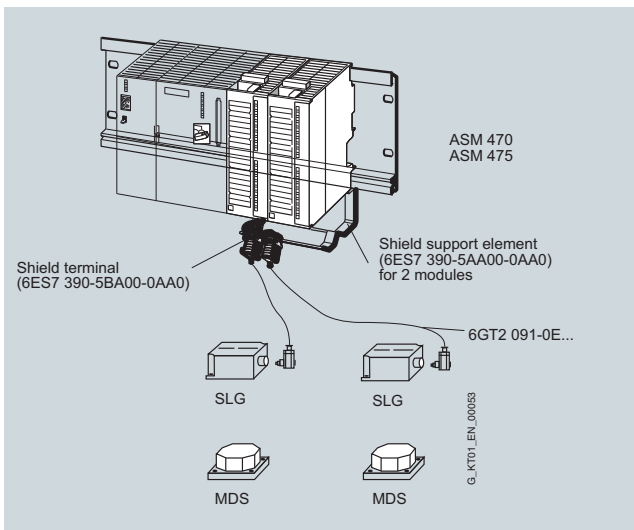
ASM 470 (for MOBY E)

The data in the MDS is accessed direct by means of physical addresses using the ASM 470. Communication with the ASM takes place in the process image in blocks of 12 byte and is slower than with the ASM 475. Via ET 200M, it can be operated on any non-Siemens PROFIBUS master.

ASM 475 (for MOBY E/U/D/RF300)

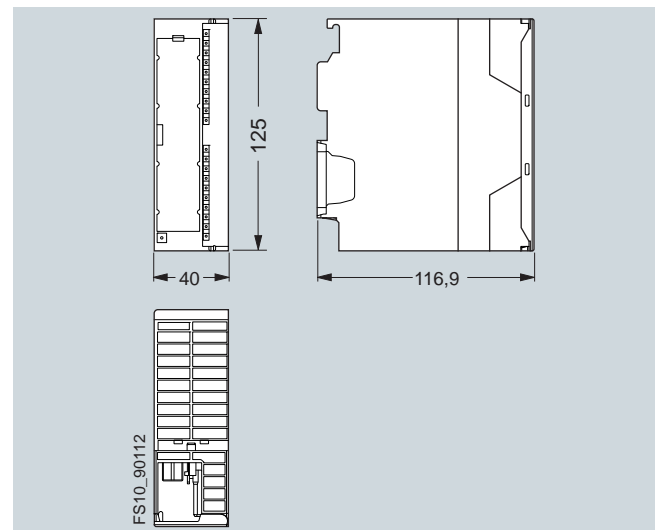
The data in the MDS is accessed direct by means of physical addresses using the ASM 475. The data is transferred between FC/FB45, FC55 and ASM at great speed and without placing a great load on the CPU. In the MOBY I/U mode, the ASM can also be operated with the FC56 (file handler).

Design



Configuration

Dimensions



ASM 475 communication module

*Technical specifications und Selection and Ordering data:
See following page.*

Technical specifications

Communication modules	ASM 470	ASM 475	ASM 475 (with MOBY U file handler)
Serial interface to SLG	RS422		
SLG connection point	Max. 2 units via screw terminals in front connector		
Interface/cable length, max. connectable length	RS422/1000 m, depending on SLG and cable type		
Connectable SLGs	MOBY E (multiplex mode)	MOBY E/U/D/SIMATIC RF300	MOBY U
Interface for 24 V DC	Via screw terminals in front connector		
Function blocks			
SIMATIC S7	FC47	FC/FB45, FC55 (multitag)	FC56
MDS addressing	Direct access via addresses		Access via DOS-like file system
Commands	Initialize MDS, read data from MDS, write data to MDS, etc.		Format MDS, read file, write file, etc.
Power supply			
• Nominal value	24 V DC		
• Permitted range	20 ... 30 V DC		
Electrical isolation between S7-300 and MOBY	Yes		
Current consumption from S7 bus terminal, max.	100 mA		
Power loss, typically	1 W		
Ambient temperature			
Operation			
• Horizontal configuration of SIMATIC	0 ... +60 °C		
• Vertical configuration of SIMATIC	0 ... +40 °C		
Transport and storage	-40 ... +70 °C		
Dimensions (W x H x D) in mm	40 x 125 x 120		
Weight, approx.	0.2 kg		

Selection and Ordering data

	Order No.		Order No.
MOBY communication module ▶ ASM 470	6GT2 002-0FA10	MOBY D connecting cable	
For SIMATIC S7-300 and ET 200M		Pre-assembled, between the ASM 475 and SLG D1xS, 9-pin sub-D connector in the following lengths:	
MOBY communication module ▶ ASM 475	6GT2 002-0GA10	5 m ▶ A	6GT2 491-0EH50
For SIMATIC S7-300 and ET 200M, parameterizable		20 m ▶ A	6GT2 491-0EN20
Accessories		50 m ▶	6GT2 491-0EN50
Front connector (1 x per ASM) ▶	6ES7 392-1AJ00-0AA0	SIMATIC RF300 connecting cable	
MOBY E, U connecting cable		Pre-assembled, between ASM 452/473/475 and RF3xxR, IP65, straight connector, in the following lengths ¹⁾ :	
Pre-assembled, between ASM 470/475 and read/write device, angled connector, in the following lengths:		2 m ▶ A	6GT2 891-0EH20
2 m ▶	6GT2 091-0EH20	5 m ▶ A	6GT2 891-0EH50
5 m ▶ A	6GT2 091-0EH50	CD: "RFID Systems Software & Documentation" ▶	6GT2 080-2AA10
10 m ▶ A	6GT2 091-0EN10	FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C-libraries, PC presentation program, RFID documentation	
20 m ▶ A	6GT2 091-0EN20	A: Subject to export regulations AL = N and ECCN = EAR99H	
50 m ▶ A	6GT2 091-0EN50	▶ Preferred type, available from stock.	
Pre-assembled, between ASM 470/475 and read/write device, straight connector, in the following lengths:		1) The connecting cables can be extended using the RF300 connecting cable for the ASM 456. These connecting cables are supplied in the lengths 2 m, 5 m, 10 m, 20 m and 50 m (6GT2 891-0Fxxx)	
2 m ▶ A	6GT2 091-2EH20		
5 m ▶ A	6GT2 091-2EH50		
10 m ▶	6GT2 091-2EN10		
50 m ▶	6GT2 091-2EN50		

RFID systems

Communication modules

ASM 424, ASM 754/724

Overview



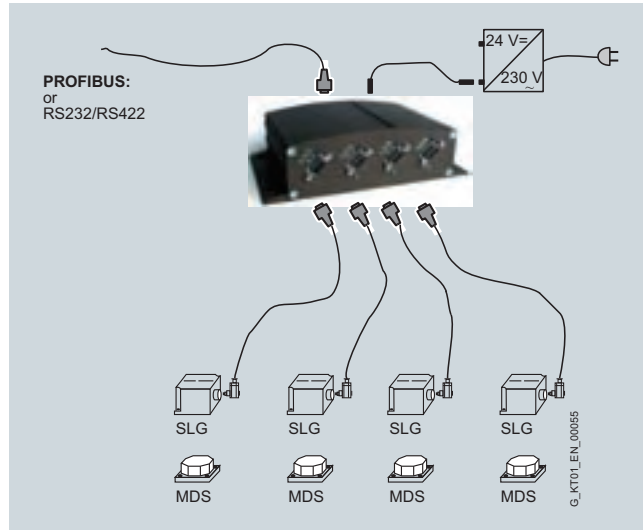
Up to 4 read/write devices or antennas can be connected **in parallel** to the low-cost connection modules. The user can select between two interfaces:

- PROFIBUS DP-V1 (ASM 754)
- RS232/RS422; serial interface to PC/PLC (ASM 424, ASM 724)

Design

Mounting

For easy mounting on a standard rail, an optional adapter is available



Configuration

Function

Up to four read/write devices or antennas from the corresponding MOBY system can be connected to the rugged housing. Data in the MDS is accessed directly over the physical addresses. The extended MOBY E functions (multitag, access rights, password, etc.) are not supported.

Error messages and operating states (MDS in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

PROFIBUS DP-V1 interface (ASM 754)

Communication to the application uses the acyclic protocol service of PROFIBUS DP-V1. The station address on PROFIBUS is set directly on the ASM by means of a DIP switch.

The function **FC45 or FC55 (multitag)** is available to SIMATIC S7 users for easy integration in the application. The ASM is integrated into the hardware configuration via a GSD file. The ASM can then be configured via the SW tool HW_Config of SIMATIC Manager or another PROFIBUS tool.

For connection to any PROFIBUS DP-V1 master, the programming interface is described in the FC45 documentation.

RS232/RS422 interface (ASM 424, ASM 724)

A WINDOWS 98/NT/2000 C library (**MOBY API**, DLL functions) incl. 3964R driver with basic functions (open/close channel, read data from data memory, etc.) is available to the PC user for his application.

MOBY E

Up to four **SLA 7x** can be connected in parallel to the **ASM 754/724** which, however, operate internally in multiplex mode. If more than one SLA 7x is connected, the **MOBY E** data memory can only be reliably read or written in the stationary state.

Up to four **SLG 4x or SLG 7x** can be connected in parallel to the **ASM 424**. MOBY data memories can be read or written simultaneously on all 4 SLGs

Technical specifications

Communication module	ASM 754	ASM 424, ASM 724
Serial interface to user	PROFIBUS DP-V1, 9-pin submin. D-connector (Order No. 6ES7 972-0BA 12-0AX0)	RS232/RS422 9-pin submin. D-connector
Cable length, max	See PROFIBUS	30 m for RS232, 500 m for RS422
Procedure/protocol	EN 50170 Vol. 2 PROFIBUS	3964 R
Data transmission rate	9600 Kbit/s up to 12 Kbit/s (automatic detection)	38.4 bit/s
Block length, max	4 words cyclic/ 238 byte acyclic	238 byte
Serial interface to SLA/SLG	4 x 9-pin submin. D socket	
Cable length, max	55 m to SLA; 1000 m to SLG	
Connectable SLG/SLA	MOBY E: max. 4 x SLG 4x or SLG 7x (parallel mode) MOBY E: max. 4 x SLA 7x (multiplex mode) Note: Mixed mode is not possible	
Software function		
Programming	Depending on the PROFIBUS DP-V1 master	Depending on the PC/PLC
Available software (CD "RFID Systems Software & Documentation")	FC45 for SIMATIC S7-300/400	C library MOBY API for PC with Windows 89/NT
• MDS addressing	Access directly via addresses	
• Commands	Initialize MDS, read data from MDS, write to MDS, etc.	
Power supply		
• Rated value	24 V DC (separate connector)	
• Permissible range	20 ... 30 V DC	
Current consumption	250 mA	
Starting current, max.	1.1 A (without SLA)	
Mounting	4 x M5 screws	
Degree of protection	IP40 (higher degree of protection on request)	
MTBF (at 40 °C)	100,000 hours	
Housing		
• Dimensions (W x H x D) in mm	205 x 130 x 60 (without connector)	
• Material	Aluminum	
• Color	Anthracite	
Ambient temperature		
• Operation	-25 ... +55 °C (condensation not permitted)	
• For transport and storage	-40 ... +85 °C (condensation not permitted)	
Weight, approx.	1.3 kg	

RFID systems

Communication modules

ASM 424, ASM 754/724

Selection and Ordering data	Order No.	Order No.
ASM 424 communication module ▶ With serial interface RS232/RS422, max. 4 SLG 4x or 4 SLG 7x can be connected	6GT2 002-2CE00	
ASM 724 communication module ▶ A With serial interface RS 232/RS422, max. 4SLA 7x can be connected	6GT2 302-2CE00	
ASM 754 communication module ▶ With PROFIBUS DP-V1 interface, max. 4 SLG 7x can be connected	6GT2 302-2EE00	
Accessories		
SLG connecting cable, pre-assembled for MOBY E/U		
Between ASM 424 and SLG		
• SLG connector, angled		
- 5 m ▶ A	6GT2 091-0AH50	
- 10 m ▶ A	6GT2 091-0AN10	
- 20 m ▶ A	6GT2 091-0AN20	
- 50 m ▶	6GT2 091-0AN50	
• SLG connector, straight		
- 10 m ▶	6GT2 091-2AN10	
- 50 m ▶ A	6GT2 091-2AN50	
SLA connecting cable		
Between SLA 71 and ASM 724/754, length 5 m ▶	6GT2 391-1AH50	
Extension cable for SLA connecting cable 6GT2 391-1AH50		
10 m ▶	6GT2 391-1BN10	
25 m ▶	6GT2 391-1BN25	
RS232 connecting cable		
Between PC and ASM 424/724		
5 m ▶	6GT2 391-0BH50	
20 m ▶	6GT2 391-0BN20	
Connector, ASM side		
9-pin Sub-D connector (male) with screw locking for connecting cable between an ASM 424/724/754 and SLG		
• 1 unit ▶	6GT2 090-0BB00	
• 10 units ▶	6GT2 090-0BB10	
Adapter base plate ▶		
6GT2 390-0BA00		
For standard rail mounting, implementable for ASM 424/724/754		
Wide-range power supply		
Primary side: 100 ... 240 V AC, 120 ... 353 V DC, secondary side: 24 V DC, 3 A, with no-load protection, with continuous short-circuit protection		
• EU connector version ▶ A	6GT2 898-0AA00	
• UK connector version ▶ A	6GT2 898-0AA10	
• US connector version ▶ A	6GT2 898-0AA20	
Cable for wide-range power supply ▶		
24 V DC, length 5 m		
6GT2 491-1HH50		
24 V connector (M12 socket) ▶ A		
For ASM 424/724/754, SLG Ux (over PC connecting cable), SLG D1x		
6GT2 390-1AB00		
CD "RFID Systems Software & Documentation" ▶		
6GT2 080-2AA10		
FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C-libraries, PC presentation program, RFID documentation		
A: Subject to export regulations AL = N and ECCN = EAR99H		
▶ Preferred type, available from stock.		

Overview**SIMATIC RF-MANAGER**

The SIMATIC RF-MANAGER is a software tool designed for the fast and simple creation and commissioning of RFID applications as well as their smooth operation. It is linked with a higher-level enterprise system or connected SIMATIC S7 controllers.

The current RF-MANAGER 2008 version supports stationary RF660R read/write devices and mobile RF610M hand-held terminals. Depending on the scope of the RFID application, various software packages are available which differ in the number of supported readers (maximum 50).

Benefits

- Management and operation of readers (read/write devices)
- Collection, visualization and preprocessing of RFID data
- Transmission of RFID data to higher-level enterprise systems
- Linking of RFID data with the automation data of the S7 controller

Application

The RF-MANAGER supports read/write devices of types RF660R and RF610M. Both reader types can be jointly used in applications.

The main areas of application of the RF600 Readers range from the recognition of goods at loading gates to goods receipt and dispatch, through product flow control on conveyor belts, up to deployment in warehouses or distribution centers and high-bay inventory control. Industrial use in factories, e.g. in paintshops or on assembly lines in the automotive industry, is also possible.

RFID systems

Software

SIMATIC RF-MANAGER

Overview



SIMATIC RF-MANAGER is data & device management software for RFID applications:

- For the quick and easy creation and commissioning of RFID applications
- For smooth operation of the connected readers (read/write devices)
- For preprocessing and transmission of RFID data to a higher-level enterprise system
- For linking of RFID data with automation data of SIMATIC S7 control systems

The current RF-MANAGER 2008 version supports stationary RF660R read/write devices and mobile RF610M hand-held terminals.

The RF-MANAGER comprises the Engineering System and Runtime components. With the help of the Engineering System, all necessary configuration tasks are performed and the components involved are parameterized. The RFID project created in this manner is subsequently executed in the Runtime system. The Runtime can run on the same PC as the Engineering System or on a different PC or a Microbox 420/427B.

Depending on the scope of the RFID application, different software packages are available. Every product version contains both an Engineering System and a Runtime. The packages only differ with regard to the number of readers supported by Runtime. Several Runtime licenses can also be added.

The following RF-MANAGER packages are available:

- SIMATIC RF-MANAGER 2008 – 1 Reader
- SIMATIC RF-MANAGER 2008 – 5 Readers
- SIMATIC RF-MANAGER 2008 – 20 Readers
- SIMATIC RF-MANAGER 2008 – 50 Readers

In addition, every package is also offered as an upgrade version. For this purpose an older version of the RF-MANAGER must already be available.

Benefits

- Configuring instead of programming and therefore easy and convenient creation of RFID applications.
- Fast commissioning and diagnosis of complex RFID systems with ready-made solution aids.
- Standardized, consistent operation of the RF660R and RF610M read/write devices facilitates joint processing of bar-codes and RFID data.
- Preprocessing / filtering of the RFID data make special preparation of the data in the enterprise system superfluous.
- More independence from the Enterprise System used thanks to an open interface (ALE)¹⁾.
- Linking of RFID data with automation data by connecting SIMATIC S7 controllers (e.g. point control dependent on the read RFID data).
- Future-oriented thanks to EPCglobal²⁾ compatible software architecture.
- Hardware and software from a single source and therefore perfectly interacting components.

Application

The RF-MANAGER can be used together with RF600 read/write devices to implement the most diverse scenarios. For example, identification of products, automatic acquisition of goods flow or RFID-supported asset management

The focus is on the following areas of application:

- Asset management
- Incoming and outgoing goods
- Internal logistics / production logistics
- Warehouse management
- Tracking & tracing
- Material handling control

Depending on the application, commissioning, monitoring and diagnosis of the readers is considerably simplified by using RF-MANAGER.

Function

Engineering System for configuration of RFID applications:

- Efficient mass data editors
- Clearly comprehensible graphical editors
- Multi-language user interface
- Project assistant with different scenarios

Management of RFID readers (read/write devices):

- Support of up to 50 readers in parallel operation
- Universal support of the RF660R and RF610M readers
- Special online dialogs for fine tuning and monitoring of the RFID application
- Display of status information and error messages
- Support for maintenance scenarios (e.g. expansion of the plant without downtime)

1) Application Level Events

2) Non-profit organization which defines commercial and technical standards for EPC networks.

SIMATIC RF-MANAGER

Preprocessing of RFID data:

- Multilevel filters, from sorting of non-relevant read events to filtering according to EPC criteria
- Reading, writing, display and transfer of RFID data
- Linking of RFID and automation data via connection to S7 controllers

Connection to the higher-level enterprise level:

- Provision of preprocessed RFID data
- Transmission of application-internal information (e.g. messages)

EPCglobal¹⁾ compatible:

- Implementation of the EPCglobal reader protocol layer for communication with the readers

Open ALE²⁾ interface for communication with higher-level enterprise systems

Technical specifications

SIMATIC RF-MANAGER	
General data	
Current version	2008
Supported devices	<ul style="list-style-type: none"> • SIMATIC RF660R • SIMATIC RF610M
Target systems	<ul style="list-style-type: none"> • Standard PC • SIMATIC Microbox PC 420 • SIMATIC Microbox PC 427B
Functions	<ul style="list-style-type: none"> • Commissioning, management and diagnosis of RFID devices • Collection, filtering, displaying and writing of RFID data • Preparation and forwarding of RFID data to higher-level applications and S7 controllers
Type of delivery	
<ul style="list-style-type: none"> • Product CD 	<ul style="list-style-type: none"> • RF-MANAGER configuring software • RF-MANAGER Runtime • Automation License Manager • Documentation as PDF • Getting Started project • ALE Demo Client • RF660R Configuration Software
<ul style="list-style-type: none"> • Licenses on the USB stick (for Automation License Manager) 	<ul style="list-style-type: none"> • Floating license for configuring software • Single license for Runtime (as countable licenses)
Packages	<ul style="list-style-type: none"> • RF-MANAGER 2008 – 1 Reader • RF-MANAGER 2008 – 5 Readers • RF-MANAGER 2008 – 20 Readers • RF-MANAGER 2008 – 50 Readers <p>The packages are available both as complete versions and upgrades.</p>

1) Non-profit organization which defines commercial and technical standards for EPC networks

2) Application Level Events

SIMATIC RF-MANAGER	
Languages	
• Documentation	German, English
• Configuring software	German, English
• Runtime software	German, English
Hardware requirements	
Configuring software	
• Processor	Pentium IV with 1.6 GHz processor or higher
• Graphics	<ul style="list-style-type: none"> • Resolution: 1024 x 768 or higher / 1280 x 1024 recommended • Colors: At least 256
• Main memory	At least 1.0 GB / 2.0 GB recommended
• Memory space required on the hard disk	At least 1.5 GB
• Additional hardware	<ul style="list-style-type: none"> • CD-ROM drive (for installing the software) • USB connection (for transfer of licenses)
Runtime software	
• Processor	Pentium III with 933 MHz processor or higher
• Graphics	<ul style="list-style-type: none"> • Resolution: 640 x 480 or higher • Colors: At least 256
• Main memory	512 MB minimum / 1024 MB recommended
• Memory space required on the hard disk	<ul style="list-style-type: none"> • Standard-PC: at least 256 MB, without the archives • Microbox: Compact Flash card with at least 512 MB
• Additional hardware	<ul style="list-style-type: none"> • CD-ROM drive (for installing the software) • USB connection (for transfer of licenses)
Software requirements	
Operating system	<ul style="list-style-type: none"> • Standard-PC: Windows XP Professional + SP2 • Microbox: Windows XP Embedded + SP2
Additional software	<ul style="list-style-type: none"> • Microsoft Internet Explorer V6.0 SP1 / SP2 • Adobe Acrobat Reader 5.02

Selection and Ordering data		Order No.
SIMATIC RF-MANAGER		
Data & Device Management Software for RFID applications, Version 2008		
Complete version:	▶ C	6GT2080-3CA00-8AA5
• License for one reader	▶ C	6GT2080-3CC00-8AA5
• License for 5 readers	▶ C	6GT2080-3CE00-8AA5
• License for 20 readers	▶ C	6GT2080-3CG00-8AA5
Upgrade:		
• License for one reader	▶ C	6GT2080-3CA00-8AE5
• License for 5 readers	▶ C	6GT2080-3CC00-8AE5
• License for 20 readers	▶ C	6GT2080-3CE00-8AE5
• License for 50 readers	▶ C	6GT2080-3CG00-8AE5

C: Subject to export regulations AL = N and ECCN = EAR99S

▶ Preferred type, available from stock.

RFID systems

Software



Notes



Code Reading Systems



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6/10	SIMATIC VS130-2
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6/18	Hand-held Reading Systems
6/20	SIMATIC HawkEye 40, 40T
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6/34	SIMATIC HawkEye 50T, 51T
6/37	SIMATIC HawkEye 52T, 53T
6/40	Verification Systems
6/41	SIMATIC HawkEye Direct Part Mark Verifier

Code Reading Systems

Introduction

Code reading systems – Reading and verification of 1D/2D codes

For state-of-the-art production systems, tracing products and parts with machine-readable identification is a central requirement. A unique coding system permits the planning of each and every step of production for every part manufactured and changes within the production process or in the materials used. Direct marking of products also allows the implementation of specified legal requirements for tracing production batches throughout the production system.

What is Direct Part Marking (DPM) ?

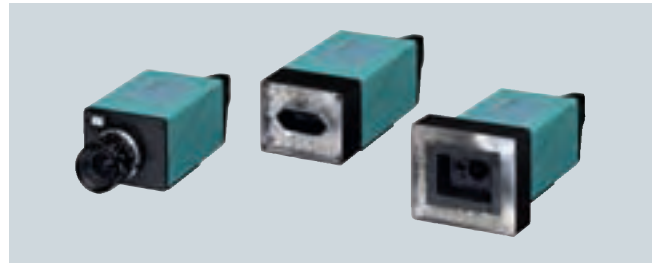
Direct Part Marking (DPM) indicates the application of a mark directly on the surface of a product without the use of a separate carrier material such as e.g. an adhesive label. This makes it possible to identify products in production and tracing them after delivery as well. So-called 2D codes have been used for years in a coding method that meets all user requirements. 2D codes consist of easy to implement, point-shaped basic elements. Laser and needle marking technologies are outstanding regarding durability, marking speed and material independence. Because of mechanical deformation, 2D codes can still be read using 2D read devices after multiple processing steps on metallic work pieces for example. 2D codes also provide the advantage of being able to encode data in more limited spaces than comparable barcodes or text.

Highlights

- Unique identification of products or product parts – Direct Part Marking is the key technology for tracing products
- Part-specific documentation of the production process
- Automation of the manufacturing process
- Verification for product liability cases (e.g. recall actions)

The production spectrum of the Siemens code reading systems

Stationary code reading systems



The stationary code reading systems SIMATIC HawkEye 1510, 1515 and 1525 (from the left)

The stationary code reading systems either have high-performance read devices or a PC-based code reading system. The devices read various two-dimensional (2D) codes as well as one-dimensional (1D) barcodes. The PC-based system is a fast, powerful code reading system for various two-dimensional (2D) codes, one dimensional (1D) barcodes and OCR (text recognition). Many readers, including the PC-based code reading system use data matrix print-quality monitoring (verification) for process control.

Hand-held reading systems



The hand-held reading systems SIMATIC HawkEye 40T and 45T (from the left)

These hand-held reading systems are powerful, high-resolution read devices for either two-dimensional (2D) data matrix codes and/or one-dimensional bar codes (1D). The devices can communicate with a host computer using RS232, USB, PS2 and Bluetooth depending on the selected variant.

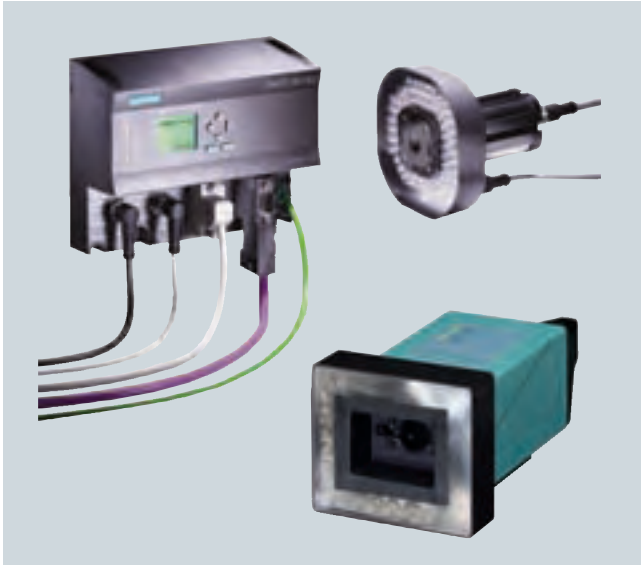
Verification systems



HawkEye Direct Part Marking Verifier, option for the SIMATIC HawkEye 1500 stationary code reading systems

By using verification systems, the readability of marks is guaranteed throughout the entire production process regardless of any possible contamination or when using different read devices. Moreover, the marking can continue to be read after the production process throughout the lifespan of the product.

Overview



The stationary code reading systems read various two-dimensional (2D) codes as well as one-dimensional (1D) barcodes. The PC-based system is a fast, powerful code reading system for various two-dimensional (2D) codes, one-dimensional (1D)

barcodes. Many readers use data matrix print quality monitoring (verification) for process control.

SIMATIC HawkEye 1500

The SIMATIC HawkEye 1500 devices are powerful, stationary read devices for data matrix codes and barcodes. The special format, in the size of an intelligent camera, makes the HawkEye 1500 the perfect replacement for a barcode scanner. Uncomplicated setup and the advanced programming capabilities make for user-friendliness and universal application at the same time. The HawkEye 1500 series can check the print quality of data matrix codes and barcodes with an optional verification license.

SIMATIC VS130-2

The SIMATIC VS130-2 code reading system has been developed especially for reading data matrix codes (DMC) ECC200 and various 1D/2D codes in an industrial environment. The complete package comprises lighting, evaluation unit, sensor and cables. They are installed and commissioned in double-quick time. They are so easy to operate that no courses are necessary and the system is "trained" instead of programmed, so even untrained personnel can use it instantly. Thanks to standardized interfaces, the Vision Sensors can be flexibly integrated into the plant automation. For simple conveyor units, a stand-alone solution is available without an additional PLC.

Major differences

	SIMATIC HawkEye 1500	SIMATIC VS130-2
Enclosure	Compact (IP40) with integrated lighting	Modular (sensor head and lamps), IP65
Commissioning and operation	Setup software, QuicSet, alignment tools, language: E	Integrated Web server, on-board operator controls, auto-optimizing parameters, Languages: E/G/F/I/S/CH
Communication	Ethernet (ASCII), RS232	PROFIBUS, PROFINET, Ethernet
Verification	AIM, Siemens-DPM-Verification	AIM

Application

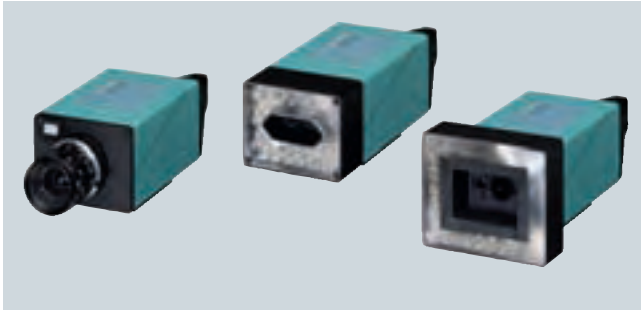
- Automotive
 - Dot peen mark on various automotive power train components (cylinder heads, cylinder blocks, manifolds, etc.)
 - Laser marks on various automotive power train components (camshafts, crankshafts, pistons, connecting rods, transmission components, etc.)
 - Laser marks on automotive electronics components, printed circuit boards, or enclosures
- Aerospace
 - Dot peen marks on gas turbine blades
 - Dot peen marks on various aerospace alloy engine parts
- Medical Devices
 - Laser marks on pacemakers and other implantable devices
 - Laser marks on various medical device components and enclosures
- Electronics
 - Laser marks on ESD sensitive hard drive components
- Semiconductor
 - Laser marks on printed circuit boards and flex circuits
 - Laser mark on packaged semiconductor devices, heat sinks or heat spreaders

Code Reading Systems

Stationary Code Reading Systems

SIMATIC HawkEye 1500

Overview



The SIMATIC HawkEye 1500 devices are powerful, stationary reading devices for data matrix codes and barcodes. The special format, in the size of an intelligent camera, makes the HawkEye 1500 the perfect replacement for a barcode scanner. Uncomplicated setup and the advanced programming capabilities make for user-friendliness and universal application at the same time. The HawkEye 1500 series can check the print quality of data matrix codes and barcodes with an optional verification license.

Benefits

- Industry leading Data Matrix reading performance on hard-to-read direct part marks¹⁾
- Compact, all-in-one smart-camera configuration for ease of integration
- Variety of external NERLITE lighting options for broadest applicability
- Plug-and-play deployment for greatest ease of use
- Auto-photometry and auto-training for accommodating a very wide variety of parts without any parameter adjustments or programming
- Powerful GUI (Graphical User Interface) for advanced setup and remote monitoring of network readers
- Enhanced saved image diagnostics for archiving the highest possible read rates
- GUI customization for application-specific operator interfaces
- Unique direct part mark verification options for in-process mark quality monitoring
- QuicSet™ audio-visual alignment for fast setup & changeover without a PC

Application

- Automotive industry
 - Markings on various drive components (cylinder heads, cylinder blocks, elbow joints, etc.)
 - Laser markings on various drive components (cam shafts, crankshafts, pistons, piston rods, gearbox components, etc.)
 - Laser markings on electronic components, PCBs or enclosures
- Aircraft and space industry
 - Markings on gas turbine blades
 - Markings on various aluminium components of propulsion units
- Medical equipment
 - Laser markings on pacemakers and other implanted devices
 - Laser markings on various medical equipment components and housings

- Electronics
 - Laser markings on rigid and flexible PCBs
- Semiconductors
 - Laser markings on enclosed semiconductor components, heatsinks or heat exchangers

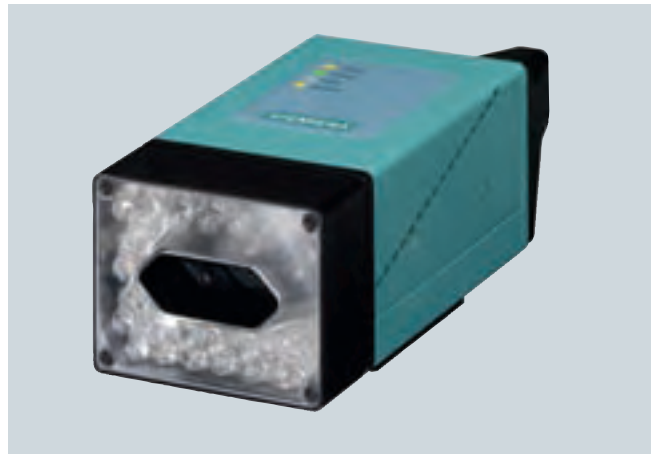
Design

SIMATIC HawkEye 1510



DPM read device for applications that demand flexibility with regard to the selection of lighting and lenses.

SIMATIC HawkEye 1515



Universal read device for a wide range of DPM applications.

1) Direct Part Mark stands for Data Matrix Codes which are printed directly on the surface of parts, e.g. by Laser, dot peen or printing, as opposed to the use of adhesive labels.

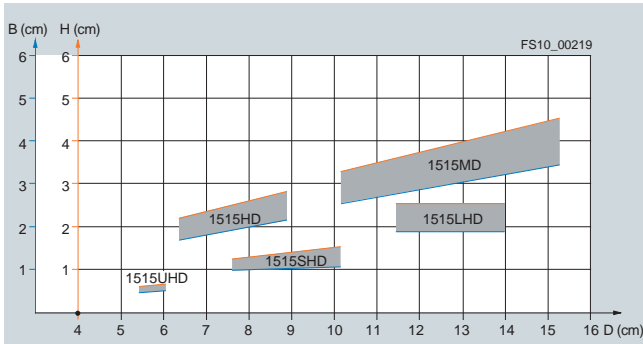
Code Reading Systems

Stationary Code Reading Systems

SIMATIC HawkEye 1500

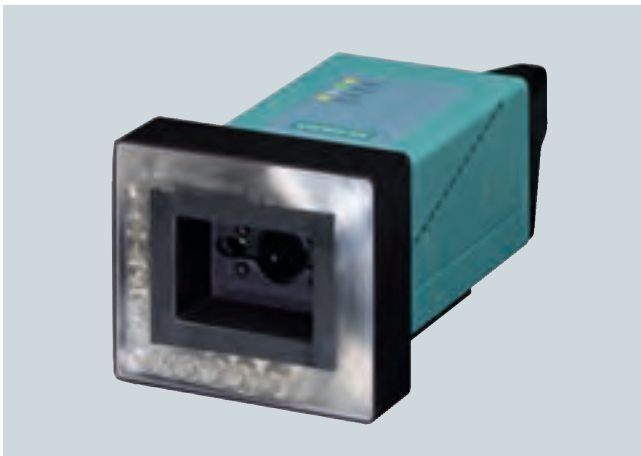
The following diagram shows the relationship between the working distance D and the dimensions of the image area B (width) and H (height) for the different versions of the HawkEye 1515 read devices.

Example: In the case of the HawkEye 1515MD, the image area is 3 x 4 cm in size for a working distance D of 13 cm:



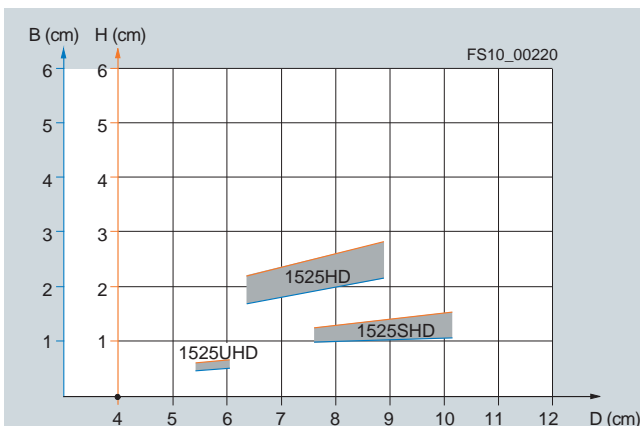
D = Working distance
B = Width of image area
H = Height of image area

SIMATIC HawkEye 1525



DPM read device with dark field lighting, usually used for highly reflective components.

The following diagram shows the relationship between the working distance D and the dimensions of the image area B (width) and H (height) for the different versions of the HawkEye 1525 read devices.



D = Working distance
B = Width of image area
H = Height of image area

Function

Whether the application is a printed label or a challenging, directly marked part with little or no contrast, the SIMATIC HawkEye 1500 series readers provide cost-effective, robust reading solutions.

Industry-leading decoding algorithms allow the HawkEye 1500 series to robustly read damaged, distorted or otherwise challenging codes directly marked on a variety of surfaces at rates of up to 30 parts per second. Built-in verification also enables users to monitor mark quality on a real-time basis to ensure consistently high read rates. In addition to Data Matrix, the HawkEye also reads and auto-discriminates a variety of other 1-D or 2-D codes.

QuicSet

The QuicSet audiovisual alignment in combination with unique auto-learn features allow users to easily and reliably align and train the unit in seconds, without the use of any external display or PC during initial setup or subsequent line changeovers.

- Unique, patented feature
- Laser targeting establishes x, y, z position quickly
- Automatically computes exposure settings
- Optimum read tone indicates best positioning
- Locks in settings upon exiting QuicSet mode

Auto-learn

The unique auto-learn feature allows users to easily and reliably train the unit in seconds. The powerful graphical interface permits users to remotely monitor and fine tune performance. Support software allows for the remote upgrade of camera firmware and review of captured failing part images.

Saved Part Queue Diagnostics for very high read rates

- Saving queue of failed part images on reader
- Remote viewing saved images & reports while running without affecting reading performance
- Remote host saving option through FTP

DPM verification

- Advanced DPM verification method
- Very repeatable on challenging marks
- Predefined A/B/C/D/F grade ranges
- User selectable active measurements
- User defined good/fair/poor (green/yellow/red) alarm ranges
- Enhanced verification GUI
- Support of all public domain verification standards and our advanced DPM verification

Integration

The HawkEye 1500 reader has Ethernet and serial communication onboard as standard.

Ethernet networking supports remote operation and monitoring of a plant, whereas RS232 communication makes the HawkEye 1500 products direct replacements for 1D barcode readers.

Code Reading Systems

Stationary Code Reading Systems

SIMATIC HawkEye 1500

Technical specifications

Type	SIMATIC HawkEye 1510	SIMATIC HawkEye 1515	SIMATIC HawkEye 1525
Optical resolution	640 x 480 pixels		
Image field (W x H) at specified working distance	Dependent on the lens selected	HawkEye 1515MD: 3.30 x 2.54 cm at 10.16 cm (1.3" x 1.0" at 4.0") 3.94 x 3.02 cm at 12.70 cm (1.55" x 1.19" at 5.0") 4.57 x 3.45 cm at 15.24 cm (1.80" x 1.36" at 6.0") HawkEye 1515HD: 2.21 x 1.70 cm at 6.35 cm (0.87" x 0.67" at 2.5") 2.54 x 1.90 cm at 7.62 cm (1.0" x 0.75" at 3.0") 2.82 x 2.16 cm at 8.89 cm (1.11" x 0.85" at 3.5") HawkEye 1515SHD: 1.27 x 0.97 cm at 7.62 cm (0.50" x 0.38" at 3.0") 1.40 x 1.14 cm at 8.89 cm (0.55" x 0.42" at 3.5") 1.55 x 1.07 cm at 10.16 cm (0.60" x 0.46" at 4.0") HawkEye 1515LHD: 2.54 x 1.90 cm at 12.7 cm ± 1.27 cm (1.0" x 0.75" at 5.0" ± 0.5")	HawkEye 1525HD: 2.21 x 1.70 cm at 6.35 cm (0.87" x 0.67" at 2.5") 2.54 x 1.90 cm at 7.62 cm (1.0" x 0.75" at 3.0") 2.82 x 2.16 cm at 8.89 cm (1.11" x 0.85" at 3.5") HawkEye 1525SHD: 1.27 x 0.97 cm at 7.62 cm (0.50" x 0.38" at 3.0") 1.40 x 1.14 cm at 8.89 cm (0.55" x 0.42" at 3.5") 1.55 x 1.07 cm at 10.16 cm (0.60" x 0.46" at 4.0")
Working distance ¹⁾	Dependent on the lens selected	HawkEye 1515MD: 10.16 ... 15.24 cm (4.0" ... 6.0") HawkEye 1515HD: 6.35 ... 8.89 cm (2.5" ... 3.5") HawkEye 1515SHD: 7.62 ... 10.16 cm (3.0" ... 4.0")	HawkEye 1525HD: 6.35 ... 8.89 cm (2.5" ... 3.5") HawkEye 1525SHD: 7.62 ... 10.16 cm (3.0" ... 4.0")
Minimum element size	Dependent on the lens selected	HawkEye 1515MD: 1D: 0.12 mm (0.005"); 2D: 0.25 mm (0.010") HawkEye 1515HD: 1D: 0.07 mm (0.003"); 2D: 0.15 mm (0.006") HawkEye 1515SHD: 1D: 0.04 mm (0.0015"); 2D: 0.07 mm (0.003")	HawkEye 1525HD: 1D: 0.07 mm (0.003"); 2D: 0.15 mm (0.006") HawkEye 1525SHD: 1D: 0.04 mm (0.0015"); 2D: 0.07 mm (0.003")
Velocity	Up to 30 parts per second		
Min. contrast	–	20% at 630 nm	
Decoding capability	1D: Code 39, Code 128, Codabar, Code 93, I2of5, UPC/EAN, UPC-E, UPC Supplementals, RSS and Composite, Postnet, Pharmacode, BC412 2D: Data Matrix, PDF417, QR Code		
Verification	1D: ANSI/ISO 15416 2D: ISO 15415, AIM DPM (Draft Rev D), AS9132/IAQG, Siemens DPM verification		
Interfaces	<ul style="list-style-type: none"> • Integrated interfaces TCP/IP; RS232, baud rates from 1200 bit/s to 115.2 kbit/s • Digital I/O 1 optically isolated input trigger; 3 optically isolated outputs; 4 TTL level I/O; optional TTL level tube flash output 		
General data	<ul style="list-style-type: none"> • Power supply, typically 24 V at 350 mA • Operating temperature 0 ... 40 °C (32 ... 104 °F) • Storage temperature -20 ... 65 °C (-4 ... 149 °F) • Air humidity Up to 95%, no condensation • EMC EN 61326: 1998 Class A • Electr./mech. safety EN 61010 - 1:2002 • Laser safety – EN 60825-1: 1993 Revision 2 2001-01 		

¹⁾ Working distance measured from last physical element to the component.

Code Reading Systems

Stationary Code Reading Systems

SIMATIC HawkEye 1500

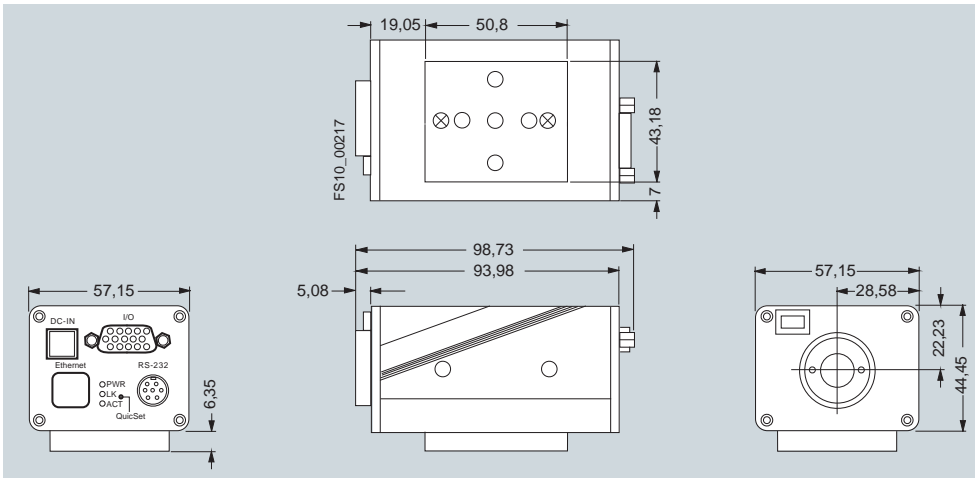
Selection and Ordering data	Order No.	Order No.
SIMATIC HawkEye 1510 ▶ A DPM read device for applications that demand flexibility with regard to the selection of lighting and lenses. Supplied without lens.	6GF3010-0HE15-0CS0	
SIMATIC HawkEye 1515 Universal read device for a wide range of DPM applications. Supplied with integrated lens.		
<ul style="list-style-type: none"> • SIMATIC HawkEye 1515 MD ▶ A 6GF3010-0HE15-1MD0 • SIMATIC HawkEye 1515 HD ▶ A 6GF3010-0HE15-1HD0 • SIMATIC HawkEye 1515 SHD ▶ A 6GF3010-0HE15-1SD0 • SIMATIC HawkEye 1515 LHD ▶ A 6GF3010-0HE15-1LD0 		
SIMATIC HawkEye 1525 DPM read device with dark field lighting, usually used for highly reflective components. Supplied with integrated lens.		
<ul style="list-style-type: none"> • SIMATIC HawkEye 1525 HD ▶ A 6GF3010-0HE15-2HD0 • SIMATIC HawkEye 1525 SHD ▶ A 6GF3010-0HE15-2SD0 		
Accessories		
Cable		
<ul style="list-style-type: none"> • Serial cable, length 3 m ▶ A 6GF3010-0AC00-0SC0 • Industrial Ethernet TP cable 4 x 2, RJ45/RJ45 connector, Cat. 6, pre-assembled with 2 RJ45 connectors <ul style="list-style-type: none"> - Length 2 m ▶ 6XV1870-3QH20 - Length 6 m ▶ 6XV1870-3QH60 - Length 10 m ▶ 6XV1870-3QN10 • Industrial Ethernet twisted-pair cable 4 x 2, RJ45/RJ45 connector, Cat. 6, pre-assembled with 2 RJ45 connectors <ul style="list-style-type: none"> - Length 2 m ▶ 6XV1870-3RH20 - Length 6 m ▶ 6XV1870-3RH60 - Length 10 m ▶ 6XV1870-3RN10 		
<i>For other Ethernet cables, please refer to Catalog 1K PI, Section 2 "Industrial Ethernet"</i>		
Power supplies		
<ul style="list-style-type: none"> • HawkEye 1500 power supply ▶ A 6GF3010-0HE15-0PS0 • HawkEye power supply cable – free end (i.e. without connector) ▶ A 6GF3010-0AC00-0PC6 • Mini lens 16 mm, 1:1.4 D = 29.5 mm, L = 37.2 mm ▶ K 6GF9001-1BF01 • Mini lens 25 mm, 1:1.4 D = 29.5 mm, L = 38.9 mm ▶ K 6GF9001-1BG01 • Mini lens 35 mm, 1:1.6 D = 29.5 mm, L = 41.4 mm ▶ K 6GF9001-1BH01 • Mini lens 50 mm, 1:2.8 D = 29.5 mm, L = 38.0 mm ▶ K 6GF9001-1BJ01 		
Lens for reading code and plain text		
with fixed focal length, adjustable aperture and focus, with locking screw		
<ul style="list-style-type: none"> • Mini lens 8.5 mm, 1:1.5 D = 42 mm, L = 47 mm ▶ K 6GF9001-1BE01 • Mini lens 12 mm, 1:1.4 D = 29.5 mm, L = 35.7 mm ▶ K 6GF9001-1BL01 • Mini lens 75 mm, 1:2.8 D = 34.0 mm, L = 63.6 mm ▶ K 6GF9001-1BK01 		
CS-Mount for C-Mount adapter ring 5 mm ▶ A	6GF9001-1AP02	
Set of intermediate rings ▶ A	6GF9001-1BU	
For using mini lenses at close range; with 0.5 mm, 1.0 mm, 5.0 mm, 10.0 mm, 20.0 mm, 40 mm rings with 31 mm diameter C thread, attached between the lens and the camera body for shots in the macro range		
Lighting accessories		
<ul style="list-style-type: none"> • HELTMA-1L support for NERLITE lighting DF-100, DF-150 and DF-150-3 ▶ A 6GF3010-0LG14-0XX0 • HELTMA-2L support for NERLITE lighting R-100 V2 ▶ A 6GF3010-0LG15-0XX0 • HELTMA-3L support for NERLITE lighting R-60 V2 ▶ A 6GF3010-0LG16-0XX0 • HELTMA-4L support for NERLITE lighting DOAL-50 V2 ▶ A 6GF3010-0LG17-0XX0 • HawkEye lighting controller ▶ A 6GF3010-0LG18-0XX0 		
Miscellaneous		
<ul style="list-style-type: none"> • HawkEye adapter plate (inch/metric thread) ▶ A 6GF3010-0AC00-0BM5 		
▶ Preferred type, available from stock. A: Subject to export regulations AL = N and ECCN = EAR99H K: Subject to export regulations AL = 91999 and ECCN = EAR99H		

Code Reading Systems

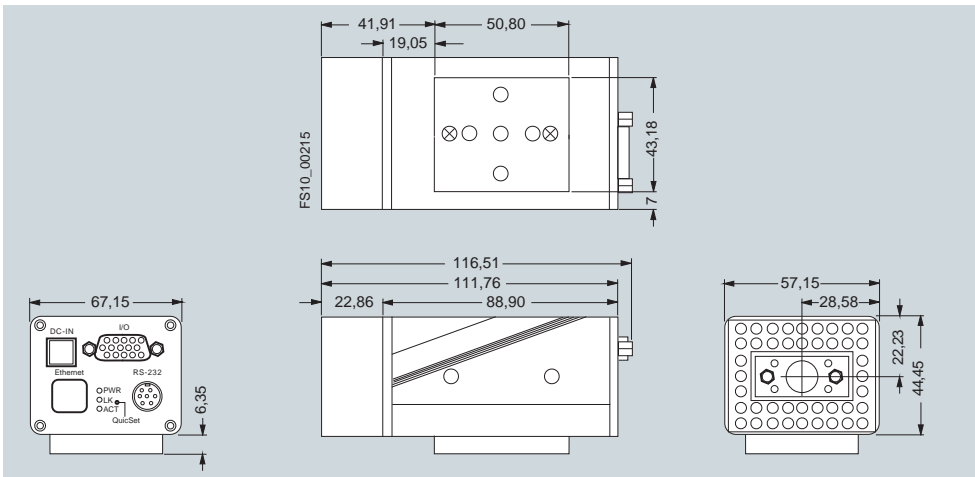
Stationary Code Reading Systems

SIMATIC HawkEye 1500

Dimensions

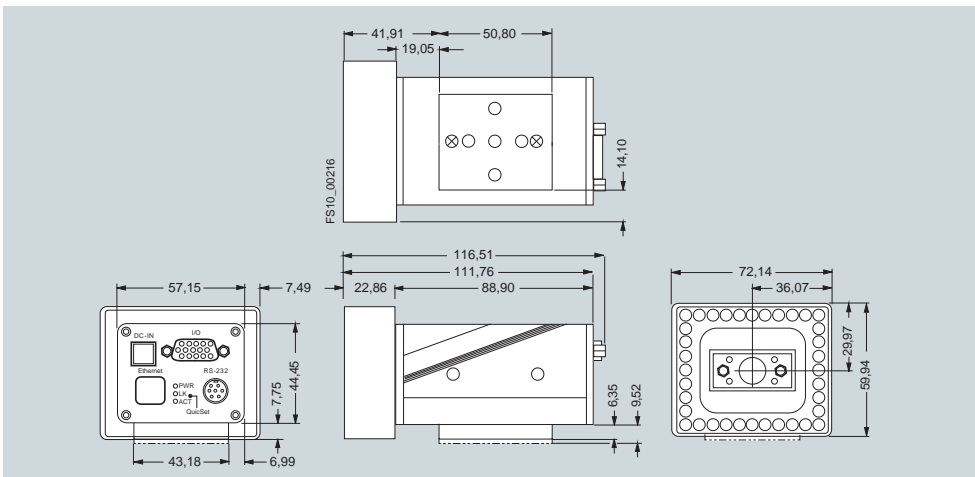


SIMATIC HawkEye 1510



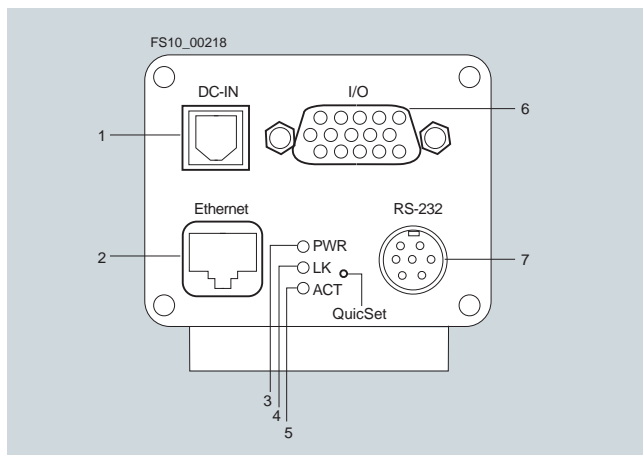
SIMATIC HawkEye 1515

6



SIMATIC HawkEye 1525

Schematics



No.	Designation
1	Power connector 24 V DC
2	Ethernet connector – RJ45
3	Power ON LED
4	Ethernet LINK LED
5	Ethernet ACT LED
6	Field I/O connector – DB15S 1 opto in, 3 opto out, 4 GPIO (strobe out optional on GPIO 1)
7	Serial port connector – 8 pin mini DIN

Code Reading Systems

Stationary Code Reading Systems

SIMATIC VS130-2

Overview



- The SIMATIC VS130-2 has been developed especially for reading data matrix codes (DMC) ECC200 in an industrial environment. More 2D codes and 1D codes are also available making the SIMATIC VS130-2 into a complete code reader:
- 1D codes (barcodes):
 - Code 39,
 - Code 128,
 - Interleave 2/5,
 - EAN13.
- 2D codes:
 - Data matrix code (DMC) according to ECC200,
 - QR (alphanumeric characters; without sub-variants: truncated, macro, micro),
 - PDF417 (without subvariants: macro, micro),
- SIMATIC VS130-2 reads codes on different construction elements and surfaces, e.g. (incomplete listing):
 - Paper or plastic labels,
 - Plastic parts,
 - Circuit boards,
 - Metallic objects.
- SIMATIC VS130-2 reads codes of different types of markings, e.g. (incomplete list):
 - printed,
 - stamped,
 - lasered,
 - drilled.
- No parameter definition for adapting to the various support materials and types of marking is required by the user. "Training" is performed automatically by presenting a readable code pattern. Programming and parameterization are not required.
- Can be used in principle for the following applications:
 - Coded information can be read out,
 - The coded information is compared with a defined character sequence,
 - Quality assessment of the marking process (exclusively DMC).
- Parameters are set using the web-based operator interface which runs on various platforms with the following requirements: browser (IE5.5 and higher), JAVA-VM (MS, SUN).
- The web-based operator interface is also used for controlling the device from an HMI device. In this case, the requirements mentioned above also apply with regard to the browser and JAVA VM
- Remote maintenance concept using web-based operator interface.
- Remote controlled with integrated digital inputs, PROFIBUS or PROFINET IO.

- Can be supplied as a complete package in several variations for different object sizes
- The product is available in 6 languages (operator interface, manual and online help are available in German, English, French, Spanish, Italian and Chinese).

Application

The VS130-2 can be used for the following applications:

- Coded information can be read out.
- Comparing the coded information with a defined character sequence.
- Measurement of code quality.

Barcodes

The SIMATIC VS130-2 reads the barcodes (Code 39, Code 128, Interleave 2/5, EAN13) in different sizes:

- Fixed focus sensor head (640 x 480): up to 60 mm code width,
- C/CS sensor head (640 x 480 or 1024 x 768): Code width depends on the selected lens.

The main condition for reading is that the smallest code structure element (the thinnest line) has to be at least 3 pixels wide to ensure good readability.

Data matrix code

The SIMATIC VS130-2 can decode data matrix codes of the following matrices in various sizes:

- Square: 10 x 10 dots up to 72 x 72 dots
- Rectangular: 8 x 18 dots up to 16 x 48 dots

The parameter "Dot size" and the reading distance are defined by the optics selected and can vary over a wide range:

- Readable dot size 0.1 mm to >3 mm.
- Reading distance 80 to 3000 mm.

PDF417

The SIMATIC VS130-2 can decode PDF417 in various sizes:

- Fixed focus / C/CS sensor head (640 x 480): Up to 50 lines of code, up to 7 columns of code
- C/CS sensor head (1024 x 768): Up to 80 lines of code, up to 15 columns of code.

QR

The SIMATIC VS130-2 can decode QR in various sizes:

- Fixed focus / C/CS sensor head (640 x 480): Up to 89 x 89 dots
- C/CS sensor head (1024 x 768): Up to 145 x 145 dots.

Common properties

Code readability is basically not connected to the type of marking or support material, as long as the marked structure and the background are different optically.

Possible marking systems include e.g.:

- Laser inscription systems
- Inkjet printers

Examples of possible surfaces and materials e.g.:

- Different types of PCB.
- Plastic parts of various colors.
- Labels of various colors.
- Electronic components.
- Metallic objects, etc.

Design

The following components are necessary when using the SIMATIC VS130-2 and are included in the scope of supply of a fixed-focus complete package (working distance approx. 100 mm):

- Fixed focus sensor head (3 image field sizes selectable)
- Incident light in the form of a ring lamp, matched to the application and sensor head
- Evaluation unit
- Plug-in cables
- CD with mounting/operating instructions

"C/CS-Mount complete packages" are available for working distances between 80 mm and 3000 mm:

- C/CS-Mount sensor head (standard resolution 640 x 480 [pixels], high resolution 1024 x 768 [pixels])
- Evaluation unit
- Plug-in cables
- CD with mounting/operating instructions

The core of this package is a C/CS-Mount sensor head whose imaging behavior is determined by selecting a suitable C/CS-Mount lens. The lens is not a component part of the package and can be selected under accessories. The lighting (including cables) must also be selected in accordance with the working distance and is not included in the "C/CS-Mount complete package".

For commissioning, the following items are also required (not included in the scope of supply):

- Ethernet cable (see accessories) for connecting the evaluation unit to any preferred web client. The web client, e.g. PC with installed web browser, is used to adjust the sensor head and the lighting.

Sensor head

The sensor head is equipped with:

- Aluminum profile housing to degree of protection IP65.
- CCD chip (640 x 480 square pixels, 1024 x 768 square pixels).
- Lens, permanently installed (possible image field sizes: 70 x 50 mm, 40 x 30 mm, 20 x 15 mm for 640 x 480 pixels in each case) or prepared for C/CS-Mount lens (freely selectable image field size with 640 x 480 pixels or 1024 x 768 pixels)
- Interface for digital transmission of the image data to the evaluation unit.

The fixed focus sensor head offers degree of protection IP65. degree of protection IP65 can also be achieved when using C/CS-Mount lenses if the optional protective enclosure is used.

Evaluation unit

The evaluation unit has:

- A plastic housing, designed for cabinet-free installation (IP40).
- Connections for:
 - 24 V DC power supply
 - Lighting
 - Sensor head
 - Digital inputs and outputs
 - PROFIBUS DP
 - Ethernet (DHCP client, DHCP server, fixed IP address)
- User guidance on the device (4-line text display, 6 keys)
- User guidance in web-based user interface (HTML, JAVA VM)
- Access protection using password

The following communication services are included:

- PROFINET IO (slave)
- PROFIBUS DP V0 (slave)
- TCP/IP native

Front lighting

- Designed as ring lamp, pushed onto the sensor head or protective lens enclosure
- Can be removed and fixed at a different angle on the machine
- Housing to degree of protection IP65
- Equipped with different LEDs for different applications:
 - Unfocussed, for short reading distances (0.08 to 0.5 m)
 - Focussed, for long reading distances (0.5 to 3 m)
 - Infrared LED for operation without daylight
 - Red LED to generate high light levels
 - Operation in flash mode
 - Energy control for the flash integrated into the lamp.

Function

The following functions are available:

- "Training" the SIMATIC VS130-2 on the basis of a code (DMC) pattern.
- Reading out the coded information.
- Comparing the coded information with a defined character sequence.
- Measuring the code quality.
- Processing code on moving or stationary objects.
- Output of the decoding results on three control outputs:
 - READ: Code is being decoded.
 - MATCH: Decoded contents of the code matches the reference exactly.
 - N_OK: Code cannot be decoded.
- The decoded DMC information is output over PROFIBUS DP or Ethernet or via a converter on the RS232 interface.
- Formatting the output.
- Integrated DI/O, e.g. for "stand-alone" operation without an additional controller.
- Remote control capability over PROFIBUS DP, PROFINET IO, DI/O or Ethernet.
- Remote maintenance capability over web-based Intranet or Internet user interface:
 - Monitoring (live image in reading mode).
 - Diagnostics (fault descriptions, log information, etc.).
 - System administration (software update, etc.).
 - Fault analysis for searching for the causes of failed reads.
- Activation of the ring lighting

Code Reading Systems

Stationary Code Reading Systems

SIMATIC VS130-2

Mode of operation

The following steps are necessary for using the SIMATIC VS130-2:

- Mounting the SIMATIC VS130-2 and lighting.
- Manual alignment of the camera, checking the light level: The web server integrated into the device complete with a web-based user interface is available for this purpose. The user interface displays the camera image and the decoded result. The sensor head can be aligned in the alignment phase on the basis of the live image in the user interface. The user interface is executable on any PC with Microsoft Internet Explorer and a JAVA VM installation. If the sensor head is correctly aligned, the VS130-2 automatically continues with the subsequent procedure:
 - Optimization of the lighting control.
 - "Training" the image processing parameters by presenting a code pattern. The image processing parameters are saved for the current code (carrier material, type of marking, dot size, matrix size, etc.). No other parameters have to be entered.
- Evaluation mode (RUN mode) starts using the training results and the start of a read:
 - The Data Matrix Code can be fed manually or over a conveyor.
 - The Data Matrix Code must lie within the inspection window at the moment of triggering (start of reading) and can move at a maximum speed of 5000 mm/s. Any angle of rotation is permitted within the inspection window of the sensor head.

SIMATIC VS130-2 has three basic operating modes which can also be combined:

- Operating mode 1 "Code decoding":
 - The character string is transferred to the controller filtered or unfiltered. The filters that can be used are separators, start position and length of the character string or company-specific identification numbers.
- Operating mode 2 "Comparing decoded information with any preferred character string":
 - The comparison can refer to the decoded character string or only a specific part of it. Partial comparison is possible using one of the above-mentioned filter functions.
- Operating mode 3 "Measuring the code quality":
 - Absolute or relative measuring is possible. With the relative method, a reference pattern is presented during the training phase to calibrate the reading system. Quality values measured in this mode relate to the reference pattern. VS130-2 can also be used for absolute measurements. In this case, neither a calibration procedure nor reference pattern is required.
- Set the digital control outputs READ, MATCH or N_OK according to the operating mode and evaluation result.
- Output the decoded information over PROFIBUS DP, PROFIBUS IO, Ethernet or serial interface (converter required) as required and on the device display.

Programming

The SIMATIC VS130-2 is not programmed or parameterized in the same manner as conventional vision systems. It configures the lighting and trains the algorithms without the need for user entries on the basis of a code pattern or during the first read.

Training is possible with the conveyor running. Self-parameterization can be started externally via the control keys on the device or remote-controlled from the user interface. Self-parameterization can also start during reading if a read attempt fails. The reliability of reading is maximized due to the lack of user input and due to automatic self-parameterization.

Up to 15 different parameter sets can be saved in the device. These can be called up by the operator or from an external controller at any time and can be used for code reading or for another training phase.

Technical specifications

SIMATIC VS 130-2 Vision Sensor	
Sensor head	
Image capture	CCD chip 1/4", 640 x 480 square pixels; CCD chip 1/3", 1024 x 768 square pixels; Full frame shutter with automatic exposure
Image data transfer	Triggered frame transfer
Available versions	<ul style="list-style-type: none"> • Non-adjustable lens for three different image field sizes and reading distances, only available for 640 x 480 • Two C/CS-Mount versions (without lens): User-defined image field size and scanning distance
• Large field of view	Size of field of view: 70 x 50 mm Dot size: 0.60 ... 3.5 mm (edge length) Operating distance: 120 mm
• Medium-sized field of view	Size of field of view: 40 x 30 mm Dot size: 0.35 ... 2.0 mm (edge length) Operating distance: 85 mm
• Small field of view	Size of field of view: 20 x 15 mm Dot size: 0.2 ... 1.0 mm (edge length) Operating distance: 75 mm
• Variable field of view	Freely selectable image field size, scanning distance and sensor resolution, depending on: <ul style="list-style-type: none"> • Selected lens • Selected sensor head resolution 640 x 480 pixels or 1024 x 768 pixels Minimum requirement: 5 pixels/dot
Housing	Extruded aluminum housing, black anodized
Dimensions (W x H x D) in mm	42 x 42 x 100
Degree of protection	IP65 according to DIN EN 60529 / VDE 0470-1
Ambient temperature	0 ... 50 °C
Mechanical strength	
• Vibrations	1 g (60 ... 500 Hz)
• Shock	70 g (6 ms, 3 shocks)
Lighting	
Illuminant	LED, wavelength 630 nm (red) or infra-red, designed as a flash of 20 µs to 10 ms, diffuse or clear
Housing	Ring lamp of plastic, working area up to 500 mm or Ring lamp of metal, working area up to 3000 mm, suitable for lens cover
Dimensions (W x H x D) in mm	
• Plastic	102 x 102 x 26.5
• Metal	116 x 116 x 42
Degree of protection	IP65 acc. to DIN EN 60529 / VDE 0470-1
Ambient temperature	0 ... 50 °C

SIMATIC VS130-2 Vision Sensor	
Evaluation unit	
Operator controls	4-line text display and 6 operator buttons
"Teach-in" of DMC ("training")	Fully-automatic training procedure
Number of objects saved	15 different parameter sets, selectable using operator buttons or digital inputs, powerfail-proof storage
Triggering inspection	External (through digital input)
Permissible object rate, max.	20 reads/s
Infeed direction of the objects	
• For external triggering	Any
• Setup software	Software for displaying the sensor image when mounting and adjusting the sensor head and lighting. The software makes the integral web server available directly and requires an installed browser (Internet Explorer 5.5 and higher) and installed JAVA-VM (Microsoft or SUN).
Housing	Plastic, all cables can be plugged in, suitable for installation without cabinet
Dimensions (W x H x D) in mm	170 x 140 x 76
Degree of protection	IP40 according to DIN EN 60529 / VDE 0470-1
Ambient temperature	0 ... 50 °C
Mechanical strength	
• Vibrations	1 g (60 ... 500 Hz)
• Shock	70 g (6 ms, 3 shocks)
Interfaces on evaluation unit	
• Digital inputs for 24 V DC	8; of which one interrupt-capable trigger input for standard binary sensors, 7 further PLC-capable control inputs
• Digital outputs for 24 V DC	6; of which 3 quality outputs 0.5 A are for the direct activation of pneumatic valves (15-pin Sub-D socket for inputs/outputs)
• Integral PROFIBUS DP interface	DP (9-pin Sub-D socket) for real-time transfer of the test results
• Integral PROFINET I/O interface	RJ45 (socket) for operator software, real-time transfer of test results and process interfacing
• Integrated Ethernet interface	RJ45 (socket) for operator software, transfer (not real-time) of test results and process interfacing
• Lighting control	4-pin circular connector (female) for power supply and for triggering the flash
• Sensor head interface	Digital interface (26-pin Sub-D socket) for connecting the VS130-2 sensor head
Supply voltage	
• Nominal value	24 V DC
• Permitted range	20 ... 30 V DC
Current consumption, max.	4 A, of which up to 1.5 A for supplying the pneumatic valves that can be connected

Selection and Ordering data Order No.

SIMATIC VS130-2	
Complete package for object inspection; comprising sensor head, LED incident light (ring lamp 6GF9 004-8BA), evaluation unit and the following cables:	
• Cable between evaluation unit and sensor head, for lengths see below	
• Cable between lighting and evaluation unit (except for reading system with variable field of view), for length see below	
• Cable for power supply, length 10 m	
• Cable for connecting digital I/O devices, length 10 m	
Incl. documentation package for SIMATIC VS130-2	
• Field of view 70 x 50 mm	
- With cable length 2.5 m ▶ B	6GF1 130-1BA
- With cable length 10 m ▶ B	6GF1 130-1BA01
• Field of view 40 x 30 mm	
- With cable length 2.5 m ▶ B	6GF1 130-2BA
- With cable length 10 m ▶ B	6GF1 130-2BA01
• Field of view 20 x 15 mm	
- With cable length 2.5 m ▶ B	6GF1 130-4BA
- With cable length 10 m ▶ B	6GF1 130-4BA01
• Variable field of view with 640 x 480 pixels and prepared for IP65 protective housing (note: supplied without light and light cable)	
- With cable length 2.5 m ▶ B	6GF1 130-3BB
- With cable length 10 m ▶ B	6GF1 130-3BB01
• Variable field of view with 1024 x 768 pixels and prepared for IP65 protective housing (note: supplied without light and light cable)	
- With cable length 2.5 m ▶ B	6GF1 130-3BC
- With cable length 10 m ▶ B	6GF1 130-3BC01

▶ Preferred type, available from stock.

B: Subject to export regulations AL = N and ECCN = EAR99S

Code Reading Systems

Stationary Code Reading Systems

Accessories for VS130-2

Overview



The following accessories are suitable for the VS120 and VS130-2 devices:

- LED ring lamps, metal, IP65, suitable for mounting in protective lens enclosure:

Type	Illuminant	Working range
LED ring lamp	Red, diffuse	75 ... 500 mm
	Infrared, diffuse	75 ... 500 mm
	Red, diffuse	75 ... 250 mm
	Infrared, diffuse	75 ... 250 mm
	Red, clear	100 ... 1000 mm
	Red, clear	500 ... 3000 mm
	Infrared, clear	500 ... 3000 mm

- Supports:
 - Ring lamp support, coaxial, solid
 - Sensor head/ring lamp support, solid
 - Sensor head support, tri-plate
- Protective enclosure
 - IP65 protective lens enclosure (PMMA)
 - IP65 protective enclosure for evaluation unit
- Lamp multiplexer
- Standard rail mounting

Benefits

Using the accessories listed above, VS100 projects can be implemented quickly and reliably to the degree of protection IP65 for all components for a working range of 80 mm to 3000 mm.

Function

IP65 protective lens barrel/LED ring lamps

When the C/CS Mount sensor head is used, degree of protection IP65 can be achieved by using the IP65 protective lens barrel. The LED ring lamps listed here are also to the degree of protection IP65 and can be mounted and removed via the protective lens barrel, but without being mechanically connected to it.

Protective enclosure for processing units

The protective enclosure for VS100 processing units enables the evaluation unit to be installed in accordance with degree of protection IP65. The protective enclosure provides space for all components of an autonomous VS100 application: Evaluation unit, power pack, lamp multiplexer, interface converter, Ethernet switch. All the cable glands required for the cables of the maximum degree of expansion are therefore also provided. The cable glands are designed for the connector sizes of the VS100 cables. The protective enclosure can therefore be retrofitted in an existing application and additional components (Ethernet switch, additional ring lamps, etc.) can be installed later.

Supports

The supports are provided for connecting sensor heads complete with ring lamps together and for fixing both components at the installation location. The support systems offer the necessary stability and ideal fixings for the sensor head and ring light. They also offer the facility for adjusting the sensor head and ring lamp.

Lamp multiplexer

The lamp multiplexer is used for connecting several ring lamps with a VS100 evaluation unit. The cables are included in the scope of delivery for connecting the evaluation unit via the lamp interface and the interface for digital inputs/outputs to the multiplexer. The multiplexer then allows up to 4 VS100 lamps (metal LED ring lamp, plastic LED ring lamp, VS110 panel light) using the standard cables. The connected lamps can be individually controlled and used for illuminating the image field. The lamp multiplexer is activated via digital inputs/outputs and is currently only supported by VS130-2 Version 2.0 and above.

Standard rail mounting

A standard rail support is screwed to the backplane of a VS100 evaluation unit enclosure to enable the evaluation unit enclosure to be mounted on a standard rail. The mounting rail adapter is also required for mounting the evaluation unit in the protective enclosure.

Technical specifications

Ring lamps

Type	6GF9 004-8BA01	6GF9 004-7AA01	6GF9 004-8CA01	6GF9 004-8DA01	6GF9 004-7BA01
Illuminant	Red (630 nm), diffuse	Infrared, diffuse	Red (630 nm), clear	Red (630 nm), clear	IR, clear
Duration of flash	20 µs ... 10 ms				
Working range	75 ... 250 mm	75 ... 250 mm	100 ... 1000 mm	500 ... 3000 mm	500 ... 3000 mm

Type	6GF9 004-8BA	6GF9 004-7AA
Illuminant	Red (630 nm), diffuse	Infrared, diffuse
Duration of flash	20 µs ... 10 ms	
Working range	75 ... 500 mm	75 ... 500 mm

Supports

Type	6GF9 002-7AB	6GF9 002-7AC	6GF9 002-7AD
Designation	Ring lamp support, coaxial, solid	Ring lamp support, coaxial, single	Sensor head support, tri-plate
Dimensions (W x H x D) in mm	96 x 15 x 27	96 x 200 x 37	165 x 175 x 65

Protective enclosure

Protective enclosure for lenses	
Enclosure	
• Material	Metal
• Face plate	Glass or plastic (PMMA)
Dimensions (diameter x length)	
• External (mm)	50 x 70
• Internal (mm)	44 x 65
Degree of protection	IP65
Ambient temperature	0 ... 50 °C
Mechanical stress	
• Vibrations	1 g (60 ... 500 Hz)
• Shock	70 g (6 ms, 3 shocks)
Suitable lenses (see page 3/13)	6GF9 001-1AL 6GF9 001-1AQ 6GF9 001-1BF01 6GF9 001-1BG01 6GF9 001-1BJ01 6GF9 001-1BL01 6GF9 001-1AE 6GF9 001-1AF 6GF9 001-1AJ 6GF9 001-1AU 6GF9 001-1AV 6GF9 001-1BH01
Protective enclosure for evaluation unit	
Enclosure	Metal
Dimensions (W x H x D) in mm	300 x 400 x 210
Standard mounting rail	TH 35 according to DIN EN 60715
Degree of protection according to EN 60529	IP65
Ambient temperature	0 ... 50 °C

Designation	Length	Order No.
Possible built-in components		
VS100 evaluation unit		6GF1 018-3BA
Lamp multiplexer		6GF9 002-7BA
Standard rail mounting for the evaluation unit		6GF9 002-7DA
Industrial Ethernet Switch		6GK1 08-0BA00
Power supply 230 V/120 V AC 1.3/2.2 A; 24 V DC/5 A		6ES7307-1EA00-0AA0
Cable bushings for		
1 VS100 power supply cable, (D = 5.4 mm)	10 m	6GF9 002-8CA
1 sensor cable (D = 6.8 mm)	2.5 m	6GF9 002-8CD
	10 m	6GF9 002-8CF
4 lighting cables (D = 4.5 mm)	2.5 m	6GF9 002-8CE
	10 m	6GF9 002-8CG
1 digital communication cable (D = 7.4 mm)	10 m	6GF9 002-8CB
1 serial communication cable (D = 5.0 mm)	5 m	6ES790-1BF00-0XA0
3 Ethernet cables with 2 RJ45 connectors	2 m	6XV1 850-2GH20

Code Reading Systems

Stationary Code Reading Systems

Accessories for VS130-2

Selection and Ordering data

Order No.

Order No.

LED ring lamps



Figure shows protective lens enclosure; 2 small mounting brackets enclosed

- ▶ Red, diffuse, working range 75 ... 0.5 m, dimensions 102 x 102 x 26.5 mm (H x W x D), degree of protection IP65, not suitable for IP65 protective lens enclosure ▶ **6GF9 004-8BA**
- ▶ Red, clear, working range 75 ... 1000 mm, degree of protection IP65, not suitable for IP65 protective lens enclosure ▶ **6GF9 004-8CA**
- ▶ Infrared, diffuse, working range 75 ... 0.5 m, dimensions 102 x 102 x 26.5 mm (W x H x D), degree of protection IP65, not suitable for IP65 protective lens enclosure ▶ **6GF9 004-7AA**
- ▶ Red, diffuse, working range 75 ... 250 mm ▶ **6GF9 004-8BA01**
- ▶ Infrared, diffuse, working range 75 ... 250 mm ▶ **6GF9 004-7AA01**
- ▶ Red, clear, working range 100 ... 1000 mm ▶ **6GF9 004-8CA01**
- ▶ Red, clear, working range 500 ... 3000 mm ▶ **6GF9 004-8DA01**
- ▶ Infrared, clear, working range 500 ... 3000 mm ▶ **6GF9 004-7BA01**

Power supply cable

- ▶ For SIMATIC VS100, length 10 m, plugs into VS end, one end unconnected (this cable is included in the VS110 complete package) ▶ **6GF9002-8CA**

Lighting cable

- ▶ For SIMATIC VS100 LED ring lamp, length 2.5 m, for plugging in at both ends, suitable for trailing ▶ **6GF9 002-8CE**
- ▶ For SIMATIC VS100 LED ring lamp, length 10 m, for plugging in at both ends, suitable for trailing ▶ **6GF9 002-8CG**

Data cable

- ▶ Connecting cable for HMI adapter and PC/TS adapter, (RS232, null modem cable, 5 m); for VS110, VS130 ▶ **6ES7 901-1BF00-0XA0**
- ▶ Industrial Ethernet twisted-pair cable 4 x 2, RJ45/RJ45 connector, Cat. 6, pre-assembled with 2 RJ45 connectors, length 2 m ▶ **6XV1870-3RH20**
- ▶ Industrial Ethernet TP cable 4 x 2, RJ45/RJ45 connector, Cat. 6, pre-assembled with 2 RJ45 connectors, length 2 m ▶ **6XV1870-3QH20**

- ▶ Digital communication cable, length 10 m, plugs into VS end, one free end (this cable is included in the VS110 complete package) ▶ **6GF9002-8CB**

- ▶ Sensor cable for connecting SIMATIC VS100 sensor head, length 10 m, for plugging in at both ends, suitable for trailing (this cable is included in the SIMATIC VS120 and VS130 complete packages) ▶ **6GF9002-8CF**

- ▶ Sensor cable for connecting the SIMATIC VS100 sensor head, length 2.5 m, for plugging in at both ends, suitable for trailing ▶ **6GF9002-8CD**

IP65 protective lens enclosure



For lenses with the following maximum dimensions: Diameter: 41 mm/44.6 mm and length from contact facing 65 mm (e.g. for lenses 6GF9 001-1BL01, -1BF01, -1BG01, -1BH01, -1BJ01)

- ▶ With glass face plate ▶ **6GF9 002-7AA**
- ▶ With plastic face plate (PMMA) ▶ **6GF9 002-7AA01**

Supports

For connecting the sensor head with the ring lamp and for fixing at the mounting location and adjusting it.





- ▶ Ring lamp support, coaxial, solid, 2 units ▶ **6GF9 002-7AB**



- ▶ Sensor head support, tri-plate ▶ **6GF9 002-7AD**



- ▶ Preferred type, available from stock.

Selection and Ordering data	Order No.
<ul style="list-style-type: none"> • Sensor head/ring lamp support, solid ▶ 	6GF9 002-7AC
<p>Lamp multiplexer ▶</p>  <p>For connecting several ring lamps with a VS100 evaluation unit</p>	6GF9 002-7BA
<p>IP65 protective enclosure for processing units ▶</p>  <p>Provides degree of protection IP65 for components</p>	6GF9 002-7CA
<p>Standard rail mounting ▶</p>  <p>For mounting the evaluation unit on a standard rail</p> <p>▶ Preferred type, available from stock.</p>	6GF9 002-7DA

Code Reading Systems

Hand-held Reading Systems

Overview



SIMATIC HawkEye 40/40T

- Hand-held read devices that are powerful and suitable for high-resolutions.
- Reading two dimensional (2D) data matrix codes and one-dimensional barcodes.
- Complex image processing functions and lighting technology to read codes on different surfaces.
- SIMATIC HawkEye 40 is suitable for labels with high contrasts. SIMATIC HawkEye 40T is designed for codes with low contrasts, such as are made by e.g. dot peen, laser printers or inkjet printers.
- The HawkEye 40T is also certified as a "Department of Defense Unique Identifier (UID) String Validator".
- Simple connection thanks to various cable standards (USB, RS232, PSD2) and wireless connection with Bluetooth.

SIMATIC HawkEye 45/45T

- Hand-held read devices, which combine the best image processing technology with a graphic display and a robust keypad.
- Reads large linear and compressed data matrix codes as well as one-dimensional barcodes without any time delay.
- Continuous adaptation for resolution, lighting and image field to any imaginable code and to the scanned surface, to the size of the characters and to the ambient light.
- High reading speed in decoding data matrix symbols.
- SIMATIC HawkEye 45 is suitable for labels with high contrasts. SIMATIC HawkEye 45T is designed for codes with low contrasts, such as are made by e.g. dot peen, laser printers or inkjet printers.
- The HawkEye 45T is also certified as a "Department of Defense Unique Identifier (UID) String Validator".
- Simple connection thanks to various cable standards and wireless connections.

SIMATIC HawkEye 50T/51T

- Powerful, high-resolution readers for recording low-contrast, two-dimensional (2D) Direct-Part-Mark (DPM) data matrix codes.
- Reading of codes applied, for example, by laser, needles or printing can be read on many different surfaces.
- Contact or close-contact readers.
- The LytePipe illumination system permits an increased reading performance and reading speed for data matrix codes.
- Can be connected easily via USB or RS232
- Models with ESD protection are available. They are suitable for applications in environments that react sensitively to electrostatic discharging.

SIMATIC HawkEye 52T/53T

- Powerful, high-resolution readers for recording low-contrast, two-dimensional (2D) Direct-Part-Mark (DPM) data matrix codes and large, one-dimensional (1D) barcodes.
- Reading of symbols applied, for example, by laser and inkjet on many different surfaces as well as one-dimensional barcodes by means of the integrated laser scanner.
- Contact or close-contact readers.
- The LytePipe illumination system permits an increased reading performance and reading speed for data matrix codes.
- Users can switch between DPM reading and barcode reading by double-clicking the trigger switch or by pressing the changeover button on the rear of the device.
- Easily connectable to RS232.

Code Reading Systems

Hand-held Reading Systems

Major differences

Type	SIMATIC HawkEye 40/45	SIMATIC HawkEye 40T/45T	SIMATIC HawkEye 50T/51T	SIMATIC HawkEye 52T/53T
Operating distance				
• Minimum (code-dependent)	50 mm (1.9")	50 mm (1.9")	HawkEye 50T: 0 mm (0") HawkEye 51T: 3 mm (0.125")	0 mm (0")
• Maximum (code-dependent)	375 mm (14.8")	375 mm (14.8")	HawkEye 50T: 25 mm (1") HawkEye 51T: 51 mm (2")	51 mm (2")
Image field				
• Near	25 x 15 mm (0.98" x 0.6") at 50 mm (1.9") distance	25 x 15 mm (0.98" x 0.6") at 50 mm (1.9") distance	HawkEye 50T: 13 x 13 mm (0.5" x 0.5") with contact HawkEye 51T: 19 x 19 mm (0.75" x 0.75") at 3 mm (0.125") distance	HawkEye 52T: 24 x 24 mm (0.95" x 0.95") HawkEye 53T: 19 x 19 mm (0.75" x 0.75")
• Distant	150 x 90 mm (5.9" x 3.5") at 375 mm (14.8") distance	150 x 90 mm (5.9" x 3.5") at 375 mm (14.8") distance	HawkEye 50T: 19 x 19 mm (0.75" x 0.75") at 25 mm (1") distance HawkEye 51T: 36 x 36 mm (1.4" x 1.4") at 51 mm (2") distance	HawkEye 52T: 43 x 43 mm (1.7" x 1.7") HawkEye 53T: 28 x 28 mm (1.1" x 1.1")
Decoding capability	1D: Code 128, Code 39, Code 93, Int I2of5, Codabar, UPC/EAN/JAN, RSS, Composite, Postal, Codablock F, Code 11, Matrix 2 of 5, MSI Plessey, NEC 2 of 5, Pharmacode, Telepen 2D: Data Matrix, PDF417, Micro PDF 417, QR Code, MicroQR Code, Maxicode, Aztec, GoCode	1D: Code 39, Code 128, Codabar, Code 93, I2of5, UPC/EAN, UPC-E, UPC Supplementals 2D: Data Matrix, PDF417, QR Code	2D codes	1D: Code 39, Code 93, Code 128, UPC/EAN/JAN/SUP, I 2of5 2D: data matrix:
Code creation	Laser, pressure	Laser, pressure	Laser, pressure or needles	Laser, pressure or needles
Interfaces	USB, RS232, PS2, Bluetooth Class 1 (90 m, 300 ft)	USB, RS232, PS2, Bluetooth Class 1 (90 m, 300 ft)	USB, RS232	RS232

Benefits

- Industry leading Data Matrix reading performance on hard-to-read direct part marks.
- Rugged designs for plant floor use.
- Multiple supported communication protocols including RS232, USB, PS2 and Wireless.
- Read linear barcodes, Data Matrix and other symbologies.
- Drop in replacement for handheld linear barcode readers.

Application

- Automotive industry
 - Markings on various drive components (cylinder heads, cylinder blocks, elbow joints, etc.)
 - Laser markings on various drive components (cam shafts, crankshafts, pistons, piston rods, gearbox components, etc.)
 - Laser markings on electronic components, PCBs or enclosures
- Aircraft and space industry
 - Markings on various aluminium components of propulsion units
- Medical equipment
 - Laser markings on pacemakers and other implanted devices
 - Laser markings on various medical equipment components and housings
- Electronics
 - Laser markings on rigid and flexible PCBs
- Semiconductors
 - Laser markings on enclosed semiconductor components, heatsinks or heat exchangers

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 40, 40T

Overview

The SIMATIC HawkEye 40 and HawkEye 40T are high-performance, high resolution handheld readers for two dimensional (2D) Data Matrix and one-dimensional barcodes.

They incorporate advanced video image processing and illumination technology to read symbols on a variety of surfaces.

Models are available in the HE4xx series to transmit data using wired and wireless communication standards. This guarantees an easy integration to your application.

The HawkEye 40 and 40T products are modular packages that include the reader, a handle and a cable for interfacing (RS232 models also include a power supply). The wireless versions add a Bluetooth radio (integrated into the reader) and rechargeable battery to the package.

The HawkEye 40T is also a Department of Defense Unique Identifier (UID) string validator. This includes checking the string content against the appropriate controlling documents. Typical uses are incoming inspection of UID codes marked by external vendors. UID to Unique Item Identifier (UII) conversion functionality allows vendors to use the HawkEye 40T in UID logistics applications.

SIMATIC HawkEye 40

The SIMATIC HawkEye 40 is a rugged industrial barcode and Data Matrix reader designed to read medium to high contrast Data Matrix codes with cell sizes as small as 0.13 mm (0.005"). Barcodes with a bar width as small as 0.12 mm (0.0045") are also easily read.



SIMATIC HawkEye 40T

The SIMATIC HawkEye 40T provides much better reading stability than the HawkEye 40 because it utilizes the Siemens image processing algorithm. This algorithm is especially effective for low contrast and/or damaged codes. Therefore the HawkEye 40T is especially suitable for Direct Part Mark (DPM) Codes which were created by laser markers, dot peen systems or inkjet.



Benefits

SIMATIC HawkEye 40

- Cost-effective if the code possesses high contrast (e.g. codes located on paper labels)

SIMATIC HawkEye 40/40T

- Cost-effective and sturdy handheld reader for high to medium contrast labels
- Automatically switches between barcodes and data matrix codes. The codes can be oriented in any direction
- Outfitted with a high resolution reader head that can read even the smallest codes
- High-performance processor for high decoding speed and very robust reading
- Easy reading of one-dimensional barcodes
- Dynamic illumination and internal settings optimize readability of codes
- Can communicate through almost all existing standard industrial protocols

Additionally for SIMATIC HawkEye 40T

- Masters hard-to-read low contrast Data Matrix codes, which were created, for example, by laser markers, dot peen systems or inkjet
- Can read a wide variety of codes which were printed directly on the surface of parts, with out the need of parameter adjustment
- Ruggedized and ergonomic design provides a more durable unit for hard industrial use and a more comfortable handling for the user

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 40, 40T

Application

Industrial and commercial part identification and unit level traceability applications where the part is identified by a Data Matrix (DM) code or barcode and where a hand held reader is required.

SIMATIC HawkEye 40

For applications that involve paper labels (i.e. codes offering good contrast)

SIMATIC HawkEye 40T

Typical applications in the following industries:

- Automotive industry:
Identification of various automotive power train components (e.g. cylinder heads, cylinder blocks, manifolds, etc.)
- Aerospace:
Codes located on gas turbine blades
- Medical devices:
Laser marks on various medical device components and enclosures
- Electronics:
Laser marks on ESD sensitive hard drive components

Design



Ruggedized Ergonomic handle with integrated battery for wireless and batch mode

They are hand held imaging readers with a handle. The reader may be held in the right or left hand. Reading is commanded by a trigger in front of the handle. The handle is removable.

The HawkEye 40 is the entry level offering and is equipped with a lightweight and economical pistol grip handle.

The HawkEye 40T with Siemens image processing algorithm, a higher level offering, is equipped with a ruggedized, ergonomic handle which provides greater drop resilience and a more comfortable feel.

Optional ruggedized, ergonomic handles with or without integrated batteries are available. Ruggedized, ergonomic handles with integrated batteries are available in two configurations: Either with a 1950 mAH Lithium Ion (Li-Ion) Battery or with a 3900 mAH Li-Ion Battery. The readers are constructed of a high impact durable plastic.

Integration

The SIMATIC HawkEye40/40T connects to a host system via RS232, USB, PS2 or Bluetooth. There is no need for special software. All configurations are done by reading specific data matrix codes.

Besides the direct transfer of codes to the host system via RS232, USB, PS2 or Bluetooth, the reader can also be run in "Batch mode" when no connection to a host system is available. Codes that are read when the reader is in "Batch Mode" are saved in a buffer of the reader. Next time the reader has a connection to the host system the codes can be transferred manually or automatically. For "Batch mode" a rechargeable battery is needed.

When using the code reader with the ruggedized ergonomic handle with integrated rechargeable battery (included in HE40T Bluetooth package or separately orderable) it can easily be recharged using the available accessory "Charge Cradle". Simply place the handle onto the cradle for automatic battery charging. The cradle can also hold the Bluetooth modem accessory, which receives codes from the reader's Bluetooth radio and transfers them to the host system.



Cradle with Bluetooth modem and ergonomic handle (can also be charged with reader in handle)



2 bay charger with HE40 and spare 1950 mAH Li-Ion battery module inserted for recharging

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 40, 40T

Technical specifications

Type	SIMATIC HawkEye 40/40T
Operating distance (code-dependent)	
• Minimum	50 mm (1.9")
• Maximum	375 mm (14.8")
Image field	
• Near (50 mm (1.9") distant)	25 x 15 mm (0.98" x 0.6")
• Distant (375 mm (14.8") distant)	150 x 90 mm (5.9" x 3.5")
Decoding capability	
• SIMATIC HawkEye 40	1D: Code 128, Code 39, Code 93, Int 2 of 5, Codabar, UPC/EAN/JAN, RSS, Composite, Postal, Codablock F, Code 11, Matrix 2 of 5, MSI Plessey, NEC 2 of 5, Pharmacode, Telepen 2D: Data Matrix, PDF417, Micro PDF 417, QR Code, MicroQR Code, Maxicode, Aztec, GoCode
• SIMATIC HawkEye 40T	1D: Code 39, Code 128, Codabar, Code 93, I 2 of 5, UPC/EAN, UPC-E, UPC Supplementals 2D: Data Matrix, PDF417, QR Code
Smallest code size	
• 1D barcode	0.114 mm line thickness (0.0045")
• 2D Matrix Code	0.128 mm cell size (0.005")
Contrast measured as the absolute light/dark difference at 650 nm of light	
• 1D symbols	25%
• PDF417	35%
Target beam	Visible LED laser light with 630 nm
Permissible ambient light	Sunlight up to 96890 Lux
Image formats	JPEG, Raw (uncompressed)
Focal field selection	Near, distant
Resolution, max.	1024 x 640 pixels
Gray levels	256
Resolution selection	1024 x 640 (multiple window options)
Inclination	±60° (from front to rear)
Angle	±60° to a plane that is parallel to the code (page to page)
Rotational tolerance	±180°
Code quality	Code readability index
Field selection	Near or distant
Sensor	Progressive scan CMOS 1.33 MP (1024 x 1280)
Editing of data	Code XML ready
Light source	Embedded Class 1 LED
Operating time per battery charge	3000 read procedures or 6 to 8 h of intensive use
Permissible air humidity, no dewing	5 ... 95% rel.
Operating temperature	0 ... 40 °C (32 ... 104 °F)
Storage temperature	-20 ... 60 °C (-4 ... 140 °F)
Dimensions	
• Reader W x H x D, in mm [inch]	33 x 109 x 46 [1.3 x 4.3 x 1.8]
• Gun format handle W x H x D, in mm [inch]	116.8 x 96.5 x 48.3 [4.6 x 3.8 x 1.9]
• Ergonomic handle W x H x D, in mm [inch]	139.7 x 127.0 x 50.8 [5.5 x 5.0 x 2.0]
• Ergonomic handle with integral battery W x H x D, in mm [inch]	139.7 x 101.6 x 50.8 [5.5 x 4.0 x 2.0]
Weights	
• Reader with battery insert, without battery	85 g
• Reader with battery	131 g
• Gun format handle (without cable)	59 g
• Ergonomic handle (without cable)	113 g
• Ergonomic handle (without cable) with integral 1950 mAh battery	136 g
• Ergonomic handle (without cable) with integral 3900 mAh battery	181 g

Type	SIMATIC HawkEye 40/40T
Length of cable	1.80 m (6 ft)
Shock resistance	Resistant to multiple falls onto concrete from 2 m height
Interfaces	USB, RS232, PS2, Bluetooth Class 1 (V1.2, 90 m, 300 ft)
Processor	400 MHz

Selection and Ordering data	Order No.	Order No.
SIMATIC HawkEye 40		
Rugged industrial barcode and data matrix reader, with gun format handle and cable		
<ul style="list-style-type: none"> With USB connection ▶ A 6GF3020-0HE40-0XX0 With PS2 connection ▶ A 6GF3020-0HE40-0XX1 With RS232 connection, power supply for USA A 6GF3020-0HE40-0XX3 With RS232 connection, power supply for Europe ▶ A 6GF3020-0HE40-0XX4 With RS232 connection, power supply for UK ▶ A 6GF3020-0HE40-0XX5 With Bluetooth and USB, battery ▶ A 6GF3020-0HE40-2BT0 		
SIMATIC HawkEye 40T		
Rugged industrial barcode and data matrix reader, with ergonomic handle and cable		
<ul style="list-style-type: none"> With USB connection ▶ A 6GF3020-0HT40-0XX0 With PS2 connection ▶ A 6GF3020-0HT40-0XX1 With RS232 connection, power supply for USA A 6GF3020-0HT40-0XX3 With RS232 connection, power supply for Europe ▶ A 6GF3020-0HT40-0XX4 With RS232 connection, power supply for UK ▶ A 6GF3020-0HT40-0XX5 With Bluetooth and USB, with battery (integrated in handle) ▶ A 6GF3020-0HT40-2BT0 		
Accessories		
Gun format handle; in addition a battery insert or a battery are required for installation ▶ A 6GF3020-0AC40-0AH1		
Ergonomic handle with integral Li-ion battery (1950 mAh) ▶ A 6GF3020-0AC40-0AB3		
Ergonomic handle with integral Li-ion battery (3900 mAh) ▶ A 6GF3020-0AC40-0AB4		
Ergonomic handle for use with cable. Incompatible with the 1950 mAh Li-ion battery module ▶ A 6GF3020-0AC40-0AH2		
RS232 cable		
<ul style="list-style-type: none"> 2438 mm long, spiralled ▶ A 6GF3020-0AC40-0AC1 2438 mm long, spiralled, with power supply for USA A 6GF3020-0AC40-0AC3 2438 mm long, spiralled, with power supply for Europe/South America ▶ A 6GF3020-0AC40-0AC4 2438 mm long, spiralled, with power supply for UK ▶ A 6GF3020-0AC40-0AC5 		
USB cable, 1828 mm long, not spiralled ▶ A 6GF3020-0AC40-0AC0		
PS2 accessory cable for HawkEye handheld readers, 2428 mm long ▶ A 6GF3020-0AC40-0AC6		
		Spare battery insert, not applicable in conjunction with the ergonomic handle A 6GF3020-0AC40-0AB0
		Lithium-ion rechargeable battery, 1950 mAh ▶ A 6GF3020-0AC40-0AB2
		Battery charging unit for 1950 mA battery with 2 charging bays
		<ul style="list-style-type: none"> For 2 batteries, with USA PSU A 6GF3020-0AC40-0AA2 For 2 batteries, with EU PSU ▶ A 6GF3020-0AC40-0AA3 For 2 batteries, with UK PSU ▶ A 6GF3020-0AC40-0AA4
		Charging station with battery handle, suited only for ergonomic handle with integrated battery
		<ul style="list-style-type: none"> Battery charging station with power supply for the USA ▶ A 6GF3020-0AC40-0AA5 Battery charging station with power supply for the USA ▶ A 6GF3020-0AC40-0AA6 Battery charging station with power supply for the UK ▶ A 6GF3020-0AC40-0AA7
		HawkEye 40 Elastomer protective cover, not applicable with HawkEye 45/45T, 4xT ergonomic handles without batteries ▶ A 6GF3020-0AC40-0AV3
		Power supplies
		<ul style="list-style-type: none"> For USA A 6GF3020-0AC40-0AP1 For Europe/South America ▶ A 6GF3020-0AC40-0AP2 For UK ▶ A 6GF3020-0AC40-0AP3
		Metal stands for HawkEye handheld readers ▶ A 6GF3020-0AC40-0AS1
		▶ Preferred type, available from stock.
		A: Subject to export regulations AL = N and ECCN = EAR99H

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 40, 40T

Selection and Ordering data Order No.

Bluetooth modem

Note:

It is also possible to operate the Bluetooth modem with a USB interface.

Order modem (6GF3020-0AC00-2BT0) and USB cable (6GF3020-0AC40-0AC0) for this configuration

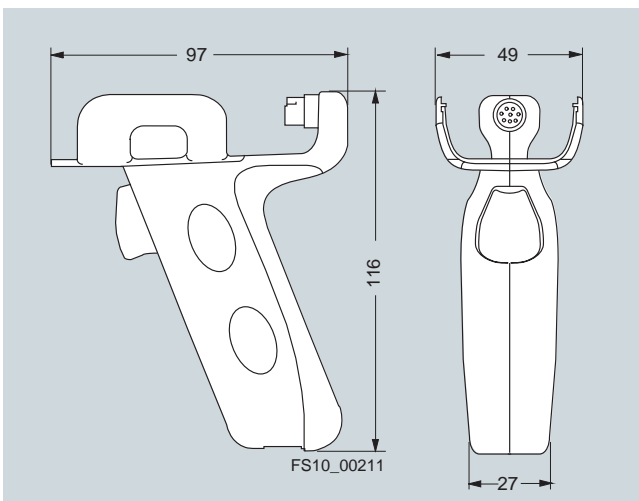
Configuration with matrix code label

- With PS2 cable ▶ A **6GF3020-0AC00-2BT0**
- With RS232 interface, power supply for USA A **6GF3020-0AC10-3BT0**
- With RS232 interface, power supply for Europe/South America ▶ A **6GF3020-0AC10-4BT0**
- With RS232 interface, power supply for UK ▶ A **6GF3020-0AC10-5BT0**

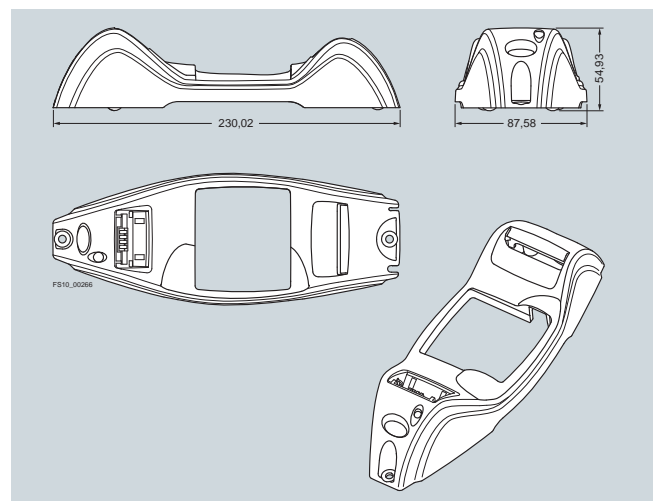
▶ Preferred type, available from stock.

A: Subject to export regulations AL = N and ECCN = EAR99H

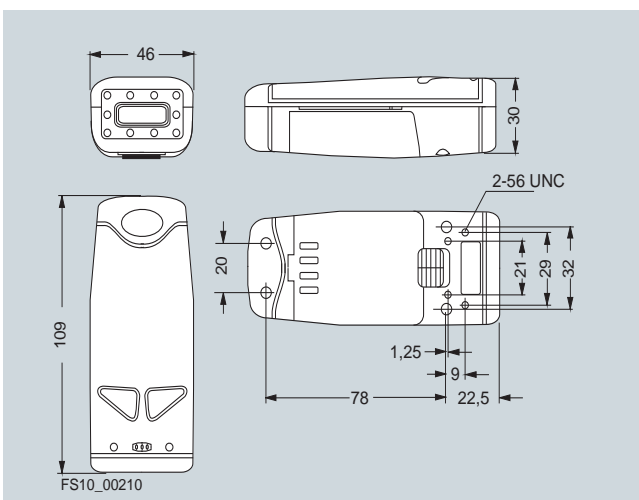
Dimensions



SIMATIC HawkEye gun format handle (without battery)



Charging unit with battery handle

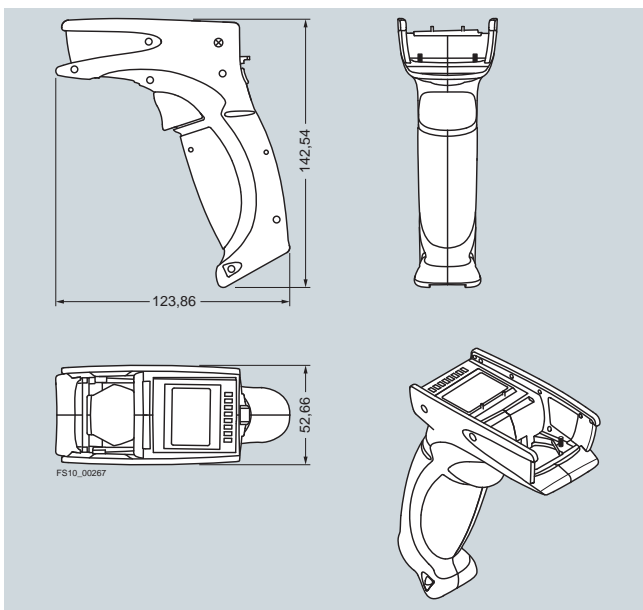


SIMATIC HawkEye 40/40T

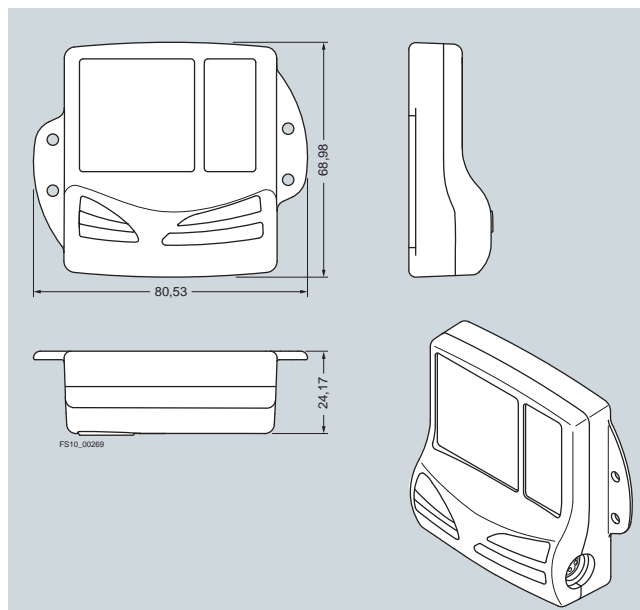
Code Reading Systems

Hand-held Reading Systems

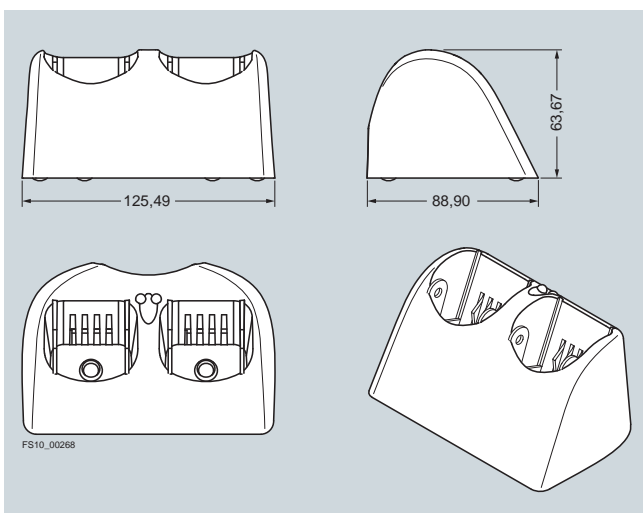
SIMATIC HawkEye 40, 40T



Rugged ergonomic handle



Bluetooth modem



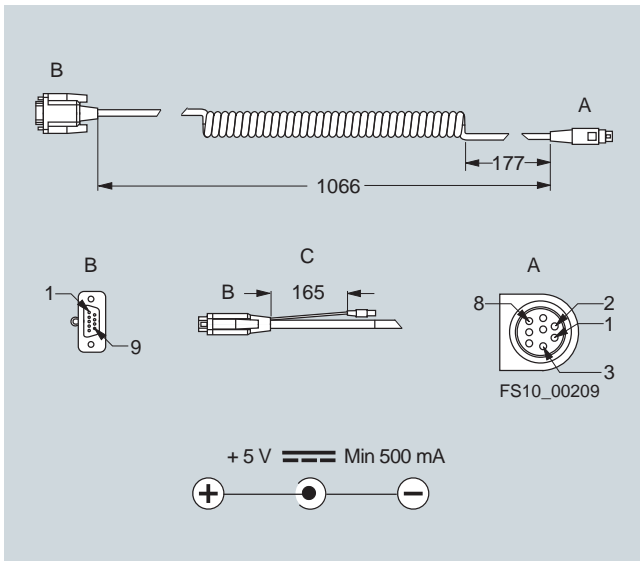
Battery charging unit with 2 charging bays

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 40, 40T

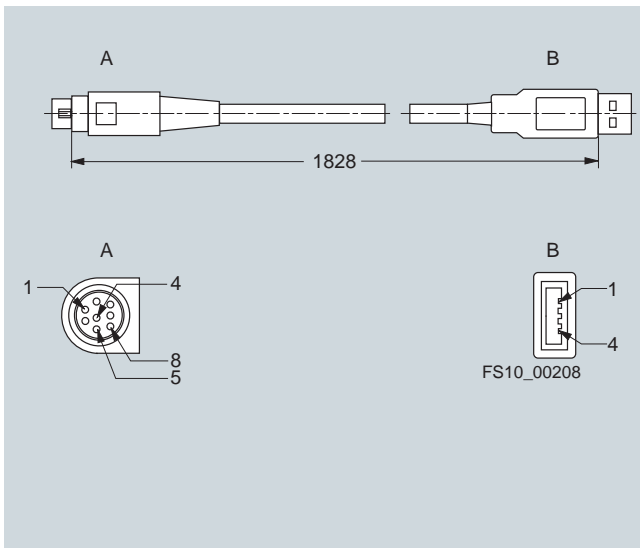
Schematics



RS232 cable

Connector A Pin No.	Connector B Pin No.	Connector C	Designation	Wire thickness	Color
1	1	center contact	V+ (5 V ±0.5 V)	24 AWG	red
2	2	-	TX	28 AWG	brown
3	3	-	RX	28 AWG	orange
4	-	-	not connected	-	-
5	-	-	not connected	-	-
6	-	-	not connected	-	-
7	-	-	not connected	-	-
8	5	ring	ground	24 AWG	black
9	-	-	not connected	-	-
shell	-	-	drain	-	bare

Contact assignment RS232 cable



USB cable

Connector A Pin No.	Connector B Pin No.	Designation	Wire thickness	Color
1	1	V+ (5 V ±0.5 V)	24 AWG	red
2	-	not connected	-	-
3	-	not connected	-	-
4	3	D+	28 AWG	green (twisted)
5	2	D-	28 AWG	white (twisted)
6	-	not connected	-	-
7	-	not connected	-	-
8	4	ground	24 AWG	black
plug housing	plug housing	drain	-	bare

Contact assignment USB cable

6

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 45, 45T

Overview

The SIMATIC HawkEye 45 and SIMATIC HawkEye 45T establish a new benchmark for portable data terminals and hand held computers by combining the industry's best imaging technology with a graphic display and rugged keyboard to create the smallest and lightest full-featured Data Matrix reading terminal on the market.

The HawkEye 45 and HawkEye 45T instantly read large linear as well as high density Data Matrix symbols. The units continuously adapt the resolution, illumination, and image field for the fastest automatic symbology identification and decoding over the widest range of symbology types, sizes, recording surfaces and ambient lighting. The HawkEye 45 and HawkEye 45T achieve matrix symbol decoding at speeds that are similar to linear bar code decoding, while preserving battery energy.

Both products from the HawkEye 45 series are able to transmit data using wired and wireless communication standards. This guarantees an easy integration to your application.

The HawkEye 45 and 45T products are packages that include the reader, a handle plus the cable for interfacing and power supply. In case of the wireless version, it comes additionally with a rechargeable battery.

The HawkEye 45T is also a Department of Defense Unique Identifier (UID) string validator. This includes checking the string content against the appropriate controlling documents. Typical uses are incoming inspection of UID codes marked by external vendors. UID to Unique Item Identifier (UII) conversion functionality allows vendors to use the HawkEye 45T in UID logistics applications.

SIMATIC HawkEye 45

The SIMATIC HawkEye 45 is a rugged industrial barcode and Data Matrix reader designed to read medium to high contrast Data Matrix codes with cell sizes as small as 0.005 inches. Barcodes with a bar width as small as .0045" are also easily read. The integrated display shows read data and allows for reader configuration.

SIMATIC HawkEye 45T

The SIMATIC HawkEye 45T provides much better reading stability than the HawkEye 45 because it utilizes the Siemens image processing algorithm. This algorithm is especially effective for low contrast and/or damaged codes. Therefore the HawkEye 45T is especially suitable for Direct Part Mark (DPM) Codes which were created by laser markers, dot peen systems or inkjet.



Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 45, 45T

Benefits

SIMATIC HawkEye 45

- Cost-effective if the code possesses high contrast (e.g. codes located on paper labels)

SIMATIC HawkEye 45/45T

- Cost-effective and sturdy handheld reader for high to medium contrast labels
- Integrated screen displays read data and allows for reader configuration.
- Automatically switches between barcodes and Data Matrix codes. The codes can be oriented in any direction
- Outfitted with a high resolution reader head that can read even the smallest codes
- High-performance processor for high decoding speed and very robust reading
- Easy reading of one-dimensional barcodes
- Dynamic illumination and internal settings optimize readability of codes
- Can communicate through almost all existing standard industrial protocols

Additionally for SIMATIC HawkEye 45T

- Masters hard-to-read low contrast Data Matrix codes, which were created, for example, by laser markers, dot peen systems or inkjet
- Can read a wide variety of codes which were printed directly on the surface of parts, with out the need of parameter adjustment
- Optimized ergonomic design providing a comfortable handling for the user

Application

Industrial and commercial part identification and unit level traceability applications where the part is identified by a Data Matrix (DM) code and where a hand held reader is required.

SIMATIC HawkEye 45

For applications that involve paper labels (i.e. codes offering good contrast)

SIMATIC HawkEye 45T

Typical applications in the following industries:

- Automotive industry: Identification of various automotive power train components (cylinder heads, cylinder blocks, manifolds, etc.)
- Aerospace: Dot peen marks on gas turbine blades
- Medical devices: Laser marks on various medical device components and enclosures
- Electronics: Laser marks on ESD sensitive hard drive components

Design



Ergonomic handle for wired applications

They are hand held imaging readers with a handle. The reader may be held in the right or left hand. Reading is commanded by a trigger in front of the handle. The handle is removable.

The SIMATIC HawkEye 45 is the entry level offering and is equipped with a lightweight and economical pistol grip handle.

The SIMATIC HawkEye 45T with Siemens image processing algorithm, a higher level offering, is equipped with a ruggedized, ergonomic handle which provides greater drop resilience and a more comfortable feel.

Optional ruggedized, ergonomic handles with or without integrated batteries are available. Ruggedized, ergonomic handles with integrated batteries are available in two configurations: either with a 1950 mAH Lithium Ion (Li-Ion) battery or with a 3900 mAH Li-Ion battery.

The readers are constructed of a high impact durable plastic.

Integration

The SIMATIC HawkEye45/45T connects to a host system via RS232, USB, PS2 or Bluetooth. There is no need for special software. All configurations are done by reading specific data matrix codes.

Besides the direct transfer of codes to the host system via RTS232, USB, PS2 or Bluetooth, the reader can also be run in "Batch mode" when no connection to a host system is available. Codes that are read when the reader is in "Batch Mode" are saved in a buffer of the reader. Next time the reader has a connection to the host system the codes can be transferred manually or automatically. For "Batch mode" a rechargeable battery is needed.

When using the code reader with the ruggedized ergonomic handle, that has an integrated rechargeable battery (included in HE45T Bluetooth package or separately orderable) it can easily be charged using the available accessory "Cradle". The handle is easily be installed on the cradle and will be charged automatically. The cradle can also hold the Bluetooth modem, which receives the codes and transfers it to the host system.



Cradle with Bluetooth modem and ergonomic handle (can also be charged with reader in handle)

Technical specifications

Type	SIMATIC HawkEye 45/45T
Display	128 x 128 monochrome
Memory	4 MB for data and programs
Operating distance (code-dependent)	
• Minimum	50 mm (1.9")
• Maximum	375 mm (14.8")
Image field	
• Near (50 mm (1.9") distant)	25 x 15 mm (0.98" x 0.6")
• Distant (375 mm (14.8") distant)	150 x 90 mm (5.9" x 3.5")
Decoding capability	
• SIMATIC HawkEye 45	1D: Code 128, Code 39, Code 93, Int 2 of 5, Codabar, UPC/EAN/JAN, RSS, Composite, Postal, Codablock F, Code 11, Matrix 2 of 5, MSI Plessey, NEC 2 of 5, Pharmacode, Telepen 2D: Data Matrix, PDF417, Micro PDF 417, QR Code, MicroQR Code, Maxicode, Aztec, GoCode
• SIMATIC HawkEye 45T	1D: Code 39, Code 128, Codabar, Code 93, I2of 5, UPC/EAN, UPC-E, UPC Supplementals 2D: Data Matrix, PDF417, QR Code
Smallest code size	
• 1D barcode	0.114 mm line thickness (0.0045")
• 2D Matrix Code	0.128 mm cell size (0.005")
Contrast measured as the absolute light/dark difference at 650 nm of light	
• 1D symbols	25%
• PDF417	35%
Target beam	Class IIa, visible LED laser light with 630 nm
Permissible ambient light	Sunlight up to 96890 Lux
Image formats	JPEG, Raw (uncompressed)
Focal field selection and optical resolution	
• Near	1024 x 640 pixels
• Distant	1024 x 640 pixels
Gray levels	256
Resolution selection	1024 x 640 (multiple window options)
Inclination	±60° (from front to rear)
Angle	±60° to a plane that is parallel to the code (page to page)
Rotational tolerance	±180°
Code quality	Code readability index
Field selection	Near or distant
Sensor	Progressive scan CMOS 1.33 MP (1024 x 1280)
Real-time clock	With on-board battery, 7 year lifetime

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 45, 45T

Type	SIMATIC HawkEye 45/45T
Editing of data	Code XML ready
Light source	Embedded Class 1 LED
Operating time per battery charge	3000 read procedures or 6 to 8 h of intensive use
Permissible air humidity, no dewing	5 ... 95% rel.
Operating temperature	0 ... 40 °C (32 ... 104 °F)
Storage temperature	-20 ... 60 °C (-4 ... 140 °F)
Dimensions	
• Reader W x H x D, in mm [inch]	41 x 113 x 46 [1.6 x 4.4 x 1.8]
• Gun format handle W x H x D, in mm [inch]	116.8 x 96.5 x 48.3 [4.6 x 3.8 x 1.9]
• Ergonomic handle W x H x D, in mm [inch]	139.7 x 127.0 x 50.8 [5.5 x 5.0 x 2.0]
• Ergonomic handle with integral battery W x H x D, in mm [inch]	139.7 x 101.6 x 50.8 [5.5 x 4.0 x 2.0]
Weights	
• Reader with battery insert, without battery	125 g
• Reader with battery	172 g
• Gun format handle (without cable)	59 g
• Ergonomic handle (without cable)	113 g
• Ergonomic handle (without cable) with integral 1950 mAh battery	136 g
• Ergonomic handle (without cable) with integral 3900 mAh battery	181 g
Shock resistance	Resistant to multiple falls onto concrete from 1.2 m height
Interfaces	USB, RS232, PS2, Bluetooth Class 1 (V1.2, 90 m, 300 ft)
Processor	400 MHz

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 45, 45T

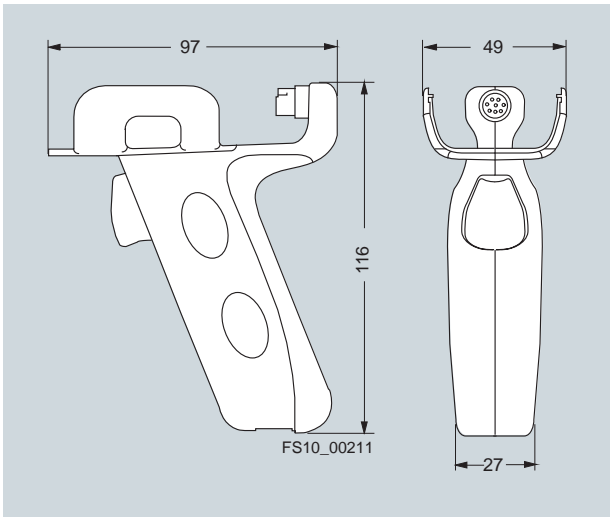
Selection and Ordering data	Order No.	Order No.
SIMATIC HawkEye 45		
Rugged industrial barcode and data matrix reader, with integral display, with handle and cable		
• With USB connection ▶ A	6GF3020-0HE45-0XX0	
• With PS2 connection ▶ A	6GF3020-0HE45-0XX1	
• With RS232 connection, power supply for USA A	6GF3020-0HE45-0XX3	
• With RS232 connection, power supply for Europe ▶ A	6GF3020-0HE45-0XX4	
• With RS232 connection, power supply for UK ▶ A	6GF3020-0HE45-0XX5	
• With Bluetooth and USB, battery ▶ A	6GF3020-0HE45-2BT0	
SIMATIC HawkEye 45T		
Rugged industrial barcode and data matrix reader, with integral display, with ergonomic handle and cable		
• With USB connection ▶ A	6GF3020-0HT45-0XX0	
• With PS2 connection ▶ A	6GF3020-0HT45-0XX1	
• With RS232 connection, power supply for USA A	6GF3020-0HT45-0XX3	
• With RS232 connection, power supply for Europe ▶ A	6GF3020-0HT45-0XX4	
• With RS232 connection, power supply for UK ▶ A	6GF3020-0HT45-0XX5	
• With Bluetooth and USB, battery integrated in handle ▶ A	6GF3020-0HT45-2BT0	
Accessories		
Gun format handle; in addition a battery insert or a battery are required for installation ▶ A	6GF3020-0AC40-0AH1	
Ergonomic handle with integral Li-ion battery (1950 mAh) ▶ A	6GF3020-0AC40-0AB3	
Ergonomic handle with integral Li-ion battery (3900 mAh) ▶ A	6GF3020-0AC40-0AB4	
Ergonomic handle for use with cable. Incompatible with the 1950 mAh Li-ion battery module ▶ A	6GF3020-0AC40-0AH2	
RS232 cable		
• 2438 mm long, spiralled ▶ A	6GF3020-0AC40-0AC1	
• 2438 mm long, spiralled, with power supply for USA A	6GF3020-0AC40-0AC3	
• 2438 mm long, spiralled, with power supply for Europe/South America ▶ A	6GF3020-0AC40-0AC4	
• 2438 mm long, spiralled, with power supply for UK ▶ A	6GF3020-0AC40-0AC5	
USB cable, 1828 mm long, not spiralled ▶ A	6GF3020-0AC40-0AC0	
PS2 accessory cable for HawkEye handheld readers, 2428 mm long ▶ A	6GF3020-0AC40-0AC6	
Plastic housing for rechargeable battery (without function) for use in read device A	6GF3020-0AC40-0AB0	
Lithium ion rechargeable battery, 1950 mAh, for ergonomic handle ▶ A	6GF3020-0AC40-0AB2	
Battery charging unit for 1950 mA battery with 2 charging bays		
• For 2 batteries, with USA PSU A	6GF3020-0AC40-0AA2	
• For 2 batteries, with European PSU ▶ A	6GF3020-0AC40-0AA3	
• For 2 batteries, with UK PSU ▶ A	6GF3020-0AC40-0AA4	
Charging station with battery handle, suited only for ergonomic handle with integrated battery		
• Battery charging station with power supply for the USA ▶ A	6GF3020-0AC40-0AA5	
• Battery charging station with power supply for the USA ▶ A	6GF3020-0AC40-0AA6	
• Battery charging station with power supply for the UK ▶ A	6GF3020-0AC40-0AA7	
Power supplies		
• For USA A	6GF3020-0AC40-0AP1	
• For Europe/South America ▶ A	6GF3020-0AC40-0AP2	
• For UK ▶ A	6GF3020-0AC40-0AP3	
Metal stands for HawkEye handheld readers ▶ A	6GF3020-0AC40-0AS1	
Bluetooth modem		
Note:		
It is also possible to operate the Bluetooth modem with a USB interface. Order modem (6GF3020-0AC00-2BT0) and USB cable (6GF3020-0AC40-0AC0) for this configuration		
Configuration with matrix code label		
• With PS2 cable ▶ A	6GF3020-0AC00-2BT0	
• With RS232 interface, power supply for USA A	6GF3020-0AC10-3BT0	
• With RS232 interface, power supply for Europe/South America ▶ A	6GF3020-0AC10-4BT0	
• With RS232 interface, power supply for UK ▶ A	6GF3020-0AC10-5BT0	
▶ Preferred type, available from stock.		
A: Subject to export regulations AL = N and ECCN = EAR99H		

Code Reading Systems

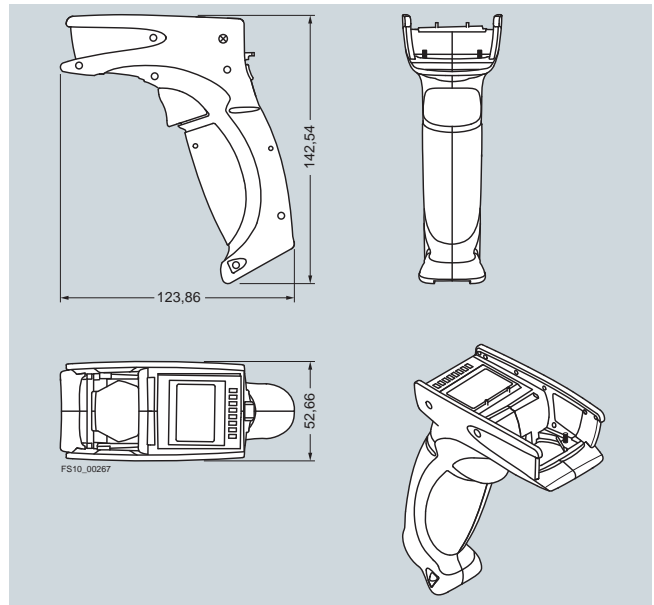
Hand-held Reading Systems

SIMATIC HawkEye 45, 45T

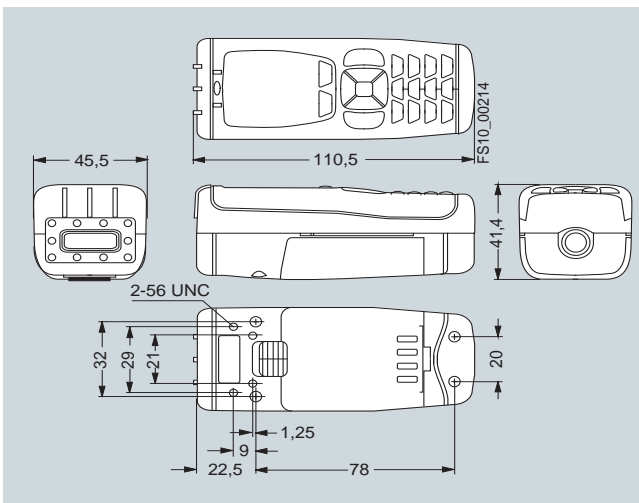
Dimensions



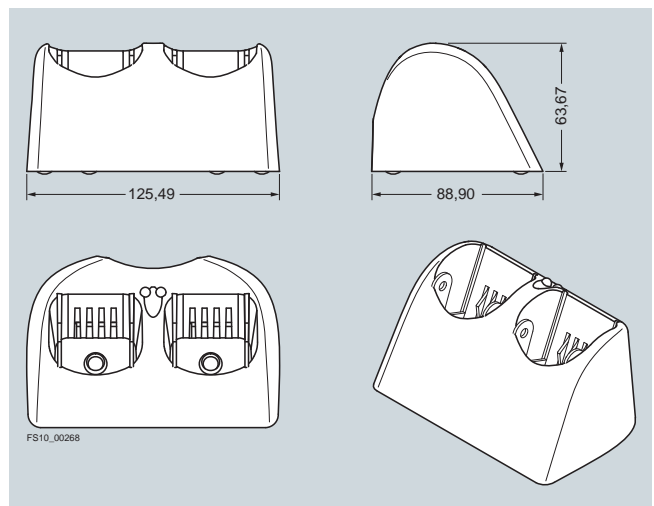
SIMATIC HawkEye gun format handle (without battery)



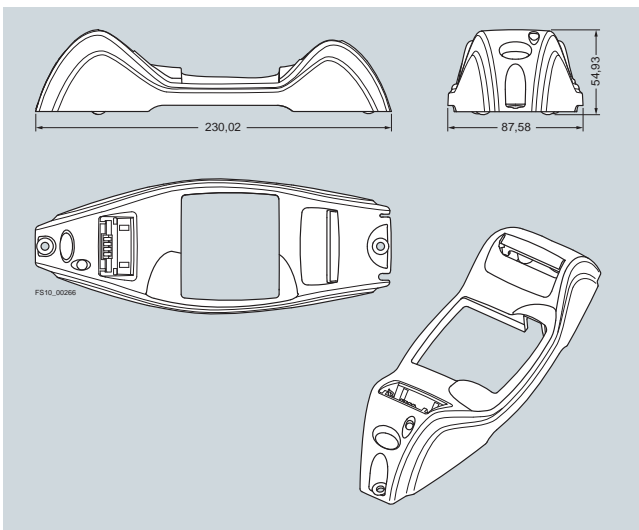
Rugged ergonomic handle



SIMATIC HawkEye 45/45T



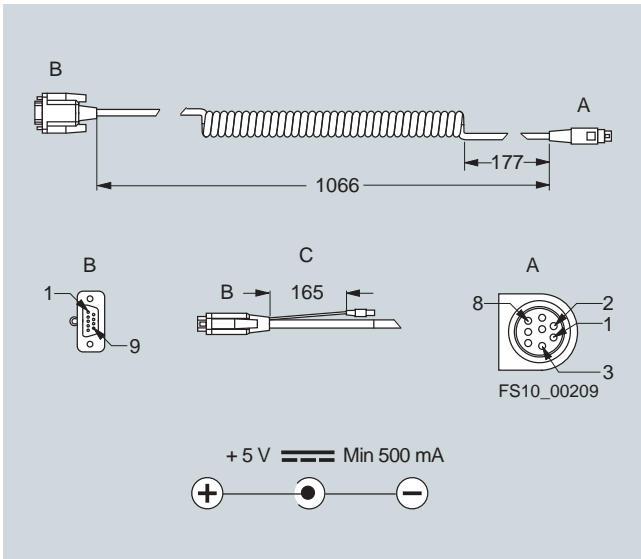
Battery charging unit with 2 charging bays



Charging unit with battery handle

6

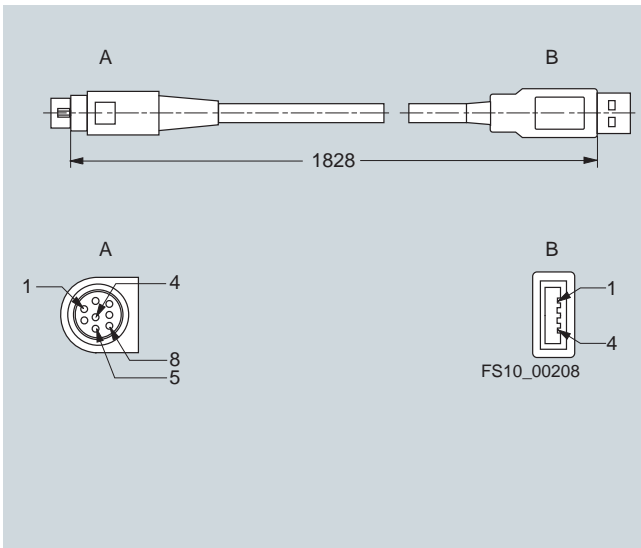
Schematics



RS232 cable

Connector A Pin No.	Connector B Pin No.	Connector C	Designation	Wire thickness	Color
1	1	center contact	V+ (5 V ±0.5 V)	24 AWG	red
2	2	-	TX	28 AWG	brown
3	3	-	RX	28 AWG	orange
4	-	-	not connected	-	-
5	-	-	not connected	-	-
6	-	-	not connected	-	-
7	-	-	not connected	-	-
8	5	ring	ground	24 AWG	black
9	-	-	not connected	-	-
shell	-	-	drain	-	bare

Contact assignment RS232 cable



USB cable

Connector A Pin No.	Connector B Pin No.	Designation	Wire thickness	Color
1	1	V+ (5 V ±0.5 V)	24 AWG	red
2	-	not connected	-	-
3	-	not connected	-	-
4	3	D+	28 AWG	green (twisted)
5	2	D-	28 AWG	white (twisted)
6	-	not connected	-	-
7	-	not connected	-	-
8	4	ground	24 AWG	black
plug housing	plug housing	drain	-	bare

Contact assignment USB cable

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 50T, 51T

Overview



The SIMATIC HawkEye 50T and SIMATIC HawkEye 51T are high-performance, high resolution readers for low-contrast two dimensional (2D) Data Matrix direct part marks (DPMs). They incorporate advanced video image processing and illumination technology to read symbols on a variety of surfaces that have been created by dot peen, laser, or inkjet.

The hand-held readers feature the LytePype™ illumination system that delivers superior performance for DPM reading at high reading rates. The HawkEye 50T/51T are contact or near contact readers, and the LytePype guides the operator to position the reader for a simple point-and-shoot operation.

The hand-held readers provide a comprehensive set of programmable features that can be configured to address any data collection application. Setup is simple and performed via the Graphical User Interface PC application program through the serial interface or USB port and by reading special Data Matrix codes supplied with the unit.

Benefits

- Decodes hard to read low contrast Data Matrix codes made by dot peen, laser or ink-jet
- Reading of a broad variety of direct part marks without any parameter adjustments
- LytePype illumination system enhances readability of low-contrast marks
- High-resolution imager for reading very small codes
- High-performance processor for high decoding speed and very robust reading

Application

Industrial and commercial part identification and unit level traceability applications where the part is identified by a Data Matrix (DM) code and where a hand held reader is required.

Wide range of applications in many industries, e.g.

- Automotive industry: Identification of various automotive power train components (cylinder heads, cylinder blocks, manifolds, etc.)

- Aerospace: Dot peen marks on gas turbine blades
- Medical devices: Laser marks on various medical device components and enclosures
- Electronics: Laser marks on ESD sensitive hard drive components

Design

They are hand held imaging readers with an ergonomic pistol grip design. The reader may be held in the right or left hand. Reading is commanded by a trigger in front of the pistol grip. The readers are constructed of a high impact durable plastic. ESD versions (Electrostatic Sensitive Devices) of the HawkEye 50T are available for applications with electrostatic discharge threats.

Power supply and LytePype options are not included as part of HawkEye 50T or 51T systems and must be ordered as individual line items

SIMATIC HawkEye 50T

The SIMATIC HawkEye 50T is designed to read DPM codes with element sizes as small as 0.004 inches (0.10 mm), and an overall symbol size of up to 0.75" x 0.75" (19 x 19 mm).

SIMATIC HawkEye 51T

The SIMATIC HawkEye 51T is designed to read DPM codes with element sizes as small as 0.006 inches (0.15 mm), and overall symbol size of up to 1.4" x 1.4" (36 x 36 mm).

Illumination

Diffused Bright Field LytePype (1" and 1.5")

Specify the 10 degree diffused bright field LytePype for most applications involving dot peen, laser or printed marks on typical surfaces.

Dark Field LytePype (1" and 1.5")

The 30 degree Dark Field LytePype may be required for very low contrast marks or marks on highly reflective surfaces.

Note that unique LytePype models exist for HawkEye 50T ESD systems, please order appropriately.

Function

The SIMATIC HawkEye 50T/51T read and decode direct part mark Data Matrix symbols on a wide variety of industrial surfaces.

The readers are hand held and will read and decode on input from the pistol grip trigger.

Data communication requires connection to a system capable of receiving ASCII serial data via RS 232 at a baud rate between 2400 bps and 115 Kbps or USB V1.1. Operation of the supplied graphical user interface requires a PC running Windows 2000 or Windows XP and equipped with at least one serial or USB port.

Integration

The SIMATIC HawkEye 50T/51T will typically be employed as hand held, on-demand readers in an industrial environment.

They connect as a serial or USB device and transmit ASCII data using RS 232 at configurable baud rates between 2400 bit/s and 115 Kbit/s or USB V1.1. The connection and configuration will be similar to that typically employed for hand held one-dimensional bar code readers.

Technical specifications

Type	SIMATIC HawkEye 50T	SIMATIC HawkEye 51T
Image processing		
Element size, min.	0.10 mm (0.004")	0.15 mm (0.006")
Contrast, min.	20% at 660 nm	
Image field		
• Near	13 x 13 mm (0.5" x 0.5") with contact	19 x 19 mm (0.75" x 0.75") at 3 mm (0.125") distance
• Remote	19 x 19 mm (0.75" x 0.75") at 25 mm (1") distance	36 x 36 mm (1.4" x 1.4") at 51 mm (2") distance
Depth of field, max.	0 ... 51 mm (0 ... 2")	
Resolution	1024 x 1024 pixels	
Lighting possibilities	<ul style="list-style-type: none"> • Diffuse bright field LytePype – Suitable for most applications with markings that were applied using dot peen, laser or inkjet • Dark field LytePype – For extremely low contrast laser markings or markings on reflective surfaces 	
Interface		
Integrated interface	RS 232 with transmission rates up to 115.2 kbit/s or USB V1.1	
Configuration	Uploading of images and basic settings using simple graphical user interface (GUI) supported by Windows XP/2000 or by decoding with special setup codes that are supplied with the device.	
General data		
Power Supply		
• Reader	12 V at average of 250 mA (peak current 1,250 mA)	12 V at average of 300 mA (peak current 1,700 mA)
• AC adapter	Input voltage 100 ... 250 V AC; 0.5 A; 50/60 Hz	Input voltage 100 ... 250 V AC; 0.5 A; 50/60 Hz
Decoding capability	2D data matrix codes	
Operating temperature	0 ... 40 °C (32 ... 104 °F)	
Storage temperature	-20 ... +65 °C (-4 ... +149 °F)	
Air humidity	Max. 95%, no condensation	
Electrical safety	EN 61010 (available soon)	
EMI/high-frequency interference	CE, EN 61326:1998 Class A	
Dimensions (H x D x W) in mm (inches)	160 x 102 x 56 (6.3" x 4.0" x 2.2")	

Code Reading Systems

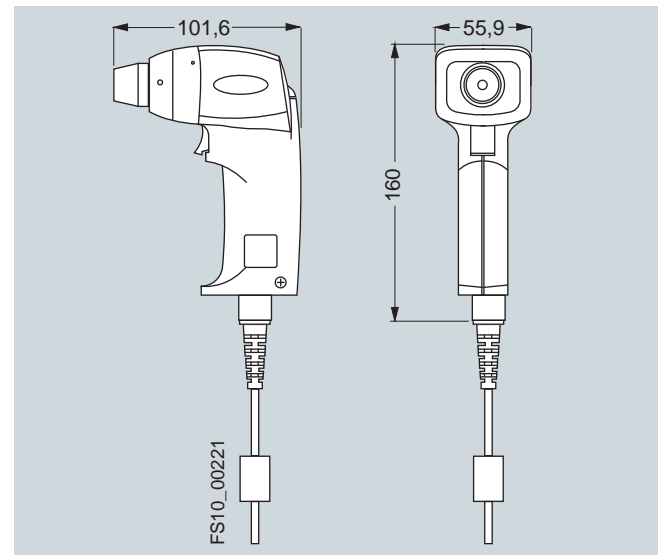
Hand-held Reading Systems

SIMATIC HawkEye 50T, 51T

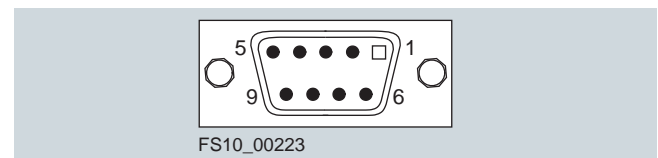
Selection and Ordering data

	Order No.
SIMATIC HawkEye 50T	
• Handheld reader with RS 232 interface	▶ A 6GF3020-0HT50-0XX0
• Handheld reader with USB port	▶ A 6GF3020-0HT50-0UX0
• Handheld reader (ESD) with RS 232 interface	▶ A 6GF3020-0HT50-0EX0
• Handheld reader (ESD) with USB port	▶ A 6GF3020-0HT50-0EU0
SIMATIC HawkEye 51T	
• Handheld reader with RS 232 interface	▶ A 6GF3020-0HT51-0XX0
• Handheld reader with USB port	▶ A 6GF3020-0HT51-0UX0
Accessories	
Power supply	▶ A 6GF3020-0AC00-0PS5
for SIMATIC HawkEye 5xT with RS232 interface. Supplied with adapters for worldwide use. Input 12 V DC (10 ... 250 V AC, 47... 63 Hz); output (12 V DC)	
LytePype lighting system for HawkEye 50T	
• 1.0° x 10 degree diffuse bright field; suitable for almost all DPM codes that were applied using dot peen, laser or inkjet	▶ A 6GF3020-0AC50-0LB1
• 1.0° x 30 degree dark field, suitable for low-contrast, laser DPM markings or on reflective surfaces	▶ A 6GF3020-0AC50-0LD3
• For ESD version: 1.0° x 10 degree diffuse bright field; suitable for almost all DPM codes that were applied using dot peen, laser or inkjet	A 6GF3020-0AC50-0LB2
• For ESD version: 1.0° x 30 degree diffuse dark field, suitable for low-contrast laser DPM markings or on reflective surfaces	A 6GF3020-0AC50-0LD2
LytePype lighting system for HawkEye 51T	
• 1.5° x 10 degree diffuse bright field; suitable for almost all DPM codes that were applied using dot peen, laser or inkjet	▶ A 6GF3020-0AC51-0LB1
• 1.5° x 30 degree dark field, suitable for low-contrast, laser DPM markings or on reflective surfaces	▶ A 6GF3020-0AC51-0LD3
SIMATIC HawkEye handheld reader cradle	▶ A 6GF3020-0AC50-0HR0
Assembly system for permanent installation of SIMATIC HawkEye 5xT devices	
MX wedge	▶ B 6GF3020-0AC50-0WD1
Software package required for sending serial data from the SIMATIC HawkEye 5xT to PC applications	

Dimensions

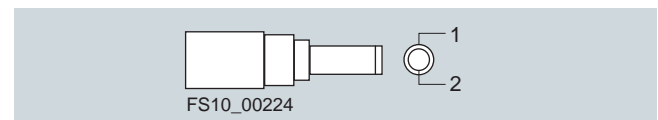


Schematics



9-Pin D-type Sub (F)

Pin	Signal name
1	not connected
2	RxD Data In
3	TxD Data Out
4	not connected
5	SG
6	not connected
7	CTS Send In
8	RTS Send Out
9	not connected



Power Jack

Pin	Signal name
1	+12 V
2	Ground

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 52T, 53T

Overview



The SIMATIC HawkEye 52T and SIMATIC HawkEye 53T are high-performance, high resolution readers/scanners for low-contrast two dimensional (2D) Data Matrix direct part marks (DPMs) and large one-dimensional (1D) barcodes. They combine an advanced video image processing illumination engine for reading 2D symbols with a laser scan engine for 1D barcodes into a single hand held device.

The hand held readers feature the LytePype™ illumination system that delivers superior performance for DPM reading at high-reading rates. The HawkEye 52T/53T are contact or near contact readers, and the LytePype guides the operator to position the reader for a simple point-and-shoot operation. The user can easily switch between DPM reading and barcode reading by double clicking the trigger or pressing the button on the back of the unit.

The hand held readers provide a comprehensive set of programmable features that can be configured to address any data collection application. Setup is simple and performed via the Graphical User Interface PC application program through the serial interface port or by reading special Data Matrix codes supplied with the unit.

Benefits

- Specialized on decoding hard to read low contrast Data Matrix codes made by dot peen, laser or ink-jet on a variety of surfaces
- Reading of a broad variety of direct part marks without any parameter adjustments
- LytePype illumination system enhances readability of low-contrast marks
- High-resolution imager for reading very small codes
- High-performance processor for high decoding speed and very robust reading
- Easy reading of one-dimensional barcodes with a laser scanner

Application

Industrial and commercial part identification and unit level traceability applications where the part is identified by a Data Matrix (DM) code or barcode and where a hand held reader is required.

Wide range of applications in many industries, e.g.

- Automotive industry: Identification of various automotive power train components (cylinder heads, cylinder blocks, manifolds, etc.)
- Aerospace: Dot peen marks on gas turbine blades
- Medical devices: Laser marks on various medical device components and enclosures
- Electronics: Laser marks on various electronic components or assemblies

Design

They are hand-held readers/scanners with an ergonomic pistol grip design. The device may be held in the right or left hand. Reading is commanded by a trigger in front of the pistol grip. The user can easily switch between DPM reading and barcode scanning by double clicking the trigger or pressing the selector button on the back of the unit. The readers are constructed of a high impact durable plastic.

The data from the reader is passed through an attached 8 foot (2.5 m) coiled cable which is terminated at a 9 pin female D shell connector. The read results are passed in RS232 serial form to any connected device capable of receiving serial data.

Power supply and LytePype options are not included as part of HawkEye 52T or 53T systems and must be ordered as individual line items.

SIMATIC HawkEye 52T

The SIMATIC HawkEye 52T is designed to read DPM codes with element sizes as small as 0.006 inches (0.15 mm), and an overall symbol size of up to 1.4" x 1.4" (36 x 36 mm). Barcodes with a bar width as small as 0.005 inches (0.13 mm) and an overall code as wide as 6" (15.24 cm) are read with the laser scanner

SIMATIC HawkEye 53T

The SIMATIC HawkEye 53T is designed to read DPM codes with element sizes as small as 0.004 inches (0.10 mm), and overall symbol size of up to 0.75" x 0.75" (19 x 19 mm). Barcodes with a bar width as small as 0.005 inches (0.13 mm) and an overall code as wide as 6" (15.24 cm) are read with the laser scanner.

Illumination

Diffused Bright Field LytePype (1" and 1.5")

Specify the 10 degree diffused bright field LytePype for most applications involving dot peen, laser or printed marks on typical surfaces.

Dark Field LytePype (1" and 1.5")

The 30 degree dark field LytePype may be required for very low contrast marks or marks on highly reflective surfaces.

Function

The SIMATIC HawkEye 52T/53T read and decode direct part mark Data Matrix symbols and barcodes on a wide variety of industrial surfaces.

The readers are hand held and will read and decode on input from the pistol grip trigger.

Data communication requires connection to a system capable of receiving ASCII serial data via RS 232 at a baud rate between 2400 bit/s and 19.2 Kbit/s. Operation of the supplied graphical user interface requires a PC running Windows 2000 or Windows XP and equipped with at least one serial port.

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 52T, 53T

Integration

The SIMATIC HawkEye 52T/53T will typically be employed as hand held, on-demand readers in an industrial environment.

They connect as a serial device and transmit ASCII data using RS232 at configurable baud rates between 2400 bit/s and 19.2 Kbit/s. The connection and configuration will be similar to that typically employed for hand held one-dimensional bar code scanners.

Technical specifications

Type	SIMATIC HawkEye 52T	SIMATIC HawkEye 53T
Reads the following codes		
<ul style="list-style-type: none"> • 2D Matrix Code • 1D barcode 	Data Matrix, QR Code Code 39, Code 128, UPC/EAN/JAN/SUP, Interleaved 2 of 5	
Element size, min.		
<ul style="list-style-type: none"> • 2D Matrix Code • 1D barcode 	0.15 mm (0.006") 0.13 mm (0.005")	0.10 mm (0.004") 0.13 mm (0.005")
Contrast, min.		
<ul style="list-style-type: none"> • 2D Matrix Code • 1D barcode 	20% at 660 nm 25% at 650 nm	
Image field		
<ul style="list-style-type: none"> • Near (contact) • Distant 	19 x 19 mm (0.75" x 0.75") 36 x 36 mm (1.4" x 1.4") at 51 mm (2") distance	13 x 13 mm (0.5" x 0.5") 19 x 19 mm (1.1" x 1.1") at 25 mm (1") distance
Depth of field, max.		
<ul style="list-style-type: none"> • Matrix Code reader • Barcode reader 	0 ... 51 mm (0 to 2") 51 ... 152 mm (2" to 6")	
Resolution	1024 x 1024 pixels	
Lighting		
<ul style="list-style-type: none"> • Matrix Code reader • Barcode reader 	<ul style="list-style-type: none"> • Diffuse bright field LytePype – Suitable for most applications with markings that were applied using dot peen, laser or inkjet • Dark field LytePype – For extremely low-contrast laser markings or markings on reflective surfaces 	Visible laser light, wavelength 650 ± 10 nm
Interface		
Integral interface	RS232 with transmission rates from 2400 bit/s to 19.2 Kbit/s	
Configuration	Uploading of images and basic setting using simple graphical user interface (GUI) supported by Windows XP/2000 or by decoding with special setup codes that are supplied with the device.	
General data		
Power supply		
<ul style="list-style-type: none"> • Reader • AC adapter 	12 V at average of 250 mA (peak current 1250 mA) Input voltage 100 ... 250 V AC; 0.5 A; 50/60 Hz	12 V at average of 300 mA (peak current 1700 mA) Input voltage 100 ... 250 V AC; 0.5 A; 50/60 Hz
Operating temperature	0 ... 40 °C (32 ... 104 °F)	
Storage temperature	-20 ... +65 °C (-4 ... +149 °F)	
Air humidity	Max. 95%, no condensation	
Electrical safety	EN 61010-1 : 2002	
EMI/high-frequency interference	CE, EN 61326: 1997+A1+A2+A3 Class A	
Dimensions (H x D x W) in mm (inches)	177.8 x 101.6 x 57.15 (7.0" x 4.0" x 2.25")	

Code Reading Systems

Hand-held Reading Systems

SIMATIC HawkEye 52T, 53T

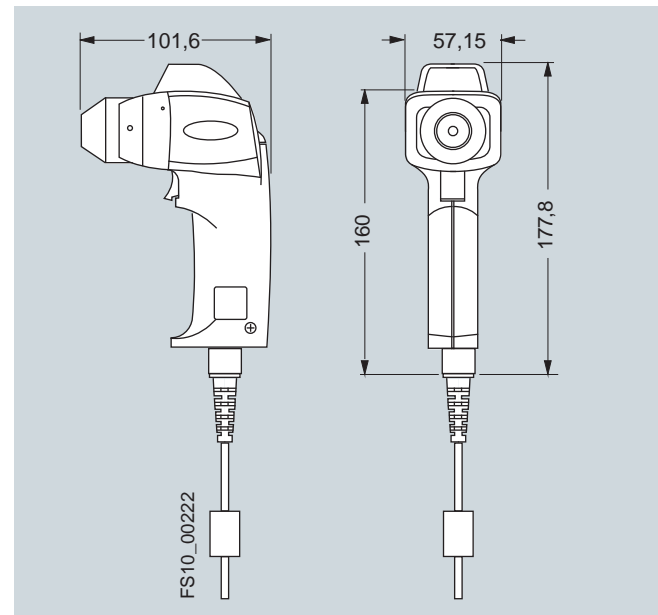
Selection and Ordering data	Order No.
SIMATIC HawkEye 52T ▶ A Handheld reader with RS232 interface, for 2D code elements from 0.15 mm and 1D code elements from 0.13 mm. Maximum code size 36 x 36 mm	6GF3020-0HT52-0XX0
SIMATIC HawkEye 53T ▶ A Handheld reader with RS232 interface, for 2D code elements from 0.10 mm and 1D code elements from 0.13 mm. Maximum code size 19 x 19 mm	6GF3020-0HT53-0XX0
Accessories	
Power supply ▶ A for SIMATIC HawkEye 5xT with RS232 interface. Supplied with adapters for global use. Input 12 V DC (10 ... 250 V AC, 47 ... 63 Hz); output (12 V DC).	6GF3020-0AC00-0PS5
LytePype lighting system for HawkEye 53T	
• 1.0° x 10 degree diffuse bright field; suitable for almost all DPM codes that were applied using dot peen, laser or inkjet ▶ A	6GF3020-0AC50-0LB1
• 1.0° x 30 degree dark field, suitable for low-contrast, laser DPM markings or on reflective surfaces ▶ A	6GF3020-0AC50-0LD3
LytePype lighting system for HawkEye 52T	
• 1.5° x 10 degree diffuse bright field; suitable for almost all DPM codes that were applied using dot peen, laser or inkjet ▶ A	6GF3020-0AC51-0LB1
• 1.5° x 30 degree dark field, suitable for low-contrast, laser DPM markings or on reflective surfaces ▶ A	6GF3020-0AC51-0LD3
SIMATIC HawkEye handheld reader cradle ▶ A Assembly system for permanent installation of SIMATIC HawkEye 5xT devices	6GF3020-0AC50-0HR0
MX wedge ▶ B Software package required for sending serial data from the SIMATIC HawkEye 5xT to PC applications	6GF3020-0AC50-0WD1

▶ Preferred type, available from stock.

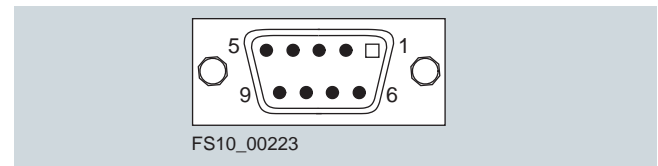
A: Subject to export regulations AL = N and ECCN = EAR99H

B: Subject to export regulations AL = N and ECCN = EAR99S

Dimensions

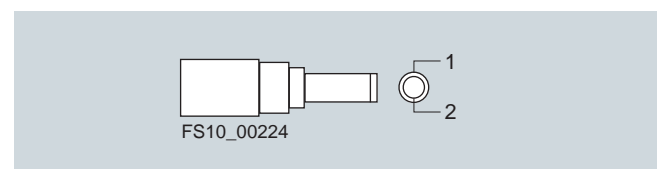


Schematics



9-Pin D-type Sub (F)

Pin	Signal Name
1	not connected
2	RxD Data In
3	TxD Data Out
4	not connected
5	SG
6	not connected
7	CTS Send In
8	RTS Send Out
9	not connected



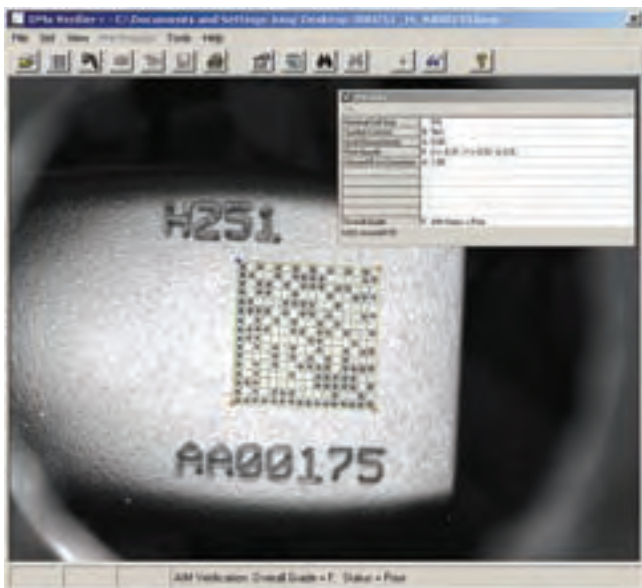
Power Jack

Pin	Signal Name
1	+12 V
2	Ground

Code Reading Systems

Verification Systems

Overview



Marking a product is normally done very early on in the production process so that all following steps can be controlled using the product identity.

By using verification systems, the readability of marks is guaranteed throughout the entire production process regardless of any possible contamination or when using different read devices. Moreover, the marking can continue to be read after the production process throughout the lifespan of the product.

HawkEye Direct Part Mark Verifier

SIMATIC HawkEye Direct Part Mark (DPM) Verifier guarantees the quality of data matrix codes on directly marked parts. This is a software option for the cameras of the SIMATIC HawkEye 1500 series. Siemens Direct Part Marking (DPM) technology is utilized here. Users of HawkEye 1500 cameras can perform a 100% inspection for DPMs with this device and the marking system can be set correctly before illegible markings are made on the parts.

VS130-2 Verifier

SIMATIC VS130-2 automatically checks the quality of data matrix codes on parts with direct part marks. This function is included in an optional software for the cameras of the SIMATIC VS130-2 series. The verification algorithms are in line with the test criteria of the AIM specification. The verification is particularly suitable for marks that change color (e.g. print, laser, etc.). The software option enables users of the SIMATIC VS130-2 to carry out a 100% check for DPM with color change and set the marking system correctly to avoid illegible marks on the parts.

Overview

To ensure the quality of Data Matrix codes marked directly on parts, Siemens offers the SIMATIC HawkEye DPM Verifier. This verifier consists of a software option for the SIMATIC HawkEye 1500 Series cameras. It uses the Siemens Direct Part Marking (DPM) technology. Using this system, manufacturers can now continuously monitor and adjust their marking system before it begins producing unreadable marks.

While Data Matrix readers or verifiers from other vendors evaluate marks using a specification known as the AIM standard (ISO 16022), originally developed for labels, the HawkEye DPM Verifier uses a set of quality measures developed by Siemens specifically for direct part marks. This helps prevent false alarms or incorrect decisions, since direct part marks that receive a perfect 'A' according to the AIM spec may really be marginal or even unacceptable, whereas marks that receive a very low or failing AIM grade may be perfectly readable and need not indicate any problems or require any changes in the marking process.

Benefits

- 100% in-line mark quality monitoring for DPMs in production
- Broad applicability resulting from support of the following verification standards: Siemens DPM, AS9132, ISO 15415 and ISO 16022 (AIM)
- Unique Siemens DPM quality measurements overcome limitations of other verification standards
- Built-in A/B/C/D/F grading levels for ease of interpretation
- User selectable mark quality measurements to identify different marking process problems
- User configurable good/fair/poor quality alarm ranges for each measurement
- Direct connection to PLC or stack lights through onboard digital I/O
- Graphical interface for advanced setup and in-line monitoring of verification results and statistics

Code Reading Systems

Verification Systems

SIMATIC HawkEye Direct Part Mark Verifier

Design

Direct Part Mark Verification is offered as special software option for all SIMATIC HawkEye 1500 series cameras.

The optimum configuration for a direct part mark verifier is typically different than that for a reader. Direct part mark verification requires higher resolution than reading (more pixels per Data Matrix symbol cell) and also requires that the axis of the camera is perpendicular to the mark surface.

Function

Direct part mark quality problems that can be detected by the Direct Part Mark Verification technology include:

- Improper or inconsistent mark dot/cell size
- Improper or inconsistent mark dot/cell location
- Improper overall mark geometry
- Mark or part surface damage
- Very low or inconsistent mark contrast

The Direct Part Mark quality verification measurements include:

- Cell size
- Cell center offset
- Cell size offset
- Cell modulation
- Border match
- Angle of distortion
- Symbol contrast
- Axial non-uniformity
- Print growth
- Unused error correction

Selection and Ordering data

Order No.

SIMATIC HawkEye DPM Verifier

Code reading system including license for

- | | | |
|--------------------------|-----|---------------------------|
| • SIMATIC HawkEye1510 | ▶ A | 6GF3020-0HE15-2CV0 |
| • SIMATIC HawkEye1525HD | ▶ A | 6GF3020-0HE15-2HV0 |
| • SIMATIC HawkEye1525SHD | ▶ A | 6GF3020-0HE15-2SV0 |
| • SIMATIC HawkEye1515MD | ▶ A | 6GF3020-0HE15-1MV0 |
| • SIMATIC HawkEye1515HD | ▶ A | 6GF3020-0HE15-1HV0 |
| • SIMATIC HawkEye1515SHD | ▶ A | 6GF3020-0HE15-1SV0 |
| • SIMATIC HawkEye1515LHD | ▶ A | 6GF3020-0HE15-1LV0 |

▶ Preferred type, available from stock.

A: Subject to export regulations AL = N and ECCN = EAR99H

Appendix



7/2	Training
7/3	Ordering notes
7/3	Length codes for cables
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Training

Faster and more applicable know-how: Hands-on training from the manufacturer

SITRAIN® – the Siemens Training for Automation and Industrial Solutions – provides you with comprehensive support in solving your tasks.

Training by the market leader in automation and plant engineering enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning..



First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

Achieve more with SITRAIN

- Shorter times for startup, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

Contact

Visit our site on the Internet at:

www.siemens.com/sitrain

or let us advise you personally. You can request our latest training catalog from:

SITRAIN Customer Support Germany:

Phone: +49 (0)1805 / 23 56 11

Fax: +49 (0)1805 / 23 56 12

(0.14 €/min. from a German landline network, mobile telephone prices may vary)

E-Mail: info@sitrain.com

SITRAIN highlights

Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens products as well as interaction of the products in systems. Telecourses, teach-yourself software and seminars with a presenter on the Web supplement our classic range of courses.

Tailor-made training

We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning

"Blended learning" means a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.



Logistics

General

Our logistics service ensures "quality from the time of ordering to delivery" regarding delivery service, communications and environmental protection. We concentrate on optimizing logistics processes by designing our infrastructure to customer requirements and implementing electronic order processing.

Personal consulting, on-time delivery and limiting transport times to 1 day – within Germany – are essential to us.

The DIN-ISO-9001 approval and subsequent quality check are indispensable prerequisites for us.

Electronic order processing is fast, cost-efficient and error-free. Please contact us if you want to benefit from these advantages.

Packing, packing units

The packaging in which our equipment is dispatched provides protection against dust and mechanical damage during transport thus ensuring that you receive our products in a perfect state.

We select our packaging for maximum environmental compatibility and reusability (e.g. crumpled paper instead of polystyrene chips for protection during transport in packages up to 32 kg) and, in particular, with a view to reducing waste.

With our multi-unit packaging, we offer you specific types of packaging that are both kind to the environment and tailored to your requirements:

Your advantages at a glance:

- Lower ordering overhead
- Cost savings through uniform-type packaging: low/no disposal costs.
- Less time and personnel required thanks to short unpacking times.
- Delivery on time and direct to the production line reduces your inventories: Cost savings through reduction of storage area.
- Fast assembly thanks to supply in sets.
- Standardized Euro standard boxes corresponding to modules of the Euro range are suitable for most conveyor systems.
- Active contribution to environmental protection.

Where nothing is stated to the contrary in the selection and ordering data of this catalog, our products are supplied individually packed.

For small parts/accessories, we offer you economical packing units as standard packs containing more than one item, e.g. 5, 10, 50 or 100 units. It is essential that whole number multiples of these quantities be ordered to ensure satisfactory quality of the products and problem-free order processing.

The products are delivered in a neutral, white carton. The label includes warning notices, the CE mark, the open arrow recycling symbol, and product description information in English and German. In addition to the Order No. (MLFB) and the number of items in the packing, the Instr. Order No. is also specified for the operating instructions. It can be obtained from your local Siemens contact (you will find Siemens representatives at www.siemens.com/automation/partner).

The product order numbers for most devices can be read from the EAN barcode to facilitate ordering and warehouse logistics

Small orders

When small orders are placed, the costs associated with order processing are greater than the order value. We recommend therefore that you combine several small orders. We this is not possible we unfortunately find it necessary to charge a processing supplement of 20 Euros to cover our costs for order processing and invoicing for all orders with a net goods value of less than 250 Euros.

Length codes for cables 6XV

For cables whose length can be selected according to the following list, complete the empty positions (■■■■) of the order number according to the specified length code. Other lengths on request.

Cable 6XV. ...

Length of cable = multiplier x length digit	Order number extension for cable
	6XV. ... - ■■■■
	E
	H
	N
	T
	U
Multiplier: 0.01 m	1 0
0.1 m	1 2
1.0 m	1 5
10.0 m	1 6
100.0 m	2 0
Length digit: 10	2 5
12	3 2
15	4 0
16	4 0
20	5 0
25	6 0
32	6 3
40	8 0
50	
60	
63	
80	

Standard lower price lengths are available for many cables. Standard lengths can be supplied from the central warehouse in Nürnberg, Germany (LZN) within three days.

Special lengths can only be supplied from the factory. Delivery may take up to thirty days.

Order example

The cable 6XV1 404-0A■■■■ must be 16 m long. Multiplier 1.0 m (N) x length digit 16 (16) provides a length of 16 m. The order number extension is N16. The complete order number for the cable is therefore:

6XV1 404-0AN16.

Standards and approvals

Special specifications for the USA and Canada

Installation considerations

The control products described in this catalog have been designed, tested and manufactured in accordance with a wide variety of standards including but not limited to those issued by UL, CSA, NEMA, and IEC. These standards typically apply to the control product as a component and not the installation or use of the product. It is the responsibility of the end user of the control product to make sure each installation complies with all of the applicable safety requirements, laws, regulations, codes and standards (some examples of which are the N.E.C., the C.E.C. and OSHA regulations). Note the local authorities may impose further jurisdiction over each installation. When in doubt, consult with the local inspection authorities.





Unless otherwise specified, the control products described in this catalog are designed to operate under "usual service conditions" as defined in NEMA Standards Publication – Part ICS 1-108. Open type devices are intended for installation in enclosures that provide environmental protection as needed for the specific application. See page 8/20 for definitions of the various enclosure types.

Tubing system

In the USA and Canada, especially with machine tools and processing machines, supply lines are laid using rubber insulated conductors enclosed in heavy-duty steel piping which corresponds somewhat to gas or water pipe systems.

The tubing system must be completely watertight and electrically conductive (especially sleeving and elbows). Since the tubing system can also be earthed, the cable entries of enclosed units equipped with heavy-gauge or metric threads must be fitted with metal adapters between these threads and the tube thread. The necessary adapters are specified for the switchgear as accessories; they should be ordered separately unless otherwise specified.

Different features of UL approvals (for USA and Canada)

Recognized component	Listed product
UL issues yellow "Guide cards" with a Guide No. and a File No.	UL issues white "Guide cards" with a Guide No. and a File No.
Devices are identified on the rating plate using the "UL recognition mark": USA:   Canada:  	Devices are identified using the "UL listing mark" on the rating plate • e.g. USA: LISTED 165 C, IND. CONT. EQ • e.g. Canada: c@ LISTED 165 C, IND. CONT. EQ (165 C stands for: Siemens, A & D CD Division, Amberg plant)
Devices are approved as modules for "factory wiring", i.e.: as devices for installation in control systems, which are selected, installed, wired and tested entirely by trained personnel in factories, workshops or elsewhere, according to the conditions of use.	Devices are approved for "field wiring", i.e.: • as devices for installation in control systems which are completely wired by trained personnel in factories, workshops or elsewhere. • as single devices for sale in retail outlets in the USA/Canada.

If devices are ® or c® approved as "listed products", they are also approved as "recognized components" and allowed to be marked  or .

Utilization categories

Low-voltage devices for auxiliary circuits (e.g. contactor relays, command and signaling devices and control switches/auxiliary contacts in general) are mostly only approved by CSA and UL for "**Heavy Duty**" or "**Standard Duty**" and are identified either with these specifications in addition to the maximum permissible voltage or by using an abbreviation.

The abbreviations are harmonized with IEC 60947-5-1 Appendix 1 Table A1 and correspond to the stated utilization categories.

Performance data

Where given in this catalog, performance data should only be used as a guide to determine the suitability of the product for an application. The data may be the result of the accelerated testing or elevated stress levels under controlled conditions. The user must take care in correlating these data to actual application or service conditions.

For various switching devices detailed in the catalog, a note has been included to the effect that, above a certain voltage, the control switches/auxiliary contacts can only be used if they have the same polarity. This means that the input terminals can only be connected to the same pole of the control voltage, e.g. "AC 600 V above AC 300 V same polarity".

UL and CSA File Numbers and Guide Cards Numbers

Most control equipment listed in this catalog is designed, manufactured and tested in accordance with the relevant UL and CSA standards as listed in the table below.

Quality Management

The quality management system of our division complies with the international standard ISO 9001.

The products and systems described in this catalog are sold under application of a quality management system certified by DQS and TÜV Management Service GmbH in accordance with ISO 9001. The certificates are recognized in all IQ Net countries.

Siemens Contacts Worldwide



At

<http://www.siemens.com/automation/partner>

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner for

- Technical Support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
- Sector.

By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.

Siemens Solution Partner Automation and Power Distribution

Overview



Siemens Solution Partner is the name used to identify selected system integrators as suppliers of solutions for the Siemens portfolio in the automation, power distribution and product lifecycle management (PLM) sectors in accordance with globally uniform qualification procedures.

In the context of the Siemens Solution Partner program, our strengths merge with the competences of our Solution Partners. Our product and system expertise works together with the comprehensive application and sector expertise of our partners to always produce perfect solutions for every application.

The number of Solution Partners has increased extremely rapidly, and now more than 850 certified Solution Partners are able to provide pioneering, tailored solutions in more than 45 countries.

The Solution Partner Finder, available to you on the Internet, is a comprehensive database in which all Solution Partners, together with their performance profiles, present themselves.

In addition to the search criteria Technology, Sector and Country, you can also search by Company and ZIP Code. From there it is only a small step to making the first contact.

Call up the Solution Partner Finder as follows:

- CA 01 on CD-ROM:
On the start page via "Contacts & Partners; Siemens Solution Partner Automation and Power Distribution"
- CA 01 online:
Go directly to the Solution Partner Finder:
www.siemens.com/automation/partnerfinder

Additional information about the Siemens Solution Partner Program is available in the Internet at:

www.siemens.com/automation/solutionpartner

Siemens Industry Automation and Drive Technologies in the WWW

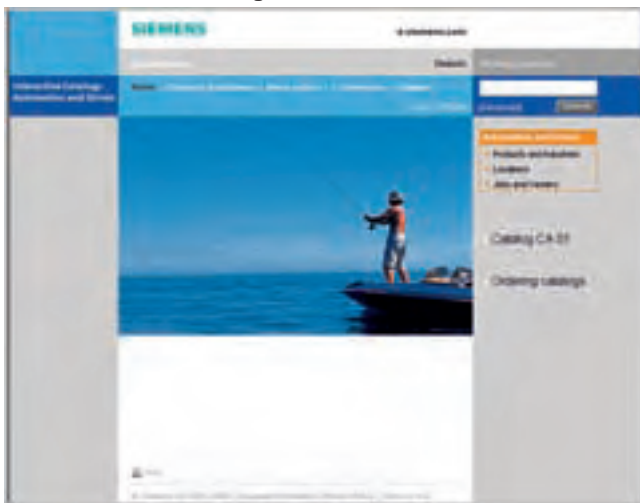
A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

<http://www.siemens.com/automation>

you will find everything you need to know about products, systems and services.

Product Selection Using the Offline Mall

Detailed information together with convenient interactive functions:

The Offline Mall CA 01 covers more than 80,000 products and thus provides a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found in the Internet under

<http://www.siemens.com/automation/ca01>

or on DVD.

Easy Shopping with the Mall

The Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Mall on the Internet under:

<http://www.siemens.com/automation/mall>

Appendix

Customer Support

Our Services for Every Phase of Your Project



In the face of harsh competition you need optimum conditions to keep ahead all the time:

A strong starting position. A sophisticated strategy and team for the necessary support – in every phase.

Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and startup to maintenance and upgrading.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

Online Support



The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

<http://www.siemens.com/automation/service&support>

Technical Support



Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

Tel.: +49 (0)180 50 50 222
Fax: +49 (0)180 50 50 223
 (€ 0.14 /min. from a German landline network, mobile telephone prices may vary)

<http://www.siemens.com/automation/support-request>

Technical Consulting



Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution.¹⁾

Configuration and Software Engineering



Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.¹⁾

Service On Site



With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.

In Germany
0180 50 50 444¹⁾
 (€ 0.14 /min. from a German landline network, mobile telephone prices may vary)

Repairs and Spare Parts



In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.

In Germany
0180 50 50 446¹⁾
 (€ 0.14 /min. from a German landline network, mobile telephone prices may vary)

Optimization and Upgrading



To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.¹⁾

¹⁾ For country-specific telephone numbers go to our Internet site at: <http://www.siemens.com/automation/service&support>

Knowledge Base on CD-ROM



For locations without online connections to the Internet there are excerpts of the free part of the information sources available on CD-ROM (Service & Support Knowledge Base). This CD-ROM contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service and Technical Support.

The CD-ROM also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The CD-ROM will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on CD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base CD** from your Siemens contact.

Order no. **6ZB5310-0EP30-0BA2**

Orders via the Internet
(with Automation Value Card or credit card) at:

<http://www.siemens.com/automation/service&support>

in the Shop domain.

Automation Value Card



Small card – great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase high-quality Support Tools in our Online Shop, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Automation Value Card order numbers

Credits	Order no.
200	6ES7 997-0BA00-0XA0
500	6ES7 997-0BB00-0XA0
1000	6ES7 997-0BC00-0XA0
10000	6ES7 997-0BG00-0XA0

Detailed information on the services offered is available on our Internet site at:

<http://www.siemens.com/automation/service&support>

Service & Support à la Card: Examples

Technical Support

"Priority"	Priority processing for urgent cases
"24 h"	Availability round the clock
"Extended"	Technical consulting for complex questions

Support Tools in the Support Shop

"System Utilities"	Tools that can be used directly for configuration, analysis and testing
"Applications"	Complete topic solutions including ready-tested software
"Functions & Samples"	Adaptable blocks for accelerating your developments

Appendix

Customer Support

Safety of electronic devices

Overview

The information listed here is mainly of a fundamental nature and applies regardless of the type and vendor of the electronic control system.

Reliability

The reliability of devices and components is being driven as high as possible by employing extensive and cost-effective measures in development and production.

This includes

- Selection of high-quality components;
- Worst-case design calculation of all circuits;
- Systematic and computer-controlled testing of all subcontracted components;
- Burn-in of all large-scale integrated circuits (e.g. processors, memories etc.);
- Measures to prevent static charging when working at or with MOS circuits;
- Visual checks at various stages of production;
- In-circuit testing of all modules, i.e. computer-aided testing of all components and their interaction in the circuit;
- Hot endurance run at high ambient temperature over several days;
- Meticulous computer-controlled final testing;
- Statistical evaluation of all returns for immediate introduction of remedial actions.

These measures are regarded a basic measures in safety engineering. They prevent or keep control of the majority of potential faults.

Risks

Wherever faults are liable to cause injury to persons or damage to property it is necessary to introduce measures aimed in particular at the safety of the plant and, therefore, of the control system. Special, plan-specific directives exist for these applications and need to be taken into account when configuring the control system.

In the case of safety-relevant electronic control systems the measures needing to be taken to prevent or keep control of faults are aimed at the risk presented by the plant. In such a case the basic measures listed above are no longer sufficient above a certain level of hazard potential. Additional measures have to be implemented and certified (e.g. dual-channel arrangements, tests, checksums etc.) for the control system.

Division into a safe and a non-safe zone

In practically all plants there are parts which perform safety-related functions (e.g. emergency stop pushbuttons, mesh guards, two-hand controls). In order not to have to consider the complete control system in terms of safety engineering it is customary to divide the control system into a **safe** and a **non-safe zone**. No special requirements are imposed on the safety of the control system in the non-safe zone because there would be no impact on the safety of the plant if the electronics failed in this case. In the safe zone, on the other hand, you are only allowed to use control systems and/or circuits which satisfy the directives in question.

The following zonal divisions are customary in practice:

- Control systems with little safety engineering, e.g. machine control systems.
- Control systems with balanced zones, e.g. chemical plants, aerial ropeways.
- Control systems with mainly safety engineering, e.g. incineration plants.

Important

Even if a maximum of design-based safety is achieved in the configuration of an electronic control systems – e.g. through multi-edge configuration – it is still essential to closely follow the instructions in the operating manuals as otherwise wrong actions may suspend precautions for preventing potential faults or may create additional sources of danger.

Overview**Software types**

Software requiring a license is categorized into types. The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Automation & Drives offers various types of software license:

- Floating license
- Single license
- Rental license
- Trial license
- Factory license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.

A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per device, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific number of hours (the operating hours do not have to be consecutive).

One license is required for each installation of the software.

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Factory license

With the Factory License the user has the right to install and use the software at one permanent establishment only. The permanent establishment is defined by one address only. The number of hardware devices on which the software may be installed results from the order data or the Certificate of License (CoL).

Certificate of license

The Certificate of License (CoL) is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated. The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.

A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.

The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.

A separate upgrade must be purchased for each original license of the software to be upgraded.

ServicePack

ServicePacks are used to debug existing products.

ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Automation & Drives supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).



Detailed explanations concerning license conditions can be found in the "Terms and Conditions of Siemens AG" or under <http://www.siemens.com/automation/mall> (A&D Mall Online-Help System)

A&D/Software licenses/En 03.08.06

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3RG6115-3BE00-0XB4	2/59	N
3RG6115-3BE00-0XB7	2/60	N
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3RG6115-3BF00-0XB4	2/59	N
3RG6115-3BF00-0XB7	2/60	N
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Detailed individual catalogs with all product versions?

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Notes

Appendix



Notes



Notes

Conditions of sale and delivery Export regulations

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

General

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.

The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA1
(for customers based in Germany)
- 6ZB5310-0KS53-0BA1
(for customers based outside Germany)

or download them from the Internet
<http://www.siemens.com/automation/mall>
(Germany: A&D Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the <u>German Export List</u> Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an " <u>AL not equal to N</u> " are subject to a European or German export authorization when being exported out of the EU.
ECCN	<u>Export Control Classification Number</u> Products marked other than "N" are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an " <u>ECCN not equal to N</u> " are subject to a US re-export authorization.

Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.

A&D/VuL_ohne MZ/En 05.09.06

Industry Automation, Drive Technologies and Electrical Installation Technology

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Automation and Drives	<i>Catalog</i>	Low-Voltage	<i>Catalog</i>
Interactive catalog on DVD	CA 01	Controls and Distribution – SIRIUS, SENTRON, SIVACON	LV 1
Drive Systems		Controls and Distribution – Technical Information	LV 1 T
<u>Variable-Speed Drives</u>		SIRIUS, SENTRON, SIVACON	
SINAMICS G110/SINAMICS G120	D 11.1	SIDAC Reactors and Filters	LV 60
Inverter Chassis Units		SIVENT Fans	LV 65
SINAMICS G120D		SIVACON 8PS Busbar Trunking Systems	LV 70
Distributed Frequency Inverters			
SINAMICS G130 Drive Converter Chassis Units, SINAMICS G150 Drive Converter Cabinet Units	D 11		
SINAMICS GM150/SINAMICS SM150 Medium-Voltage Converters	D 12	Process Instrumentation and Analytics	
SINAMICS S150 Drive Converter Cabinet Units	D 21.3	Field Instruments for Process Automation	FI 01
Asynchronous Motors Standardline	D 86.1	Measuring Instruments for Pressure, Differential Pressure, Flow, Level and Temperature, Positioners and Liquid Meters	
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2	<i>PDF: Indicators for panel mounting</i>	MP 12
DC Motors	DA 12	SIREC Recorders and Accessories	MP 20
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1	SIPART, Controllers and Software	MP 31
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2	SIWAREX Weighing Systems	WT 01
<i>PDF: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units</i>	DA 22	Continuous Weighing and Process Protection	WT 02
SIMOVERT PM Modular Converter Systems	DA 45	Process Analytical Instruments	PA 01
SIEMOSYN Motors	DA 48	<i>PDF: Process Analytics, Components for the System Integration</i>	PA 11
MICROMASTER 420/430/440 Inverters	DA 51.2		
MICROMASTER 411/COMBIMASTER 411	DA 51.3	SIMATIC HMI	
SIMOVERT MASTERDRIVES Vector Control	DA 65.10	Human Machine Interface Systems	ST 80
SIMOVERT MASTERDRIVES Motion Control	DA 65.11		
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3	SIMATIC Industrial Automation Systems	
SIMODRIVE 611 universal and POSMO	DA 65.4	Products for Totally Integrated Automation and Micro Automation	ST 70
<u>Low-Voltage Three-Phase-Motors</u>		SIMATIC PCS 7 Process Control System	ST PCS 7
IEC Squirrel-Cage Motors	D 81.1	Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
MOTOX Geared Motors	D 87.1	Migration solutions with the SIMATIC PCS 7 Process Control System	ST PCS 7.2
<u>Automation Systems for Machine Tools SIMODRIVE</u>	NC 60	pc-based Automation	ST PC
• Motors		SIMATIC Control Systems	ST DA
• Converter Systems SIMODRIVE 611/POSMO			
<u>Automation Systems for Machine Tools SINAMICS</u>	NC 61	SIMATIC NET	
• Motors		Industrial Communication	IK PI
• Drive System SINAMICS S120			
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21	SIMATIC Sensors	
<u>Drive and Control Components for Hoisting Equipment</u>	HE 1	Sensors for Factory Automation	FS 10
<u>Mechanical Driving Machines</u>			
Flender Standard Couplings	MD 10.1	Systems Engineering	
Electrical Installation Technology		Power supplies SITOP power and LOGO! Power	KT 10.1
<i>PDF: ALPHA Distribution Boards and Terminal Blocks</i>	ETA 1	System cabling SIMATIC TOP connect	KT 10.2
<i>PDF: ALPHA 8HP Molded-Plastic Distribution System</i>	ETA 3		
<i>PDF: BETA Low-Voltage Circuit Protection</i>	ET B1	System Solutions	
<i>PDF: DELTA Switches and Socket Outlets</i>	ET D1	Applications and Products for Industry are part of the interactive catalog CA 01	
<i>PDF: GAMMA Building Management Systems</i>	ET G1		
Motion Control		TELEPERM M Process Control System	
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60	<i>PDF: AS 488/TM automation systems</i>	PLT 112
SINUMERIK & SINAMICS Automation Systems for Machine Tools	NC 61		
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21		

PDF: These catalogs are only available as pdf files.

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