Proximity switches

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

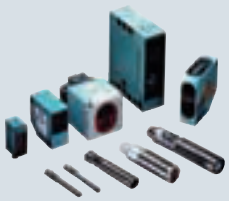
Sonar proximity switches can be used as non-contact proximity switches in many fields of automation.

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.

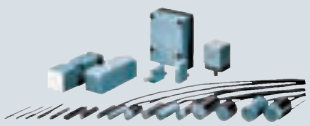
Depending on the type of device, the interruption or reflection of the light beam is evaluated.



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.

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.

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 re-parameterization 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

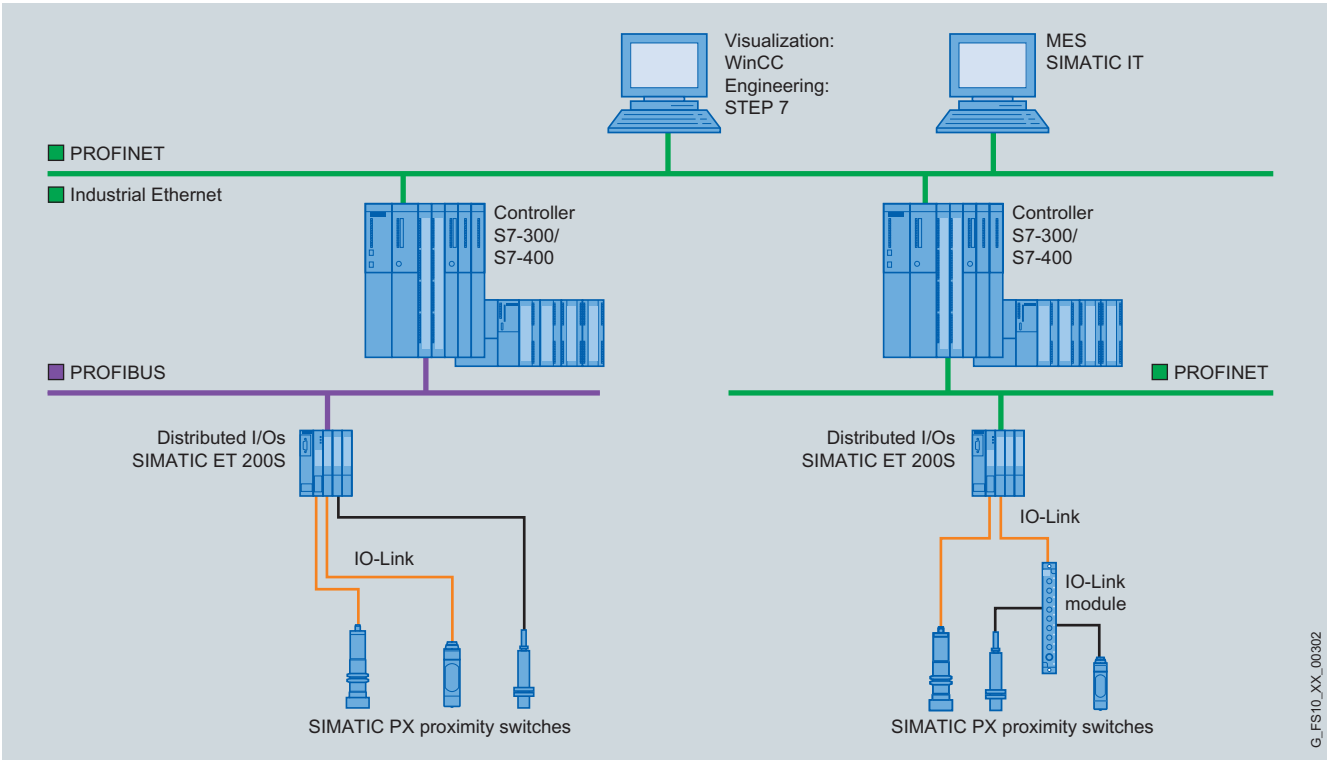
Application

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)

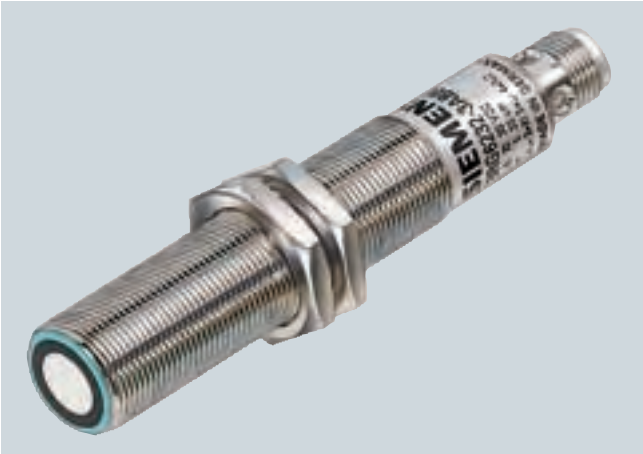
If a complex pressure transducer is used, numerous parameters (e.g. threshold values, hysteresis values) are set during commissioning to ensure smooth operation of the plant. Via IO-Link this data is transferred to the controller and stored there. Should this sensor fail, the sensor simply needs to be 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



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

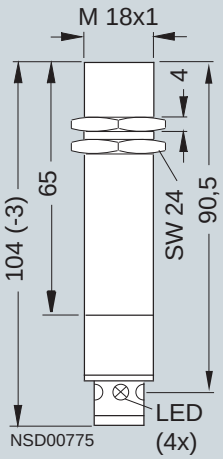
Type		6GR6333-3KS00
Sensing range	cm	10 ... 100
Standard target	cm	2 x 2
Operational voltage (DC)	V	20 ... 30 (including 10% residual ripple)
Rated operating current I_e	mA	200
No-load supply current I_0	mA	Max. 50
Ultrasonic frequency	kHz	200
Switching frequency f	Hz	5
ON-delay	ms	100
Time delay before 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

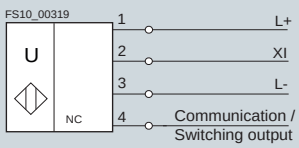
	Sensing range cm	Rated operational current mA		Order No.
PXS310C ultrasonic proximity switch				
	10 ... 100	200	► A	**6GR6 333-3KS00**

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

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.

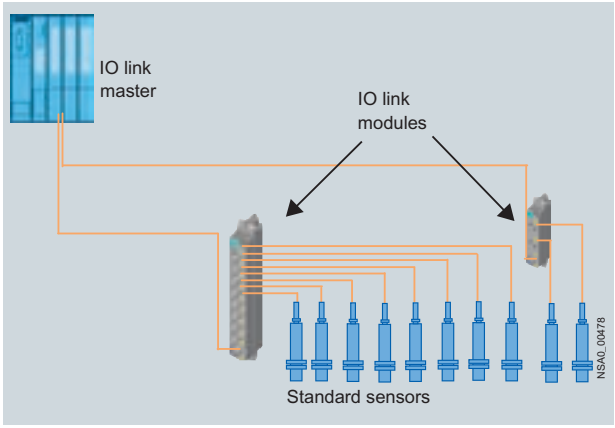
No passive distributors are used and therefore there is no associated laborious and fault-prone wiring.

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 010-0BA10-0AA0**
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"

2

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.

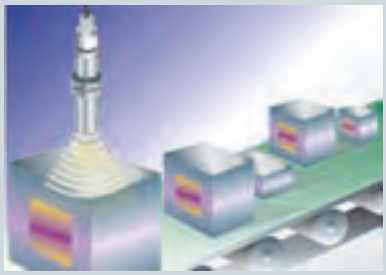
Personal safety

NSD0_00801

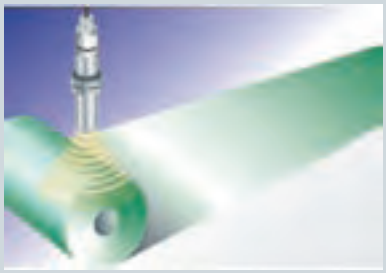
Due to their physical characteristics, the ultrasonic proximity switches cannot be used for safety-related applications (e.g. for the protection of personnel).

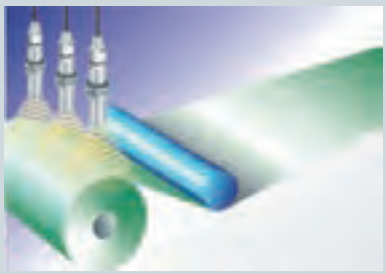
2

Application examples


Size measurement


Measurement of stack height


Measurement of diameter and speed


Contour measurement


Loop monitoring


Quality control


Distance monitoring


Level measurements

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.

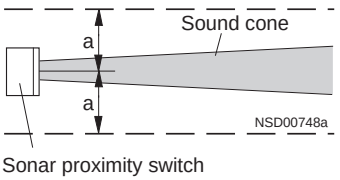
If two Sonar proximity switches of an identical design are mounted opposite each other, the distance d must be maintained between them. If two sensors of identical design are arranged in parallel, the distance e must be maintained between the sensors.

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

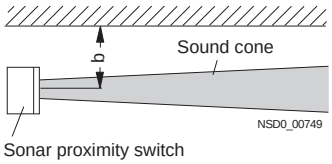
The range of the proximity switch is reduced if the transducer surface is damaged or painted or if water or wet dirt is applied to it.

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



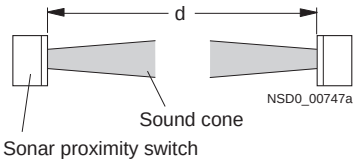
Sonar proximity switches with sensing range	a
cm	cm
6 (5) … 30	> 6
20 to 130 (100)	> 30
40 to 300	> 60
60 to 600	> 90
80 to 1000	> 150

Distance b between two Sonar proximity switches and a smooth surface



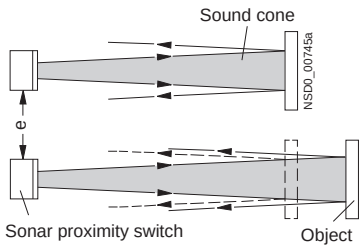
Sonar proximity switches with sensing range	b
cm	cm
6 (5) … 30	> 3
20 to 130 (100)	> 15
40 to 300	> 30
60 to 600	> 40
80 to 1000	> 70

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



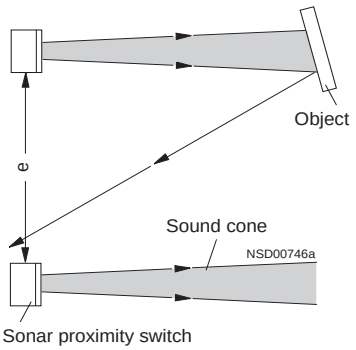
Sonar proximity switches with sensing range	d
cm	cm
6 (5) … 30	> 120
20 to 130 (100)	> 400
40 to 300	> 1200
60 to 600	> 2500
80 to 1000	> 4000

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 mm – 600 mm = 5400 mm
5400 mm/4096 = 1.3 mm (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 ± 1.5 % (M30 K2 and M30 K3 compact ranges) or of ± 2.5 % (M18 compact range) is achieved.

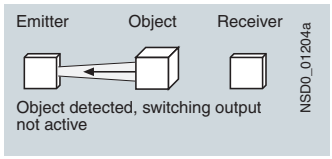
Operating modes with switching output

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.

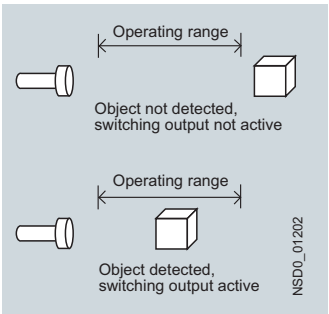


- Active measurement system:
  The propagation time of the ultrasonic signal from the emitter to the receiver is measured. The enabling inputs of the two proximity switches must be connected together for this purpose. All options of the proximity switches can still be used; the range is twice the normal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

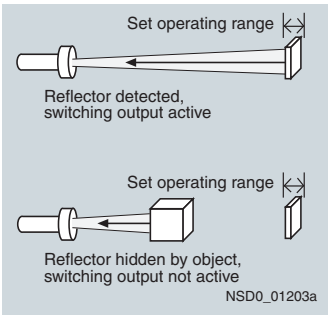
Emitter and receiver

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.



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

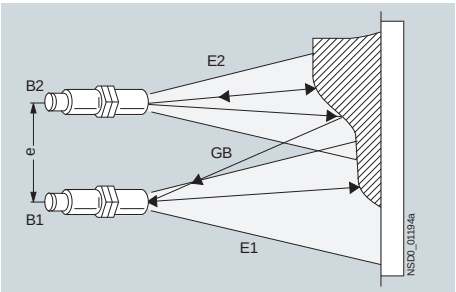
- No additional wiring overheads, simply connect the enable inputs of the individual proximity switches.
- Fast response, because every proximity switch is constantly active.

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

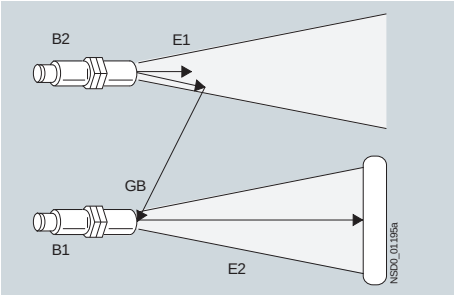
- Reliable protection against mutual interference.
- An object can be assigned to a proximity switch.

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 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 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 in 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 *H*	mm	5	10
Repeat accuracy *R*	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_e	mA	100	
No-load supply current I_0	mA	max. 35	
Ultrasonic frequency	kHz	400	200
Switching frequency *f*	Hz	8	5
Response time	ms	70	90
Power-up delay t_v	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	

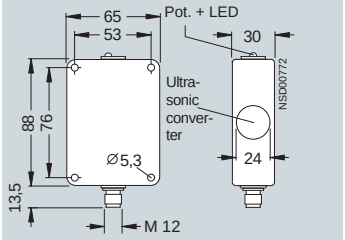
Selection and Ordering data

	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**

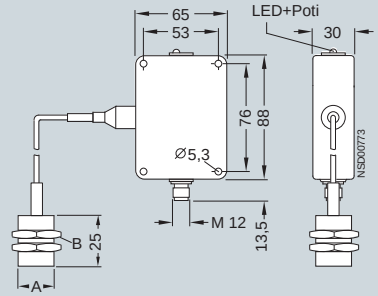
► Preferred type, available from stock.

Dimensions

3RG 63 4.–3..00



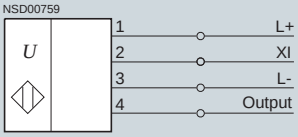
3RG 63 4.–3..01



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

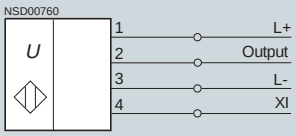
Schematics

NSD00759



NO or analog output

NSD00760



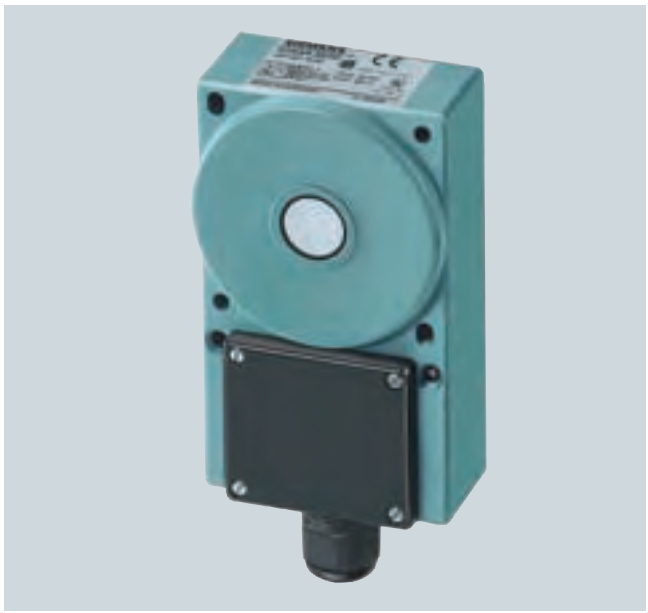
NC

View from rear onto device

NSD01042a

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

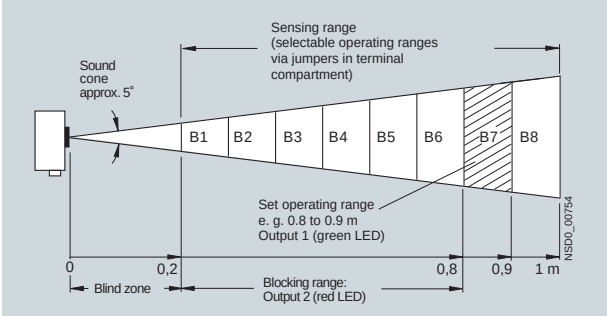
The sonar proximity switch outputs a signal while an object is located in the set operating range or inhibit range outside the blind zone (see figure).

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

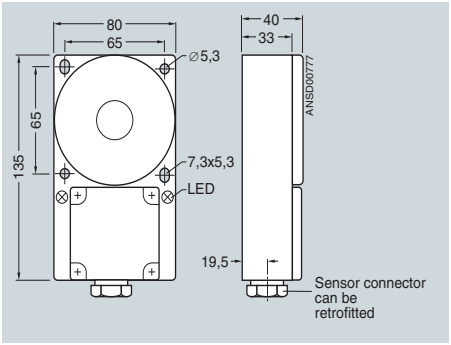
Type		3SG16 compact form
Sensing range	cm	20 ... 100
Standard target	cm	2 × 2
Hysteresis *H*	mm	10
Repeat accuracy *R*	mm	± 2
Operational voltage (DC)	V	10 ... 35 (including ± 10% residual ripple, at 10 … 18 V sensitivity reduced by approx. 30%)
No-load supply current I_0	mA	< 60
Switching output		
• Rated operational current I_e	mA	150
• Voltage drop	V	2
• Residual current	mA	0.01
Ultrasonic frequency	kHz	200
Switching frequency *f*	Hz	4
Response time	ms	120
Power-up delay t_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

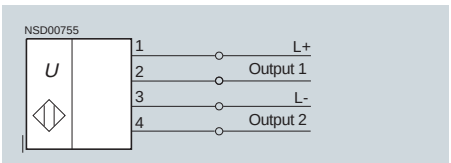
	Sensing range	Rated operational current	Switching output	Connection		Order No.
	cm	mA	pnp			
3SG16 sonar proximity switches	20 ... 100	150	2 NO	Terminal compartment	▶	**3SG16 67–1BJ87**
Accessories						
	Aligning unit					**3SX6 287**

▶ Preferred type, available from stock.

Dimensions



Schematics



SIMATIC 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

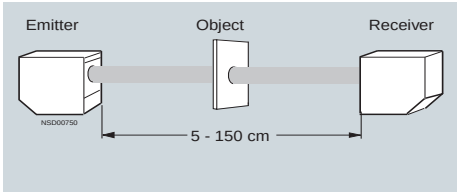
The sensitivity can be adjusted at the receiver module at terminal 2 (NO version) or 4 (NC version).

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 × 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	

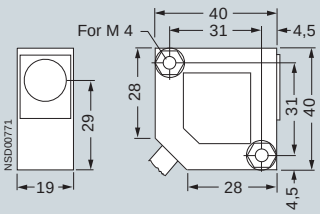
Selection and Ordering data

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**

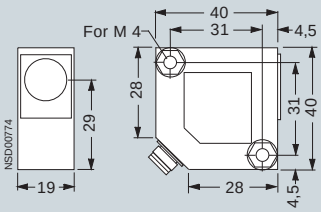
► Preferred type, available from stock.

Dimensions

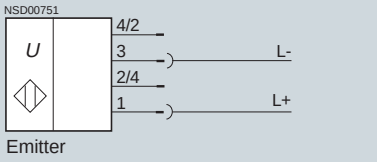
3RG62 43–0..00



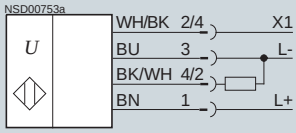
3RG62 43–3..00, 3RG62 43–7..00



Schematics



Emitter



Receiver (NO/NC)

View from rear onto device

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
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SIMATIC PXS200

	K08 compact range			M18S compact range					
				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

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.

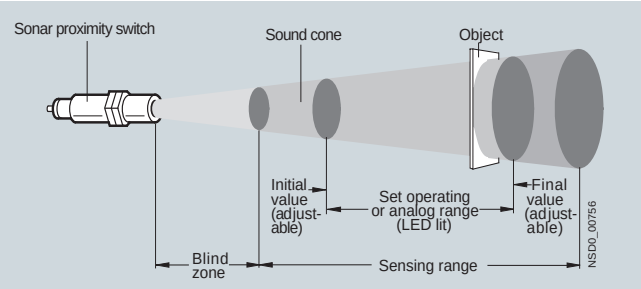
M30 K1 compact range

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	Rated operational current	Switching output	Analog output		Order No.
	cm	mA	pnp			
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**

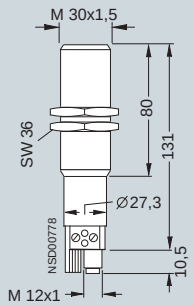
▶ Preferred type, available from stock.

M30 K1 compact range

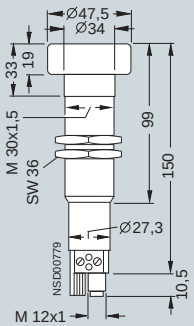
Dimensions

With fixed sensor

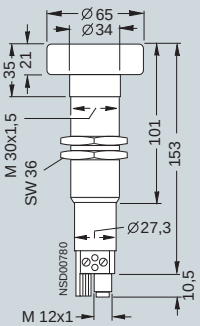
3RG 6. 12–3..00
3RG 6. 13–3..00



3RG 6. 15–3..00

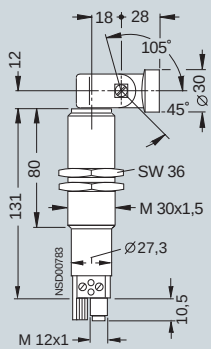


3RG 6. 14–3..00

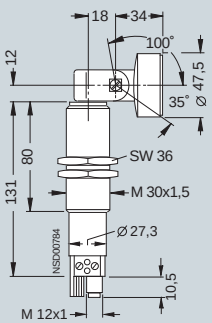


With swiveling sensor

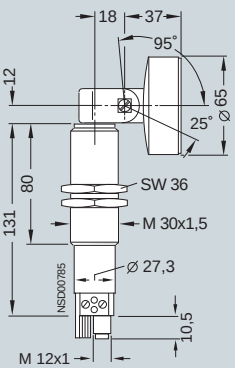
3RG 6. 22–3..00
3RG 6. 23–3..00



3RG 6. 25–3..00

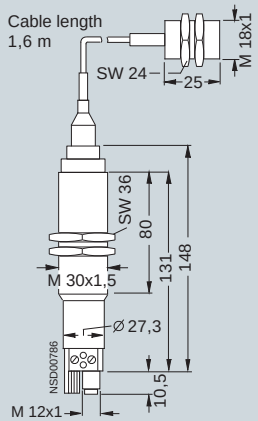


3RG 6. 24–3..00

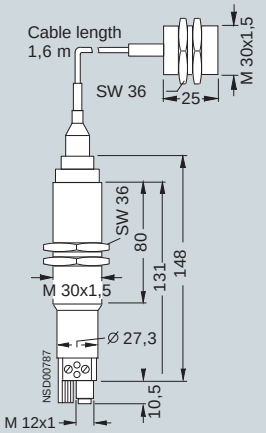


With separate sensor

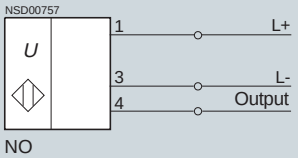
3RG 6. 12–3..01



3RG 6. 13–3..01



Schematics



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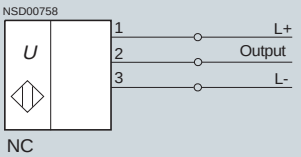


NC

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.

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 *H*	mm	10 or 2		10 or 3
Repeat accuracy *R*	mm	± 1 (frequency output ± 2.5)		
Operating voltage (DC)	V	20 ... 30 (including ± 10% residual ripple)		
Rated operating current I_e	mA	150		
No-load supply current I_0	mA	Max. 20		
Ultrasonic frequency	kHz	400	300	200
Switching frequency *f*	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 *H*	mm	10	
Repeat accuracy *R*	mm	± 1 (frequency output ± 2.5)	
Operating voltage (DC)	V	20 ... 30 (including ± 10% residual ripple)	
Rated operating current I_e	mA	375	
No-load supply current I_0	mA	max. 20	
Ultrasonic frequency	kHz	300	200
Switching frequency *f*	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	

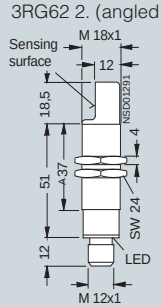
Selection and Ordering data

	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**

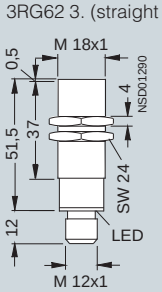
▶ Preferred type, available from stock.

Dimensions

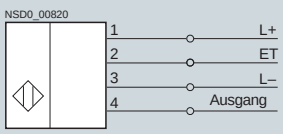
3RG62 2. (angled sensor)



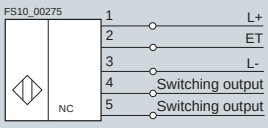
3RG62 3. (straight sensor)



Schematics



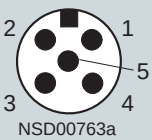
1 switching output/frequency output



2 switching outputs

NSD01042a

View from rear onto device



NSD00763a

View from rear onto device

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

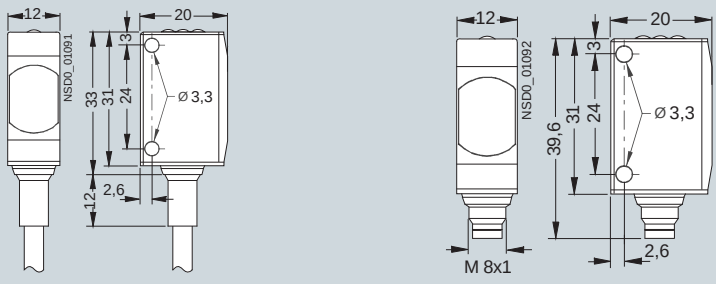
Type		6GR62 42	6GR62 41	6GR62 41-.P.. (receiver) 6GR62 41-.N.. (emitter)
Sensing range	cm	2 ... 25 or 0 ... 25	2.5 ... 40 or 0 ... 40	0 ... 80
Adjustment range	cm	4.5 ... 25 or 9.8 ... 25	4 ... 40 or 12 ... 40	–
Standard target	cm	2 x 2		–
Hysteresis *H*	mm	2.5	4	–
Repeat accuracy *R*	mm	± 1 (frequency output ± 2.5)		–
Operating voltage, including 10% residual ripple	V DC	20 ... 30		
Rated operating current I_e				
• Switching output, max.	mA	200		
• Frequency output, max.	mA	100		
No-load current I_0, max.	mA	20		
Ultrasonic frequency	kHz	400	300	
Switching frequency *f*	Hz	10	5	100
Response time	ms	50	75	5
Power-up delay t_v	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

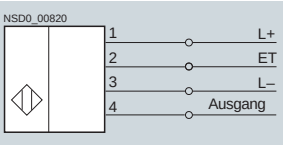
	Sensing range cm	Operating mode/ frequency output	Switching output	Connection		Order No.
K21 compact range						
	2.5 … 40	Diffuse sensor	NO contact	2 m cable	▶ A	**6GR62 41-0AB00**
		Diffuse sensor	NO contact	M8 connector	▶	**6GR62 41-7AB00**
		Diffuse sensor	NC contact	2 m cable	▶ A	**6GR62 41-0AA00**
		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	2 m cable	▶ A	**6GR62 42-0AB00**
		Diffuse sensor	NO contact	M8 connector	▶	**6GR62 42-7AB00**
		Diffuse sensor	NC contact	2 m cable	▶ A	**6GR62 42-0AA00**
		Diffuse sensor	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	2 m cable	▶ A	**6GR62 41-0BB00**
		Retroflective sensor	NO contact	M8 connector	▶	**6GR62 41-7BB00**
		Retroflective sensor	NC contact	2 m cable	▶ A	**6GR62 41-0BA00**
		Retroflective sensor	NC contact	M8 connector	▶	**6GR62 41-7BA00**
	0 … 25	Retroflective sensor	NO contact	2 m cable	▶ A	**6GR62 42-0BB00**
		Retroflective sensor	NO contact	M8 connector	▶	**6GR62 42-7BB00**
		Retroflective sensor	NC contact	2 m cable	▶ A	**6GR62 42-0BA00**
		Retroflective sensor	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	2 m cable	▶ A	**6GR62 41-0PB00**
		Thru-beam sensor receiver	NO contact	M8 connector	▶	**6GR62 41-7PB00**
		Thru-beam sensor receiver	NC contact	2 m cable	▶ A	**6GR62 41-0PA00**
		Thru-beam sensor receiver	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

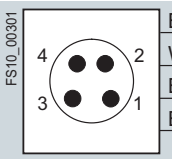


Schematics



1 switching output/frequency output

View from rear onto device



BN (1)	+ U_b
WH (2)	ET
BK (4)	Sw/freq output
BU (3)	0 V

M8 connector, type B, cable

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

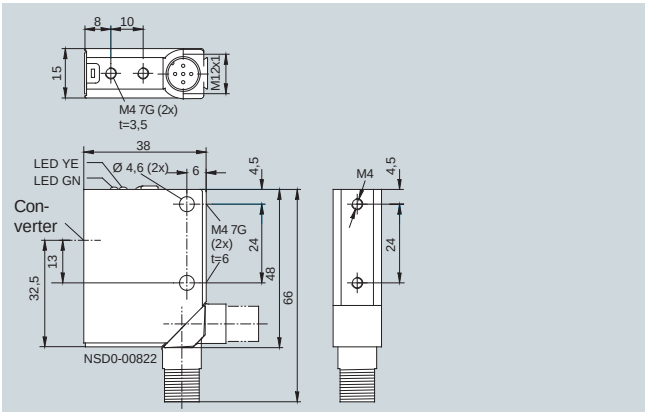
Type		3RG64 51–3CC00	3RG64 51–3DC00	3RG64 51–3SB00
Operating mode		Diffuse sensor	Reflex sensor	Thru-beam sensor
Sensing range	mm	50 ... 400	0 ... 400	0 ... 800
Adjustment range	mm	60 ... 400	160 ... 400	0 ... 800
Standard target	cm	2 × 2	2 × 2	2 × 2
Hysteresis *H*	mm	10	2	–
Repeat accuracy *R*	mm	± 1	± 1	–
Operational voltage (DC)	V	20 ... 30 (including ± 10% residual ripple)		
Rated operational current I_e	mA	150		
No-load supply current I_0	mA	Max. 25		
Ultrasonic frequency	kHz	300	300	300
Switching frequency *f*	Hz	8	8	250
Response time	ms	100	100	100
Power-up delay t_v	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

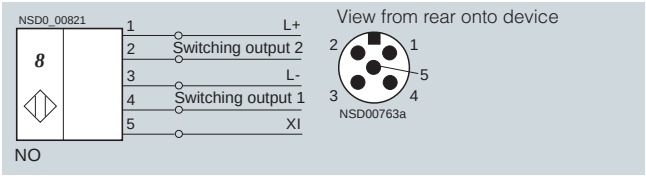
	Sensing range	Rated operational current	Switching output	Operating mode		Order No.
	cm	mA	pnp + npn			
Cubic form						
	5 ... 40	150	1 selectable NO/NC contact each	Diffuse sensor	►	**3RG64 51-3CC00**
	0 ... 40	150	1 selectable NO/NC contact each	Reflex sensor		**3RG64 51-3DC00**
	–	–	–	Thru-beam sensor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

► Preferred type, available from stock.

Dimensions



Schematics



Overview

SIMATIC sensors PXS300

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

Selection table

SIMATIC PXS300

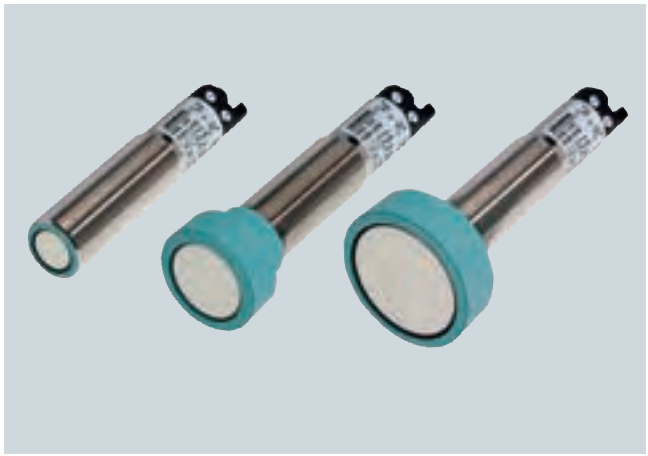
	M30 K2 compact range										M18 compact range			K65 compact form		
	Fixed sensor head				Swivel-mounted sensor head				Separate sensor head		Fixed sensor head					
Sensing range (cm)	6 ... 30	20 ... 130	40 ... 300	60 ... 600	6 ... 30	20 ... 130	40 ... 300	60 ... 600	6 ... 30	20 ... 130	5 ... 30	10 ... 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 program-ming 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

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").

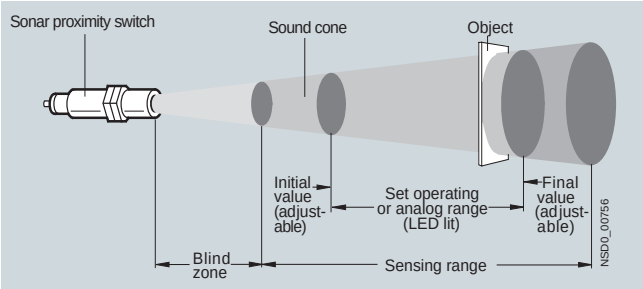
Where space is limited, objects can be detected which are perpendicular to the Sonar proximity switch (which reduces the installation depth). The blind zone is then reduced by about 6 cm.

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 *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			

M30 K2 compact range

Selection and Ordering data

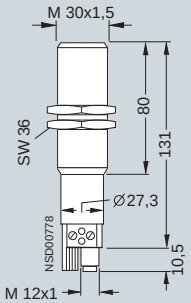
	Sensing range	Rated operational current	Switching output	Frequency output		Order No.
	cm	mA	pnp			
Fixed sensor						
3RG60 12–3..00 	6 ... 30	300	1 NO	–	▶	**3RG60 12–3AF00**
	20 ... 130	300	1 NO	–	▶	**3RG60 13–3AF00**
	40 ... 300	300	1 NO	–	▶	**3RG60 15–3AF00**
	60 ... 600	300	1 NO	–	▶	**3RG60 14–3AF00**
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.

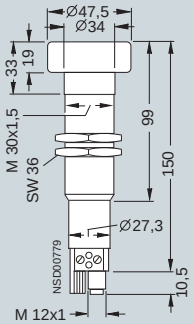
Dimensions

With fixed sensor

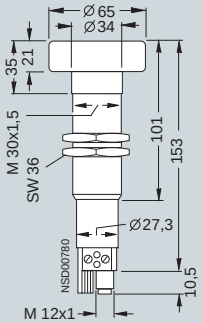
3RG 6. 12–3..00
3RG 6. 13–3..00



3RG 6. 15–3..00

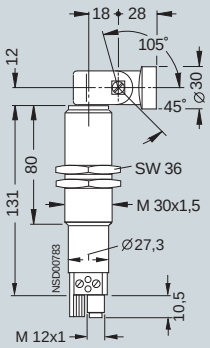


3RG 6. 14–3..00

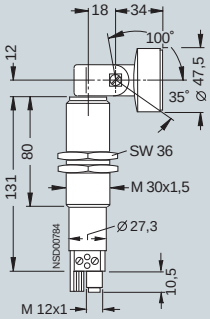


With swivel sensor

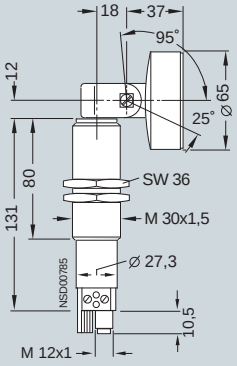
3RG 6. 22–3..00
3RG 6. 23–3..00



3RG 6. 25–3..00

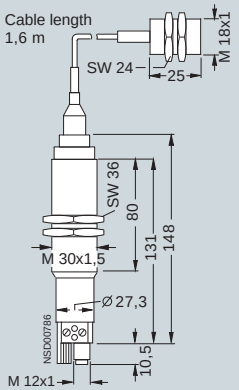


3RG 6. 24–3..00

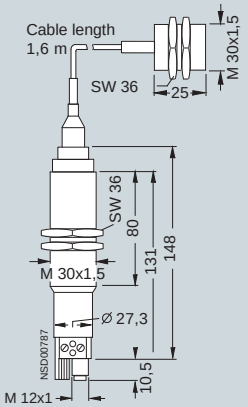


With separate sensor

3RG 6. 12–3..01

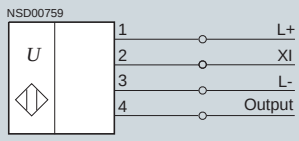


3RG 6. 13–3..01

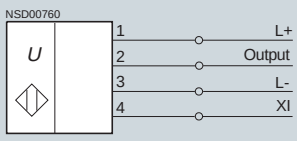


Schematics

M30 K2 compact range

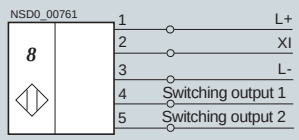


NO or analog output

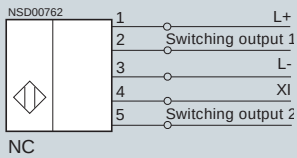


NC

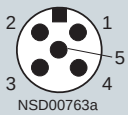
M30 K2 compact range with 2 switching outputs



NO



NC



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.

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	3RG62 33
Sensing range	cm	5 ... 30	15 ... 100
Standard target	cm	1 × 1	2 × 2
Hysteresis *H*	mm	10	
Repeat accuracy *R*	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_e	mA	150	
No-load supply current I_0	mA	max. 60	
Ultrasonic frequency	kHz	400	200
Switching frequency *f*	Hz	5	4
Response time	ms	100	120
Power-up delay t_v	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	

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 range[1]						
	10 ... 100	of IO-Link	IO-Link	–		**6GR63 33-3KS00**
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**

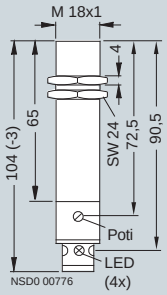
Accessories

	**SONPROG programming device,** 100 ... 240 V AC, 24 V DC	▶	**3RX4 000**

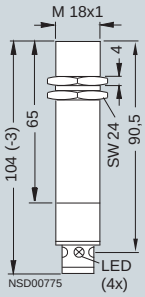
1) for further information, refer to "IO-Link" see page 2/6.
Preferred type, available from stock.

Dimensions

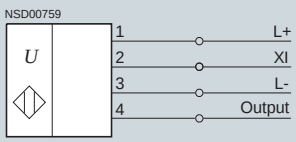
3RG 62 3.–3A.00



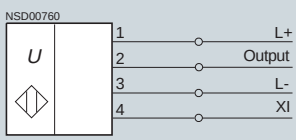
3RG 62 3.–3.S00



Schematics



NO or analog output

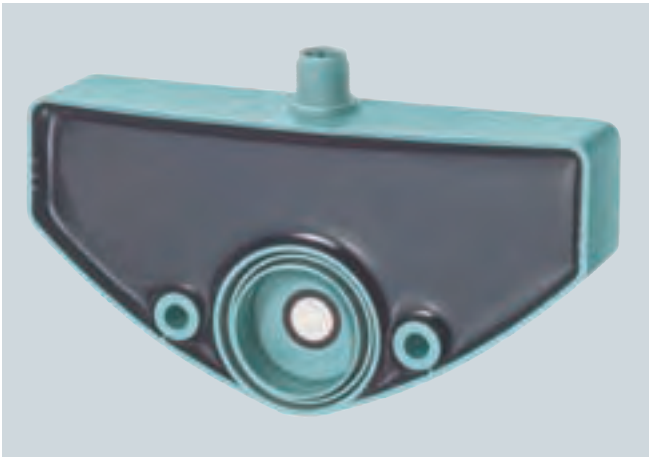


NC

View from rear onto device

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.

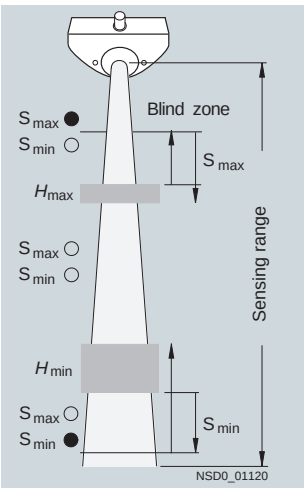
The tank opening must have a minimum diameter of 26 mm. It can be fixed to the tank by means of two M5 screws.

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**

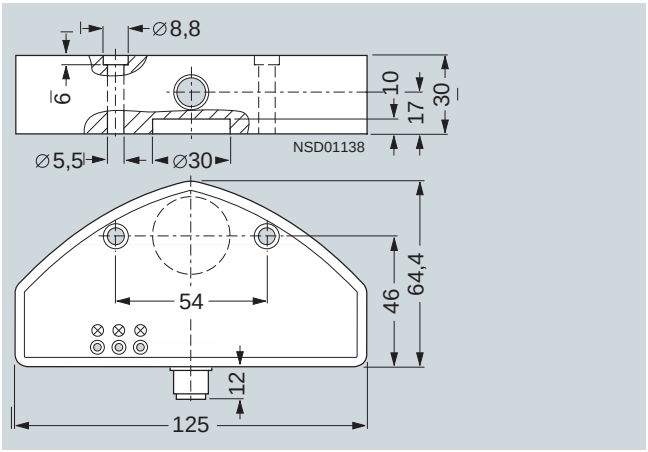
Accessories

	**SONPROG programming device,** 100 ... 240 V AC, 24 V DC	►	**3RX4 000**
	Teach-in adapter	►	**3RX4 010**

► Preferred type, available from stock.

K65 compact form

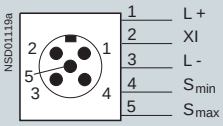
Dimensions



Schematics

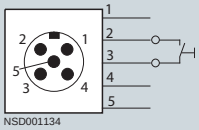
Sensors with switching output

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

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").

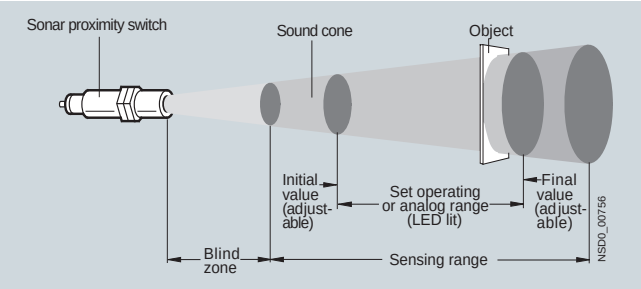
Where space is limited, objects can be detected which are perpendicular to the Sonar proximity switch (which reduces the installation depth). The blind zone is then reduced by about 6 cm.

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 *H*	mm	10	10	20	60	80
Repeat accuracy *R*	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_e						
• NO contact	mA	300				300
• NC contact	mA	150 or 300 (see table below)				150
No-load current I_0	mA	max. 50				max. 75
Ultrasonic frequency	kHz	400	200	120	80	60
Switching frequency *f*	Hz	8	4	2	1	0.5
Response delay	ms	80	110	200	400	800
Power-up delay t_v	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				

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

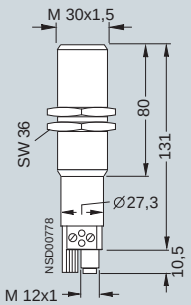
	**SONPROG programming device,** 100 ... 240 V AC, 24 V DC	▶	**3RX4 000**

M30 K3 compact range

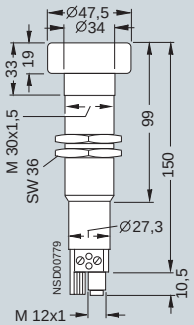
Dimensions

With fixed sensor

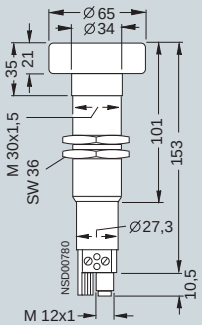
3RG 6. 12–3..00
3RG 6. 13–3..00



3RG 6. 15–3..00

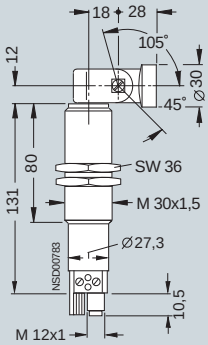


3RG 6. 14–3..00

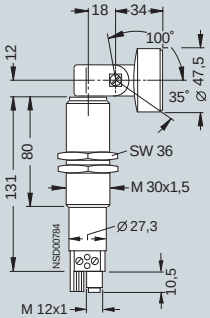


With swivel sensor

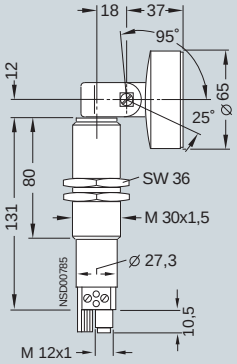
3RG 6. 22–3..00
3RG 6. 23–3..00



3RG 6. 25–3..00

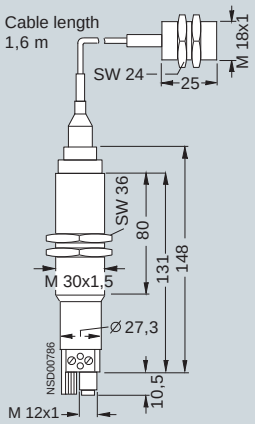


3RG 6. 24–3..00

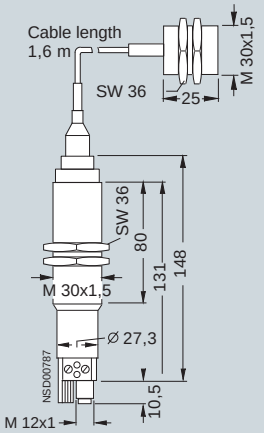


With separate sensor

3RG 6. 12–3..01

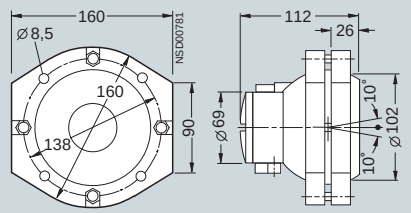


3RG 6. 13–3..01

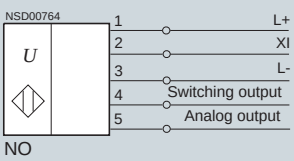


Spherical

3RG 61 76–6..00



Schematics



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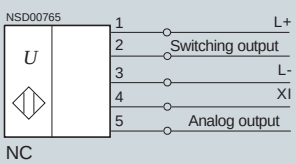
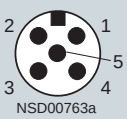


NC



NSD00763a

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

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 *H*	mm	10	
Repeat accuracy *R*	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_e	mA	150	
No-load supply current I_0	mA	max. 60	
Ultrasonic frequency	kHz	400	200
Switching frequency *f*	Hz	5	4
Response time	ms	100	120
Power-up delay t_v	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**

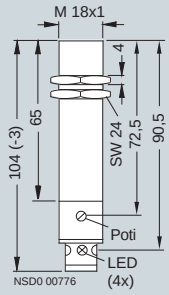
Accessories

	**SONPROG programming device,** 100 ... 240 V AC, 24 V DC	►	**3RX4 000**

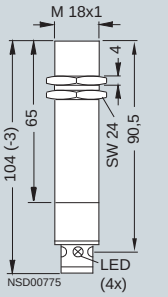
► Preferred type, available from stock.

Dimensions

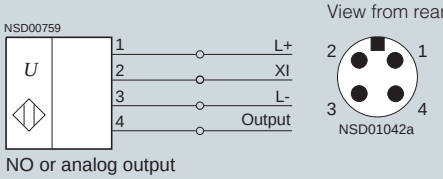
3RG 62 3.–3A.00



3RG 62 3.–3.S00

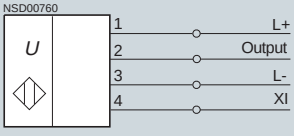


Schematics



NO or analog output

View from rear onto device



NC

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").

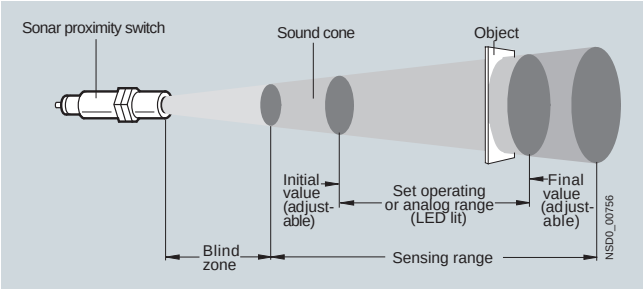
Where space is limited, objects can be detected which are perpendicular to the sonar proximity switch (which reduces the installation depth). The blind zone is then reduced by about 6 cm.

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 *H*	mm	10	10	20	60
Repeat accuracy *R*	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_e					
• NO	mA	300			
• NC	mA	150 or 300 (see table below)			
No-load current I_0	mA	max. 50			
Ultrasonic frequency	kHz	400	200	120	80
Switching frequency *f*	Hz	8	4	2	1
Response time	ms	80	110	200	400
Time delay before availability t_v	ms	280	280	280	280
Switching status display		Yellow LED			
Enclosure material		…-XB4 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		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 PXS800

M30 K3 compact range ATEX

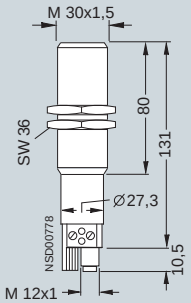
	Sensing range	Rated operational current	Switching output	Analog output		Order No.
	cm	mA	pnp			
Stainless steel, epoxy resin converter surface with protective foil						
3RG61 12–3..00 	6 ... 30	300	1 NO	4 ... 20 mA		**3RG61 12–3BF00-0XB7**
	20 ... 130	300	1 NO	4 ... 20 mA		**3RG61 13–3BF00-0XB7**
	40 ... 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.

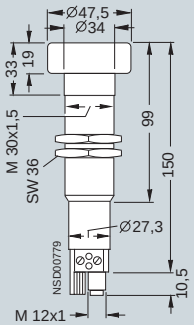
Dimensions

With fixed sensor

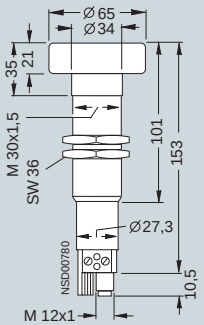
3RG 6. 12–3..00
3RG 6. 13–3..00



3RG 6. 15–3..00

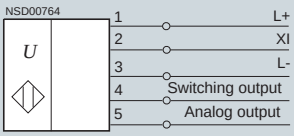


3RG 6. 14–3..00

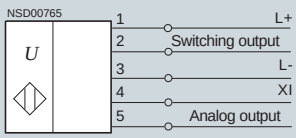


Schematics

M30 K3 ATEX compact range



NO



NC

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).

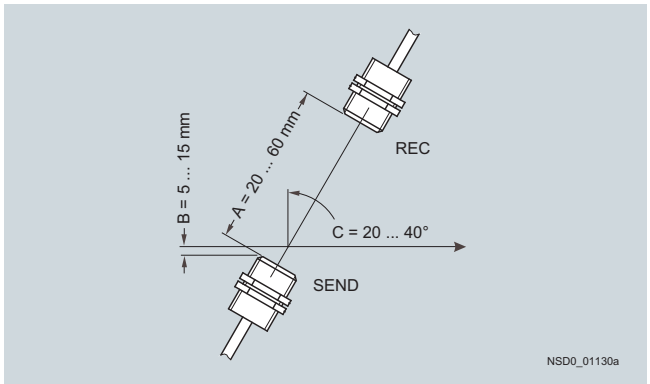
- Reliable detection of multiple layers of paper, plastic sheets or metal foil
- Measuring range from 20 g/m^2 paper to 1100 g/m^2 cardboard
- Manual or automatic offset
- Sonar sensors in M18 enclosure
- Short-circuit proof electronic outputs (pnp)
- Connection via M12 connector

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

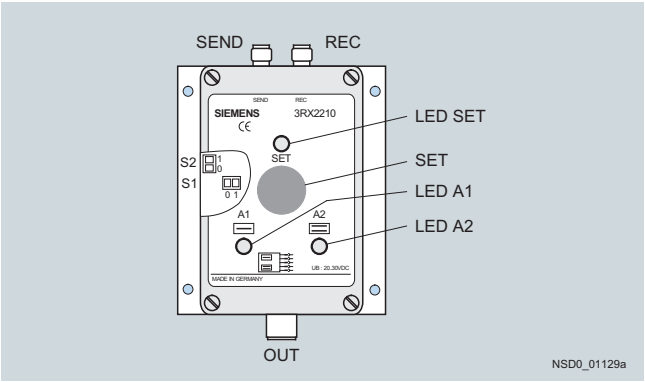
Function

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.

Double-layer sheet monitoring

Technical specifications

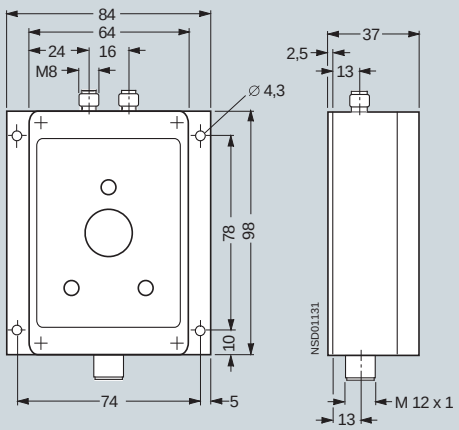
Type		3RX2 210
Sensing range	mm	20 ... 60
Material strength (paper, cardboard)	g/m^2	20 ... 1100
Operational voltage (DC)	V	18 ... 36 (including ± 10% residual ripple)
No-load current I_0	mA	< 75
Switching output		
• Rated operational current I_e	mA	200
• Voltage drop at 200 mA	V	< 3
Ultrasonic frequency	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

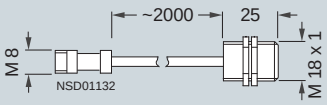
	Sensing range	Rated operational current	Switching output	Connection	Order No.
	cm	mA	pnp		
Double-layer sheet monitoring	2 ... 6	200	2 NO	M12 connector	**3RX2 210**

Dimensions

Evaluation unit



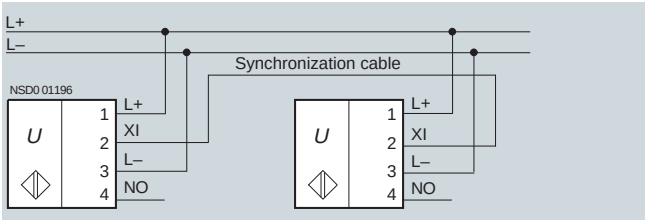
Sensor



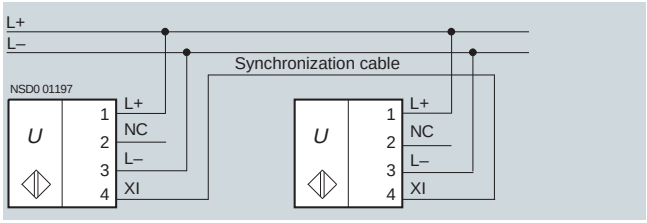
Schematics

Synchronization

NO function

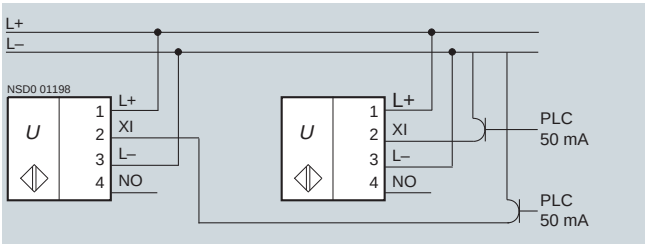


NC function

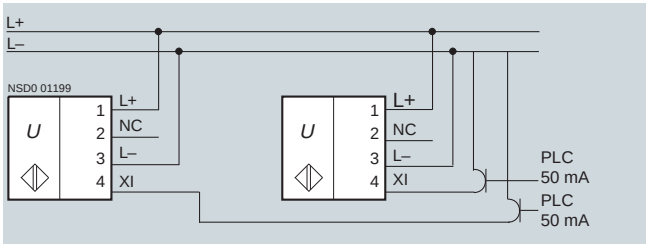


External multiplex mode

NO function

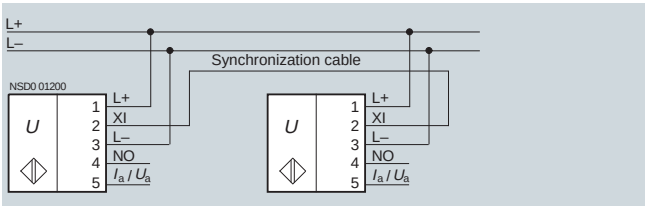


NC function

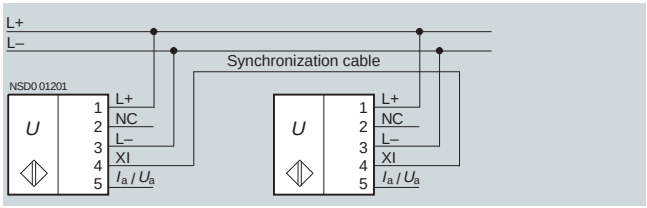


Internal multiplex mode (analog output)

NO function



NC function



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

Defined reflectors:

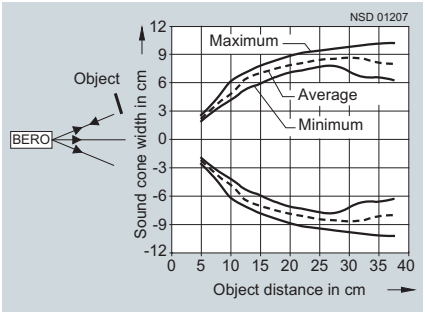
- Measurements 1, 3: plane object
  - 2 cm × 2 cm, for sensors with sensing ranges up to 130 cm
  - 10 cm × 10 cm, for sensors with larger sensing ranges
- Measurement 2: cylindrical object, 8 cm diameter.

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

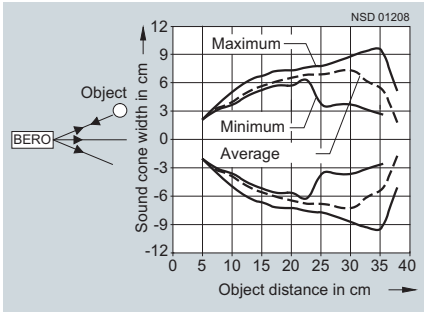
- K0, K08 compact ranges
- Sonar thru-beam sensor
- K65 compact range
- M18, M18S compact ranges
- K21 compact range
- M30 K1, M30 K2 and M30 K3 compact ranges

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

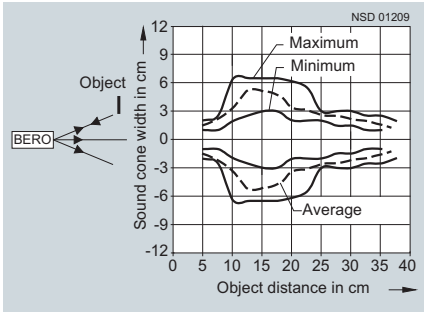
Measurement 1 (most optimum reflection), attenuation 0



Measurement 2 (cylindrical object), attenuation 0

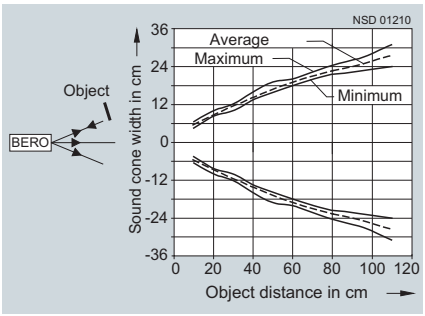


Measurement 3 (plane object), attenuation 0

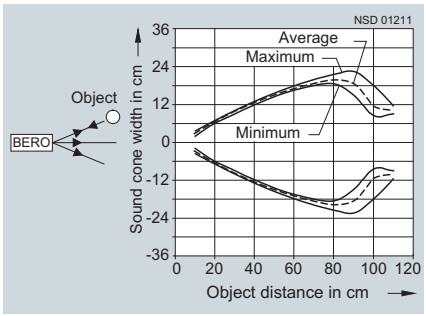


K0 compact range, sensing range 20 ... 100 cm

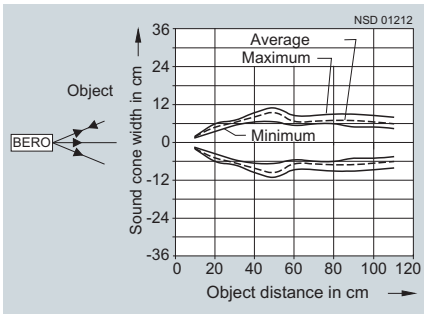
Measurement 1 (most optimum reflection), attenuation 0



Measurement 2 (cylindrical object), attenuation 0

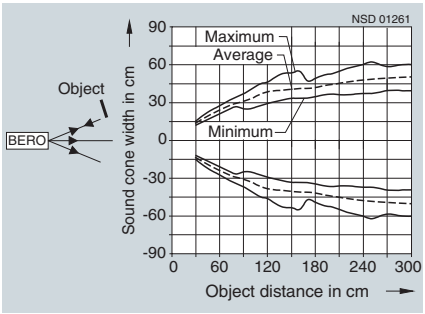


Measurement 3 (plane object), attenuation 0

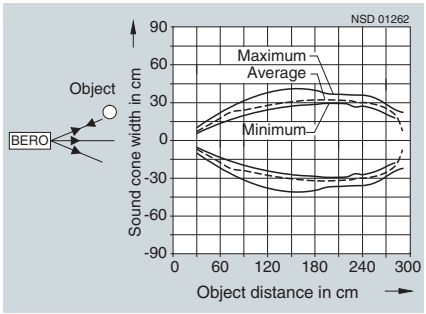


K65 compact form, sensing range 25 ... 250 cm

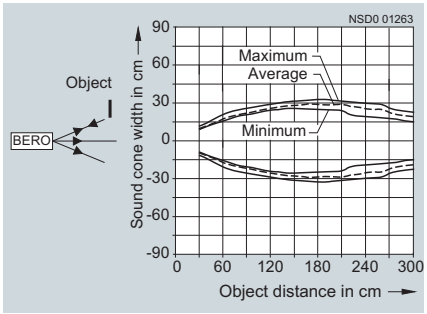
Measurement 1 (most optimum reflection), attenuation 0



Measurement 2 (cylindrical object), attenuation 0

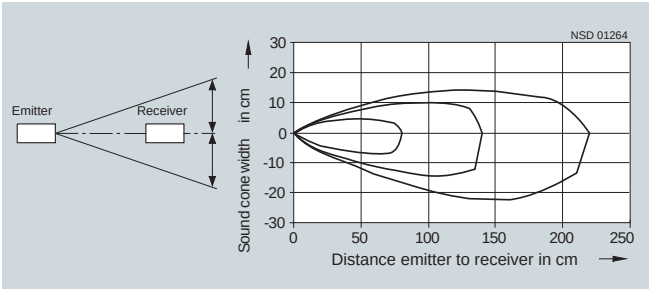


Measurement 3 (plane object), attenuation 0

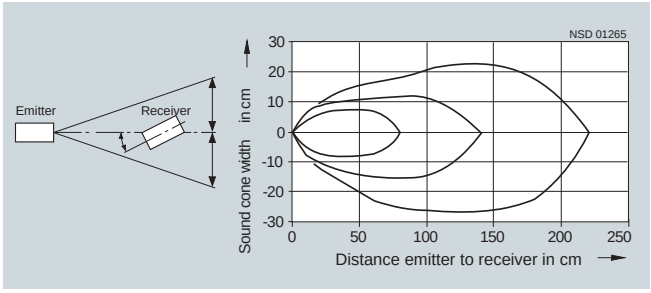


Sonar thru-beam sensor, sensing ranges 5 ... 40 cm, 5 ... 80 cm, 5 ... 150 cm

Receiver angle 0°



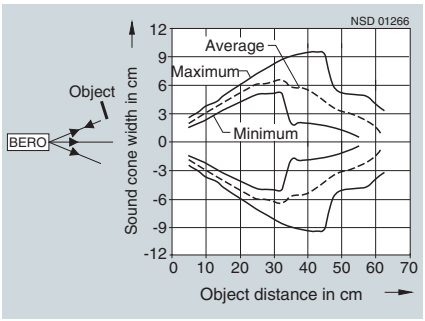
Variable receiver angle, optimally aligned



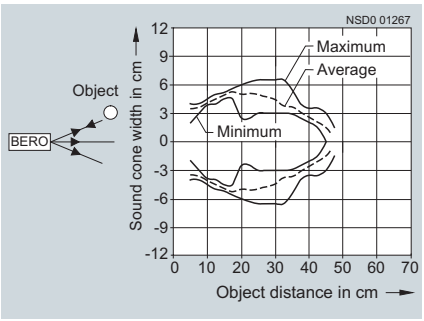
Characteristic curves

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

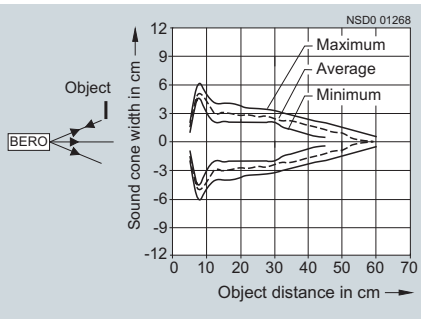
Measurement 1 (most optimum reflection), attenuation 0



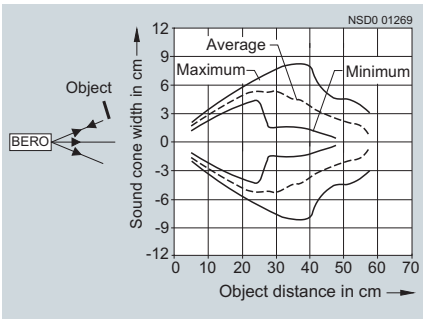
Measurement 2 (cylindrical object), attenuation 0



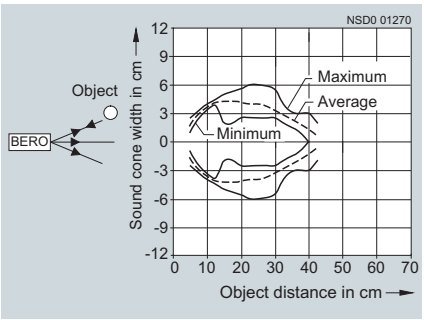
Measurement 3 (plane object), attenuation 0



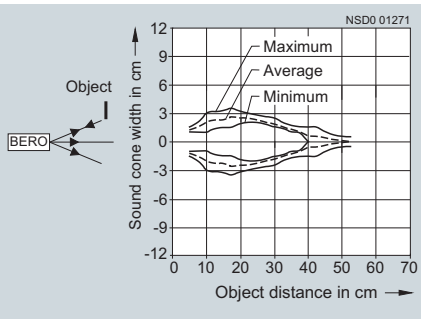
Measurement 1 (most optimum reflection), attenuation 2



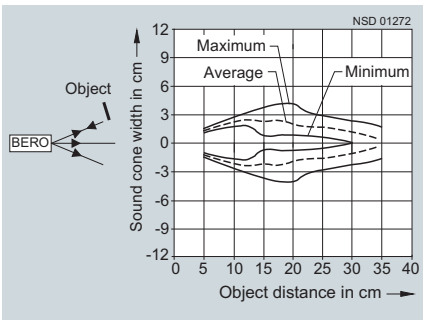
Measurement 2 (cylindrical object), attenuation 2



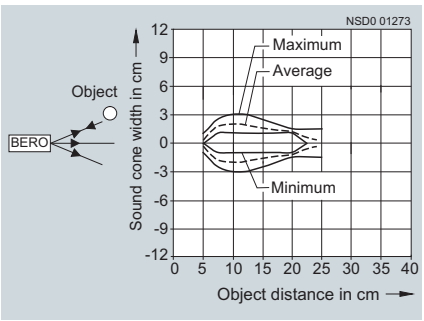
Measurement 3 (plane object), attenuation 2



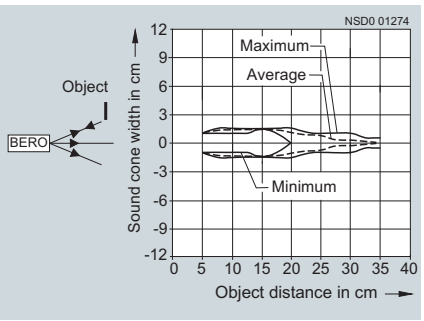
Measurement 1 (most optimum reflection), attenuation 4



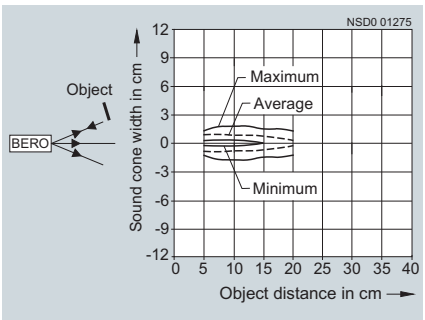
Measurement 2 (cylindrical object), attenuation 4



Measurement 3 (plane object), attenuation 4



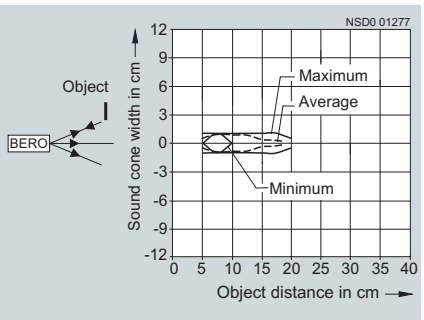
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6

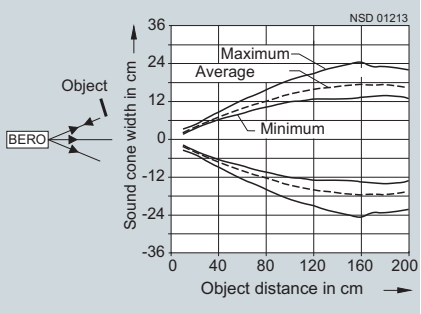
Insufficient sensitivity

Measurement 3 (plane object), attenuation 6

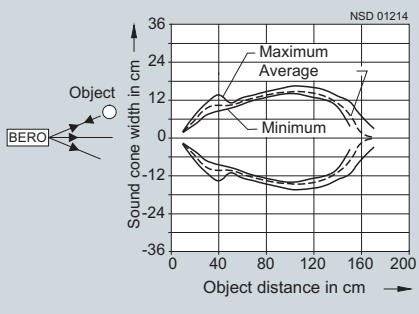


M18 compact range, sensing range 15 ... 100 cm

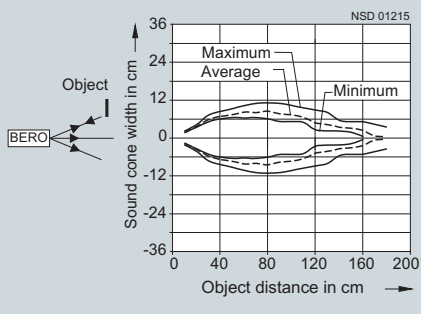
Measurement 1 (most optimum reflection), attenuation 0



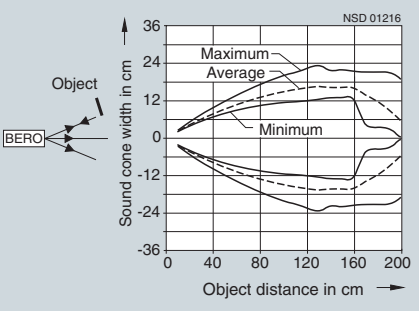
Measurement 2 (cylindrical object), attenuation 0



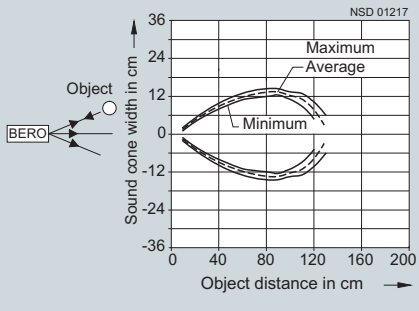
Measurement 3 (plane object), attenuation 0



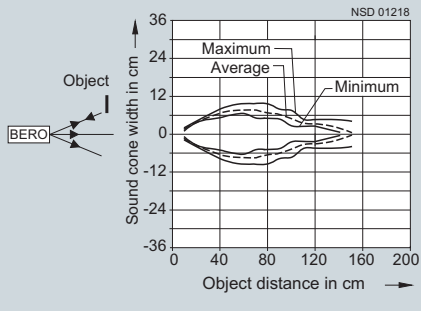
Measurement 1 (most optimum reflection), attenuation 2



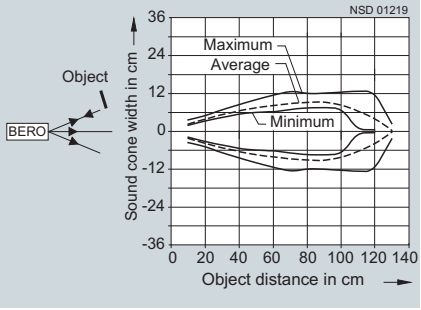
Measurement 2 (cylindrical object), attenuation 2



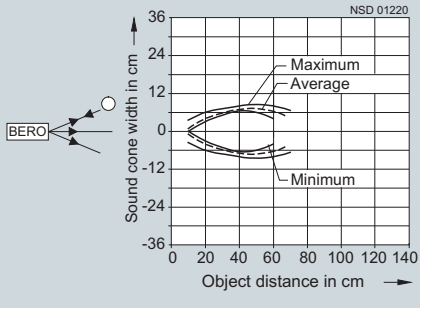
Measurement 3 (plane object), attenuation 2



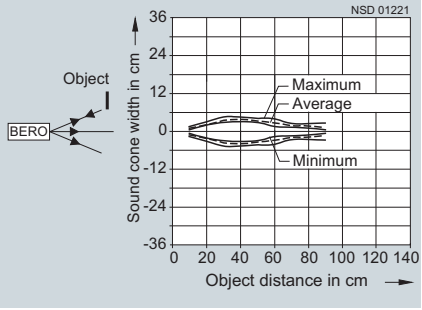
Measurement 1 (most optimum reflection), attenuation 4



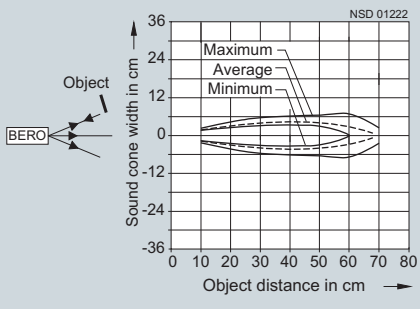
Measurement 2 (cylindrical object), attenuation 4



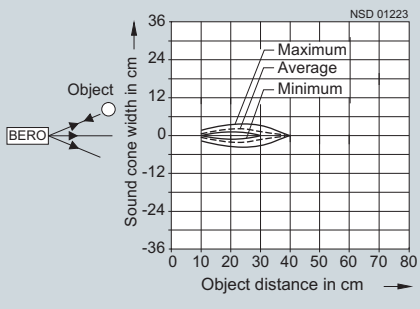
Measurement 3 (plane object), attenuation 4



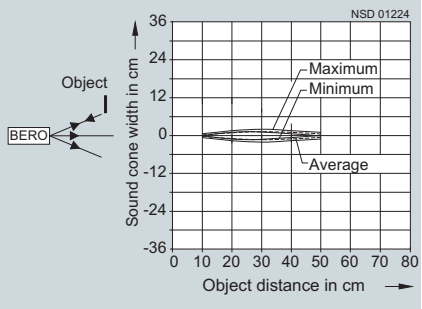
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6



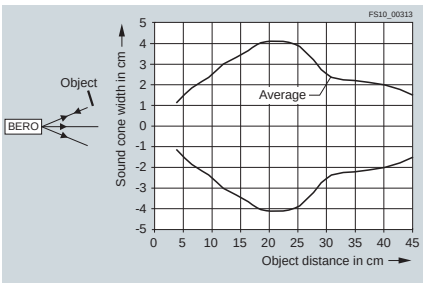
Measurement 3 (plane object), attenuation 6



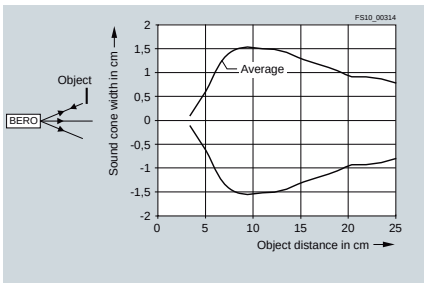
Characteristic curves

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

Measurement 1 (most optimum reflection), attenuation 0

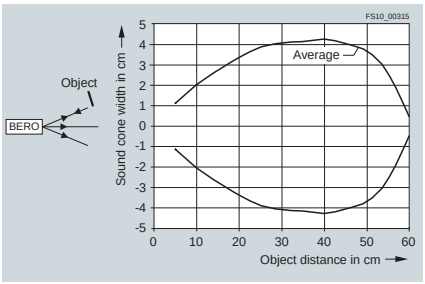


Measurement 2 (plane object), attenuation 0

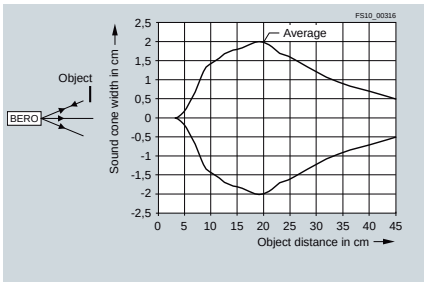


M18S compact range, sensing range 2 ... 40 cm

Measurement 1 (most optimum reflection), attenuation 0

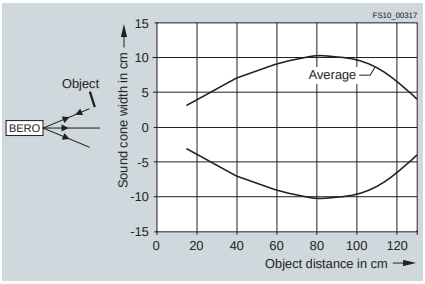


Measurement 2 (plane object), attenuation 0

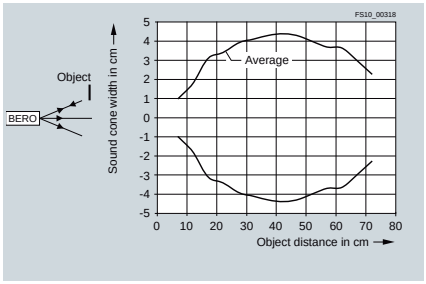


M18S compact range, sensing range 5 ... 70 cm

Measurement 1 (most optimum reflection), attenuation 0

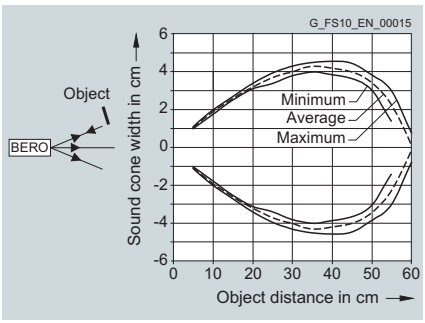


Measurement 2 (plane object), attenuation 0

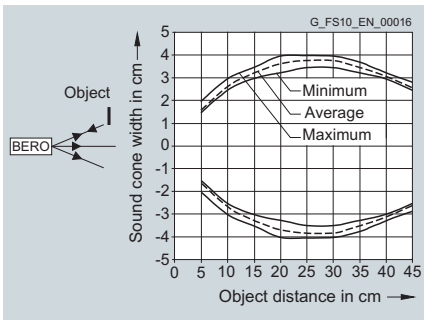


K08 compact range, sensing range 5 ... 40 cm

Measurement 1 (most optimum reflection), attenuation 0

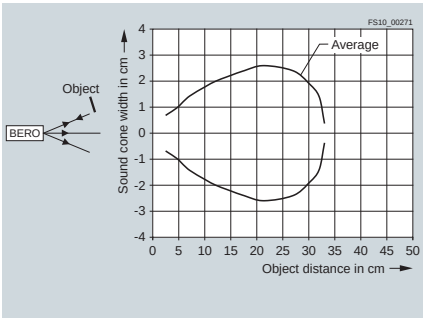


Measurement 2 (plane object), attenuation 0

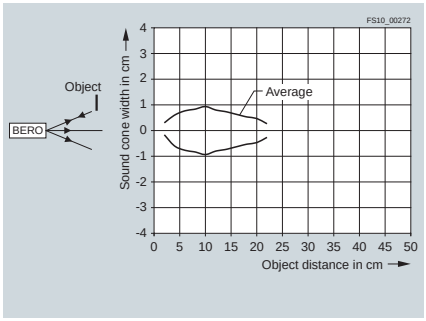


K21 compact range, sensing range 20 ... 250 mm

Measurement 1 (most optimum reflection)

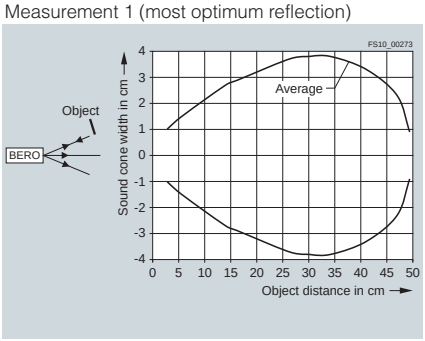


Measurement 2 (plane object)

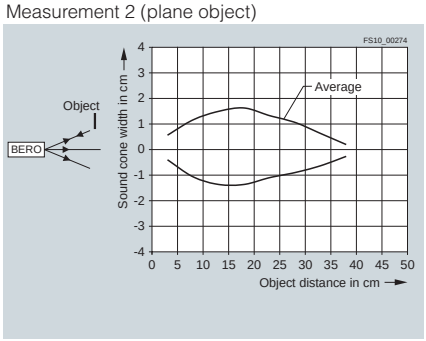


K21 compact range, sensing range 25 ... 400 mm

Measurement 1 (most optimum reflection)



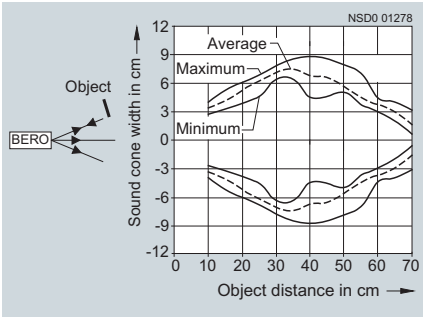
Measurement 2 (plane object)



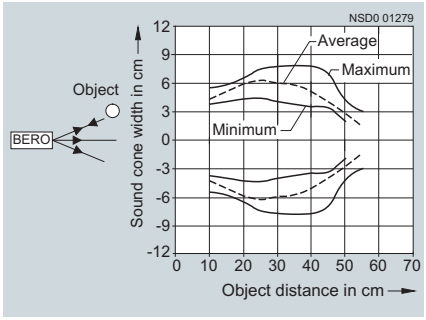
Characteristic curves

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

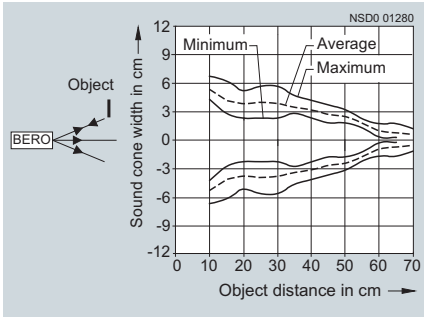
Measurement 1 (most optimum reflection), attenuation 0



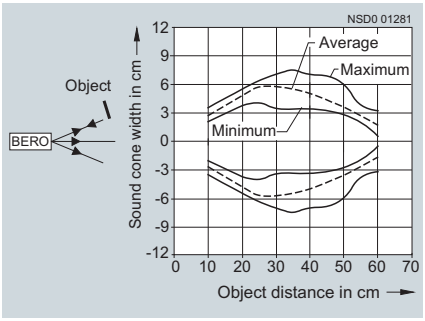
Measurement 2 (cylindrical object), attenuation 0



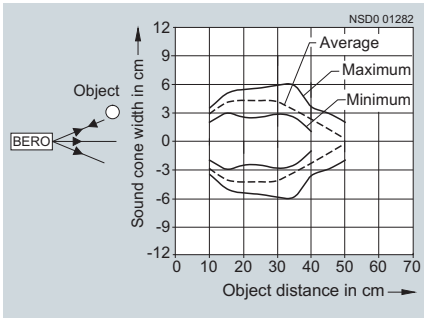
Measurement 3 (plane object), attenuation 0



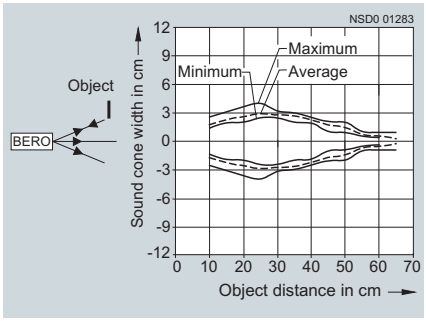
Measurement 1 (most optimum reflection), attenuation 2



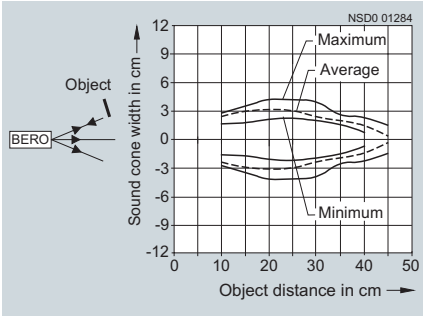
Measurement 2 (cylindrical object), attenuation 2



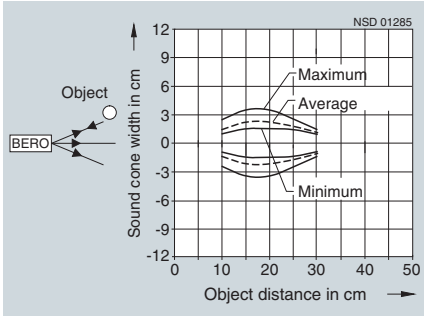
Measurement 3 (plane object), attenuation 2



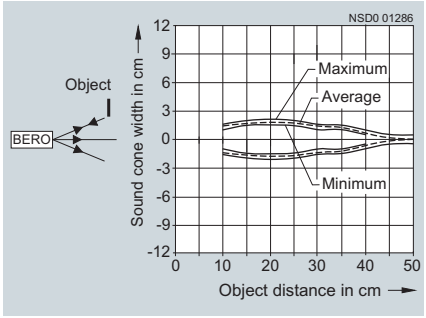
Measurement 1 (most optimum reflection), attenuation 4



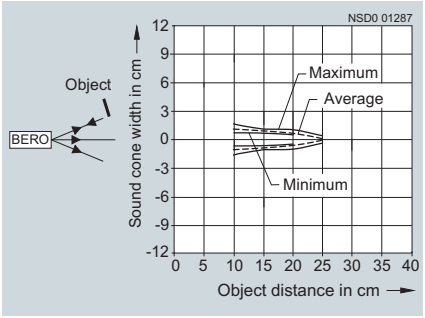
Measurement 2 (cylindrical object), attenuation 4



Measurement 3 (plane object), attenuation 4



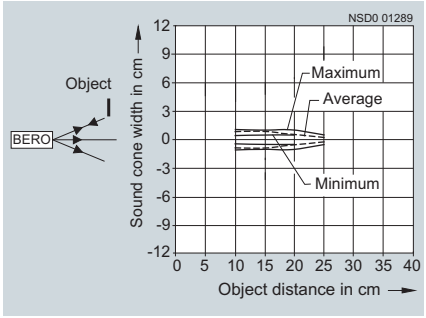
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6

Insufficient sensitivity

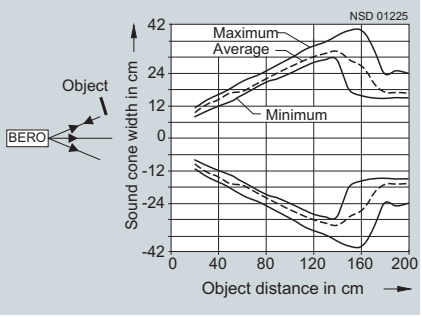
Measurement 3 (plane object), attenuation 6



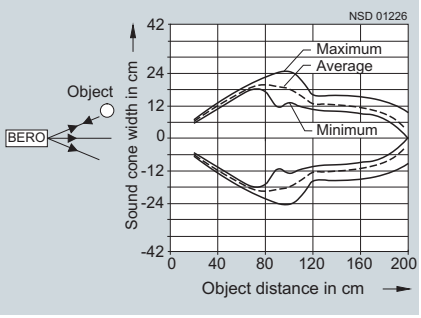
Note: only the sound cones with attenuation 0 apply to M30 K1 compact range.

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

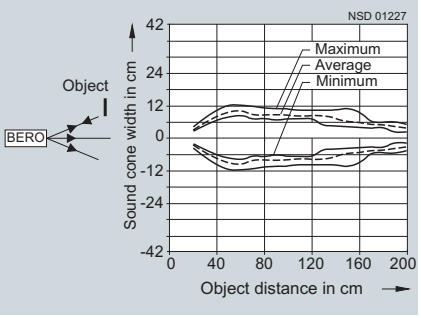
Measurement 1 (most optimum reflection), attenuation 0



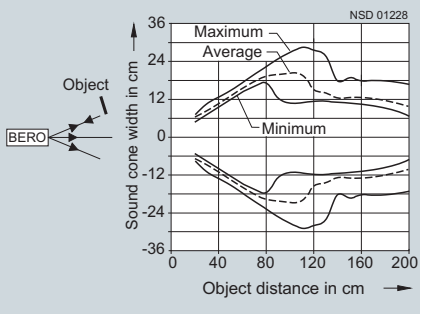
Measurement 2 (cylindrical object), attenuation 0



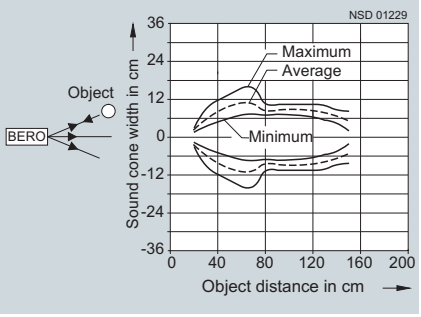
Measurement 3 (plane object), attenuation 0



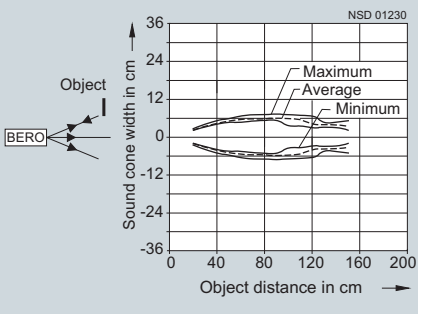
Measurement 1 (most optimum reflection), attenuation 2



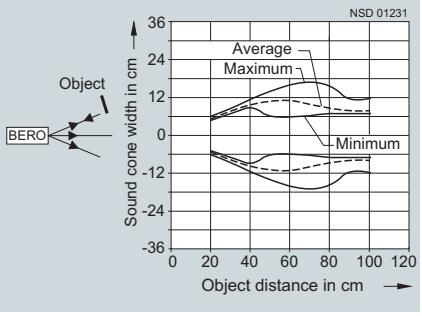
Measurement 2 (cylindrical object), attenuation 2



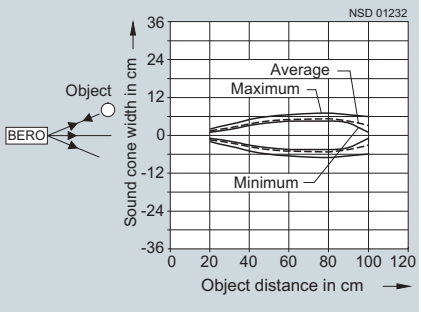
Measurement 3 (plane object), attenuation 2



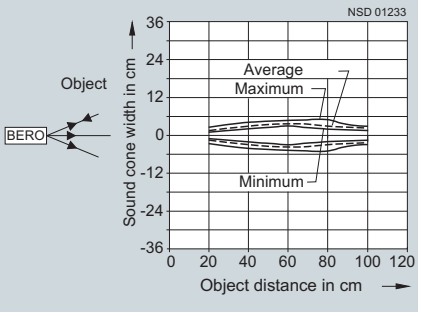
Measurement 1 (most optimum reflection), attenuation 4



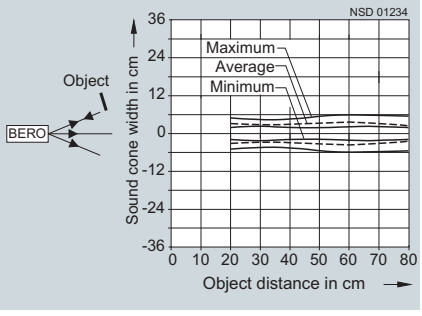
Measurement 2 (cylindrical object), attenuation 4



Measurement 3 (plane object), attenuation 4



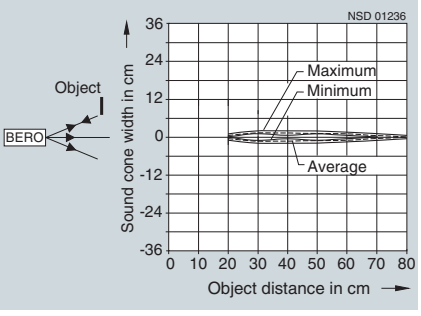
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6

Insufficient sensitivity

Measurement 3 (plane object), attenuation 6

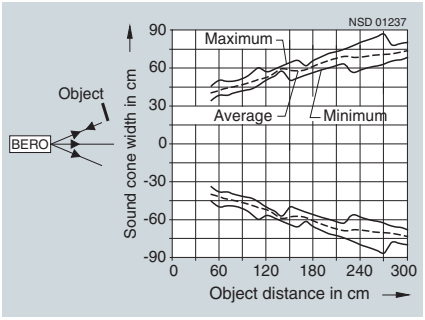


Note: only the sound cones with attenuation 0 apply to M30 K1 compact range.

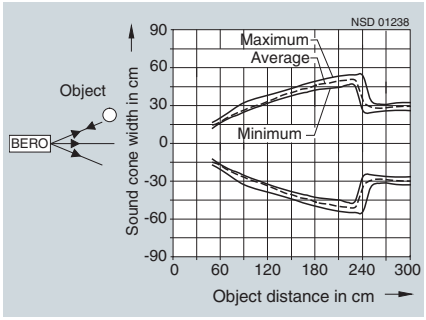
Characteristic curves

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

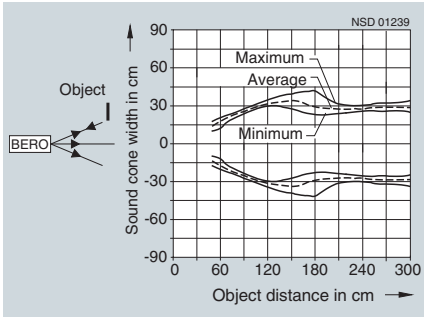
Measurement 1 (most optimum reflection), attenuation 0



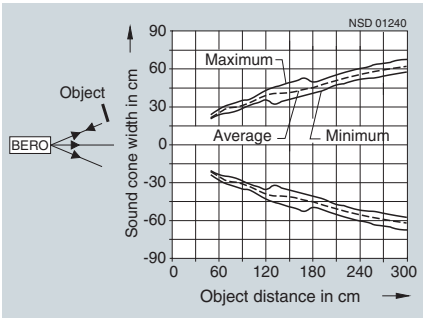
Measurement 2 (cylindrical object), attenuation 0



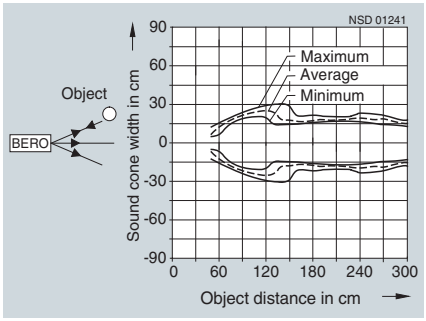
Measurement 3 (plane object), attenuation 0



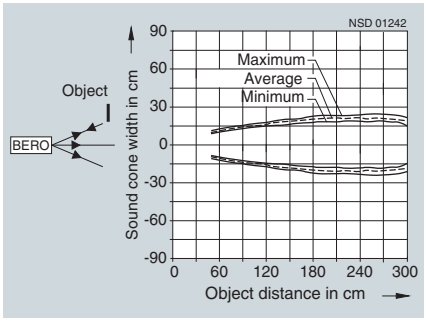
Measurement 1 (most optimum reflection), attenuation 2



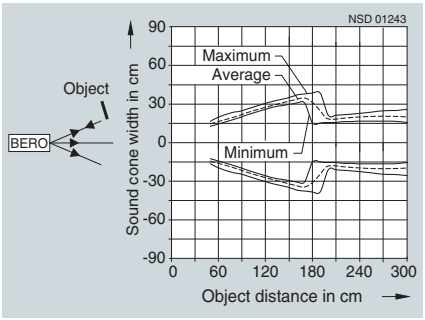
Measurement 2 (cylindrical object), attenuation 2



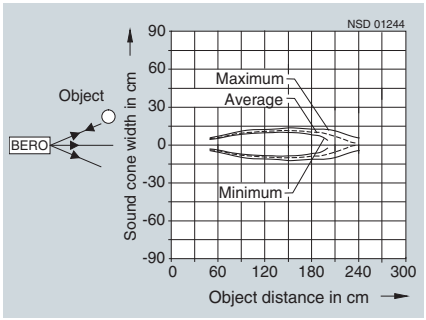
Measurement 3 (plane object), attenuation 2



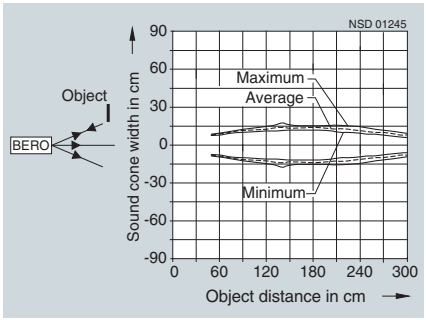
Measurement 1 (most optimum reflection), attenuation 4



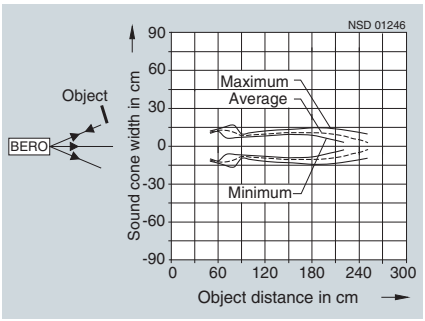
Measurement 2 (cylindrical object), attenuation 4



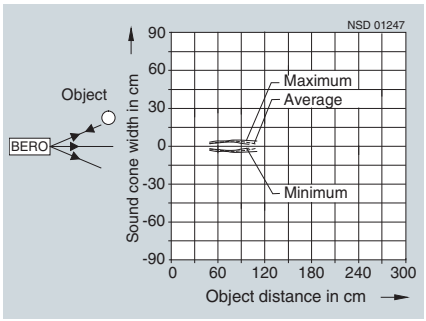
Measurement 3 (plane object), attenuation 4



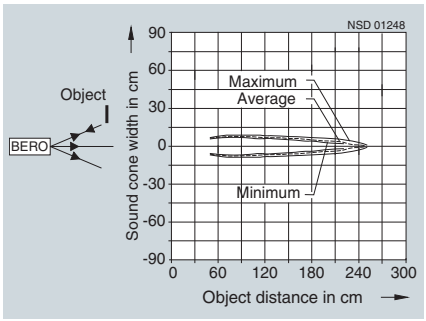
Measurement 1 (most optimum reflection), attenuation 6



Measurement 2 (cylindrical object), attenuation 6



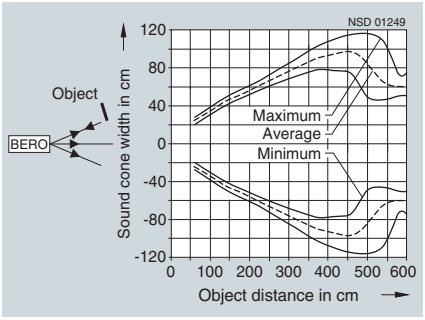
Measurement 3 (plane object), attenuation 6



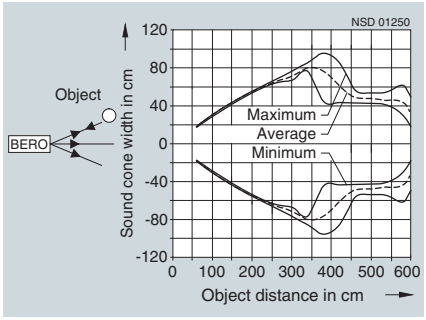
Note: only the sound cones with attenuation 0 apply to M30 K1 compact range.

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

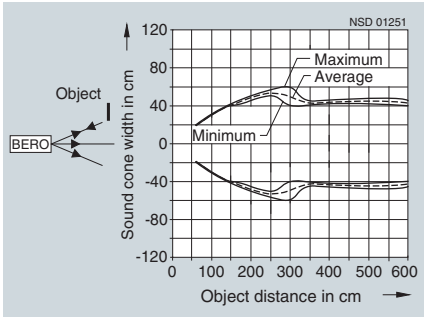
Measurement 1 (most optimum reflection), attenuation 0



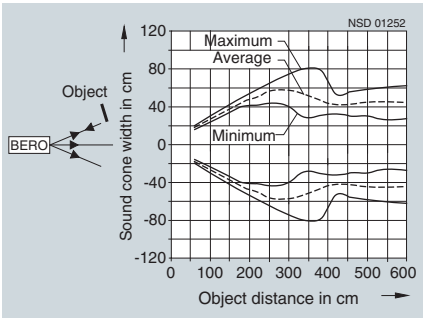
Measurement 2 (cylindrical object), attenuation 0



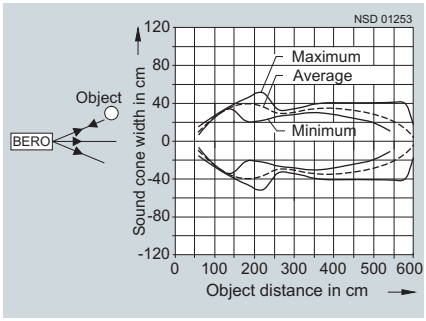
Measurement 3 (plane object), attenuation 0



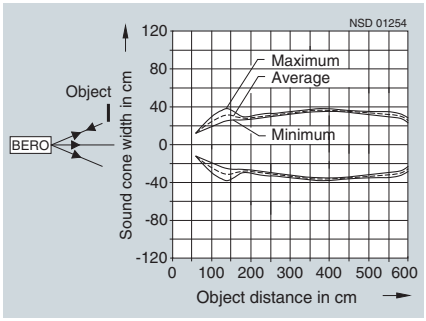
Measurement 1 (most optimum reflection), attenuation 2



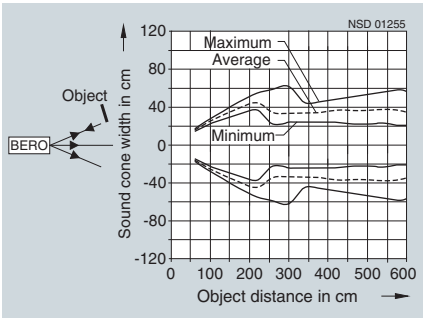
Measurement 2 (cylindrical object), attenuation 2



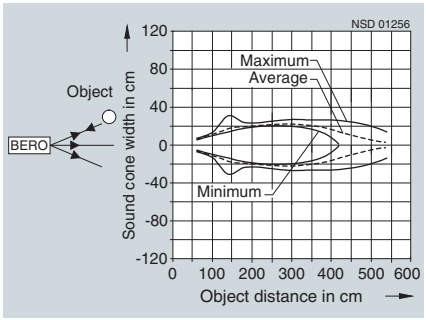
Measurement 3 (plane object), attenuation 2



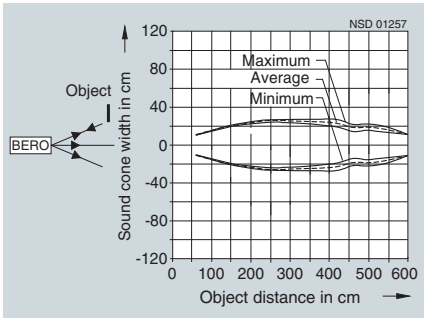
Measurement 1 (most optimum reflection), attenuation 4



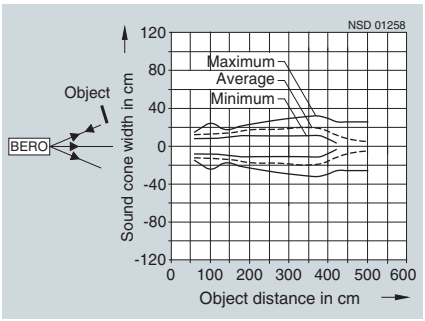
Measurement 2 (cylindrical object), attenuation 4



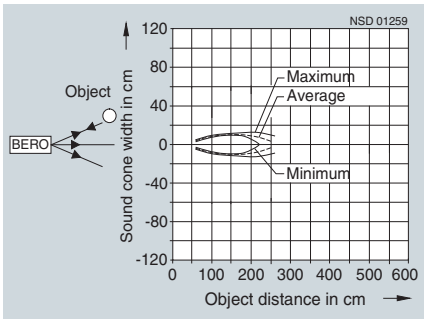
Measurement 3 (plane object), attenuation 4



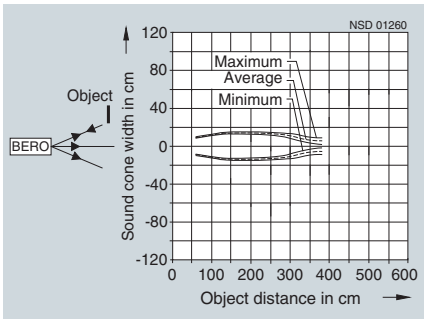
Measurement 1 (most optimum reflection), attenuation 6



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 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 sr 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

2

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


NSD0_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

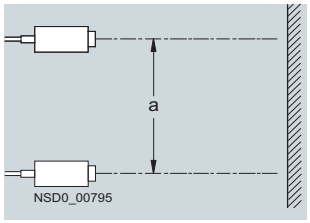
- Place the reflector at the required location and secure it firmly.
- Cover the reflector with adhesive tape so that only the center (approximately 25 % of the surface) remains free.
- Install the reflex sensor so that it switches reliably.
- Finally remove the adhesive tape from the reflector.

Thru-beam sensors

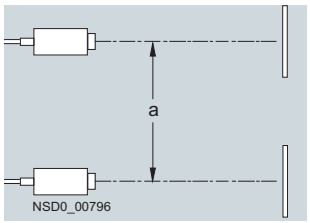
- Place the receiver in the required position and secure it firmly.
- Align the emitter with the receiver as accurately as possible.

Minimum clearance

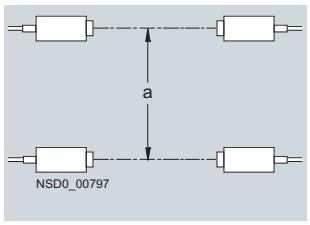
The proximity switches must not interfere with each other. Therefore a minimum distance a must be observed between two sensors. The following distances are recommended values only. The values given are for maximum sensitivity.



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.

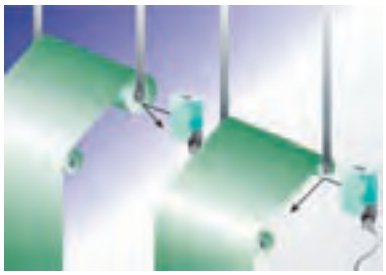
2

Function

Diffuse sensor (energetic sensor)

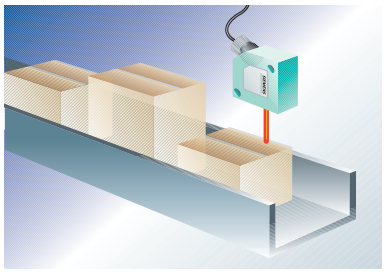
The light from the emitter falls on an object and is reflected in a diffuse pattern. Part of this reflected light reaches the receiver located in the same device. If the intensity of the received light is sufficient, the output is switched.

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

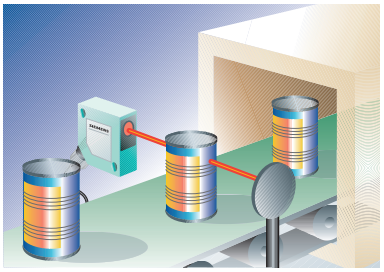
Diffuse sensors with background suppression can detect objects up to a specific sensing range. All objects beyond this range are suppressed. The focus level can be adjusted. The background is suppressed due to the geometric constellation between the emitter and the receiver.



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.

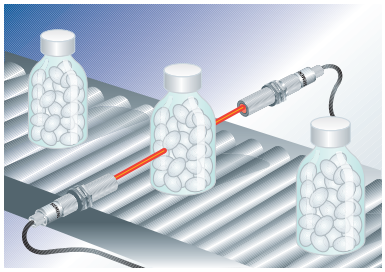
An object that interrupts the light beam from the emitter through the reflector to the receiver causes the output to switch.



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.

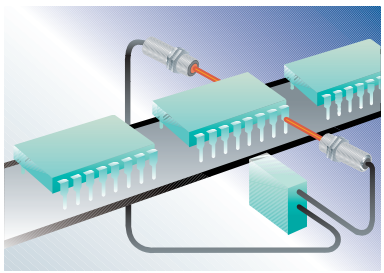
Any interruption of the light beam between emitter and receiver causes the output to switch.



Devices for fiber-optic wires

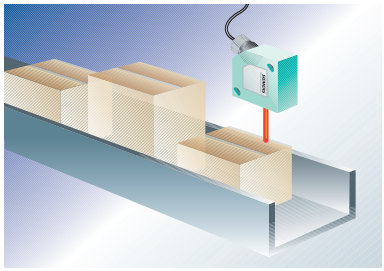
Optical fibers are fitted in front of the emitter and receiver. They represent the "extended eye" of the photoelectric proximity switch.

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

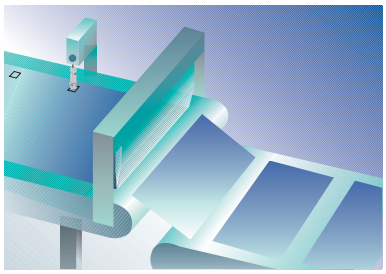
The color sensor functions with an incandescent LED, which illuminates the object.

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

Introduction

Design	D4		M5		M12			M18S			M18	L18
Operating mode	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
Operating mode	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			
Operating mode	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
Operating mode	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
Operating mode	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
Operating mode	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

Notes

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
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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			
• 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

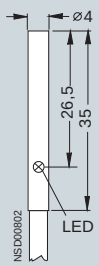
Selection and Ordering data

	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 mm²	pnp, light-ON	1	**3RG70 40–0AB00**
					npn, light-ON	1	**3RG70 40–0GB00**
				M 8 connector, 3-pole, Type A	pnp, light-ON	1	**3RG70 40–7AB00**
					npn, light-ON	1	**3RG70 40–7GB00**
	Thru-beam sensor	25	880 (IR)	cable 2 m, PUR, 3 × 0.14 mm²	pnp, light-ON	1	**3RG70 42–0AB00**
					npn, light-ON	1	**3RG70 42–0GB00**
					Emitter	2	**3RG70 42–0BG00**
				M 8 connector, 3-pole, Type A	pnp, light-ON	1	**3RG70 42–7AB00**
					npn, light-ON	1	**3RG70 42–7GB00**
					Emitter	2	**3RG70 42–7BG00**

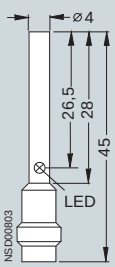
1) see page 2/127.

Dimensions

3RG70 4.–0..00



3RG70 4.–7..00



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

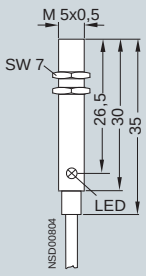
Selection and Ordering data

	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 mm²	pnp, light-ON	1	▶	**3RG70 30–0AB00**
					npn, light-ON	1		**3RG70 30–0GB00**
				M8 connector, 3-pole, type A	pnp, light-ON	1	▶	**3RG70 30–7AB00**
					npn, light-ON	1		**3RG70 30–7GB00**
	Thru-beam sensor	25	880 (IR)	2 m cable, PUR, 3 × 0.14 mm²	pnp, light-ON	1		**3RG70 32–0AB00**
					npn, light-ON	1		**3RG70 32–0GB00**
					Emitter	2		**3RG70 32–0BG00**
				M 8 connector, 3-pole, type A	pnp, light-ON	1		**3RG70 32–7AB00**
					npn, light-ON	1	▶	**3RG70 32–7GB00**
					Emitter	2		**3RG70 32–7BG00**

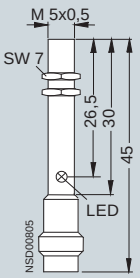
1) see page 2/127.
▶ Preferred type, available from stock.

Dimensions

3RG70 3.–0..00



3RG70 3.–7..00



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

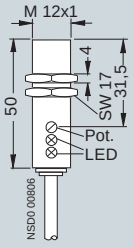
Selection and Ordering data

	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 × 0.34 mm²	pnp, light-ON	12	►	**3RG71 20–0AB00**
					pnp, dark-ON	13	►	**3RG71 20–0AA00**
					npn, light-ON	12		**3RG71 20–0GB00**
					npn, dark-ON	13		**3RG71 20–0GA00**
				M12 connector, 4-pole, type F	pnp, light-ON	12	►	**3RG71 20–3AB00**
					pnp, dark-ON	13	►	**3RG71 20–3AA00**
					npn, light-ON	12		**3RG71 20–3GB00**
					npn, dark-ON	13		**3RG71 20–3GA00**
	Reflex sensor	150	660 (red, polarized)	2 m cable, PUR, 3 × 0.34 mm²	pnp, light-ON	13	►	**3RG71 21–0AB00**
					pnp, dark-ON	12	►	**3RG71 21–0AA00**
					npn, light-ON	13	►	**3RG71 21–0GB00**
					npn, dark-ON	12		**3RG71 21–0GA00**
				M12 connector, 4-pole, type F	pnp, light-ON	13	►	**3RG71 21–3AB00**
					pnp, dark-ON	12	►	**3RG71 21–3AA00**
					npn, light-ON	13		**3RG71 21–3GB00**
					npn, dark-ON	12		**3RG71 21–3GA00**
	Thru-beam sensor	400	660 (red)	2 m cable, PUR, 3 × 0.34 mm²	pnp, light-ON	13	►	**3RG71 22–0AB00**
					pnp, dark-ON	12		**3RG71 22–0AA00**
					npn, light-ON	13		**3RG71 22–0GB00**
					npn, dark-ON	12		**3RG71 22–0GA00**
					Emitter	7	►	**3RG71 22–0BG00**
				M12 connector, 4-pole, type F	pnp, light-ON	13	►	**3RG71 22–3AB00**
					pnp, dark-ON	12	►	**3RG71 22–3AA00**
					npn, light-ON	13		**3RG71 22–3GB00**
					npn, dark-ON	12		**3RG71 22–3GA00**
					Emitter	7	►	**3RG71 22–3BG00**

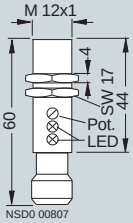
1) see page 2/127.
► Preferred type, available from stock.

Dimensions

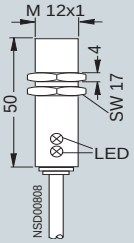
3RG71 20–0..00



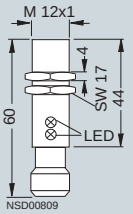
3RG71 20–3..00



3RG71 21–0..00 and 3RG71 22–0..00



3RG71 21–3..00 and 3RG71 22–3..00



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					
• 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.
Straight sensor								
	Diffuse sensor	80 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 × 0.34 mm²	pnp, light-ON	12	► B	**3RG76 40–0AB00**
					pnp, dark-ON	12	► B	**3RG76 40–0AA00**
				4 × 0.34 mm²	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**
					pnp, light-ON and dark-ON	5	► B	**3RG76 40–3CC00**
					pnp, light-ON and surplus light function	6	B	**3RG76 40–3CD00**
	Reflex sensor	300	660 (red, polarized)	2 m cable, PUR, 3 × 0.34 mm²	pnp, light-ON	12	► B	**3RG76 41–0AB00**
					pnp, dark-ON	12	► B	**3RG76 41–0AA00**
				4 × 0.34 mm²	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.

M18S design

	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 mm²	pnp, light-ON	12	► B	**3RG76 42–0AB00**
					pnp, dark-ON	12	► B	**3RG76 42–0AA00**
				4 × 0.34 mm²	pnp, light-ON and dark-ON	5	► B	**3RG76 42–0CC00**
					pnp, light-ON and surplus light function	6	B	**3RG76 42–0CD00**
				2 × 0.34 mm²	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 mm²	pnp, light-ON	12	► B	**3RG76 50–0AB00**
					pnp, dark-ON	12	► B	**3RG76 50–0AA00**
				4 × 0.34 mm²	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	**3RG76 50–3AB00**
					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 mm²	pnp, light-ON	12	► B	**3RG76 51–0AB00**
					pnp, dark-ON	12	► B	**3RG76 51–0AA00**
				4 × 0.34 mm²	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 mm²	pnp, light-ON	12	► B	**3RG76 52–0AB00**
					pnp, dark-ON	12	► B	**3RG76 52–0AA00**
				4 × 0.34 mm²	pnp, light-ON and dark-ON	5	► B	**3RG76 52–0CC00**
					pnp, light-ON and surplus light function	6	B	**3RG76 52–0CD00**
				2 × 0.34 mm²	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		
• 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

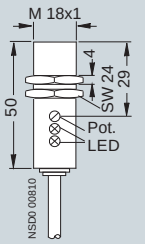
	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output	Circuit diagram number[1]		Order No.
	Diffuse sensor with background suppression	1 ... 12 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 × 0.34 mm²	pnp, light-ON	12	▶	**3RG71 34–0AB00**
					pnp, dark-ON	13		**3RG71 34–0AA00**
					npn, light-ON	12		**3RG71 34–0GB00**
					npn, dark-ON	13		**3RG71 34–0GA00**
				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		**3RG71 34–3GA00**

1) see page 2/127.
▶ Preferred type, available from stock.

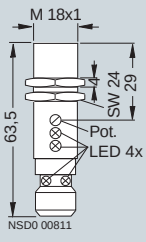
Dimensions

M18 type

3RG71 3.–0..00

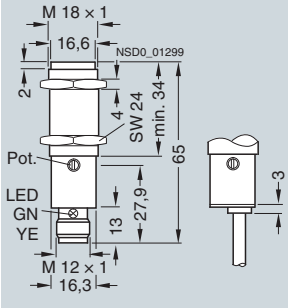


3RG71 3.–3..00

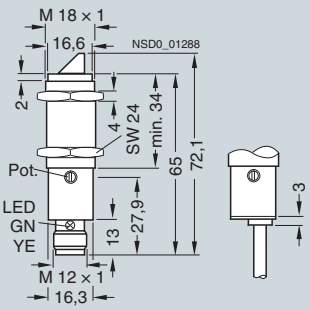


M18S type

3RG76 4.-...00



3RG76 5.-...00



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		
• 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 × 0.25 mm²	pnp, light-ON and dark-ON (antivalent)	5	►	**3RG71 35–0CC00**
					Emitter	9	►	**3RG71 35–0BE00**
				M12 connector, 4-pole, type F	pnp, light-ON and dark-ON (antivalent)	5	►	**3RG71 35–3CC00**
					Emitter	9	►	**3RG71 35–3BE00**
Straight sensor								
	Laser thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 × 0.25 mm²	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		**3RG71 35–3CD00**
Angled sensor								
	Laser thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 × 0.25 mm²	pnp, light-ON and dark-ON (antivalent)	5		**3RG71 75–0CC00**
					Emitter	9		**3RG71 75–0BE00**
				M12 connector, 4-pole, type F	pnp, light-ON and dark-ON (antivalent)	5	►	**3RG71 75–3CC00**
					Emitter	9		**3RG71 75–3BE00**

1) see page 2/127.
► Preferred type, available from stock.

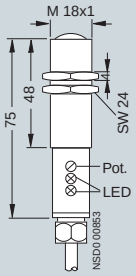
	Operating mode	Sensing range m	Illuminant nm	Connection	Switching output	Circuit diagram number[1)]	Order No.
Angled sensor							
	Laser-Thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 × 0.25 mm²	pnp, light-ON and surplus light function	6	**3RG71 75–0CD00**
				M12 connector, 4-pole, type F	pnp, light-ON and surplus light function	6	**3RG71 75–3CD00**

1) see page 2/127.

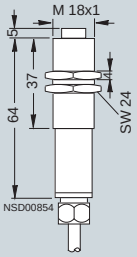
Dimensions

Straight sensor

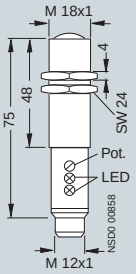
3RG71 35–0C.00



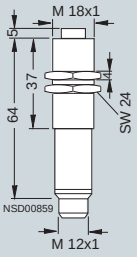
3RG71 35–0BE00



3RG71 35–3C.00

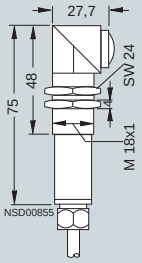


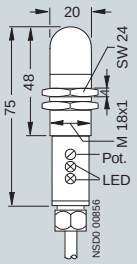
3RG71 35–3BE00



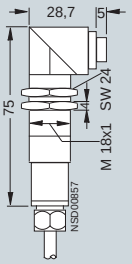
Angled sensor

3RG71 75–0C.00

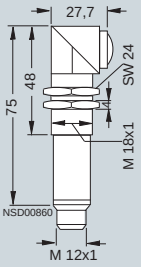


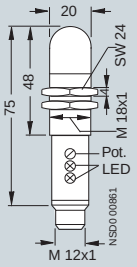


3RG71 75–0BE00

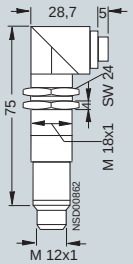


3RG71 75–3C.00





3RG71 75–3BE00



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

Retroflective 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	30
Rated operating current I_e	mA	150			
Switching frequency	Hz	700			
Switching time	ms	0.5			
Wavelength (illuminant)	nm	660 (red)			
Indicators					
• 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	Illuminant nm	Connection	Switching output	Circuit diagram number[1)]		Order No.
K21 design								
	Diffuse sensor	50	660 (red)	2 m cable, PUR, 3 × 0.14 mm²	pnp, light-ON	1	B	**3RG74 00–0AB00**
					pnp, dark-ON	1	B	**3RG74 00–0AA00**
					npn, light-ON	1	B	**3RG74 00–0GB00**
					npn, 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**
					npn, light-ON	1	B	**3RG74 00–7GB00**
					npn, dark-ON	1	B	**3RG74 00–7GA00**
	Retroreflective sensor	300	660 (red)	2 m cable, PUR, 3 × 0.14 mm²	pnp, light-ON	1	B	**3RG74 01–0AB00**
					pnp, dark-ON	1	B	**3RG74 01–0AA00**
					npn, light-ON	1	B	**3RG74 01–0GB00**
					npn, 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**
					npn, light-ON	1	B	**3RG74 01–7GB00**
					npn, 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.

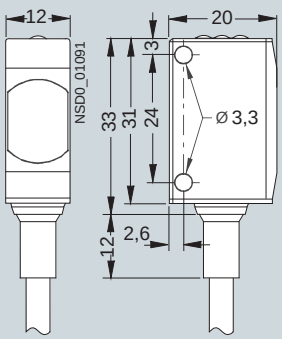
K21, K21R designs

	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 mm²	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	**3RG74 20–7AB00**
					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 mm²	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**

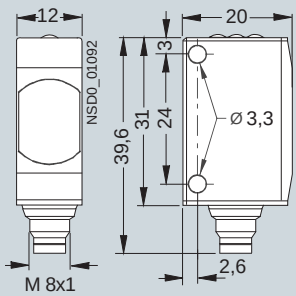
1) see page 2/127.
B: Subject to export regulations AL = N and ECCN = EAR99.
► Preferred type, available from stock.

Dimensions

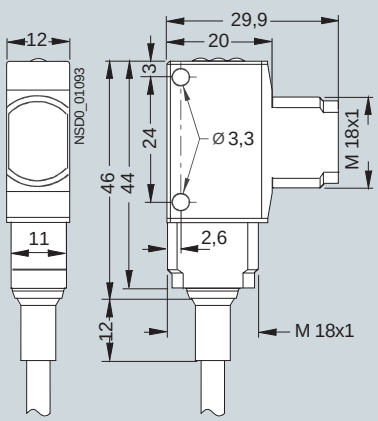
3RG74 0.–0....



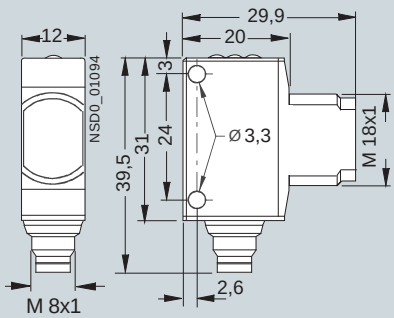
3RG74 0.–7....



3RG74 2.–0....



3RG74 2.–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

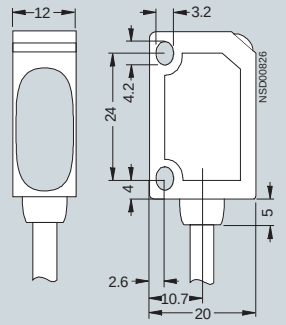
Selection and Ordering data

	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 mm²	Light-ON or dark-ON	pnp	14	▶	**3RG74 04–0CH00**
						npn	14		**3RG74 04–0HH00**
				M8 connector, 4-pole, type B	Light-ON or dark-ON	pnp	14	▶	**3RG74 04–7CH00**
						npn	14		**3RG74 04–7HH00**
	Reflex sensor for transparent objects	5 ... 50 (adjustable via "teach-in")	660 (red)	2 m cable, PUR, 4 × 0.14 mm²	Light-ON or dark-ON	pnp	14	▶	**3RG74 01–0CH52**
						npn	14		**3RG74 01–0HH52**
				M8 connector, 4-pole, type B	Light-ON or dark-ON	pnp	14	▶	**3RG74 01–7CH52**
						npn	14		**3RG74 01–7HH52**
Accessories									
	Mounting brackets for K20							▶	**3RX7 308–0AA00**

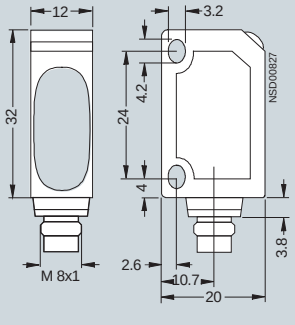
1) see page 2/127.
▶ Preferred type, available from stock.

Dimensions

3RG74 0.–0....



3RG74 0.–7....



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			
• Switching status		Yellow LED	
• Surplus light		Green LED	
Enclosure material		Molded plastic (ABS)	
Degree of protection		IP67	
Ambient temperature	°C	–20 ... +60	
Type		3RG74 06–7CH61	3RG74 07–7CH00

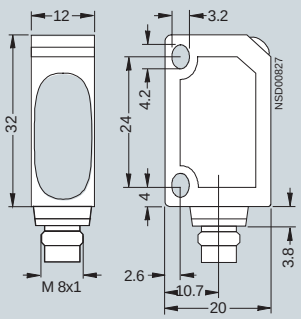
Selection and Ordering data

	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

3RG74 0.–7CH..



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

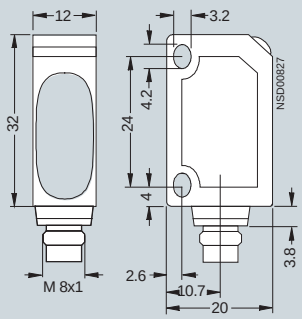
Selection and Ordering data

	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



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–...

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, PUR, 3 × 0.14 mm²	pnp, light-ON	1	► B	**3RG70 10–0AB01**
					pnp, dark-ON	1		**3RG70 10–0AA01**
					npn, light-ON	1		**3RG70 10–0GB00**
					npn, dark-ON	1	►	**3RG70 10–0GA00**
				M8 connector, 3-pole, type A	pnp, light-ON	1	► B	**3RG70 10–7AB01**
					pnp, dark-ON	1		**3RG70 10–7AA01**
					npn, light-ON	1		**3RG70 10–7GB00**
					npn, dark-ON	1		**3RG70 10–7GA00**
	Diffuse sensor with background suppression	3 ... 15 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 × 0.14 mm²	pnp, light-ON	1	►	**3RG70 14–0AB00**
					pnp, dark-ON	1		**3RG70 14–0AA00**
					npn, light-ON	1		**3RG70 14–0GB00**
					npn, dark-ON	1		**3RG70 14–0GA00**
				M8 connector, 3-pole, type A	pnp, light-ON	1	►	**3RG70 14–7AB00**
					pnp, dark-ON	1	►	**3RG70 14–7AA00**
					npn, light-ON	1		**3RG70 14–7GB00**
					npn, dark-ON	1		**3RG70 14–7GA00**
	Reflex sensor	200 (adjustable via potentiometer)	660 (red, polarized)	2 m cable, PUR, 3 × 0.14 mm²	pnp, light-ON	1	►	**3RG70 11–0AB01**
					pnp, dark-ON	1	► B	**3RG70 11–0AA01**
					npn, light-ON	1		**3RG70 11–0GB00**
					npn, dark-ON	1		**3RG70 11–0GA00**
				M8 connector, 3-pole, type A	pnp, light-ON	1	B	**3RG70 11–7AB01**
					pnp, dark-ON	1	► B	**3RG70 11–7AA01**
					npn, light-ON	1		**3RG70 11–7GB00**
					npn, dark-ON	1		**3RG70 11–7GA00**
	Thru-beam sensor	600 (adjustable via potentiometer)	880 (IR)	2 m cable, PUR, 3 × 0.14 mm²	pnp, light-ON	1	►	**3RG70 12–0AB01**
					pnp, dark-ON	1	► B	**3RG70 12–0AA01**
					npn, light-ON	1		**3RG70 12–0GB00**
					npn, dark-ON	1		**3RG70 12–0GA00**
					Emitter	2	► B	**3RG70 12–0BG01**
				M8 connector, 3-pole, type A	pnp, light-ON	1	► B	**3RG70 12–7AB01**
					pnp, dark-ON	1	► B	**3RG70 12–7AA01**
					npn, light-ON	1		**3RG70 12–7GB00**
					npn, dark-ON	1		**3RG70 12–7GA00**
					Emitter	2	► B	**3RG70 12–7BG01**
	Sensor for plastic optical fibers	Depends on FO wire	660 (red)	2 m cable, PUR, 3 × 0.14 mm²	pnp, light-ON	1	►	**3RG70 13–0AB00**
					pnp, dark-ON	1		**3RG70 13–0AA00**
					npn, light-ON	1	►	**3RG70 13–0GB00**
					npn, dark-ON	1		**3RG70 13–0GA00**
				M8 connector, 3-pole, type A	pnp, light-ON	1	►	**3RG70 13–7AB00**
					pnp, dark-ON	1	►	**3RG70 13–7AA00**
					npn, light-ON	1		**3RG70 13–7GB00**
					npn, dark-ON	1		**3RG70 13–7GA00**

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

K30 design

Selection and Ordering data

	Operating mode	Sensing range cm	Illuminant nm	Connection	Switching output		Circuit diagram number[1]		Order No.
	Diffuse sensor	120 (adjustable via potentiometer)	880 (IR)	3 m cable, PUR, 4 × 0.14 mm²	Light-ON and dark-ON (antivalent)	pnp	3	▶	**3RG70 10–0CC00**
						npn	3		**3RG70 10–0HC00**
					Light-ON and surplus light function	pnp	4		**3RG70 10–0CD00**
						npn	4		**3RG70 10–0HD00**
				M8 connector, 4-pole, type B	Light-ON and dark-ON (antivalent)	pnp	3	▶	**3RG70 10–7CC00**
						npn	3		**3RG70 10–7HC00**
					Light-ON and surplus light function	pnp	4	▶	**3RG70 10–7CD00**
						npn	4		**3RG70 10–7HD00**
	Reflex sensor	400 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 × 0.14 mm²	Light-ON and dark-ON (antivalent)	pnp	3	▶	**3RG70 11–0CC00**
						npn	3		**3RG70 11–0HC00**
					Light-ON and surplus light function	pnp	4		**3RG70 11–0CD00**
						npn	4		**3RG70 11–0HD00**
				M8 connector, 4-pole, type B	Light-ON and dark-ON (antivalent)	pnp	3	▶	**3RG70 11–7CC00**
						npn	3		**3RG70 11–7HC00**
					Light-ON and surplus light function	pnp	4	▶	**3RG70 11–7CD00**
						npn	4		**3RG70 11–7HD00**
	Thru-beam sensor	1200 (adjustable via potentiometer)	880 (IR)	3 m cable, PUR, 4 × 0.14 mm²	Light-ON and dark-ON (antivalent)	pnp	3	▶	**3RG70 12–0CC00**
						npn	3		**3RG70 12–0HC00**
					Light-ON and surplus light function	pnp	4		**3RG70 12–0CD00**
						npn	4		**3RG70 12–0HD00**
				3 × 0.14 mm²	Emitter		2	▶	**3RG70 12–0BE00**
				M8 connector, 4-pole, type B	Light-ON and dark-ON (antivalent)	pnp	3	▶	**3RG70 12–7CC00**
						npn	3		**3RG70 12–7HC00**
					Light-ON and surplus light function	pnp	4	▶	**3RG70 12–7CD00**
						npn	4		**3RG70 12–7HD00**
					Emitter		2	▶	**3RG70 12–7BE00**
	Sensor for plastic optical fibers	Depends on FO wire	660 (red)	3 m cable, PUR, 4 × 0.14 mm²	Light-ON and dark-ON (antivalent)	pnp	3	▶	**3RG70 13–0CC00**
						npn	3		**3RG70 13–0HC00**
					Light-ON and surplus light function	pnp	4		**3RG70 13–0CD00**
						npn	4		**3RG70 13–0HD00**
				M8 connector, 4-pole, type B	Light-ON and dark-ON (antivalent)	pnp	3	▶	**3RG70 13–7CC00**
						npn	3		**3RG70 13–7HC00**
					Light-ON and surplus light function	pnp	4		**3RG70 13–7CD00**
						npn	4		**3RG70 13–7HD00**

Accessories

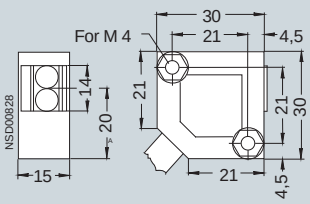
Mounting brackets for K30, K31	▶	**3RX7 910**
Fiber-optic conductors	▶	See from page 2/263

1) See page 2/127.

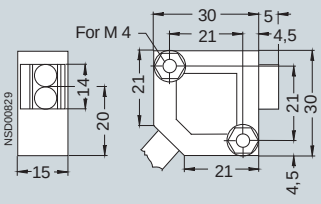
▶ Preferred type, available from stock

Dimensions

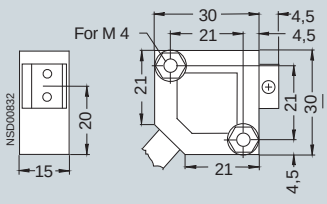
3RG70 10–0..00, 3RG70 12–0..00



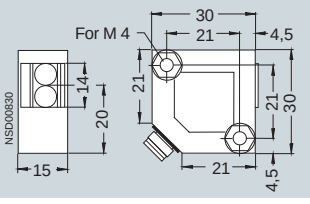
3RG70 11–0..00



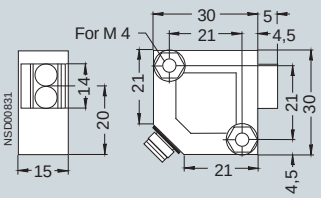
3RG70 13–0..00



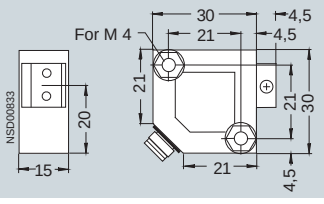
3RG70 10–7..00, 3RG70 12–7..00



3RG70 11–7..00



3RG70 13–7..00



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

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

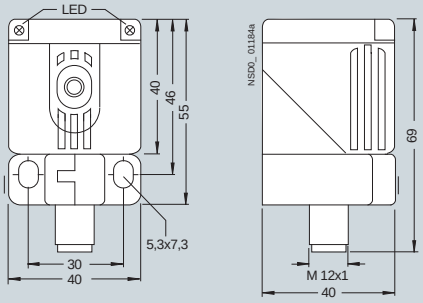
Selection and Ordering data

	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....



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	20
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	50
Switching time	ms	1	10
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

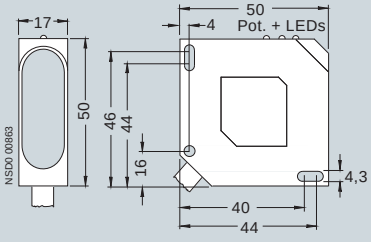
Selection and Ordering data

	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 × 0.25 mm²	Light-ON and dark-ON (antivalent)	pnp	5		**3RG70 56–0CC00**
						npn	5		**3RG70 56–0HC00**
					Light-ON and surplus light function	pnp	6		**3RG70 56–0CD00**
						npn	6		**3RG70 56–0HD00**
				M12 connector, 4-pole, type F	Light-ON and dark-ON (antivalent)	pnp	5	►	**3RG70 56–3CC00**
						npn	5		**3RG70 56–3HC00**
					Light-ON and surplus light function	pnp	6	►	**3RG70 56–3CD00**
						npn	6		**3RG70 56–3HD00**
	Laser reflex sensor	2000 cm (adjustable via potentiometer)	650 (red laser light)	2 m cable, PUR, 4 × 0.25 mm²	Light-ON and dark-ON (antivalent)	pnp	5		**3RG70 57–0CC00**
						npn	5		**3RG70 57–0HC00**
					Light-ON and surplus light function	pnp	6		**3RG70 57–0CD00**
						npn	6		**3RG70 57–0HD00**
				M12 connector, 4-pole, type F	Light-ON and dark-ON (antivalent)	pnp	5	►	**3RG70 57–3CC00**
						npn	5		**3RG70 57–3HC00**
					Light-ON and surplus light function	pnp	6	►	**3RG70 57–3CD00**
						npn	6		**3RG70 57–3HD00**
	Laser diffuse sensor with analog output	45 ... 85 mm/ 80 µm	650 (red laser light)	6 m cable, PVC, 4 × 0.34 mm², shielded	analog 0 ... 10 V, rising signal	–	15		**3RG70 56–1CM00**
		45 ... 85 mm/ 20 µm				–	15		**3RG70 56–1CM03**
		45 ... 85 mm/ 80 µm	650 (red laser light)	M12 connector, 4-pole, type F	analog 0 ... 10 V, rising signal	–	15	►	**3RG70 56–3CM00**
		45 ... 85 mm/ 20 µm				–	15	►	**3RG70 56–3CM03**
Accessories									
	Mounting brackets for L50							►	**3RX7 302**

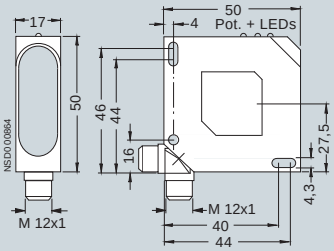
1) See page 2/127.
► Preferred type, available from stock.

Dimensions

3RG70 5.–0..00, 3RG70 56–1..0.

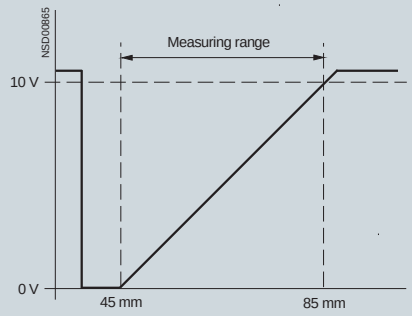


3RG70 5.–3..0.



Characteristic curves

3RG70 56–.CM0.



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

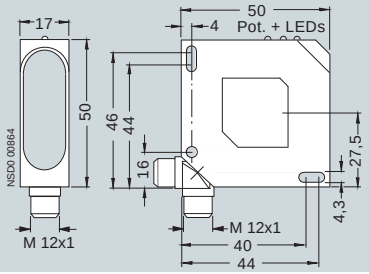
Selection and Ordering data

	Operating mode Design	Sensing range mm	Illuminant nm	Connection	Analog output mA		Circuit diagram number[1]		Order No.
 HF L50 design	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**
Accessories									
	Mounting brackets for L50 HF							►	**3RX7 302**
	Cable plug, shielded, 8 × 0.25 mm^2							►	**3RX8 000-0CB81-1GF0**

1) See page 2/127.
► Preferred type, available from stock.

Dimensions

3RG70 56–3NQ..



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

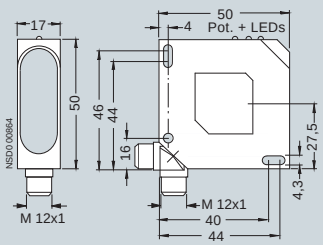
	Operating mode	Sensing range mm	Illuminant	Connection	Switching output	Circuit diagram number[1]		Order No.
	Color sensor PXO560 with 3 switching outputs	12 ... 32	White light, pulsed	M12 connector, 8-pole, Type O	3 x pnp	17	▶	**3RG70 50-3NB00**
Accessories								
	Mounting bracket for form C50						▶	**3RX7302**
	Cable plug, shielded, 8 x 0.25 mm², 5 m						▶	**3RX8000-0CB81-1GF0**
	Reflection film for detection of transparent objects						▶	**3RX7307-0AB00**

1) See page 2/127.

▶ Preferred type, available from stock.

Dimensions

3RG70 50-3NB00



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 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 × 400 (white)			200 × 200 (white)
Operating voltage range (DC)	V	10 ... 36	–	10 ... 36	10 ... 36
No-load current I_0, max.	mA	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
Switching frequency, max.	Hz	1000	20	1000	250
Switching time, max.	ms	0.5	20	0.5	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
Ambient temperature	°C	–5 ... +55	–5 ... +55	–5 ... +40	–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
Ambient temperature	°C	–5 ... +55	–5 ... +55	–5 ... +40	–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)	pnp	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)	pnp	8	B	**3RG72 10–3DK00**
						npn	8	B	**3RG72 10–3EK00**
				Pg 11, 4-pole	Light-ON and dark-ON (antivalent)	pnp			**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)	pnp	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)	pnp	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)	pnp	8		**3RG72 14–3DK00**
						npn	8		**3RG72 14–3EK00**
				Pg 11, 4-pole	Light-ON and dark-ON (antivalent)	pnp		►	**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)	pnp	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)	pnp	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)	pnp	8	B	**3RG72 11–3DK00**
						npn	8	B	**3RG72 11–3EK00**
				Pg 11, 4-pole	Light-ON and dark-ON (antivalent)	pnp	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)	pnp	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)	pnp	5	►	**3RG72 01–3CC61**
				Pg 11, 4-pole	Light-ON and dark-ON (antivalent)	pnp		►	**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.

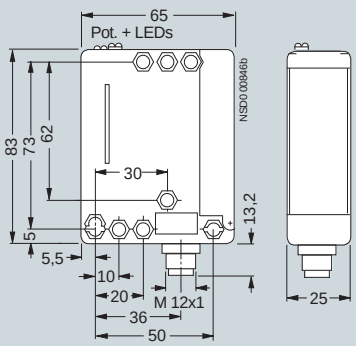
K80 design

	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**
						npn	5		**3RG72 02–3HC00**
					Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pnp	6	B	**3RG72 12–3DK00**
				Pg 11, 4-pole	Light-ON and dark-ON (antivalent)	pnp	11		**3RG72 02–6CC00**
						npn	11		**3RG72 02–6HC00**
				Pg 11, with enabling input, 5-pole	Light-ON or dark-ON and surplus light, with timing function (0.01 ... 1 s)	pnp	11	B	**3RG72 12–6DK00**
						npn	11	B	**3RG72 12–6EK00**
				Pg 11, 5-pole	Relay, Light-ON and dark-ON, with timing function (0.1 ... 10 s)	–	10	▶ B	**3RG72 12–6MC00**
	Thru-beam sensor Emitter	50 (adjustable via potentiometer)	880 (IR)	M12 connector, 4-pole, Type F	Emitter DC with enabling input	–	7	▶	**3RG72 02–3BG00**
				Pg 11, 3-pole	Emitter DC with enabling input	–	11	▶	**3RG72 02–6BG00**
				Pg 11, 3-pole	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**

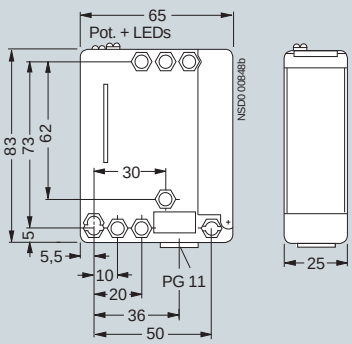
1) See page 2/127. B: Subject to export regulations AL = N and ECCN = EAR99 ▶ Preferred type, available from stock.

Dimensions

3RG72 ..–3..00, 3RG72 ..–3..00-0XB4



3RG72 ..–6..00



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

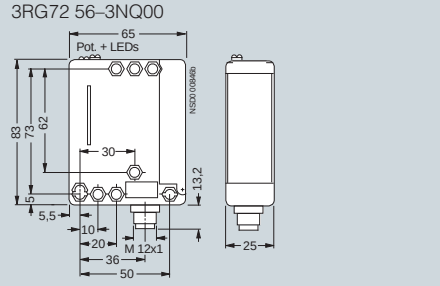
Selection and Ordering data

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 mm²							►	**3RX8 000-0CB81-1GF0**

1) See page 2/127.
► Preferred type, available from stock.

Dimensions

3RG72 56–3NQ00



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

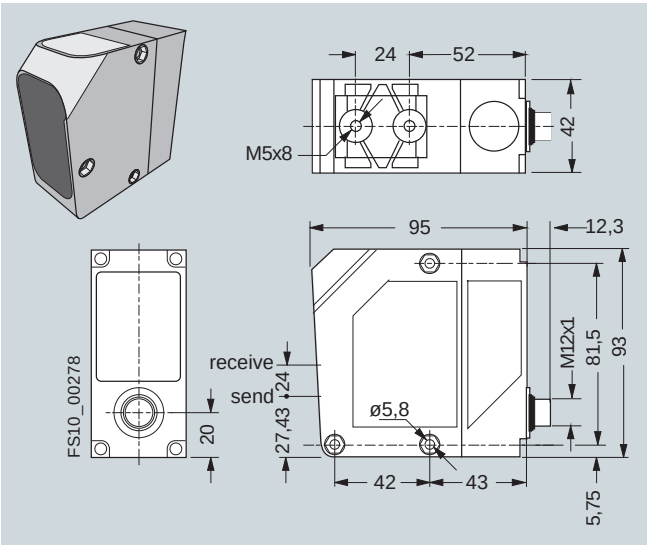
Sensing range	**0.2 ... 6 m**	**0.2 ... 6 m**	**0.2 ... 30 m**
Standard target/reflector	white 90%, 100 x 100 mm		R250 reflector, 250 x 250 mm
Operating mode	Distance sensor/jogging		Distance sensor/ reflex sensor
Light spot diameter (at end of sensing range)	4 x 12 mm		45 x 60 mm
Reproducibility			
• Slow	10 mm		5 mm
• Fast	15 mm		10 mm
Operating voltage range	18 ... 30 V DC		
No-load supply current I_o, 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.
 SIMATIC PXO560 L90L	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**

1) See page 2/127.

Dimensions



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 PXO830 GL

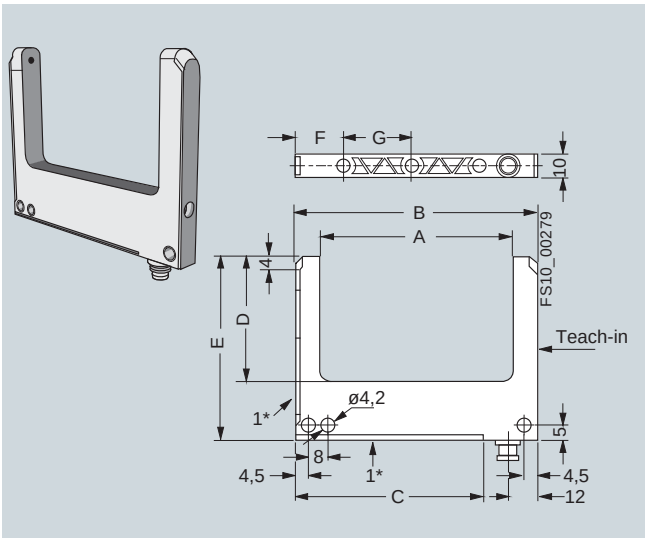
Selection and Ordering data

	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	pnp	-	1	**6GR1802-7AD00**
	30	M 8 connector, 4-pole, Type B	Light-ON or dark-ON	pnp	yes	14	**6GR1802-7BD05**
	50	M 8 connector, 3-pole, Type A	Light-ON or dark-ON	pnp	-	1	**6GR1804-7AD00**
	50	M 8 connector, 4-pole, Type B	Light-ON or dark-ON	pnp	yes	14	**6GR1804-7BD05**
	80	M 8 connector, 3-pole, Type A	Light-ON or dark-ON	pnp	-	1	**6GR1806-7AD00**
	80	M 8 connector, 4-pole, Type B	Light-ON or dark-ON	pnp	yes	14	**6GR1806-7BD05**
	120	M 8 connector, 3-pole, Type A	Light-ON or dark-ON	pnp	-	1	**6GR1808-7AD00**
	120	M 8 connector, 4-pole, Type B	Light-ON or dark-ON	pnp	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

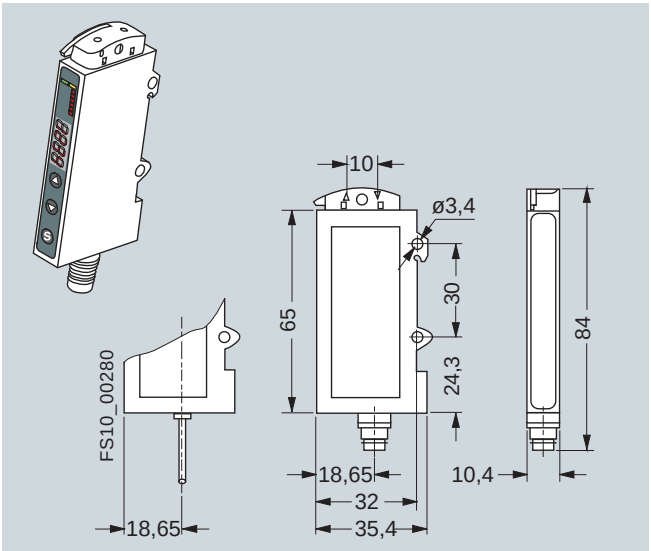
SIMATIC PXO840 LV70

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 mm²	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 mm²	660, red	Light-ON or dark-ON	0 … 10 V	pnp	18	**6GR1811-0CJ05**
Accessories							
	3RX7 plastic fiber-optic conductor						see page 2/264

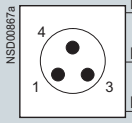
1) See page 2/127.

Dimensions



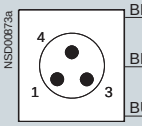
Schematics

Circuit diagram 1



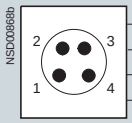
BN (1)	+U_b	M8 connector, Type A, C, D
BK (4)	Output light-ON/dark-ON	Cable
BU (3)	0 V	

Circuit diagram 2



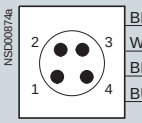
BN (1)	+U_b	M8 connector, Type A, C, D
BK (4)	Enable input	Cable
BU (3)	0 V	

Circuit diagram 3



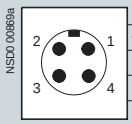
BN (1)	+U_b	M8 connector, Type B
WH (2)	Output dark-ON	Cable
BK (4)	Output light-ON	
BU (3)	0 V	

Circuit diagram 4



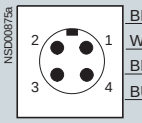
BN (1)	+U_b	M8 connector, Type B, 4-pole
WH (2)	Output surplus light	Cable
BK (4)	Output light-ON	
BU (3)	0 V	

Circuit diagram 5



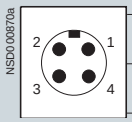
BN (1)	+U_b	M12 connector, Type F, K, L
WH (2)	Output dark-ON	Cable
BK (4)	Output light-ON	
BU (3)	0 V	

Circuit diagram 6



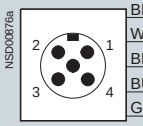
BN (1)	+U_b	M12 connector, Type F, K, L
WH (2)	Output surplus light	Cable
BK (4)	Output light-ON/dark-ON	
BU (3)	0 V	

Circuit diagram 7



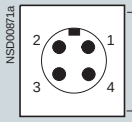
BN (1)	+U_b	M12 connector, Type E, F, H, J, K, L
BK (4)	Enable input	Cable
BU (3)	0 V	

Circuit diagram 8



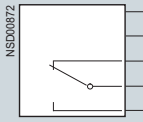
BN (1)	+U_b	M12 connector, Type G, M
WH (2)	Output surplus light	
BK (4)	Output light-ON/dark-ON	
BU (3)	0 V	
GR (5)	Enable input	

Circuit diagram 9



BN (1)	+U_b	M12 connector, Type E, F, H, J, K, L, M
BU (3)	0 V	Cable

Circuit diagram 10

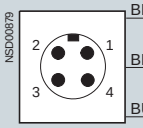


(1)		Screw-type terminals
(2)	U_C= 15 ... 264 V	
(3)	NC (relay)	
(4)	Common (relay)	
(5)	NO (relay)	

Circuit diagram 11

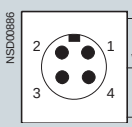
BN (1)	+U_b	Screw-type terminals
WH (2)	Output surplus light	
BK (4)	Output light-ON/dark-ON	
BU (3)	0 V	
GR (5)	Enable input	

Circuit diagram 12



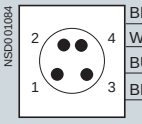
BN (1)	+U_b	M12 connector, Type E, F, H, J, K, L, N
BK (4)	Output light-ON/dark-ON	Cable
BU (3)	0 V	

Circuit diagram 13



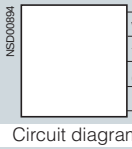
BN (1)	+U_b	M12 connector, Type E, F, H, J, K, L, N
WH (2)	Output light-ON/dark-ON	Cable
BU (3)	0 V	

Circuit diagram 14



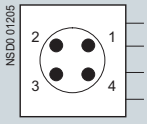
BN (1)	+U_b DC 10 ... 30 V	M 8 connector, Type B, 4-pole
WH (2)	Programming	
BU (3)	0 V	
BK (4)	Switching output light-ON/dark-ON	

Circuit diagram 15



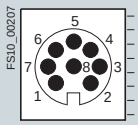
BN	+U_b	Cable
WH	+U_a	
YE	−U_a	
GN	0 V	
	Shielding	

Circuit diagram 16



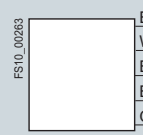
PIN 1:	+U_b	M12 connector, Type G, M
PIN 2:	Programming	
PIN 3:	0 V	
PIN 4:	Switching output light-ON/dark-ON	

Circuit diagram 17



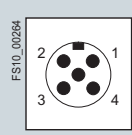
M12 connector, 8-pole, Type O

Circuit diagram 18



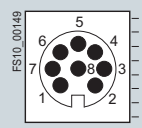
BN	+U_b DC 10 ... 30 V	Cable
WH	Programming	
BU	0 V	
BK	Switching output light-ON/dark-	
OR	Analog output 0 ... 10 V	

Circuit diagram 19



BN (1)	+U_b	M12 connector, Type F, G
WH (2)	Output A2, light-ON/dark-ON	
BU (3)	0 V	
BK (4)	Output A1, light-ON/dark-ON	
GY (5)	Analog output 4 mA ... 20 mA	

Circuit diagram 20



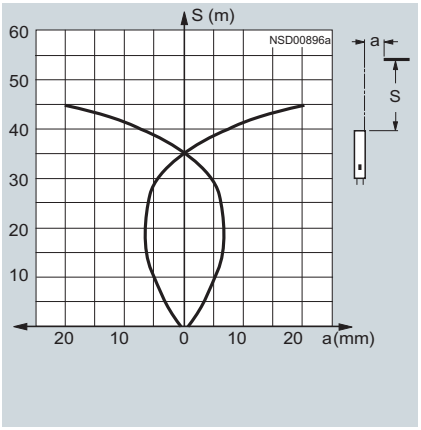
M8 socket connector, Type O, 8-pole

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

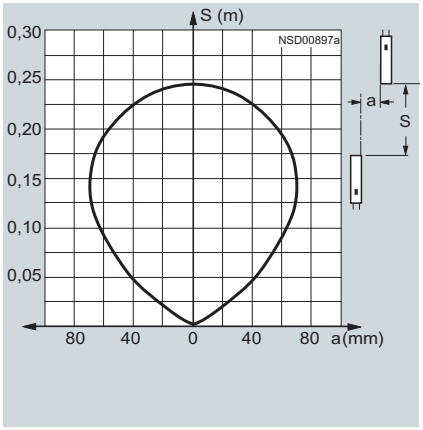
Characteristic curves

D4 and M5 design

Diffuse sensor

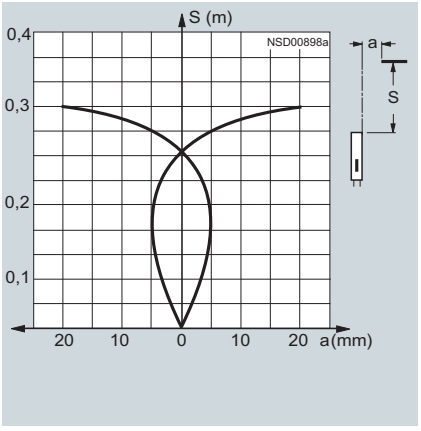


Thru-beam sensor

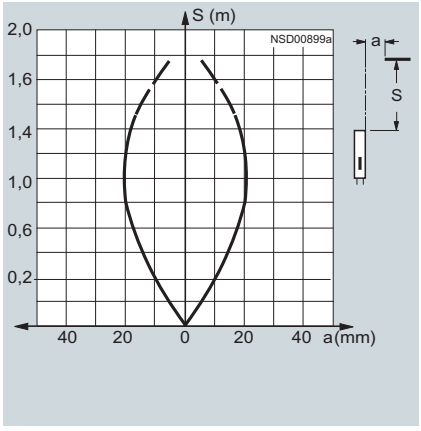


M12 design

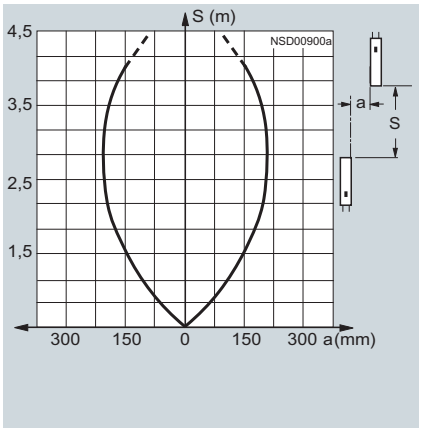
Diffuse sensor



Reflex sensor

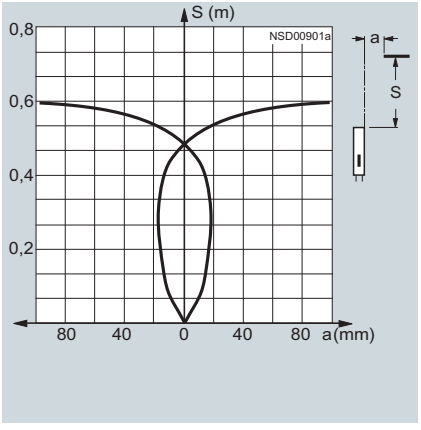


Thru-beam sensor

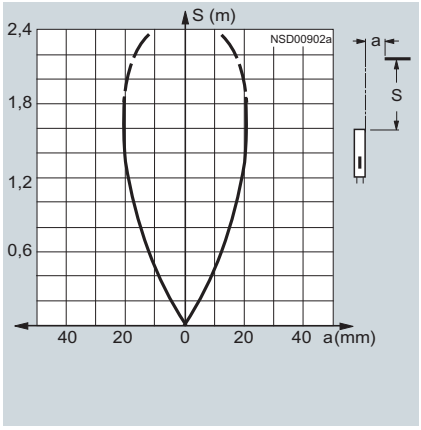


M18 design

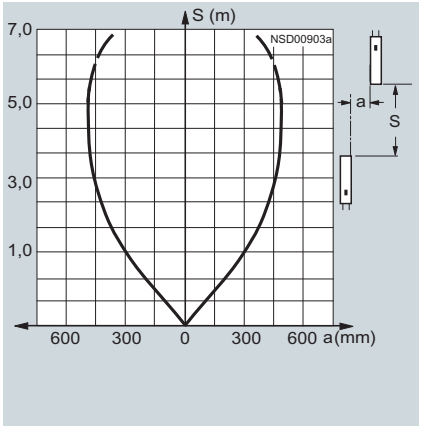
Diffuse sensor



Reflex sensor

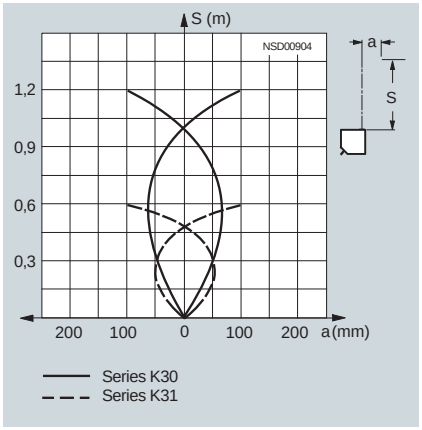


Thru-beam sensor

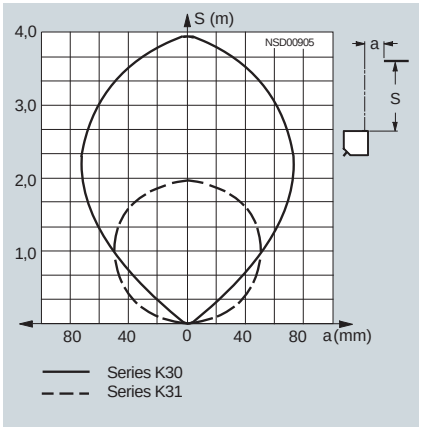


K30 and K31 design

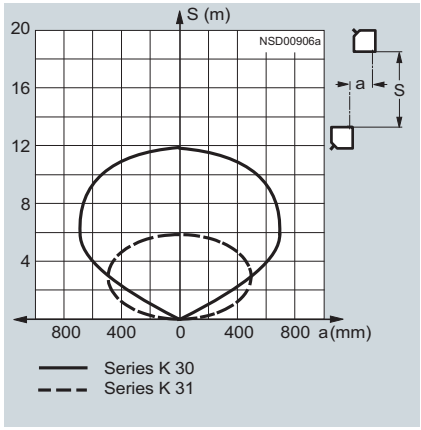
Diffuse sensor



Reflex sensor

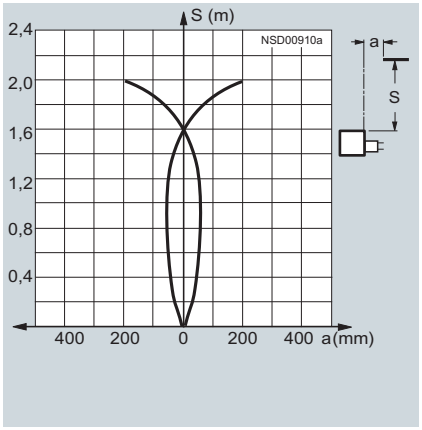


Thru-beam sensor

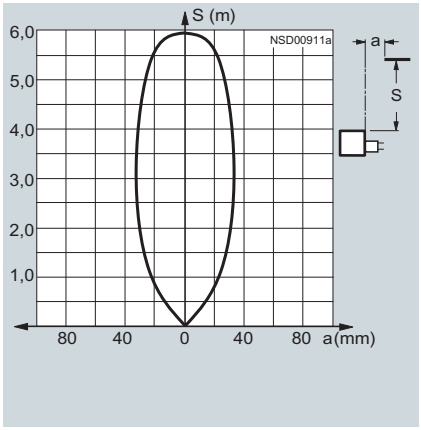


K80 design

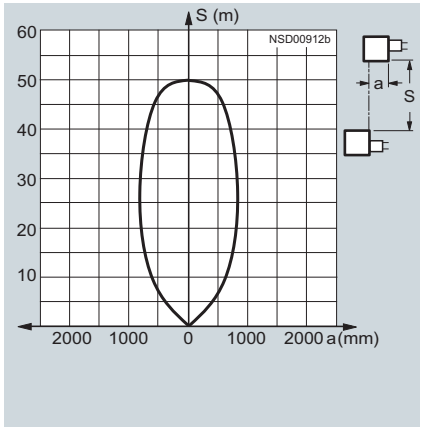
Diffuse sensor



Reflex sensor



Thru-beam sensor



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

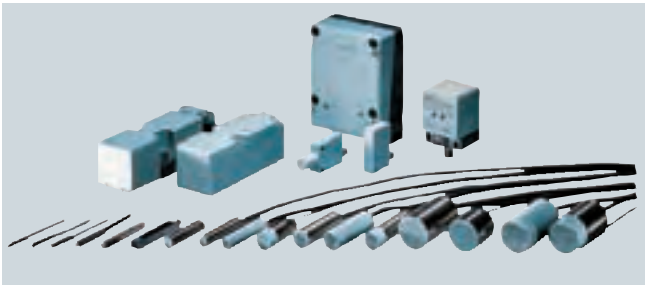
Ambient light is the light produced by external light sources. The luminescence level is measured on the light incidence surface. Thanks to the use of modulated light, the devices are insensitive to ambient light.

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.

Notes

2

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: • 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: • Increased operating voltages • Higher degrees of protection • Above-standard operating distance
PXI400	Sensors without reduction factor
PXI600	Sensors with special approvals: • ATEX sensors for hazardous area Zone 2 • Sensors with e1 type approval
PXI900	• 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

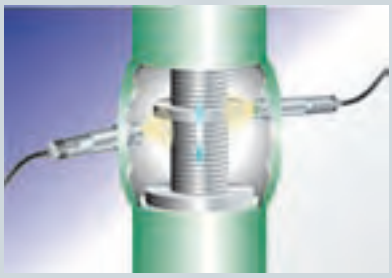

NSD0_00801

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.

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.

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

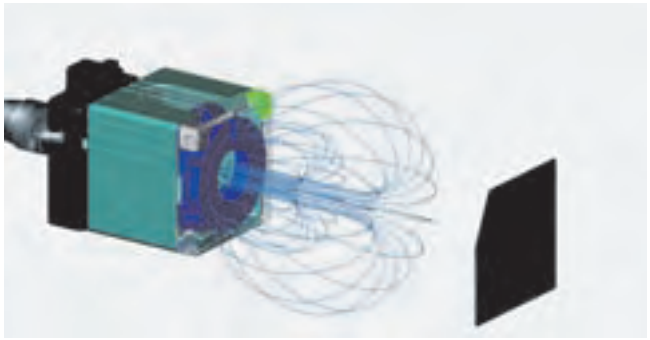
To prevent the proximity switches from switching without object, it is absolutely essential that the clearances around the sensing area of metallic objects are unobstructed. Furthermore, the minimum clearance to adjacent inductive sensors must be ensured (see diagrams in the selection tables).

Degrees of protection

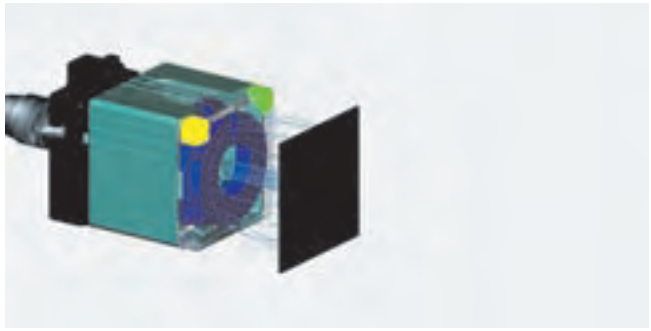
See "Further information".

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*** **≤ 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

Introduction

	Cylindrical designs								
Design	**∅ 3 mm**	**∅ 4 mm**	**M5**	**∅ 6,5 mm**	**M8**	**∅ 8 mm**	**M12**	**∅ 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		

					Cubical designs (mm)							
M18		∅ 18 mm	M30	∅ 30 mm	5 x 5	8 x 8	12 x 32	12 x 40	40 x 40	60 x 80	80 x 100	80 x 80
					2/141							
						2/146						
							2/150	2/150, 2/151				
								2/156				
2/157, 2/159		2/158										
2/160, 2/161												
			2/162, 2/163									
			2/164, 2/166						2/165, 2/166			
									2/167, 2/168			
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						2/179						
2/185, 2/186		2/186										
2/188–2/191		2/189										
			2/192–2/194	2/193								
2/195												
			2/196–2/200	2/199					2/197, 2/198, 2/201			
2/203									2/202–2/204			
			2/205									
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2

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 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

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		
• 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 × 0.055 mm²
NO contact, pnp	11	►	**3RG46 03–2AB00**

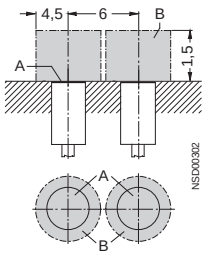
1) See page 2/242.
► Preferred type, available from stock.

Dimensions

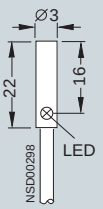
Mounting instructions

Dimension depending on form

A = active surface
B = metal-free area



3RG46 03–2AB00



Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		**3-wire**	**3-wire**	**3-wire**
Design		**5 mm × 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				
• 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

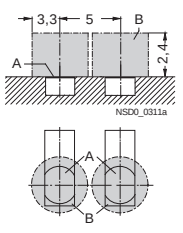
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable, PUR				3 × 0.14 mm²		3 × 0.14 mm²		3 × 0.14 mm²
NO contact, pnp	11		►	**3RG42 36–0AG00**	►	**3RG42 00–1AB00**	►	**3RG42 10–0AG00**
NC contact, pnp	12			–		**3RG42 00–1AA00**	►	**3RG42 10–0AF00**
NO contact, npn	13			**3RG46 36–0GB00**		–	►	**3RG46 10–0GB00**
With 8 mm combination plug								
NO contact, pnp	2	A, C		–	►	**3RG42 00–7AB00**	►	**3RG42 10–7AG00**
NC contact, pnp	3	A		–		–		**3RG42 10–7AF00**
NO contact, npn	4	A, C		–		–		**3RG46 10–7GB00**

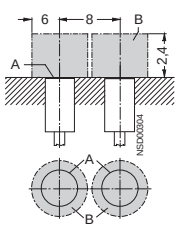
1) See page 2/242.
2) See from page 2/268.
► Preferred type, available from stock

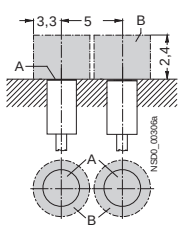
Dimensions

Mounting instructions

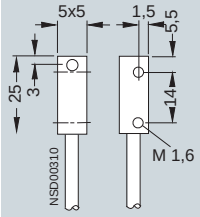
Dimension depending on form
A = active surface
B = metal-free area



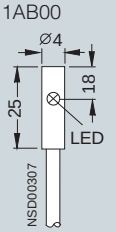




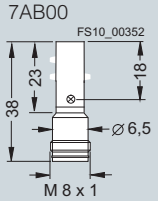
3RG42 36–0AG00



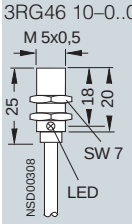
3RG42 00–1AB00



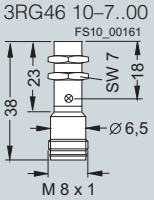
3RG42 00–7AB00



3RG42 10–0..00
3RG46 10–0..00



3RG42 10–7..00
3RG46 10–7..00



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

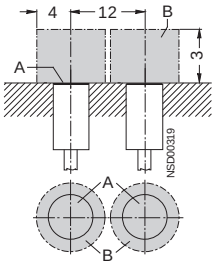
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		4 × 0.14 mm²
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

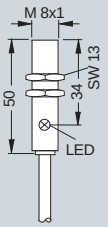
Dimensions

Mounting instructions

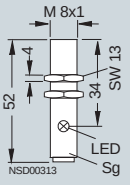


A = active surface
B = metal-free area

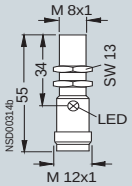
3RG40 11–0..00



3RG40 11–7..00



3RG40 11–3..00



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		
• Spurious signal suppression		•
• Short-circuit-proof/overload-proof		–
• Reverse-polarity protection		•
• Wire-break protection		•
• Inductive interference protection		•
• Radio interference protection		•
Degree of protection		IP67

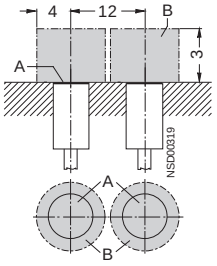
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				2 × 0.25 mm²
NO contact	15		► B	**3RG40 11–0JB00**
With 8 mm combination plug				
NO contact	7	A	B	**3RG40 11–7JB00**
With M12 connector				
NO contact	6	E, F	► B	**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

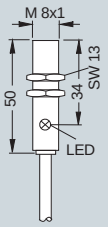
Dimensions

Mounting instructions

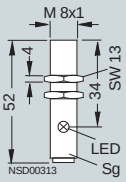


A = active surface
B = metal-free area

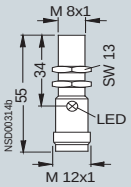
3RG40 11–0JB00



3RG40 11–7JB00



3RG40 11–3JB00



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

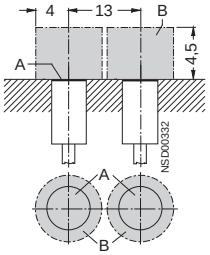
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.	Order No.
With 2 m cable, PUR				3 × 0.14 mm²		3 × 0.25 mm²	3 × 0.25 mm²
NO contact, pnp	11		►	**3RG42 01–1AB00**		**3RG40 50–0AG33**	**3RG40 50–0AG05**
NC contact, pnp	12			–	B	**3RG40 50–0AF33**	**3RG40 50–0AF05**
NO 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

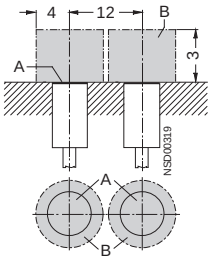
Dimensions

Mounting instructions

3RG42 01, 3RG46 01-7

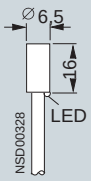


3RG40 50

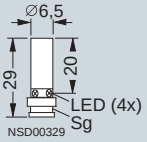


A = active surface
B = metal-free area

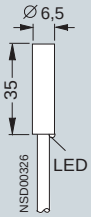
3RG42 01–1AB00



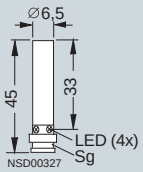
3RG42 01–7..00
3RG46 01–7..00



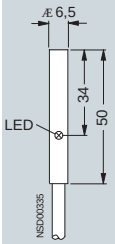
3RG40 50–0..33



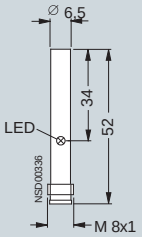
3RG40 50–7..33



3RG40 50–0..05



3RG40 50–7..05



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				3 × 0.14 mm²		3 × 0.25 mm²		3 × 0.14 mm²
NO contact, pnp	11		►	**3RG42 11–0AG31**	►	**3RG40 51–0AG33**		**3RG42 37–0AB00**
NC contact, pnp	12			**–**	B	**3RG40 51–0AF33**		**3RG42 37–0AA00**
NO contact, npn	13			**–**		**3RG40 51–0GB33**		**3RG46 37–0GG00**
NC contact, npn	14			**–**		**3RG40 51–0GA33**		**–**
With 8 mm combination plug								
NO contact, pnp	2	A	►	**3RG42 11–7AG31**		**3RG40 51–7AG33**	►	**3RG42 37–7AB00**
NC contact, pnp	3	A	►	**3RG42 11–7AF31**	B	**3RG40 51–7AF33**		**3RG42 37–7AA00**
NO contact, npn	4	A		**3RG46 11–7GB31**		**3RG40 51–7GB33**		**3RG46 37–7GG00**
NC contact, npn	5	A		**–**	B	**3RG40 51–7GA33**		**–**

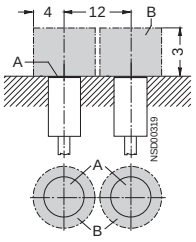
1) See page 2/242.
2) See from page 2/268.
B: Subject to export regulations AL = N and ECCN = EAR99

► Preferred type, available from stock.

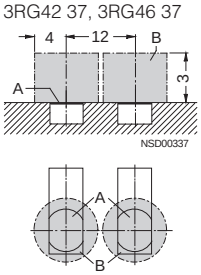
Dimensions

Mounting instructions

3RG42 11, 3RG46 11, 3RG40 51

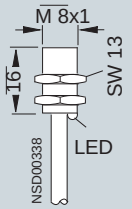


3RG42 37, 3RG46 37

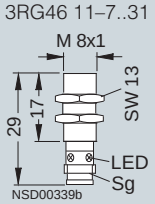


A = active surface
B = metal-free area

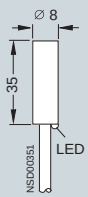
3RG42 11–0AG31



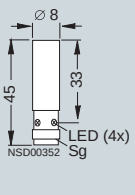
3RG42 11–7..31
3RG46 11–7..31



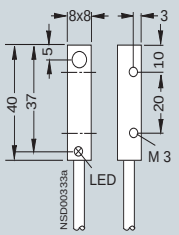
3RG40 51–0..33



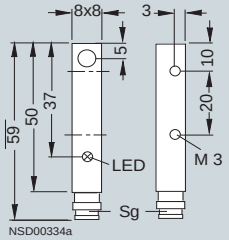
3RG40 51–7..33



3RG42 37–0..00, 3RG46 37–0..00



3RG42 37–7..00, 3RG46 37–7..00



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

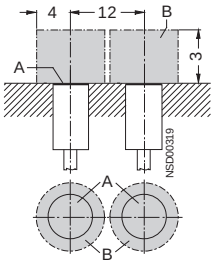
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²		4 × 0.14 mm²
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

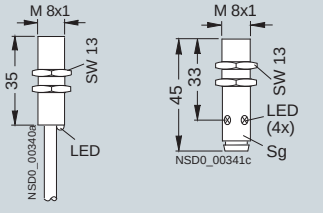
Dimensions

Mounting instructions

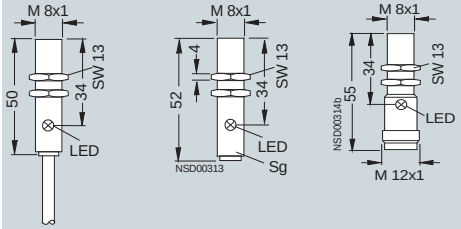


A = active surface;
B = metal-free area

3RG40 11–0..33 3RG40 11–7..33



3RG40 11–0..05 3RG40 11–7..05 3RG40 11–3..05



Operating distance 2 mm

Technical specifications

Class		Standard duty			
Number of wires		**3-wire**	**4-wire**	**3-wire**	**4-wire**
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

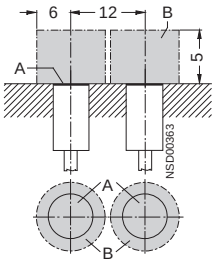
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²
NO contact, pnp	11		►	**3RG40 12–0AG33**	► B	**3RG40 12–0AG01**
NC contact, pnp	12		B	**3RG40 12–0AF33**	B	**3RG40 12–0AF01**
NO contact, npn	13		► B	**3RG40 12–0GB33**	► B	**3RG40 12–0GB00**
NC contact, npn	14			**3RG40 12–0GA33**	B	**3RG40 12–0GA00**
				4 × 0.14 mm²		4 × 0.14 mm²
NO contact and NC contact, pnp	10			**3RG40 12–0CD10**	► B	**3RG40 12–0CD00**
With M12 connector				3-wire		3-wire
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**		**–**
				4-wire		4-wire
NO contact and NC contact, pnp	1	F		**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

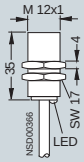
Dimensions

Mounting instructions

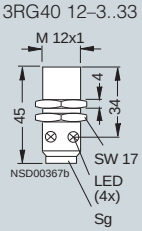


A = active surface
B = metal-free area

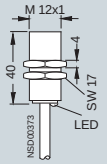
3RG40 12–0..33



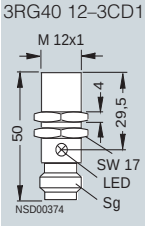
3RG40 12–3..33



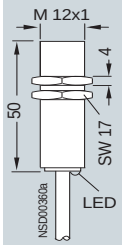
3RG40 12–0CD10



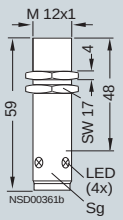
3RG40 12–3CD11



3RG40 12–0..00
3RG40 12–0..01



3RG40 12–3..00
3RG40 12–3..01



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

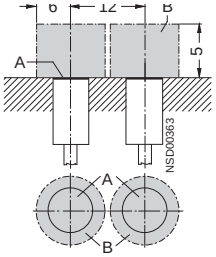
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				2 × 0.25 mm²
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

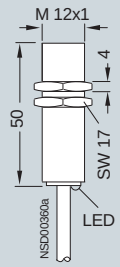
Dimensions

Mounting instructions

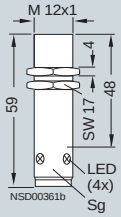


A = active surface
B = metal-free area

3RG40 12–0JB00



3RG40 12–3JB00



Operating distance 2 mm

2

Technical specifications

Class		Standard duty	Standard duty	Standard duty
Number of wires		**3-wire**	**4-wire**	**4-wire**
Design		**Cubic 12 mm × 40 mm**	**Cubic 12 mm × 40 mm**	**Cubic 12 mm × 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

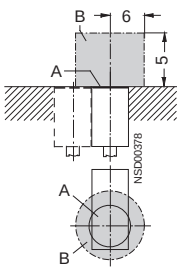
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]	Order No.	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm²	3 × 0.25 mm²	4 × 0.14 mm²
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

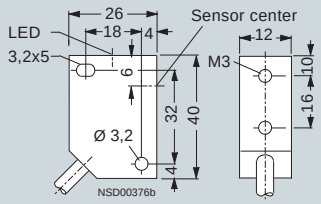
Mounting instructions



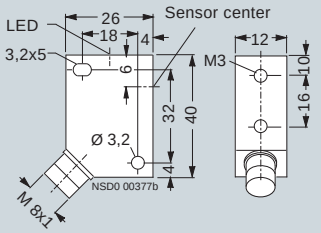
A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.

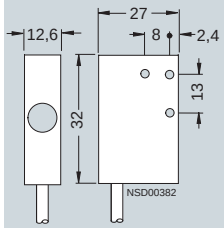
3RG40 70–0..45



3RG40 70–7..45



3RG40 71–0CD00



Technical specifications

Class		**Standard duty**	**Standard duty**
Number of wires		**3-wire**	**4-wire**
Design		**Cubic 12 mm × 40 mm**	**Cubic 12 mm × 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

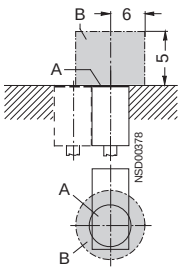
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]	Order No.	Order No.
With 2 m cable, PUR			3 × 0.25 mm²	4 × 0.14 mm²
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

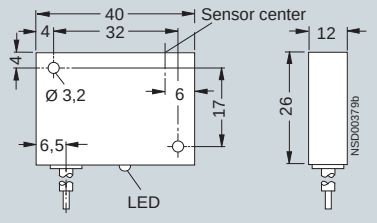
Mounting instructions



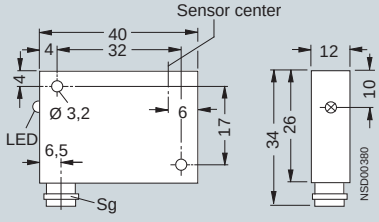
A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.

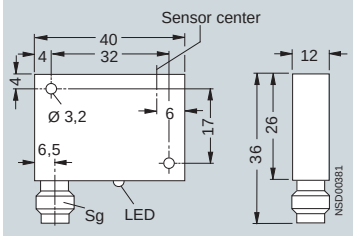
3RG40 70–0..00, 3RG40 70–0..01



3RG40 70–7..01, 3RG40 70–7..02



3RG40 70–3..00, 3RG40 70–3..01



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

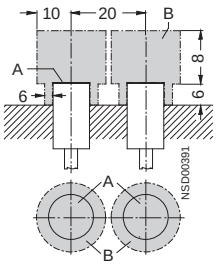
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²
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

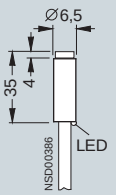
Dimensions

Mounting instructions

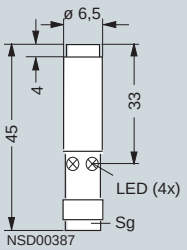


A = active surface
B = metal-free area

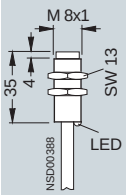
3RG40 60–0..33



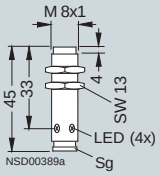
3RG40 60–7..33



3RG40 21–0..33



3RG40 21–7..33



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			
• 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

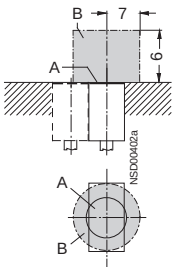
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		4 × 0.14 mm²
NO contact, npn	13		B	**3RG40 72–0GB00**		**–**
NC contact, npn	14		► B	**3RG40 72–0GA00**		**–**
NO contact and NC contact, pnp	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, pnp	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

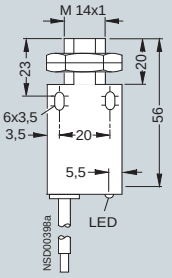
Mounting instructions



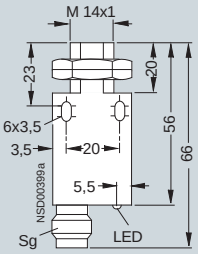
A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.

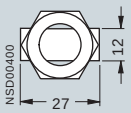
3RG40 72–0..00



3RG40 72–3..00



Plan view:



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

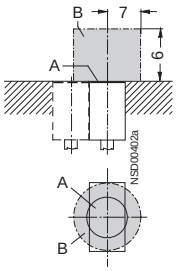
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				2 × 0.25 mm²
NO contact	15		B	**3RG40 72–0JB00**
With M12 connector				
NO contact	6	E, F	B	**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

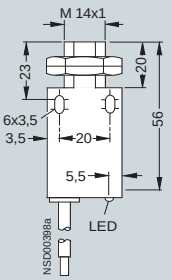
Mounting instructions



A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.

3RG40 72–0..00



Technical specifications

Class		Standard duty			
Number of wires		**3-wire**	**4-wire**	**3-wire**	**4-wire**
Design		**M12, Shorty**	**M12, Shorty**	**M12**	**M12**
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	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	800	800	800	800
Repeat accuracy R	mm	0.2	0.2	0.2	0.2
Power-up delay t_v	ms	40	40	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 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

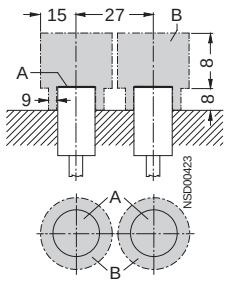
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²
NO contact, pnp	11		►	**3RG40 22–0AG33**	► B	**3RG40 22–0AG01**
NC contact, pnp	12		B	**3RG40 22–0AF33**	► B	**3RG40 22–0AF01**
NO contact, npn	13		B	**3RG40 22–0GB33**	► B	**3RG40 22–0GB00**
NC contact, npn	14			**3RG40 22–0GA33**	B	**3RG40 22–0GA00**
				4 × 0.14 mm²		4 × 0.14 mm²
NO contact and NC contact, pnp	10			**3RG40 22–0CD10**	► B	**3RG40 22–0CD00**
With M12 connector				3-wire		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		**3RG40 22–3GA33**	B	**3RG40 22–3GA00**
				4-wire		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

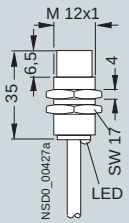
Dimensions

Mounting instructions

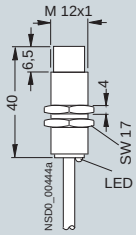


A = active surface
B = metal-free area

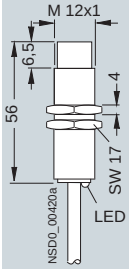
3RG40 22–0..33



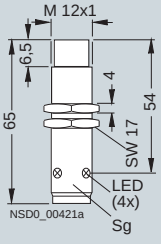
3RG40 22–0CD10



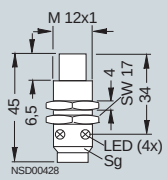
3RG40 22–0..00
3RG40 22–0..01



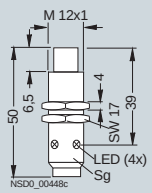
3RG40 22–3..00
3RG40 22–3..01



3RG40 22–3..33



3RG40 22–3CD11



Operating distance 4 mm

Technical specifications

Class		Standard duty	Standard duty (PLC)
Number of wires		**3-wire**	**2-wire**
Design		**Cubic 12 mm × 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 × 0.34 mm²		2 × 0.25 mm²
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**

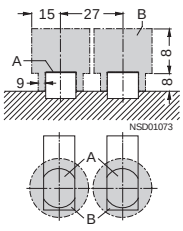
1) See page 2/242.
2) See from page 2/268.

► Preferred type, available from stock.
B: Subject to export regulations AL = N and ECCN = EAR99.

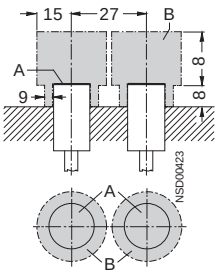
Dimensions

Mounting instructions

3RG40 80-.AG45

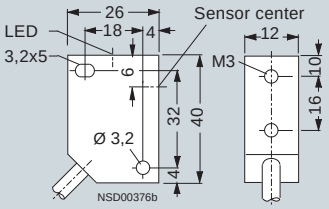


3RG40 22-.JB00

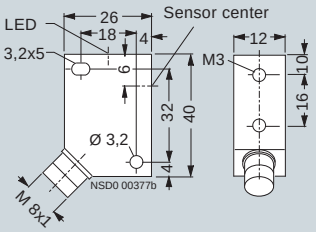


A = active surface
B = metal-free area

3RG40 80–0AG45

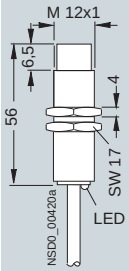


3RG40 80–7AG45

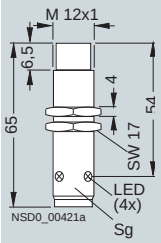


These proximity switches can be mounted next to one another.

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

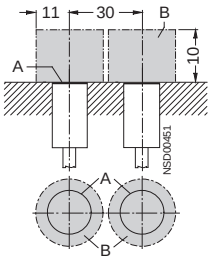
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²		4 × 0.14 mm²
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.

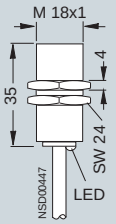
Dimensions

Mounting instructions

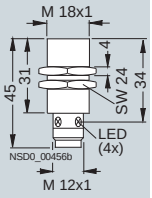


A = active surface
B = metal-free area

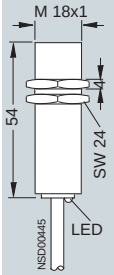
3RG40 13–0..33



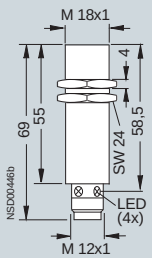
3RG40 13–3..33



3RG40 13–0..00
3RG40 13–0..01



3RG40 13–3..00
3RG40 13–3..01



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 mm²
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 mm²		
NO contact, pnp	11		►	**3RG40 75–0AJ00**		–
NC contact, pnp	12			**3RG40 75–0AH00**		–
NO contact, npn	13		►	**3RG40 75–0GJ00**		–

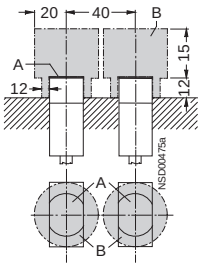
1) See page 2/242.
2) See from page 2/268.

► Preferred type, available from stock.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

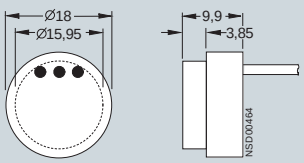
Mounting instructions

3RG40 82

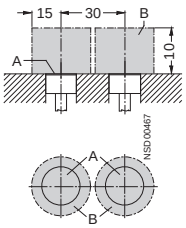


A = active surface
B = metal-free area

3RG40 75

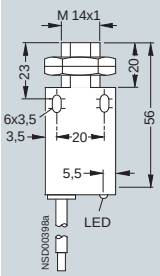


Mounting instructions

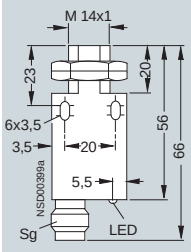


3RG40 75–0GJ00 also possible with non-embedding mounting:
Rated operating distance
s_n = 3,2 mm

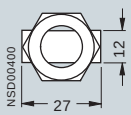
3RG40 82–0..00



3RG40 82–3..00



Plan view:



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

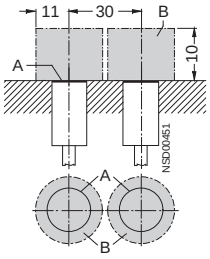
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				2 × 0.25 mm²
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.

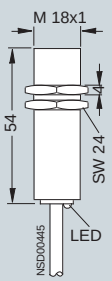
Dimensions

Mounting instructions

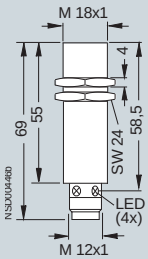


A = active surface
B = metal-free area

3RG40 13–0JB00



3RG40 13–3JB00



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

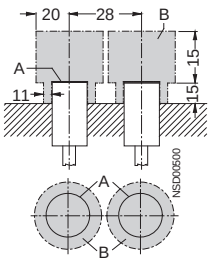
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²		4 × 0.14 mm²
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.

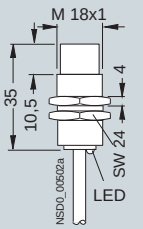
Dimensions

Mounting instructions

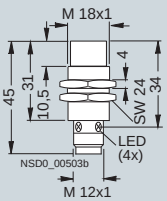


A = active surface;
B = metal-free area

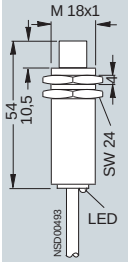
3RG40 23–0..33



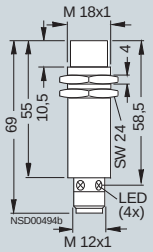
3RG40 23–3..33



3RG40 23–0..00
3RG40 23–0..01



3RG40 23–3..00
3RG40 23–3..01



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

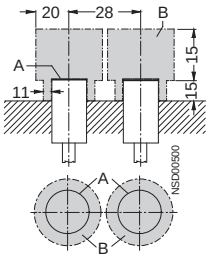
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				2 × 0.25 mm²
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.

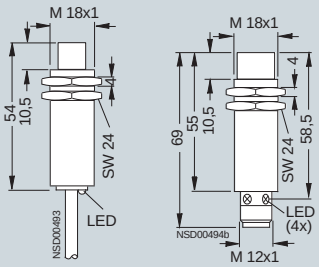
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG40 22–0..00 3RG40 22–3..00



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

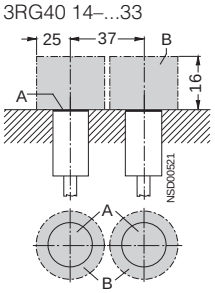
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²		4 × 0.14 mm²
NO contact, pnp	11		B	**3RG40 14–0AG33**	► B	**3RG40 14–0AG01**		**–**
NC contact, pnp	12		B	**3RG40 14–0AF33**	► B	**3RG40 14–0AF01**		**–**
NO 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

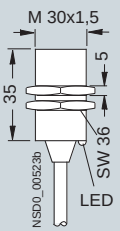
Mounting instructions

3RG40 14–...33

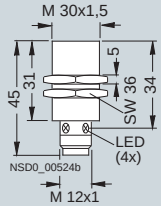


A = active surface
B = metal-free area

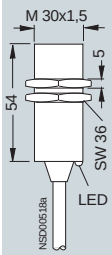
3RG40 14–0..33



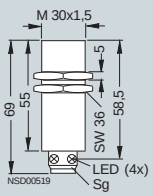
3RG40 14–3..33



3RG40 14–0..00
3RG40 14–0..01



3RG40 14–3..00
3RG40 14–3..01



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

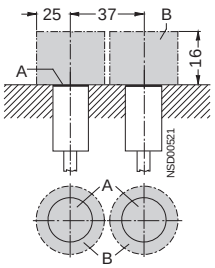
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				2 × 0.25 mm²		4 × 0.14 mm²
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.

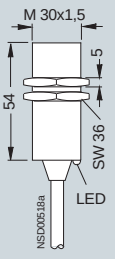
Dimensions

Mounting instructions

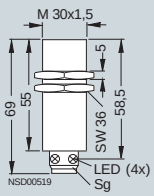


A = active surface
B = metal-free area

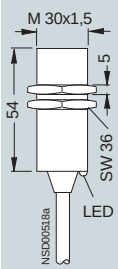
3RG40 14–0JB00



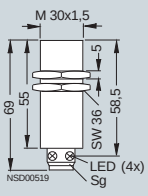
3RG40 14–3JB00



3RG40 14–3CD00



3RG40 14–0CD00



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

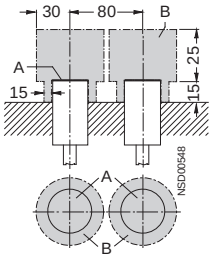
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²		4 × 0.14 mm²
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.

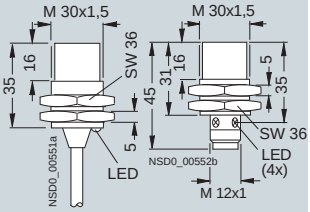
Dimensions

Mounting instructions

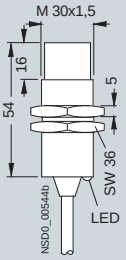


A = active surface
B = metal-free area

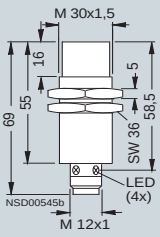
3RG40 24–0..33 3RG40 24–3..33



3RG40 24–0..00 3RG40 24–0..01



3RG40 24–3..00 3RG40 24–3..01



Technical specifications

Class		**Standard duty**	**Standard duty**	**Standard duty**
Number of wires		**3-wire**	**4-wire**	**4-wire**
Design		**Cubic 40 mm × 40 mm**	**Cubic 40 mm × 40 mm**	**Cubic 40 mm × 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

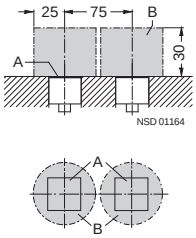
Selection and Ordering data

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.

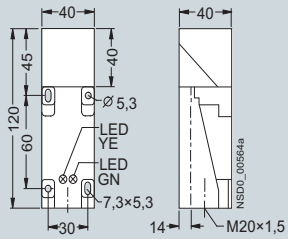
Dimensions

Mounting instructions



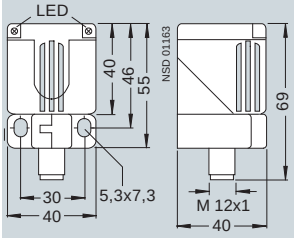
A = active surface;
B = metal-free area

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..

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

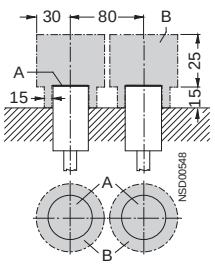
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				2 × 0.25 mm²		
NO contact	15		► B	**3RG40 24–0JB00**		**–**
With M12 connector						
NO contact	6	E, F	B	**3RG40 24–3JB00**		**–**
With terminal box						0.5 ... 2.5 mm²
NO contact	22			**–**	►	**3RG40 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

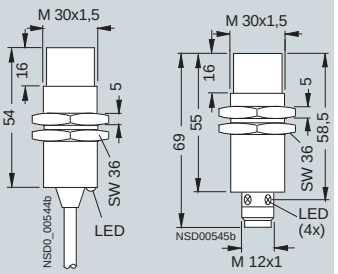
Mounting instructions

3RG40 24–0..00
3RG40 24–3..00



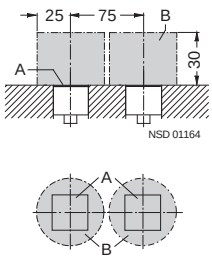
A = active surface
B = metal-free area

3RG40 24–0..00 3RG40 24–3..00



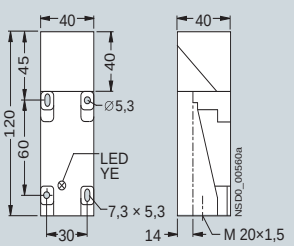
Mounting instructions

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

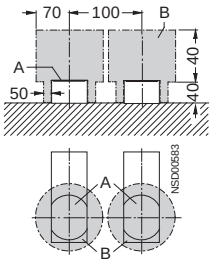
Selection and Ordering data

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.

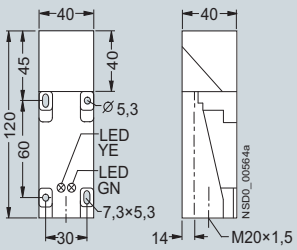
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG40 41–6..0.



The active surface can be adjusted in 5 directions.

Operating distance 20 mm

Technical specifications

Class		**Standard duty (PLC)**
Number of wires		**2-wire**
Design		**Cubic 40 mm × 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

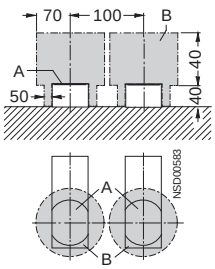
Selection and Ordering data

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.

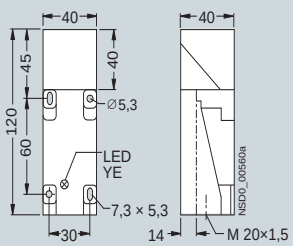
Dimensions

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 × 80 mm**	**Cubic 80 mm × 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

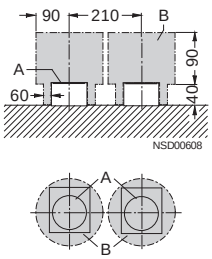
Switching output	Circuit diagram number[1)]		Order No.		Order No.
With terminal box			0.5 ... 2.5 mm²		0.5 ... 2.5 mm²
NO contact and NC contact, pnp	18	B	**3RG40 42–6CD00**	B	**3RG40 43–6CD00**

1) See page 2/242.
B: Subject to export regulations AL = N and ECCN = EAR99.

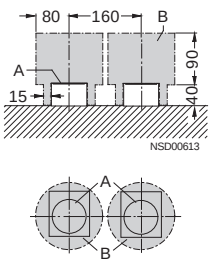
Dimensions

Mounting instructions

3RG40 42–6CD00

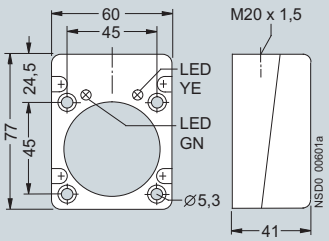


3RG40 43–6CD00

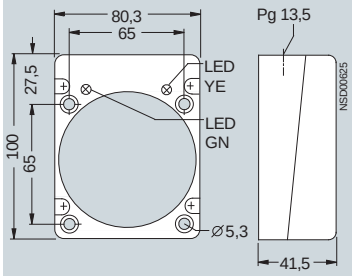


A = active surface
B = metal-free area

3RG40 42–6CD00



3RG40 43–6CD00



2

Overview

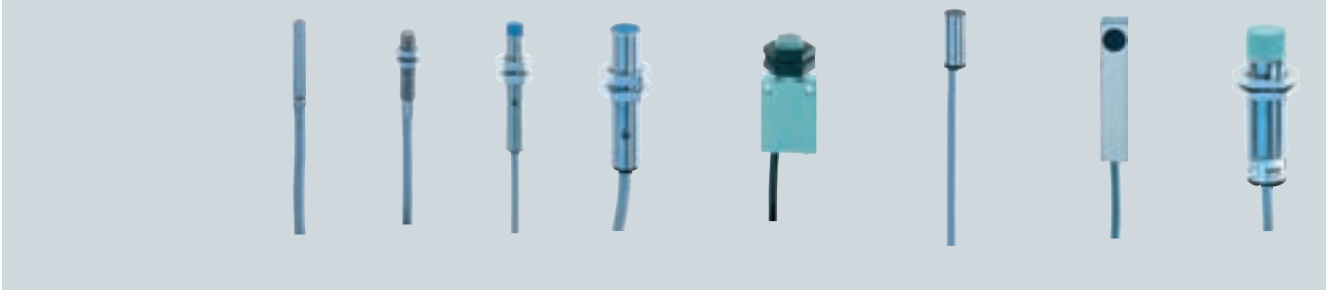
SIMATIC sensors PXI300

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 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				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		–	–	•
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
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				3 × 0.14 mm²		3 × 0.14 mm²		3 × 0.14 mm²
NO contact, pnp	11		►	**3RG46 00–0AG02**	►	**3RG46 10–0AG02**	►	**3RG40 11–0AB00**
NC contact, pnp	12			–		–		**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**

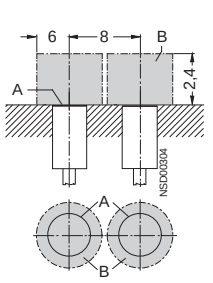
1) See page 2/242.
2) See from page 2/268.
► Preferred type, available from stock.

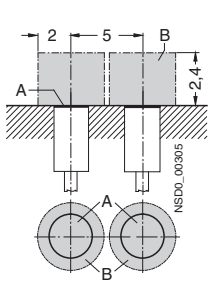
Dimensions

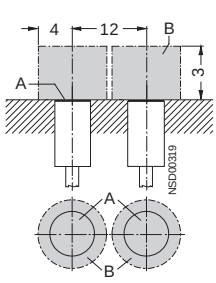
Mounting instructions

Dimension depending on form

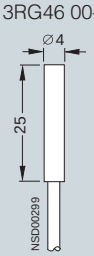
A = active surface
B = metal-free area



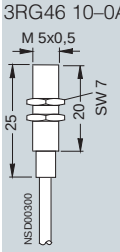




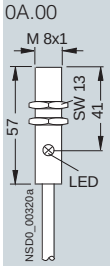
3RG46 00–0AG02



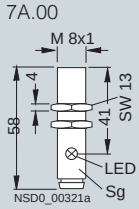
3RG46 10–0AG02



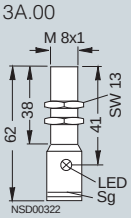
3RG40 11–0A.00



3RG40 11–7A.00



3RG40 11–3A.00



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

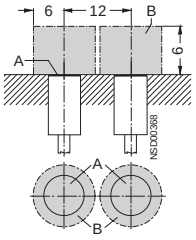
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
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.

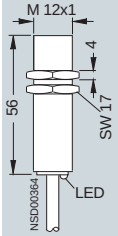
Dimensions

Mounting instructions

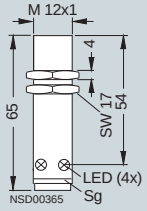


A = active surface
B = metal-free area

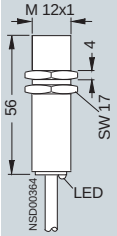
3RG40 12–0A.00



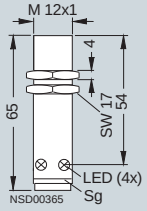
3RG40 12–3A.00



3RG40 12–0K.00



3RG40 12–3K.00



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				
• 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

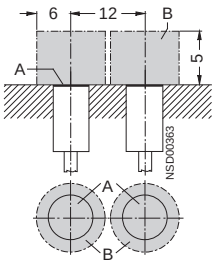
Selection and Ordering data

Switching output	Circuit diagram number[1]	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			PUR, 3 × 0.25 mm²	PUR, 3 × 0.25 mm²	PVC, 3 × 0.25 mm²
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.

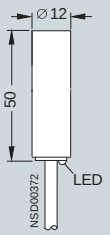
Dimensions

Mounting instructions

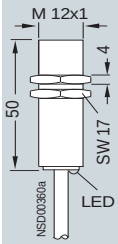


A = active surface
B = metal-free area

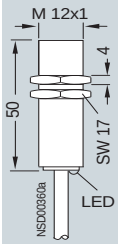
3RG40 52–0..30



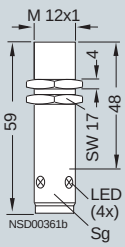
3RG40 12–0..30



3RG40 12–0..31



3RG40 12–3..31



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			
• 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

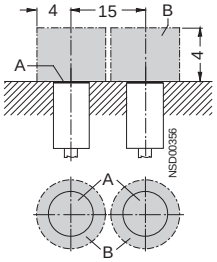
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 m, 3 × 0.25 mm²
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, pnp	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.

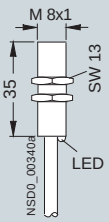
Dimensions

Mounting instructions

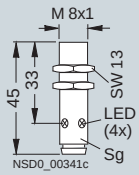


A = active surface
B = metal-free area

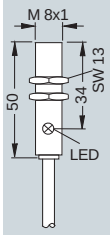
3RG41 11–0..33



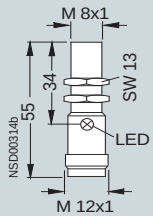
3RG41 11–7..33



3RG41 11–0..00



3RG41 11–3..00



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

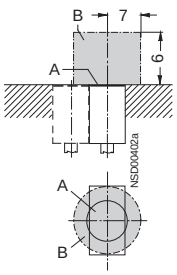
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
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

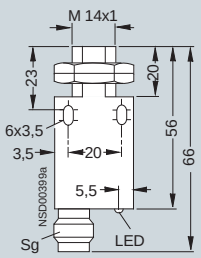
Mounting instructions



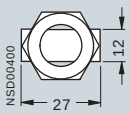
A = active surface
B = metal-free area

These proximity switches can be mounted next to one another.

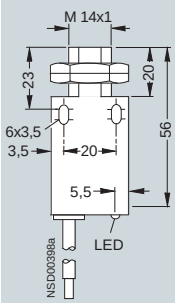
3RG40 72–3..00



Plan view



3RG40 72-0..00



Technical specifications

Class		**Increased operating distance (IP68)**	**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			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		–	–
• Inductive interference protection		•	•
• Radio interference protection		•	•
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 mm²		3 × 0.14 mm²
NO contact, pnp	11	►	**3RG46 02–0AG02**	►	**3RG46 11–0AG02**

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

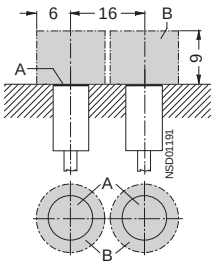
Dimensions

Mounting instructions

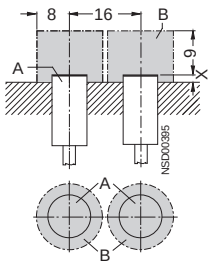
A = active surface
B = metal-free area

X ≥ 1.6 mm when mounted in steel,
X ≥ 0.8 mm when mounted in other metal

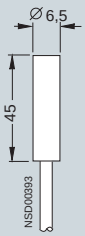
3RG46 02



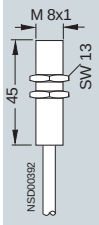
3RG46 11



3RG46 02–0AG02



3RG46 11–0AG02



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			
• 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 mm²		3 × 0.14 mm²
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**

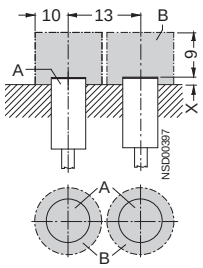
1) See page 2/242.
2) See from page 2/268.
► Preferred type, available from stock.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

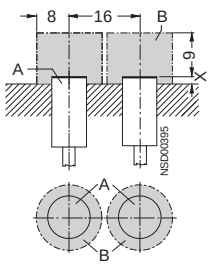
Mounting instructions

Dimension depending on form

A = active surface
B = metal-free area

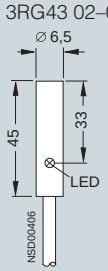


X ≥ 1.3 mm when mounted in steel,
X ≥ 0.65 mm when mounted in other metal

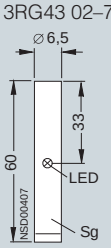


X ≥ 1.6 mm when mounted in steel,
X ≥ 0.8 mm when mounted in other metal

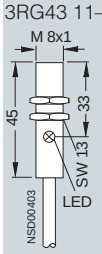
3RG43 02–0AG01



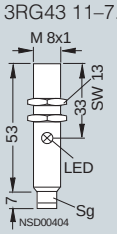
3RG43 02–7AG01



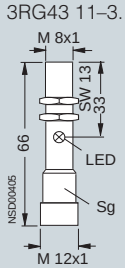
3RG43 11–0..01



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		
• Spurious signal suppression		•
• Short-circuit-proof/overload-proof		•
• Reverse-polarity protection		•
• Wire-break protection		–
• Inductive interference protection		•
• Radio interference protection		•
Degree of protection		IP67

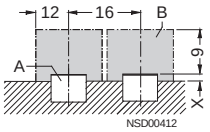
Selection and Ordering data

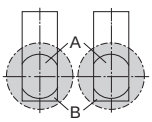
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.14 mm²
NO contact, pnp	11		► B	**3RG43 37–0AG01**
NO contact, npn	13			**3RG43 37–0GB01**
With 8 mm combination plug				
NO contact, pnp	2	A	► B	**3RG43 37–7AG01**
NO contact, npn	4	A	B	**3RG43 37–7GB01**

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

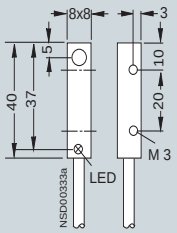




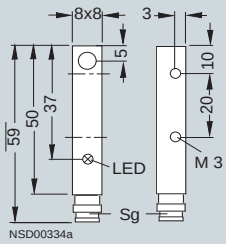
A = active surface
B = metal-free area

X ≥ 2,4 mm when mounted in steel,
X ≥ 1,2 mm when mounted in other metal

3RG43 37–0..01



3RG43 37–7..01



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

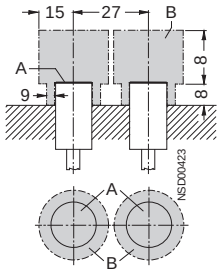
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
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.

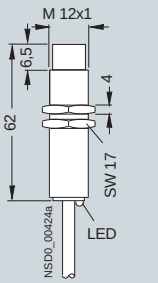
Dimensions

Mounting instructions

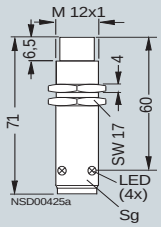


A = active surface
B = metal-free area

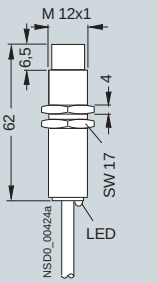
3RG40 22–0A.00



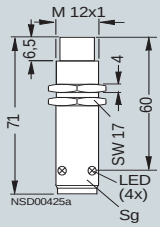
3RG40 22–3A.00



3RG40 22–0K.00



3RG40 22–3K.00



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				
• 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

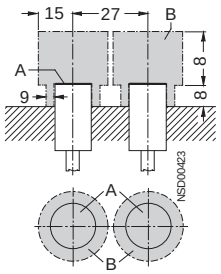
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable				PUR, 3 × 0.25 mm²		PUR, 3 × 0.25 mm²		PVC, 3 × 0.25 mm²
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.

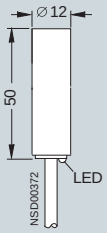
Dimensions

Mounting instructions

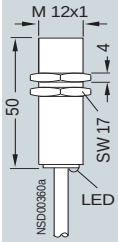


A = active surface
B = metal-free area

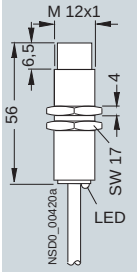
3RG40 62–0..30



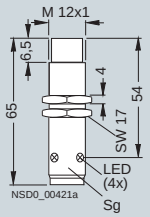
3RG40 22–0..30



3RG40 22–0..31



3RG40 22–3..31



Operating distance 4 mm

Technical specifications

		IP68 / 69 K (DC 65 V)	IP68 / 69 K (AC/DC)
Class			
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

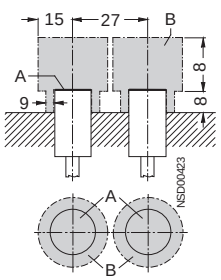
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
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.

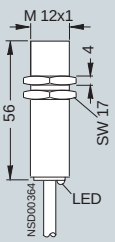
Dimensions

Mounting instructions

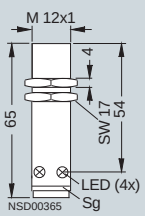


A = active surface
B = metal-free area

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			
• 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

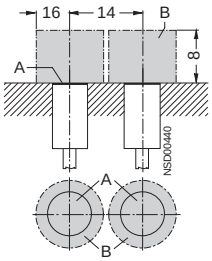
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²
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.

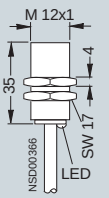
Dimensions

Mounting instructions

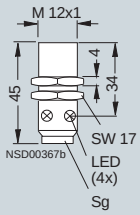


A = active surface
B = metal-free area

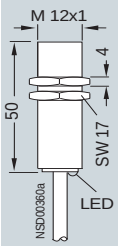
3RG41 12–0AG33



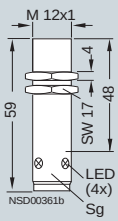
3RG41 12–3..33



3RG41 12–0A.01



3RG41 12–3A.01



Operating distance 5 mm

Technical specifications

Class		**Extra duty (65 V DC)**
Number of wires		**3-wire**
Design		**M14**
Installation in metal		**Not flush**
Rated operating distance s_n		**5 mm**
Enclosure material		Molded plastic
Operating voltage (DC)	V	10 ... 65
No-load supply current I_0	mA	≤ 10
Rated operational current I_e	mA	300
Switching frequency f	Hz	300
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

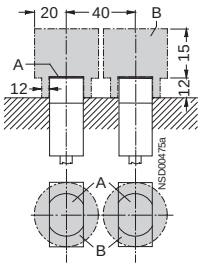
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.25 mm²
NO contact, pnp	13		► B	**3RG40 82–0AB00**
With M12 connector				
NO contact, pnp	4	E, F	► B	**3RG40 82–3AB00**

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

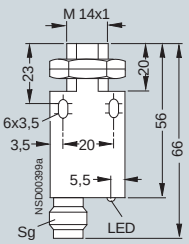
Mounting instructions

3RG40 82

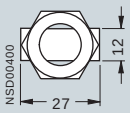


A = active surface
B = metal-free area

3RG40 82–3..00



Plan view:



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

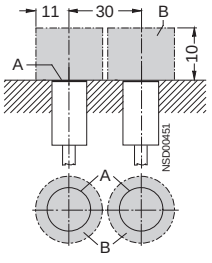
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
NO contact, pnp	11		► B	**3RG40 13–0AB00**		**–**
NC contact, pnp	12		► B	**3RG40 13–0AA00**		**–**
NO contact	16			**–**	►	**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.

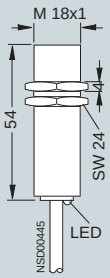
Dimensions

Mounting instructions

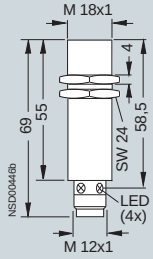


A = active surface
B = metal-free area

3RG40 13–0..00
3RG40 13–0..01



3RG40 13–3..00
3RG40 13–3..01



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				
• 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

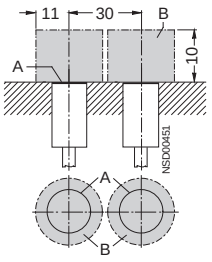
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable, PUR				PUR, 3 × 0.25 mm²		PUR, 3 × 0.25 mm²		PVC, 3 × 0.25 mm²
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								
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.

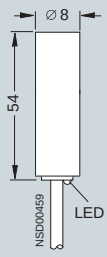
Dimensions

Mounting instructions

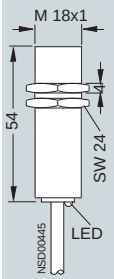


A = active surface
B = metal-free area

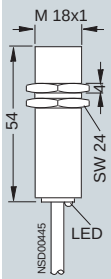
3RG40 53–0..30



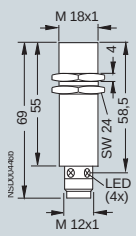
3RG40 13–0..30



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	10 ... 30
No-load supply current I_0	mA	≤ 10	≤ 10
Rated operational current I_e	mA	200	200
Switching frequency f	Hz	500	800
Repeat accuracy R	mm	0.15	0.15
Power-up delay t_v	ms	15	15
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 × 0.14 mm²		3 × 0.34 mm²
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, pnp	5	F	B	**3RG43 21–3GA01**		–

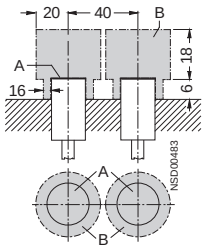
1) See page 2/242.
2) See from page 2/268.

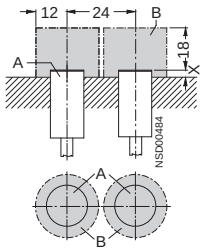
► Preferred type, available from stock.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions

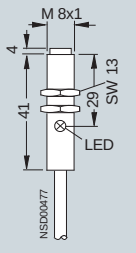
Dimension depending on form
A = active surface
B = metal-free area



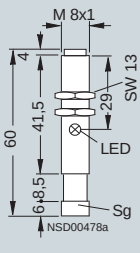


X ≥ 2.4 mm for mounting in steel,
X ≥ 1.2 mm for mounting in other metals

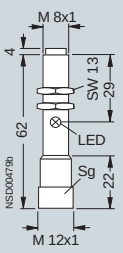
3RG43 21–0..01



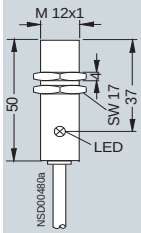
3RG43 21–7..01



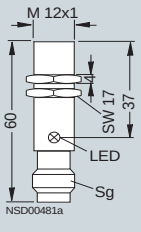
3RG43 21–3..01



3RG43 12–0..01



3RG43 12–3..01



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

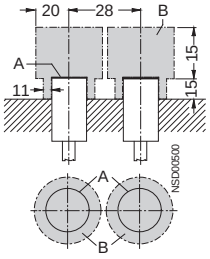
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
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.

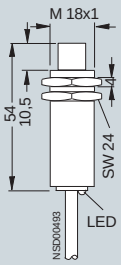
Dimensions

Mounting instructions

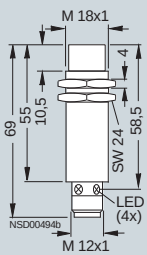


A = active surface
B = metal-free area

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	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	0.2	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		IP68 / 69 K	IP68 / 69 K	IP68 / 69 K

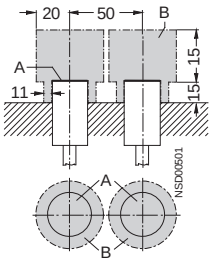
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable				PUR, 3 × 0.25 mm²		PUR, 3 × 0.25 mm²		PVC, 3 × 0.25 mm²
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								
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.

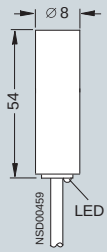
Dimensions

Mounting instructions

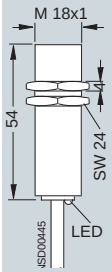


A = active surface
B = metal-free area

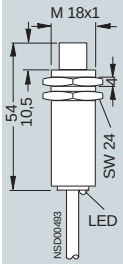
3RG40 63–0..30



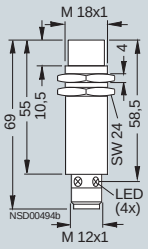
3RG40 23–0..30



3RG40 23–0..31



3RG40 23–3..31



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

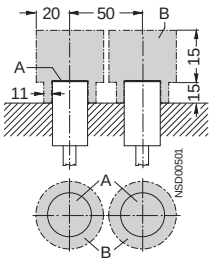
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
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.

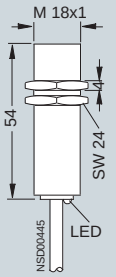
Dimensions

Mounting instructions

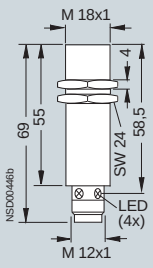


A = active surface
B = metal-free area

3RG40 23–0..30



3RG40 23–3..30



Technical specifications

Class		**Increased operating distance**	**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			
• 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

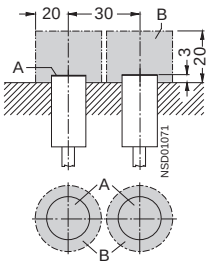
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		
NO contact, pnp	11		B	**3RG41 13–0AG33**		**–**
With 3 m cable, PUR						3 × 0.25 mm²
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.

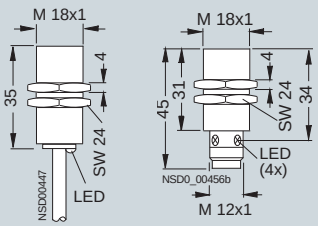
Dimensions

Mounting instructions

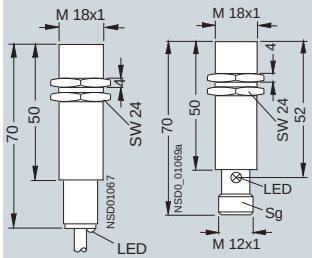


A = active surface
B = metal-free area

3RG41 13–0..33 3RG41 13–3..33



3RG41 13–0..01 3RG41 13–3..01



Operating distance 10 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		**Flush**	**Flush**
Rated operating distance s_n		**10 mm**	**10 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	25/200 (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		IP67	IP67

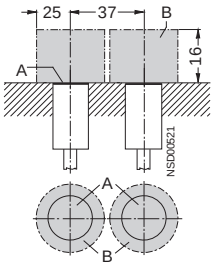
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
NO contact, pnp	11		► B	**3RG40 14–0AB00**		**–**
NC contact, pnp	12		B	**3RG40 14–0AA00**		**–**
NO contact	16			**–**	► B	**3RG40 14–0KB00**
NC contact	17			**–**	► B	**3RG40 14–0KA00**
With M12 connector						
NO contact, pnp	2	E, F	► B	**3RG40 14–3AB00**		**–**
NC contact, pnp	3	F	B	**3RG40 14–3AA00**		**–**
NO contact	8	E, F		**–**	► B	**3RG40 14–3KB00**
NC contact	9	F		**–**	B	**3RG40 14–3KA00**

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.

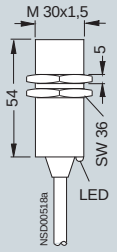
Dimensions

Mounting instructions

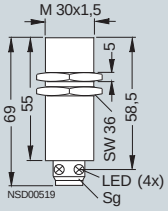


A = active surface
B = metal-free area

3RG40 14–0..00



3RG40 14–3..00



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			
• 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

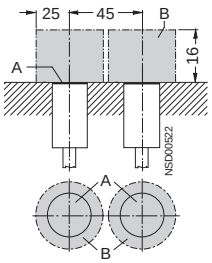
Selection and Ordering data

Switching output	Circuit diagram number[1)]		Order No.		Order No.
With 2 m cable			PUR, 3 × 0.25 mm²		PUR, 3 × 0.25 mm²
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.

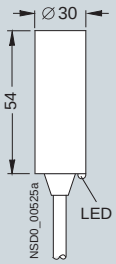
Dimensions

Mounting instructions

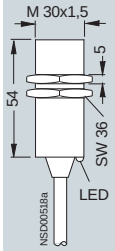


A = active surface
B = metal-free area

3RG40 54–0..30



3RG40 14–0..30



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

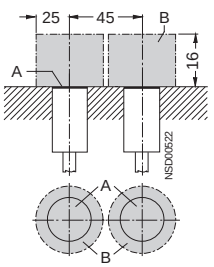
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable				PVC, 3 × 0.25 mm²		PUR, 2 × 0.25 mm²
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.

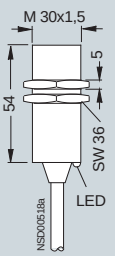
Dimensions

Mounting instructions

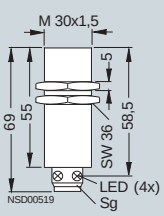


A = active surface
B = metal-free area

3RG40 14–0..31



3RG40 14–0..31



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			
• 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

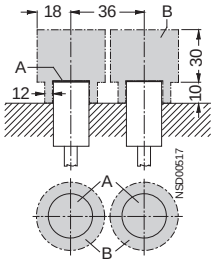
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.34 mm²		3 × 0.34 mm²
NO contact, pnp	11		► B	**3RG43 22–0AG01**	►	**3RG46 13–1AB01**
NO contact, npn	13			**–**		**3RG46 13–0GB00**
With M12 connector						
NO contact, pnp	2	E, F	► B	**3RG43 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.

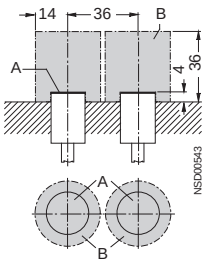
Dimensions

Mounting instructions

3RG43 22

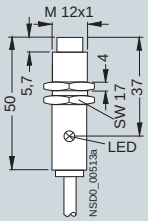


3RG46 13

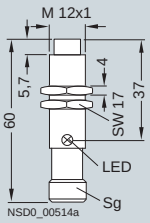


A = active surface
B = metal-free area

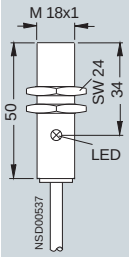
3RG43 22–0AG01



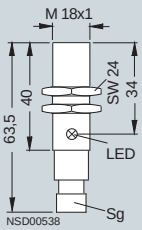
3RG43 22–3..01



3RG46 13–1AB01
3RG46 13–0GB00



3RG46 13–3AB01
3RG46 13–3GB01



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

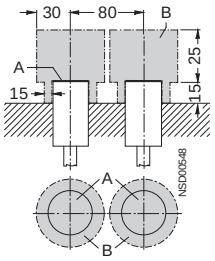
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
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.

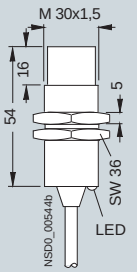
Dimensions

Mounting instructions

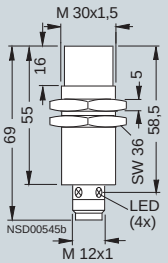


A = active surface
B = metal-free area

3RG40 24–0..00



3RG40 24–3..00



Technical specifications

Class		**Extra duty (65 V DC)**	**Extra duty (AC/DC)**
Number of wires		**3-wire**	**2-wire**
Design		**Cubic 40 mm × 40 mm**	**Cubic 40 mm × 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	100	25/150 (AC/DC)
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	–
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

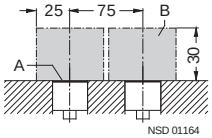
Selection and Ordering data

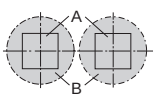
Switching output	Circuit diagram number[1]		Order No.		Order No.
With terminal box			0.5 ... 2.5 mm²		0.5 ... 2.5 mm²
NO contact or NC contact repositionable, pnp	23	► B	**3RG40 31–6AD00**		–
NO contact or NC contact repositionable	24		–	► B	**3RG40 31–6KD00**

1) See page 2/242.
► Preferred type, available from stock.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

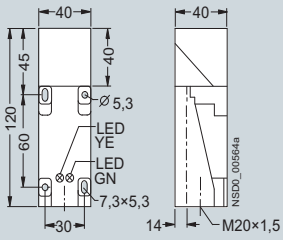
Mounting instructions





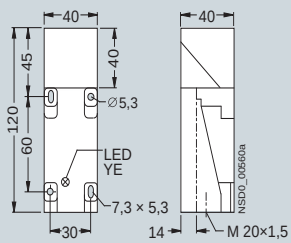
A = active surface
B = metal-free area

3RG40 31–6AD00



The active surface can be adjusted in 5 directions.

3RG40 31–6KD00



The active surface can be adjusted in 5 directions.

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 × 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

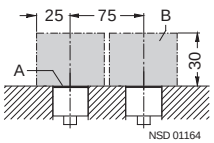
Selection and Ordering data

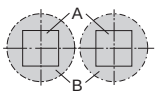
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
						3 × 0.25 mm²
With 3 m cable, PUR						
NO contact, pnp	11			–	B	**3RG41 14–0AG01**
With M12 connector						
NO contact, pnp	2	E, F		–	B	**3RG41 14–3AG01**
With M12 connector, rotatable						
NO contact	8	E, F	B	**3RG40 38–3KB00**		–

1) See page 2/242.
2) See from page 2/268.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

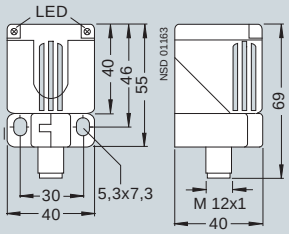
Mounting instructions





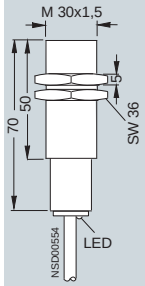
A = active surface
B = metal-free area

3RG40 38–3..00

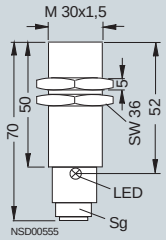


The active surface can be adjusted in 5 directions.
With rotatable connector..

3RG41 14–0AG01



3RG41 14–3AG01



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				
• 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

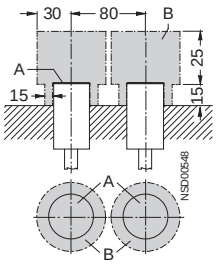
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.		Order No.
With 2 m cable				PUR, 3 × 0.25 mm²		PUR, 3 × 0.25 mm²		PVC, 3 × 0.25 mm²
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								
NO contact, pnp	8	E, F		**–**	B	**3RG40 24–3AG30**	B	**3RG40 24–3AG31**
NC contact, pnp	9	F		**–**	B	**3RG40 24–3AF30**		**–**

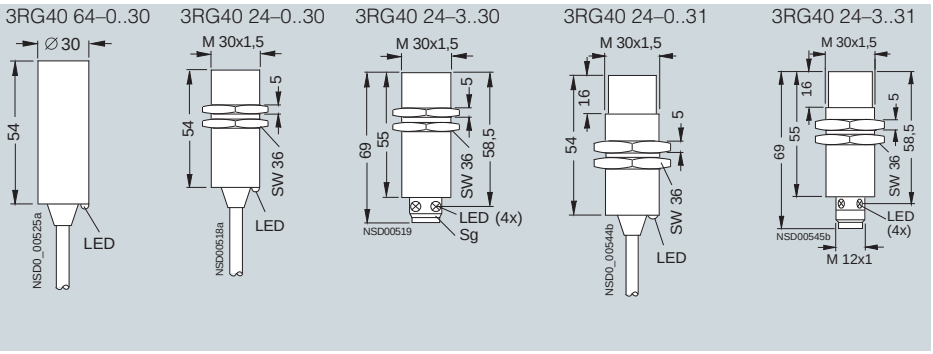
1) See page 2/242.
2) See from page 2/268.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

Mounting instructions



A = active surface
B = metal-free area



Operating distance 15 mm

Technical specifications

Class		**IP68 / 69 K (DC 65 V)**	**IP68 / 69 K (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		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	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		IP68 / 69 K	IP68 / 69 K

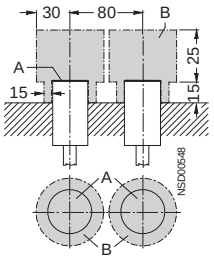
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		2 × 0.25 mm²
NO contact, pnp	11		B	**3RG40 24–0AB30**		**–**
NC contact, pnp	12		B	**3RG40 24–0AA30**		**–**
NO contact	16			**–**	► B	**3RG40 24–0KB30**
NC contact	17			**–**	B	**3RG40 24–0KA30**
With M12 connector						
NO contact, pnp	2	E, F	B	**3RG40 24–3AB30**		**–**
NC contact, pnp	3	F	B	**3RG40 24–3AA30**		**–**
NO contact	8	E, F		**–**	B	**3RG40 24–3KB30**
NC contact	9	F		**–**	B	**3RG40 24–3KA30**

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.

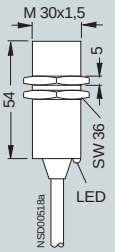
Dimensions

Mounting instructions

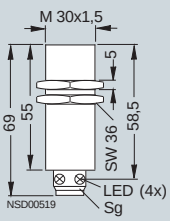


A = active surface
B = metal-free area

3RG40 24–0..30



3RG40 24–3..30



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 × 40 mm**	**Cubic 40 mm × 40 mm**	**Cubic 40 mm × 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

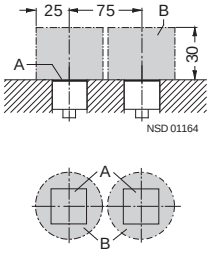
Selection and Ordering data

Switching output	Circuit diagram number[1]		Order No.		Order No.		Order No.
With 2 m cable, PUR			4 × 0.14 mm²		3 × 0.25 mm²		2 × 0.25 mm²
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.

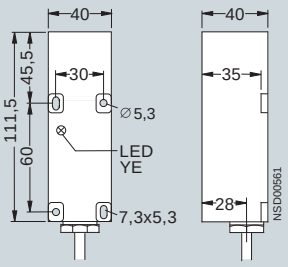
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG40 30–0..0.



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 × 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			
• 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

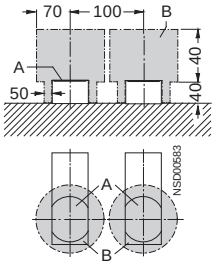
Selection and Ordering data

Switching output	Circuit diagram number[1]		Order No.		Order No.
With terminal box			0.5 ... 2.5 mm²		0.5 ... 2.5 mm²
NO contact or NC contact repositionable, pnp	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.

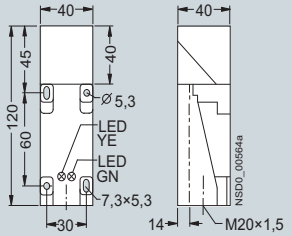
Dimensions

Mounting instructions



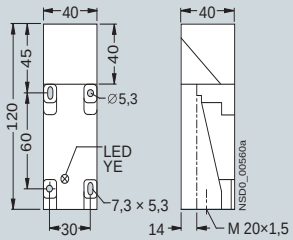
A = active surface;
B = metal-free area

3RG40 41–6AD00



The active surface can be adjusted in 5 directions.

3RG40 41–6KD00



The active surface can be adjusted in 5 directions.

Technical specifications

Class		**Increased operating distance**	**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	10 ... 30	15 ... 34
No-load supply current I_0	mA	≤ 10	≤ 30 (24 V); ≤ 50 (34 V)
Rated operational current I_e	mA	200	200 (≤ 50 °C); 150 (≤ 85 °C)
Switching frequency f	Hz	200	30
Repeat accuracy R	mm	1.0	1.5
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	IP65

Selection and Ordering data

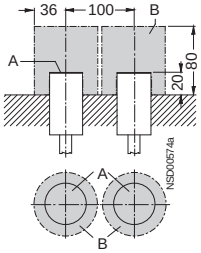
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.34 mm²		
NO contact, pnp	11		►	**3RG46 23–0AB02**		–
NO contact, npn	13			**3RG46 23–0GB02**		–
With M12 connector						
NO contact, pnp	2	E, F	►	**3RG46 23–3AB02**		–
NO contact, npn	4	E, F		**3RG46 23–3GB02**		–
With terminal box						0.5 ... 2.5 mm²
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.

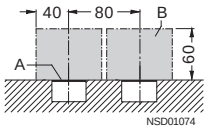
Dimensions

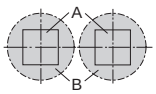
Mounting instructions

3RG46 23

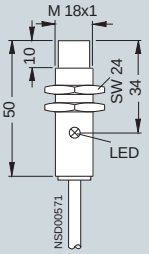


3RG41 34

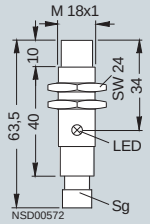




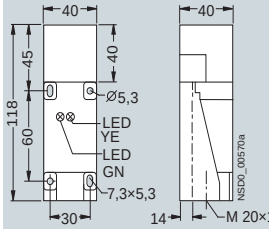
3RG46 23–0..02



3RG46 23–3..02



3RG41 34–6CD01



The active surface can be adjusted in 5 directions.
With screwed sensor.

A = active surface
B = metal-free area

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 × 40 mm**	**Cubic 40 mm × 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

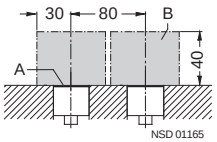
Selection and Ordering data

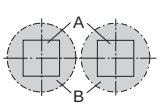
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With M12 connector						
NO contact and NC contact, pnp	1	F	► B	**3RG41 38–3CD00**		**–**
NO contact and NC contact, npn	–	F	B	**3RG41 38–3GD00**		**–**
NO contact	8	F		**–**	B	**3RG41 38–3KB00**

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

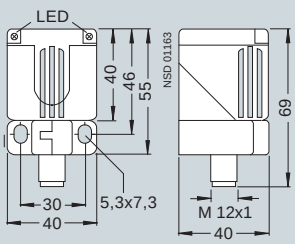
Mounting instructions





A = active surface
B = metal-free area

3RG41 38–3..00



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

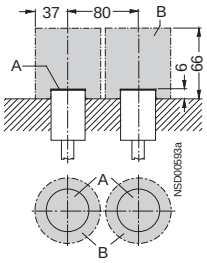
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.34 mm²
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.

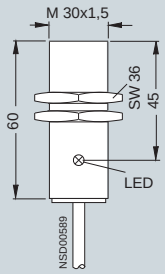
Dimensions

Mounting instructions

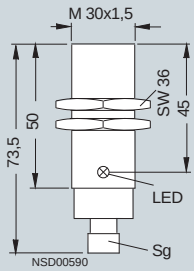


A = active surface
B = metal-free area

3RG46 14–0..00



3RG46 14–3..00



Operating distance 25 mm

Technical specifications

Class		**Increased operating distance (65 V DC)**
Number of wires		**3-wire**
Design		**Cubic 40 mm × 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

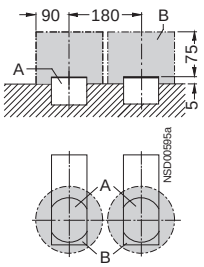
Switching output	Circuit diagram number[1]		Order No.
With terminal box			0.5 ... 2.5 mm^2
NO contact or NC contact reposi-tionable, pnp	23	► B	**3RG41 31–6AD00**

1) See page 2/242.
► Preferred type, available from stock.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

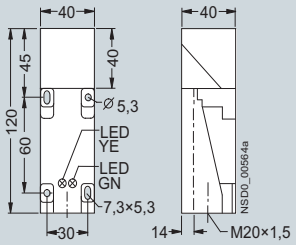
Mounting instructions

3RG41 31



A = active surface
B = metal-free area

3RG41 31–6AD0.



The active surface can be adjusted in 5 directions.

Technical specifications

Class		**Extra duty (65 V DC)**	**Extra duty (AC/DC)**
Number of wires		**3-wire**	**2-wire**
Design		**Cubic 60 mm × 80 mm**	**Cubic 60 mm × 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	50	25/60 (AC/DC)
Repeat accuracy R	mm	1.0	1.0
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		IP65	IP65

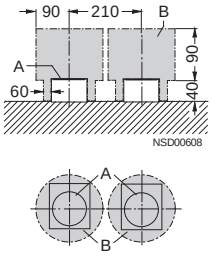
Selection and Ordering data

Switching output	Circuit diagram number[1]		Order No.		Order No.
With terminal box			0.5 ... 2.5 mm²		0.5 ... 2.5 mm²
NO contact or NC contact repositionable, pnp	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.

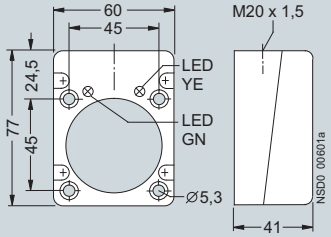
Dimensions

Mounting instructions

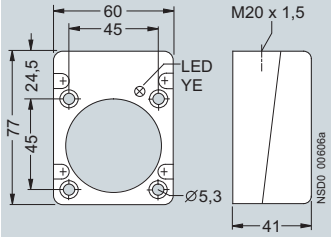


A = active surface
B = metal-free area

3RG40 42–6AD00



3RG40 42–6KD00



Operating distance 30 mm

Technical specifications

Class		**Increased operating distance**
Number of wires		**4-wire**
Design		**Cubic 40 mm × 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

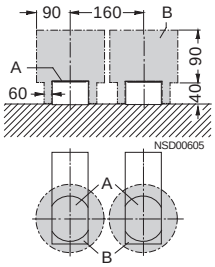
Selection and Ordering data

Switching output	Circuit diagram number[1)]	Order No.
With terminal box		0.5 ... 2.5 mm²
NO contact and NC contact, pnp	18	**3RG41 44–6CD01**

1) See page 2/242.

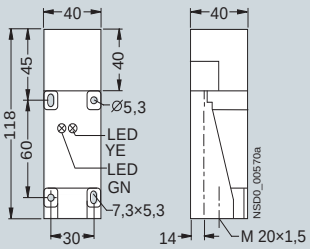
Dimensions

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 × 40 mm**	**Cubic 40 mm × 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	25/30 (AC/DC)
Repeat accuracy R	mm	0.75	0.75
Hysteresis H	mm	0.05 ... 7.7	0.05 ... 7.7
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

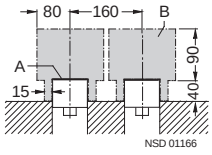
Selection and Ordering data

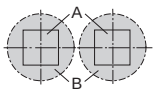
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With M12 connector						
NO contact and NC contact, pnp	1	F	► B	**3RG41 48–3CD00**		**–**
NO contact and NC contact, npn	–	F	B	**3RG41 48–3GD00**		**–**
NO contact	8	F		**–**	B	**3RG41 48–3KB00**

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

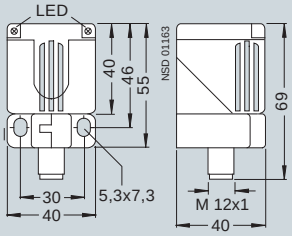
Mounting instructions





A = active surface
B = metal-free area

3RG41 48–3..00



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

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 × 100 mm**	**Cubic 80 mm × 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

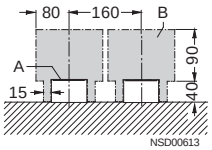
Selection and Ordering data

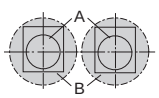
Switching output	Circuit diagram number[1]		Order No.		Order No.
With terminal box			0.5 ... 2.5 mm²		0.5 ... 2.5 mm²
NO contact or NC contact repositionable, pnp	23	► B	**3RG40 43–6AD00**		**–**
NO contact or NC contact repositionable	24		**–**	► B	**3RG40 43–6KD00**

1) See page 2/242.
► Preferred type, available from stock.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

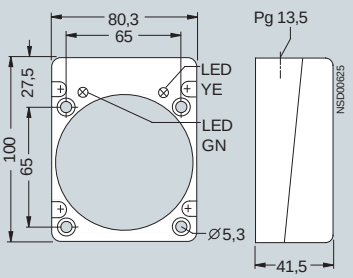
Mounting instructions



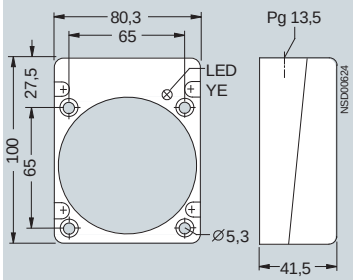


A = active surface
B = metal-free area

3RG40 43–6AD00



3RG40 43–6KD00



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

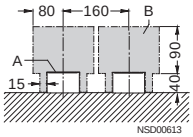
Switching output	Circuit diagram number[1]		Order No.		Order No.
With terminal box			0.5 ... 2.5 mm²		0.5 ... 2.5 mm²
NO contact or NC contact repositionable, pnp	23	► B	**3RG40 33–6AD01**		**–**
NO contact or NC contact repositionable	24		**–**	B	**3RG40 33–6KD01**

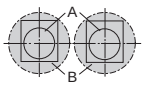
1) See page 2/242. ►Preferred type, available from stock.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

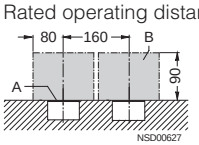
Mounting instructions

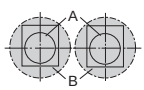
Rated operating distance 30 mm



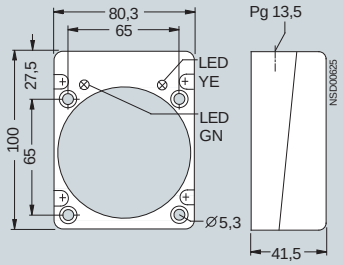


Rated operating distance 40 mm

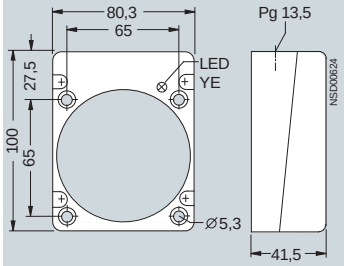




3RG40 33–6AD01



3RG40 33–6KD01



A = active surface
B = metal-free area

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)

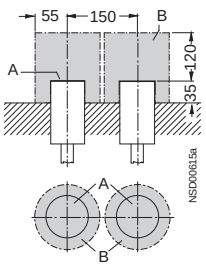
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.34 mm²
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.

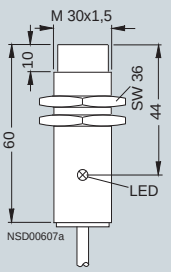
Dimensions

Mounting instructions

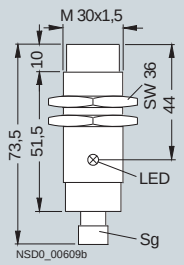


A = active surface
B = metal-free area

3RG46 24–0..02



3RG46 24–3..02



Technical specifications

Class		**Increased operating distance (65 V DC)**
Number of wires		**3-wire**
Design		**Cubic 40 mm × 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

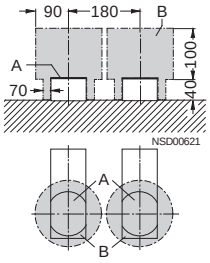
Selection and Ordering data

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 reposi-tionable, pnp	23	B	**3RG41 41–6AD00**

1) See page 2/242.
B: Subject to export regulations AL = N and ECCN = EAR99.

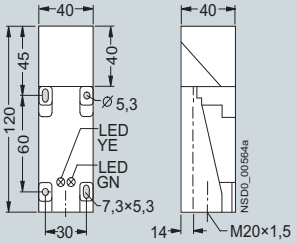
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG41 41–6A.0.



The active surface can be adjusted in 5 directions.

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 × 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		
• 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		IP67

Selection and Ordering data

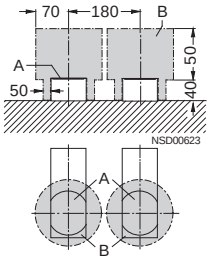
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With M12 connector				
NO contact, pnp	2	E, F	B	**3RG41 41–3AB02**
Connector can be offset in steps of 30°				
NO contact, pnp	2	E, F	B	**3RG41 41–3AB01**

1) See page 2/242.
2) See from page 2/268.
B: Subject to export regulations AL = N and ECCN = EAR99.

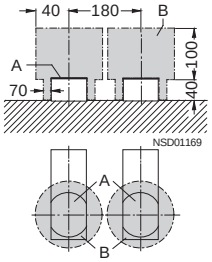
Dimensions

Mounting instructions

Rated operating distance 25 mm

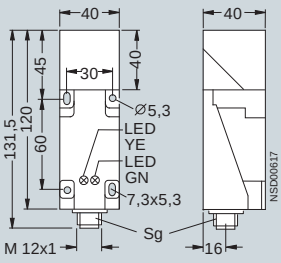


Rated operating distance 40 mm



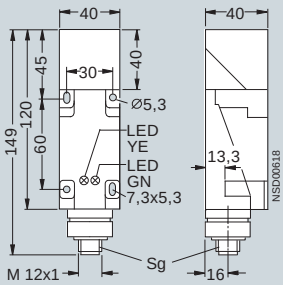
A = active surface
B = metal-free area

3RG41 41–3AB02



The active surface can be adjusted in 5 directions.

3RG41 41–3AB01



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 × 80 mm**	**Cubic 80 mm × 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	10 ... 65
No-load supply current I_0	mA	20	20
Rated operational current I_e	mA	300	300
Switching frequency f	Hz	20	10
Repeat accuracy R	mm	1.5	2
Power-up delay t_v	ms	100	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

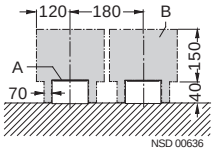
Switching output	Circuit diagram number[1]		Order No.		Order No.
With terminal box			0.5 ... 2.5 mm²		0.5 ... 2.5 mm²
NO contact or NC contact reposi-tionable, pnp	23	B	**3RG41 42–6AD00**	B	**3RG41 43–6AD00**

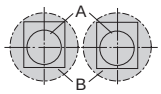
1) See page 2/242.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

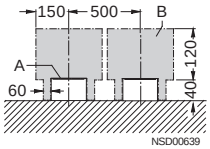
Mounting instructions

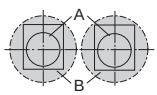
3RG41 42





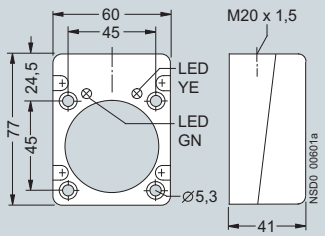
3RG41 43



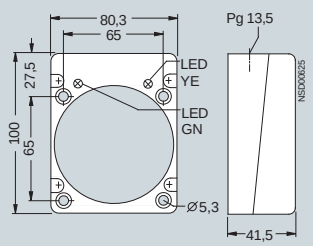


A = active surface
B = metal-free area

3RG41 42–6AD00



3RG41 43–6AD00



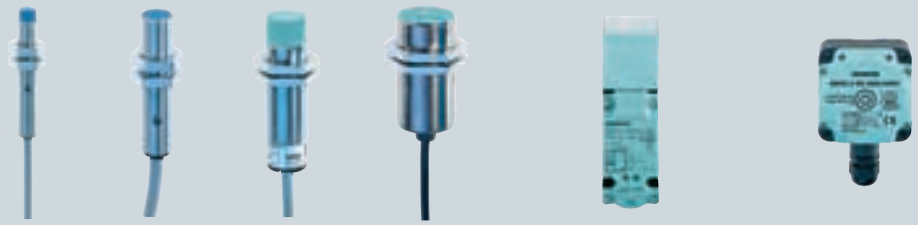
Overview

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		
• 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		•
Degree of protection		IP68

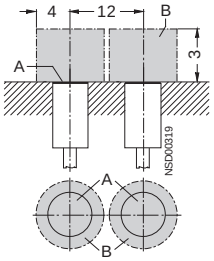
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.25 mm²
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

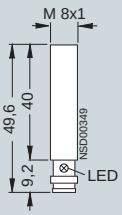
Mounting instructions



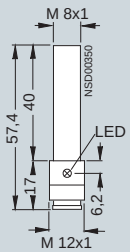
A = active surface
B = metal-free area

3RG46 11–0.N01

3RG46 11–7.N01



3RG46 11–3.N01



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		
• 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		
• Brass enclosure		IP67
• Stainless steel enclosure		IP68

Selection and Ordering data

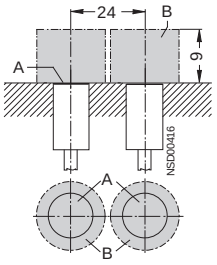
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.14 mm²
Brass, chrome-plated				
NO contact, pnp	11		►	**3RG46 12–0AN01**
NO contact, npn	13			**3RG46 12–0GN01**
Stainless steel				
NO contact, pnp	11			**3RG46 12–0AN61**
NO contact, npn	13			**3RG46 12–0GN61**
With M12 connector				
Brass, chrome-plated				
NO contact, pnp	2	E, F		**3RG46 12–3AN01**
NO contact, npn	4	E, F		**3RG46 12–3GN01**
Brass, teflon-coated				
NO contact, pnp	2	E, F		**3RG46 12–3AN05**
NO contact, npn	4	E, F		**3RG46 12–3GN05**
Stainless steel				
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.

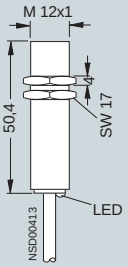
Dimensions

Mounting instructions

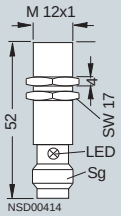


A = active surface
B = metal-free area

3RG46 12–0.N..



3RG46 12–3.N..



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		
• 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		•
Degree of protection		IP68

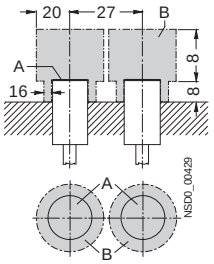
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.25 mm²
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.

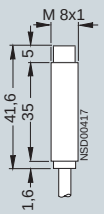
Dimensions

Mounting instructions

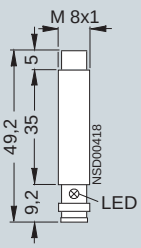


A = active surface
B = metal-free area

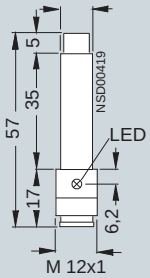
3RG46 21–0.N01



3RG46 21–7.N01



3RG46 21–3.N01



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		
• 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		
• Brass enclosure		IP67
• Stainless steel enclosure		IP68

Selection and Ordering data

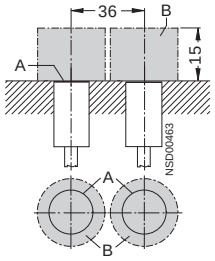
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.34 mm²
Brass, chrome-plated				
NO contact, pnp	11			**3RG46 13–0AN01**
NO contact, npn	13			**3RG46 13–0GN01**
Stainless steel				
NO contact, pnp	11			**3RG46 13–0AN61**
NO contact, npn	13			**3RG46 13–0GN61**
With M12 connector				
Brass, chrome-plated				
NO contact, pnp	2	E, F	►	**3RG46 13–3AN01**
NO contact, npn	4	E, F		**3RG46 13–3GN01**
Brass, teflon-coated				
NO contact, pnp	2	E, F		**3RG46 13–3AN05**
NO contact, npn	4	E, F		**3RG46 13–3GN05**
Stainless steel				
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.

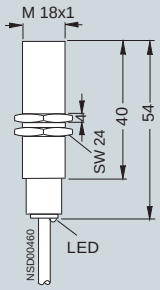
Dimensions

Mounting instructions

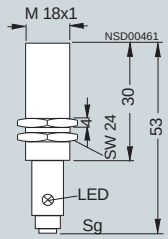


A = active surface
B = metal-free area

3RG46 13–0.N..



3RG46 13–3.N..



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 operatingl 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		
• 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		
• Brass enclosure		IP67
• Stainless steel enclosure		IP68

Selection and Ordering data

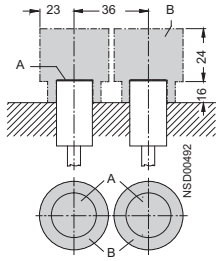
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.34 mm²
Brass, chrome-plated				
NO contact, pnp	11		►	**3RG46 22–0AN01**
NO contact, npn	13			**3RG46 22–0GN01**
Stainless steel				
NO contact, pnp	11			**3RG46 22–0AN61**
NO contact, npn	13			**3RG46 22–0GN61**
With M12 connector				
Brass, chrome-plated				
NO contact, pnp	2	E, F	►	**3RG46 22–3AN01**
NO contact, npn	4	E, F		**3RG46 22–3GN01**
Brass, teflon-coated				
NO contact, pnp	2	E, F		**3RG46 22–3AN05**
NO contact, npn	4	E, F		**3RG46 22–3GN05**
Stainless steel				
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.

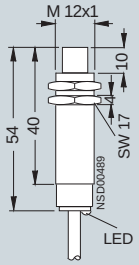
Dimensions

Mounting instructions

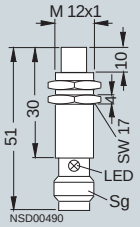


A = active surface
B = metal-free area

3RG46 22–0.N..



3RG46 22–3.N..



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		
• 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		
• Brass enclosure		IP67
• Stainless steel enclosure		IP68

Selection and Ordering data

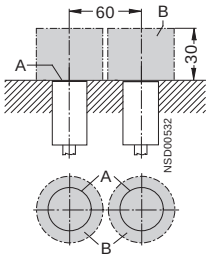
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.34 mm²
Brass, chrome-plated				
NO contact, pnp	11			**3RG46 14–0AN01**
NO contact, npn	13			**3RG46 14–0GN01**
Stainless steel				
NO contact, pnp	11			**3RG46 14–0AN61**
NO contact, npn	13			**3RG46 14–0GN61**
With M12 connector				
Brass, chrome-plated				
NO contact, pnp	2	E, F	►	**3RG46 14–3AN01**
NO contact, npn	4	E, F		**3RG46 14–3GN01**
Brass, teflon-coated				
NO contact, pnp	2	E, F		**3RG46 14–3AN05**
NO contact, npn	4	E, F		**3RG46 14–3GN05**
Stainless steel				
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.

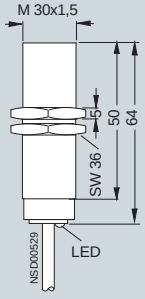
Dimensions

Mounting instructions

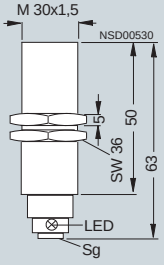


A = active surface
B = metal-free area

3RG46 14–0.N..



3RG46 14–3.N..



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		
• 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		
• Brass enclosure		IP67
• Stainless steel enclosure		IP68

Selection and Ordering data

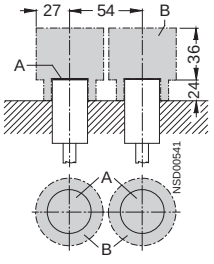
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.34 mm²
Brass, chrome-plated				
NO contact, pnp	11		►	**3RG46 23–0AN01**
NO contact, npn	13			**3RG46 23–0GN01**
Stainless steel				
NO contact, pnp	11			**3RG46 23–0AN61**
NO contact, npn	13			**3RG46 23–0GN61**
With M12 connector				
Brass, chrome-plated				
NO contact, pnp	2	E, F	►	**3RG46 23–3AN01**
NO contact, npn	4	E, F		**3RG46 23–3GN01**
Brass, teflon-coated				
NO contact, pnp	2	E, F		**3RG46 23–3AN05**
NO contact, npn	4	E, F		**3RG46 23–3GN05**
Stainless steel				
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.

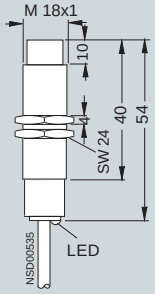
Dimensions

Mounting instructions

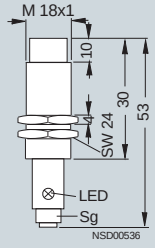


A = active surface
B = metal-free area

3RG46 23–0.N..



3RG46 23–3.N..



Operating distance 15 mm

Technical specifications

Class		**Reduction factor 1**
Number of wires		**3-wire**
Design		**Cubic 40 mm × 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					0.5 ... 2.5 mm²
NO contact, pnp	28			–	**3RG46 34–6AN01**
NO contact, npn	29			–	**3RG46 34–6GN01**

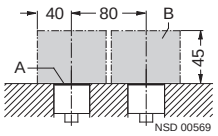
1) See page 2/242.
2) See from page 2/268.

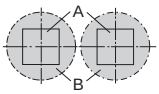
► Preferred type, available from stock.

Dimensions

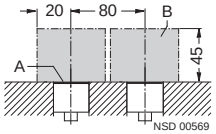
Mounting instructions

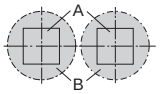
3RG46 38





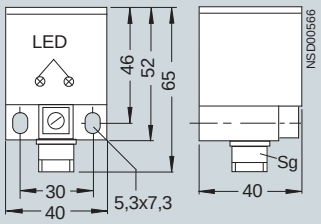
3RG46 34



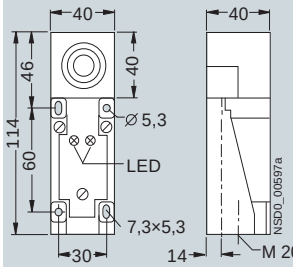


A = active surface
B = metal-free area

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		
• 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		
• Brass enclosure		IP67
• Stainless steel enclosure		IP68

Selection and Ordering data

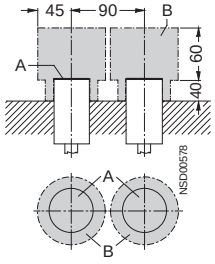
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.34 mm²
Brass, chrome-plated				
NO contact, pnp	11		►	**3RG46 24–0AN01**
NO contact, npn	13			**3RG46 24–0GN01**
Stainless steel				
NO contact, pnp	11		►	**3RG46 24–0AN61**
NO contact, npn	13			**3RG46 24–0GN61**
With M12 connector				
Brass, chrome-plated				
NO contact, pnp	2	E, F	►	**3RG46 24–3AN01**
NO contact, npn	4	E, F		**3RG46 24–3GN01**
Brass, teflon-coated				
NO contact, pnp	2	E, F		**3RG46 24–3AN05**
NO contact, npn	4	E, F		**3RG46 24–3GN05**
Stainless steel				
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.

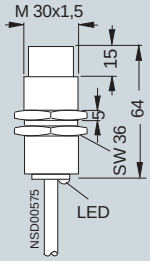
Dimensions

Mounting instructions

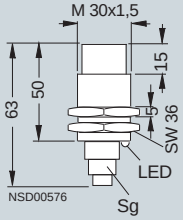


A = active surface
B = metal-free area

3RG46 24–0.N..



3RG46 24–3.N..



Operating distance 25 mm

Technical specifications

Class		**Reduction factor 1**
Number of wires		**3-wire**
Design		**Cubic 40 mm × 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

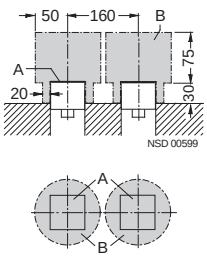
Selection and Ordering data

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					0.5 ... 2.5 mm²
NO contact, pnp	28			–	**3RG46 44–6AN02**
NO contact, npn	29			–	**3RG46 44–6GN02**

1) See page 2/242.
2) See from page 2/268.
► Preferred type, available from stock.

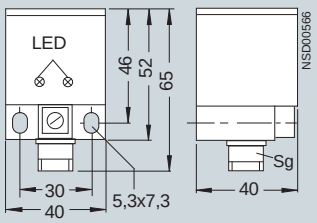
Dimensions

Mounting instructions

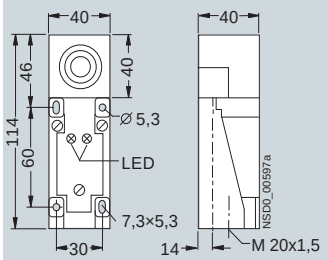


A = active surface
B = metal-free area

3RG46 48–3.N01



3RG46 44–6.N02



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 × 40 mm**	**Cubic 40 mm × 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						0.5 ... 2.5 mm²
NO contact, pnp	28			–	►	**3RG46 44–6AN01**
NO contact, npn	29			–		**3RG46 44–6GN01**

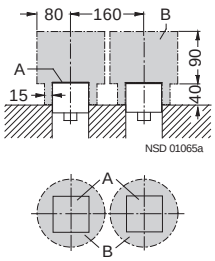
1) See page 2/242.
2) See from page 2/268.

► Preferred type, available from stock.

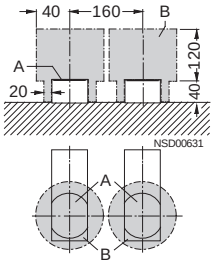
Dimensions

Mounting instructions

3RG46 48–3.N11

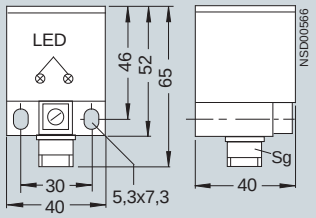


3RG46 44–6.N01

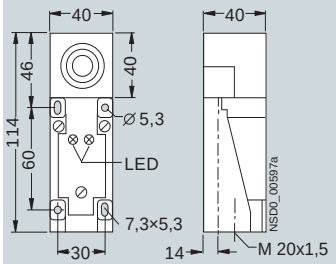


A = active surface
B = metal-free area

3RG46 48–3.N11



3RG46 44–6.N01



The active surface can be adjusted in 5 directions.

Operating distance 75 mm

Technical specifications

Class		**Reduction factor 1**
Number of wires		**3-wire**
Design		**Cubic 80 mm × 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		
• Spurious signal suppression		•
• Short-circuit-proof/overload-proof		•
• Reverse-polarity protection		•
• Wire-break protection		•
• Inductive interference protection		Magnetic field resistant up to 75 mT r.m.s.
• Radio interference protection		•
• Totally insulated		•
Degree of protection		IP67

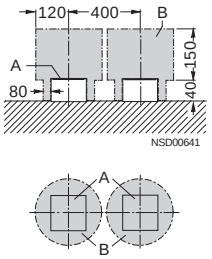
Selection and Ordering data

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.

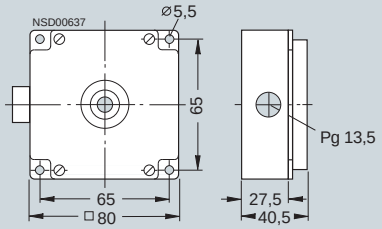
Dimensions

Mounting instructions



A = active surface
B = metal-free area

3RG46 43–6.N01



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 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				4 × 0.14 mm²		4 × 0.14 mm²
NO contact and NC contact, pnp						
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**

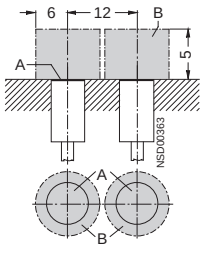
1) See page 2/242.
2) See from page 2/268.

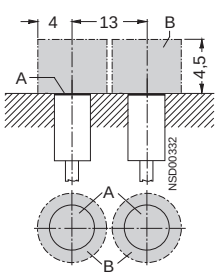
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

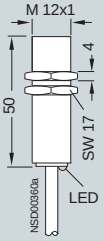
Mounting instructions

Dimension depending on form
A = active surface
B = metal-free area

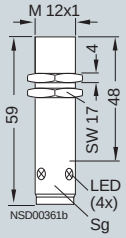




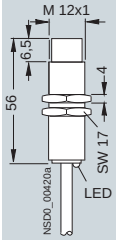
3RG40 12–0CD00



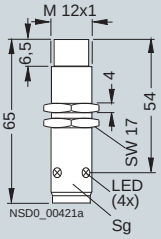
3RG40 12–3CD00



3RG40 22–0CD00



3RG40 22–3CD00



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

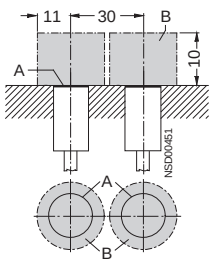
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				4 × 0.14 mm²		4 × 0.14 mm²
NO contact and NC contact, pnp						
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	10		B	**3RG40 13–0CD00-0XA0**	B	**3RG40 23–0CD00-0XA0**
Zone 22, II 3D, (dust); EX II 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	B	**3RG40 13–3CD00-0XA0**	B	**3RG40 23–3CD00-0XA0**
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	1	F	B	**3RG40 13–3CD00-0XB0**	B	**3RG40 23–3CD00-0XB0**

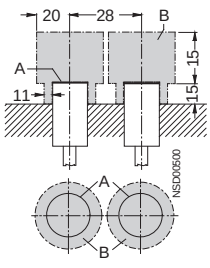
1) See page 2/242.
2) See from page 2/268.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

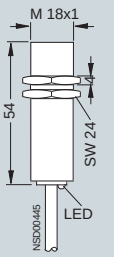
Mounting instructions

Dimension depending on form
A = active surface
B = metal-free area

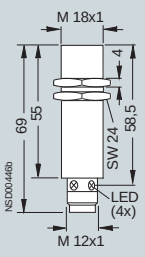




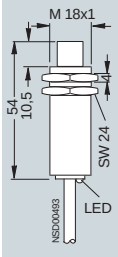
3RG40 13–0CD00



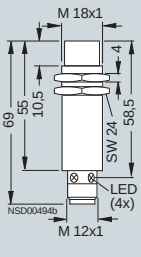
3RG40 13–3CD00



3RG40 23–0CD00



3RG40 23–3CD00



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				4 × 0.14 mm²		4 × 0.14 mm²
NO contact and NC contact, pnp						
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	10		B	**3RG40 14–0CD00-0XA0**	B	**3RG40 24–0CD00-0XA0**
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	10		B	**3RG40 14–0CD00-0XB0**	B	**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	B	**3RG40 14–3CD00-0XA0**	B	**3RG40 24–3CD00-0XA0**
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	1	F	B	**3RG40 14–3CD00-0XB0**	B	**3RG40 24–3CD00-0XB0**

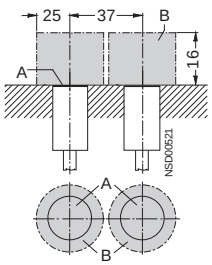
1) See page 2/242.
2) See from page 2/268.
B Subject to export regulations AL = N and ECCN = EAR99

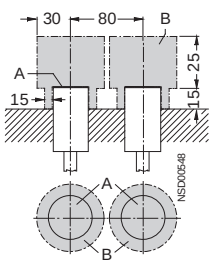
Dimensions

Mounting instructions

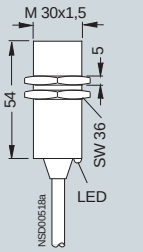
Dimension depending on form

A = active surface
B = metal-free area

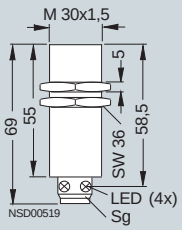




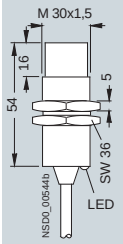
3RG40 14–0CD00



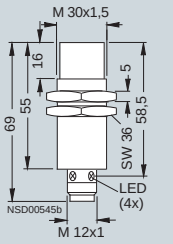
3RG40 14–3CD00



3RG40 24–0CD00



3RG40 24–3CD00



Technical specifications

Class		**Ex Zone 2**	**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			
• 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

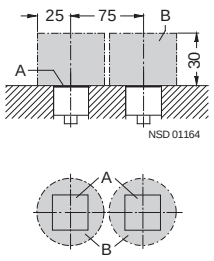
Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With M12 connector						
NO contact and NC contact, pnp						
Zone 2, II 3G, (gas); EX II 3G EEx nA II T6 X	1	F	B	**3RG40 38–3CD00-0XA0**	B	**3RG41 48–3CD00-0XA0**
Zone 22, II 3D, (dust); EX II 3D IP65 T80 °C X	1	F	B	**3RG40 38–3CD00-0XB0**	B	**3RG41 48–3CD00-0XB0**

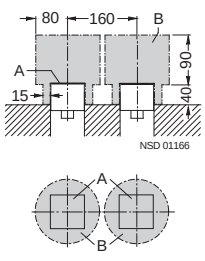
1) See page 2/242.
2) See from page 2/268.
B: Subject to export regulations AL = N and ECCN = EAR99.

Dimensions

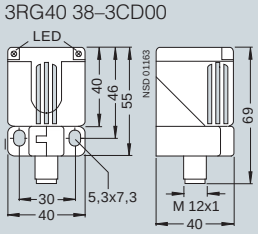
Mounting instructions

Dimension depending on form
A = active surface
B = metal-free area

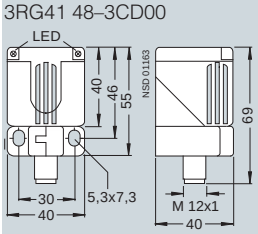




3RG40 38–3CD00



3RG41 48–3CD00



SIMATIC 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				
• Spurious signal suppression		•	•	•
• Short-circuit-proof/overload-proof		•	•	•
• Reverse-polarity protection		•	•	•
• Wire-break protection		•	•	•
• Inductive interference protection		•	•	•
• Radio interference protection		•	•	•
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 mm²		3 × 0.25 mm²		3 × 0.25 mm²
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**		–

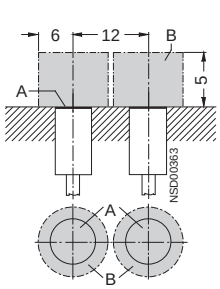
1) See page 2/242.
2) See from page 2/268.

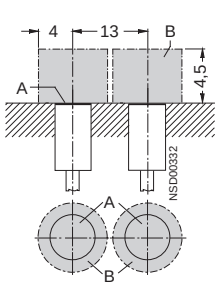
A: Subject to export regulations AL = N and ECCN = EAR99H

Dimensions

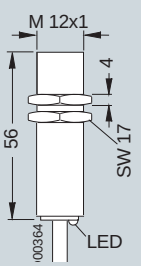
Mounting instructions

Dimension depending on form
A = active surface
B = metal-free area

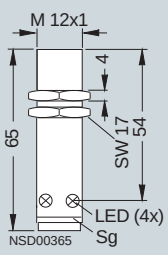




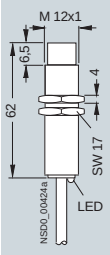
3RG40 12–0...



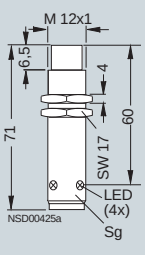
3RG40 12–3...



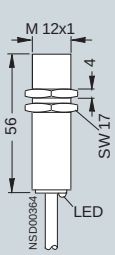
3RG40 22–0..31-4AA0



3RG40 22–3..31-4AA0



3RG40 22–0..30-4AA0



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			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP68/69K	IP68/69K

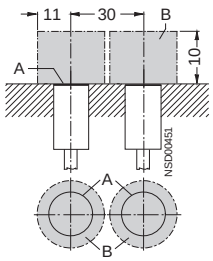
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²
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.

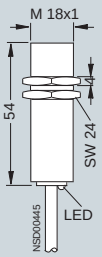
Dimensions

Mounting instructions

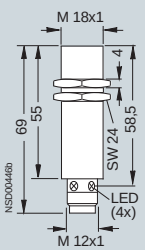


A = active surface
B = metal-free area

3RG40 13–0...



3RG40 13–3...



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			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP68/69K	IP68/69K

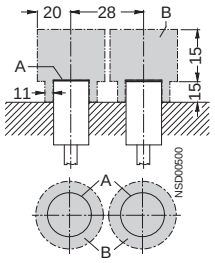
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²
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.

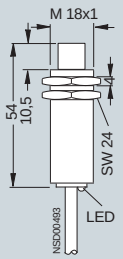
Dimensions

Mounting instructions

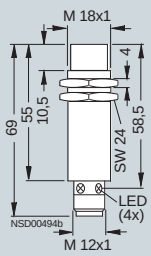


A = active surface
B = metal-free area

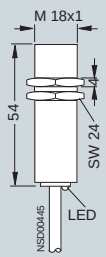
3RG40 23–0..31-4AA0



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			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP68/69K	IP68/69K

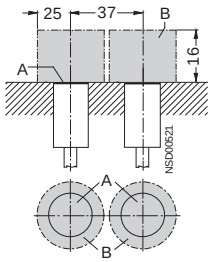
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²
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.

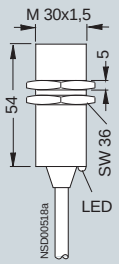
Dimensions

Mounting instructions

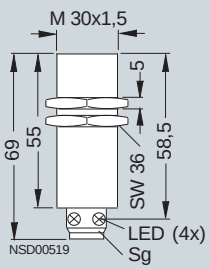


A = active surface
B = metal-free area

3RG40 14-0...



3RG40 14–3...



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			
• Spurious signal suppression		•	•
• Short-circuit-proof/overload-proof		•	•
• Reverse-polarity protection		•	•
• Wire-break protection		•	•
• Inductive interference protection		•	•
• Radio interference protection		•	•
Degree of protection		IP68/69K	IP68/69K

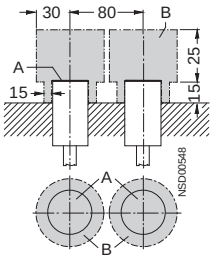
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.		Order No.
With 2 m cable, PUR				3 × 0.25 mm²		3 × 0.25 mm²
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.

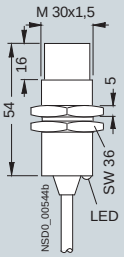
Dimensions

Mounting instructions

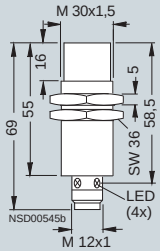


A = active surface
B = metal-free area

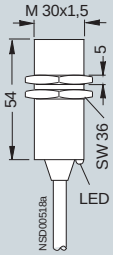
3RG40 24–0..31-4AA0



3RG40 24–3..31-4AA0



3RG40 24–0..30-4AA0



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

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		
• Spurious signal suppression		•
• Short-circuit-proof/overload-proof		•
• Reverse-polarity protection		–
• Wire-break protection		•
• Inductive interference protection		•
• Radio interference protection		–
Degree of protection		IP68

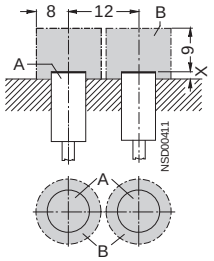
Selection and Ordering data

Switching output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				3 × 0.34 mm²
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.

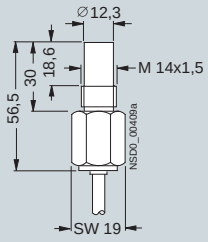
Dimensions

Mounting instructions

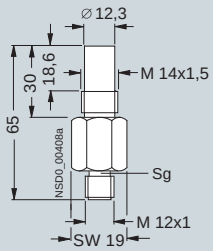


A = active surface
B = metal-free area
X ≥ 2.4 mm for mounting in steel,
X ≥ 1.2 mm for mounting in other metals

3RG46 52–0P.00



3RG46 52–3P.00



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

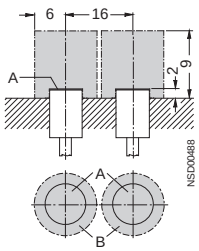
Selection and Ordering data

Analog output	Circuit diagram number[1]	Connector type[2]		Order No.
With 2 m cable, PUR				4 × 0.25 mm²
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.

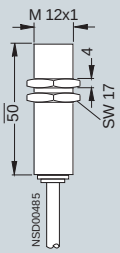
Dimensions

Mounting instructions

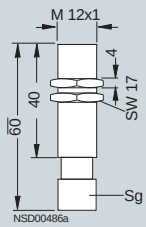


A = active surface
B = metal-free area

3RG46 12–0NB00



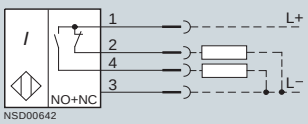
3RG46 12–3NB00



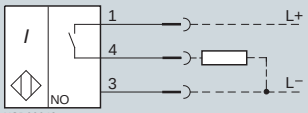
Schematics

Schematics

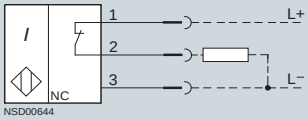
Circuit diagram 1



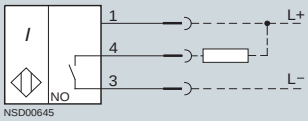
Circuit diagram 2



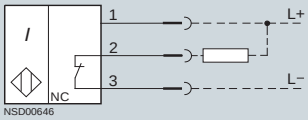
Circuit diagram 3



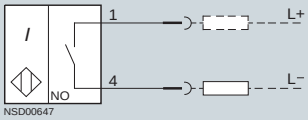
Circuit diagram 4



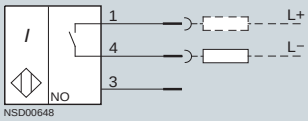
Circuit diagram 5



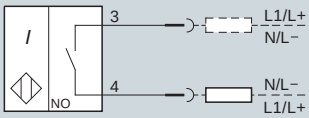
Circuit diagram 6



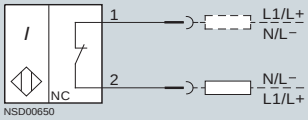
Circuit diagram 7



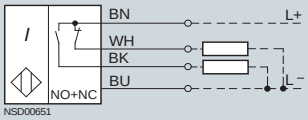
Circuit diagram 8



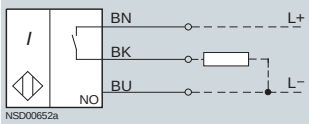
Circuit diagram 9



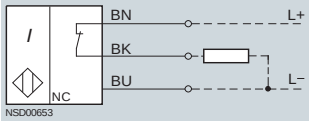
Circuit diagram 10



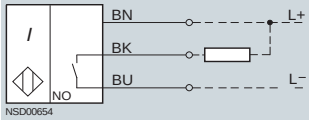
Circuit diagram 11



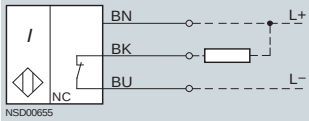
Circuit diagram 12



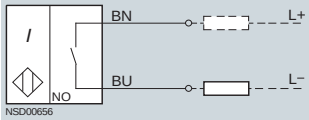
Circuit diagram 13



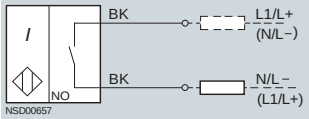
Circuit diagram 14



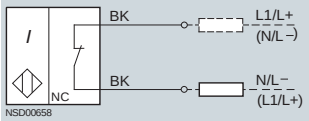
Circuit diagram 15



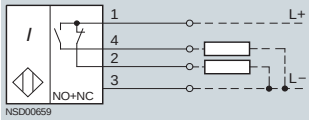
Circuit diagram 16



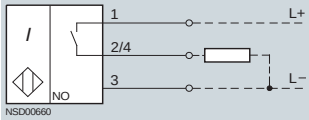
Circuit diagram 17



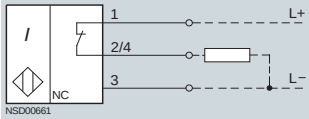
Circuit diagram 18



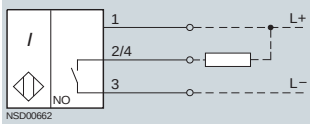
Circuit diagram 19



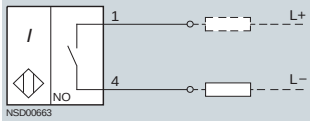
Circuit diagram 20



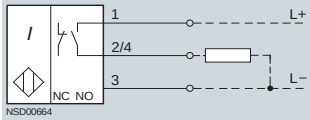
Circuit diagram 21



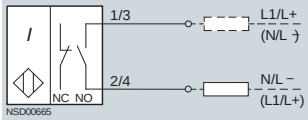
Circuit diagram 22



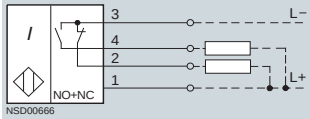
Circuit diagram 23



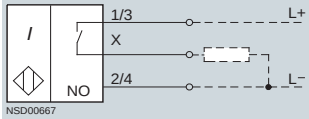
Circuit diagram 24



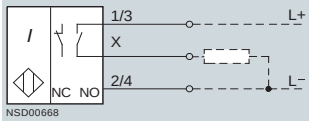
Circuit diagram 25



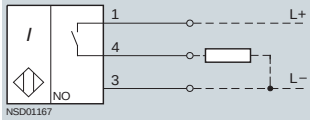
Circuit diagram 26



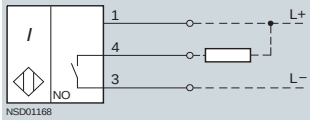
Circuit diagram 27



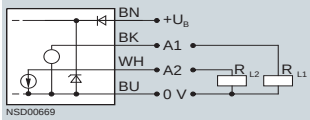
Circuit diagram 28



Circuit diagram 29



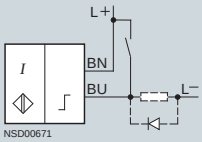
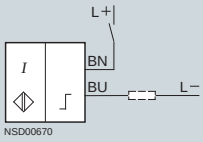
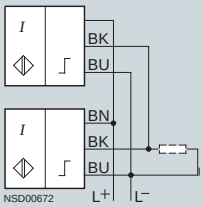
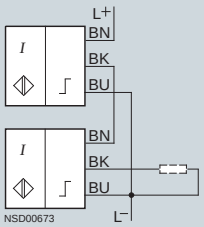
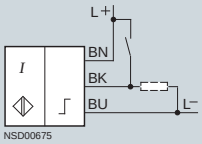
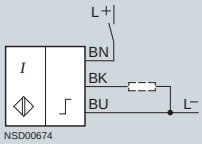
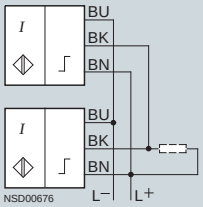
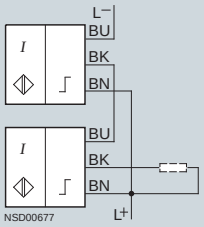
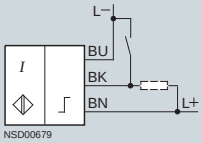
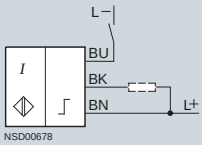
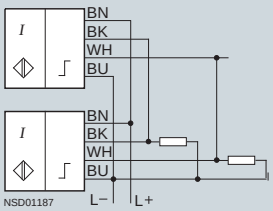
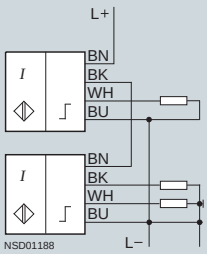
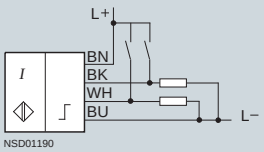
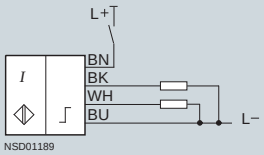
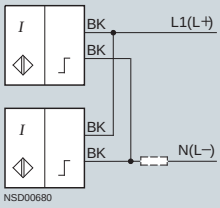
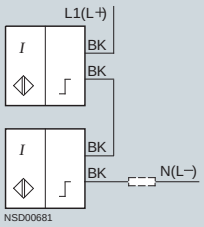
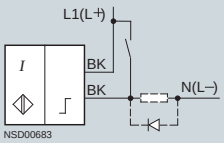
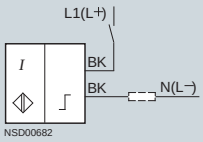
Circuit diagram 30



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	Series connection [1]	Parallel circuit with 1 contact (NO or NC)	Series connection with 1 contact (NO or NC) [1]
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	Not possible, as $n \leq \frac{U_b - 15\ V}{8\ V}$ U_b PLC: 24 V		
3-wire proximity switches, pnp			
	 $n \leq \frac{U_b - U_{min}}{2.5\ V} + 1$ $U_c = U_b - (n \cdot 2.5\ V)$		 Other connections are not permissible.
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			
 The total of all proximity switch residual currents must be smaller than the holding current of the load	 $n \leq \frac{U_b}{20\ V}$ $U_c = U_b - (n \cdot 8\ V)$	 With DC voltage operation, a diode must be connected in parallel to the primarily inductive load.	

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:

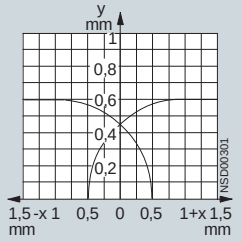
BK = Black	BN = Brown
BU = Blue	WH = White

Characteristic curves

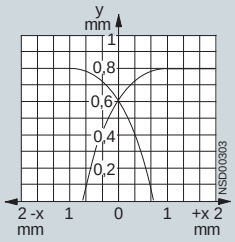
Response curves

The response curves are determined using standard targets according to EN 60947-5-2.

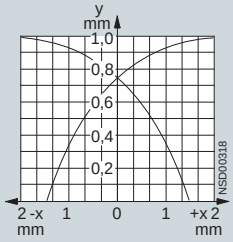
Operating distance 0.6 mm (normal)
3RG46 03, 3RG46 00, 3RG4610



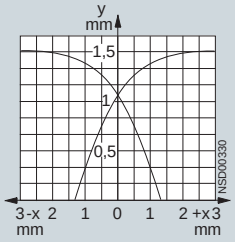
Operating distance 0.8 mm
(normal) 3RG 46 .0, 3RG 46 36



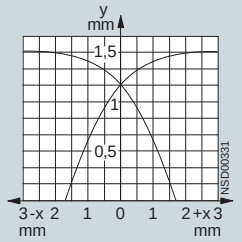
Operating distance 1 mm (normal)
3RG40 11



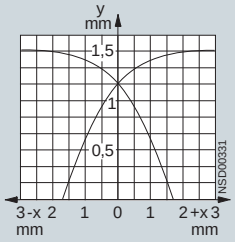
Operating distance 1.5 mm
(normal) 3RG40 ..–...33 (shorty)



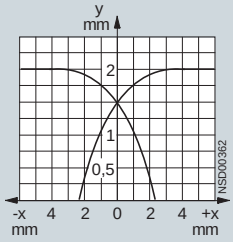
Operating distance 1.5 mm (normal)
3RG40 ..–...05, 3RG46 01,
3RG46 11, 3RG46 37



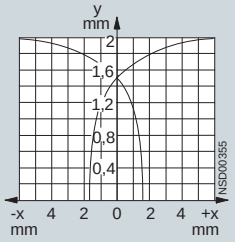
Operating distance 1.5 mm
(PXI400) 3RG46 11



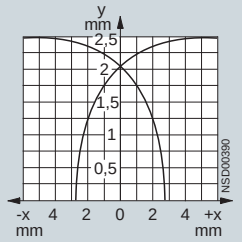
Operating distance 2 mm (normal)
3RG40 12, 3RG40 52, 3RG40 7.



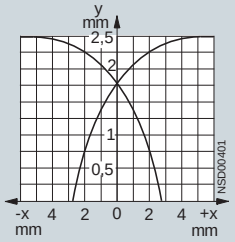
Operating distance 2 mm
(extra duty) 3RG41 11



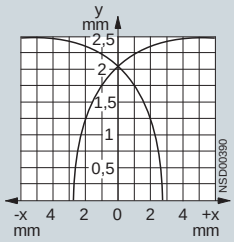
Operating distance 2.5 mm (normal)
3RG40 21, 3RG40 60



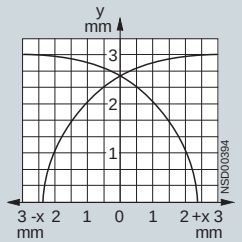
Operating distance 2.5 mm
(normal) 3RG40 72



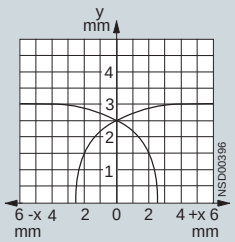
Operating distance 2.5 mm
(extra duty) 3RG46 02, 3RG46 11



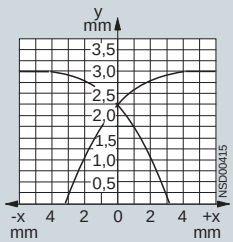
Operating distance 3 mm
(extra duty) 3RG46 11



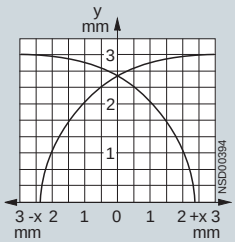
Operating distance 3 mm
(extra duty) 3RG46 02, 3RG46 37



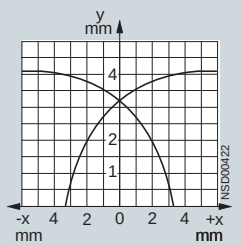
Operating distance 3 mm (PXI400)
3RG46 12



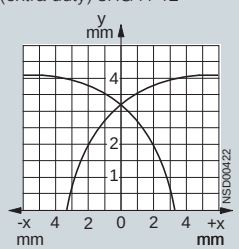
Operating distance 3 mm
(pressure-resistant) 3RG46 52



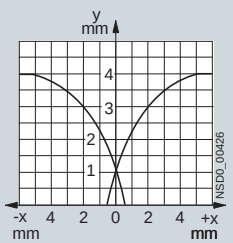
Operating distance 4 mm (normal)
3RG40 22, 3RG40 62



Operating distance 4 mm
(extra duty) 3RG41 12

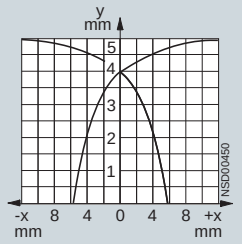


Operating distance 4 mm (PXI400)
3RG46 21

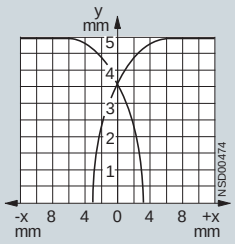


Characteristic curves

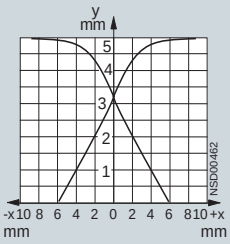
Operating distance 5 mm (normal)
3RG40 13, 3RG40 53



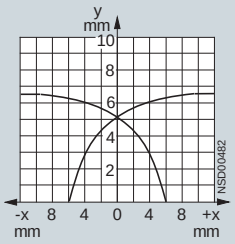
Operating distance 5 mm (normal)
3RG40 82



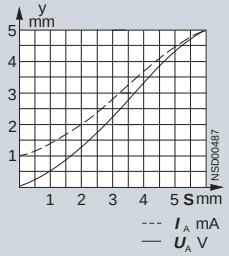
Operating distance 5 mm (PXI400)
3RG46 13



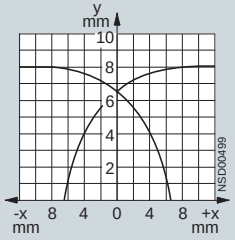
Operating distance 6 mm
(extra duty) 3RG46 21, 3RG46 12



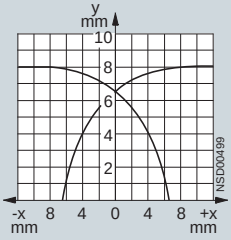
Operating distance 0 ... 6 mm
(analog) 3RG46 12



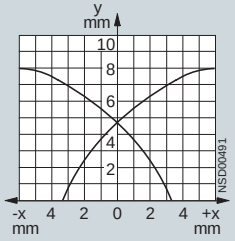
Operating distance 8 mm (normal)
3RG40 23, 3RG40 63



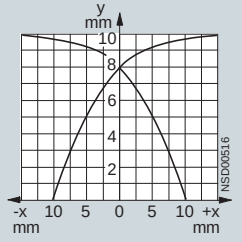
Operating distance 8 mm
(extra duty) 3RG41 13



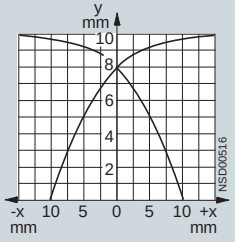
Operating distance 8 mm (PXI400)
3RG46 22



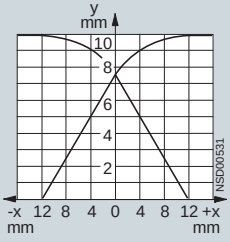
Operating distance 10 mm (normal)
3RG40 14, 3RG40 54, 3RG46 25.



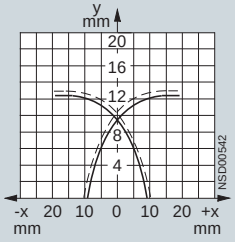
Operating distance 10 mm
(extra duty) 3RG46 22



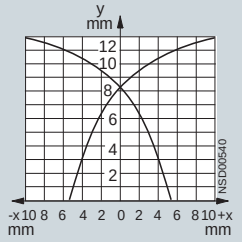
Operating distance 10 mm
(PXI400) 3RG46 14



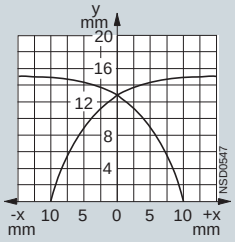
Operating distance 12 mm
(extra duty) 3RG46 13



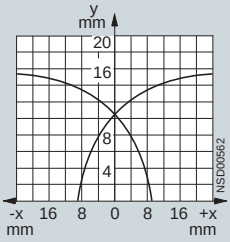
Operating distance 12 mm (PXI400)
3RG46 23



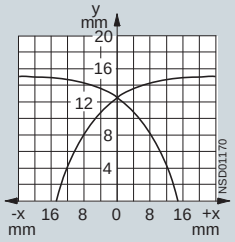
Operating distance 15 mm (normal)
3RG40 24, 3RG40 31, 3RG 40 64.



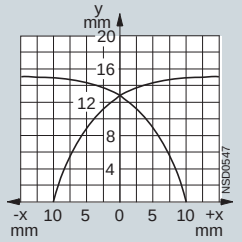
Operating distance 15 mm (normal)
3RG40 30, 3RG40 34



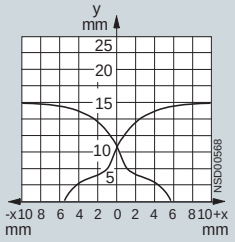
Operating distance 15 mm (normal)
3RG40 38



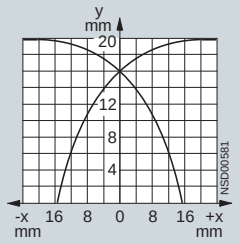
Operating distance 15 mm
(extra duty) 3RG46 12



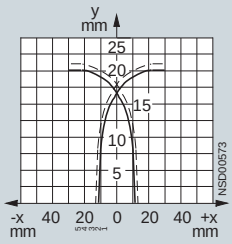
Operating distance 15 mm
(PXI400) 3RG46 34, 3RG46 38



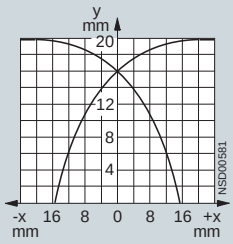
Operating distance 20 mm (normal)
3RG40 41, 3RG46 26



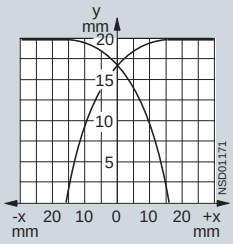
Operating distance 20 mm
(extra duty) 3RG46 23



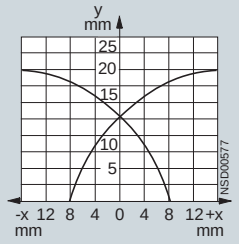
Operating distance 20 mm
(extra duty) 3RG 41 34, 3RG46 38



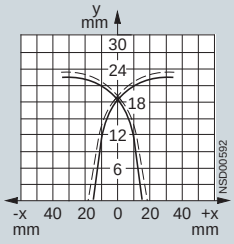
Operating distance 20 mm
(extra duty) 3RG41 38



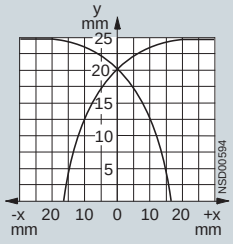
Operating distance 20 mm (PXI400)
3RG46 12



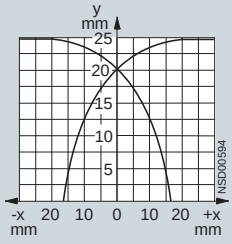
Operating distance 22 mm
(extra duty) 3RG46 14



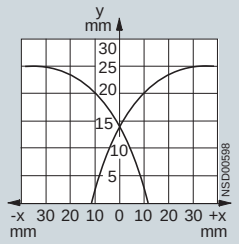
Operating distance 25 mm (normal)
3RG40 32



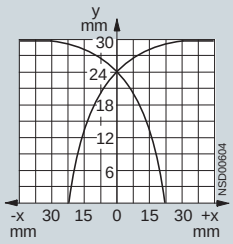
Operating distance 25 mm
(extra duty) 3RG41 31, 3RG41 41



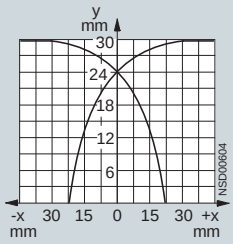
Operating distance 25 mm (PXI400)
3RG46 44, 3RG46 48



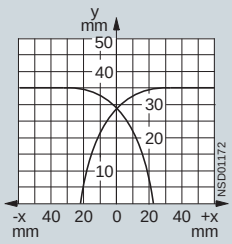
Operating distance 30 mm (normal)
3RG 40 33, 3RG40 42



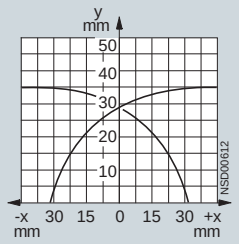
Operating distance 30 mm
(extra duty) 3RG41 44



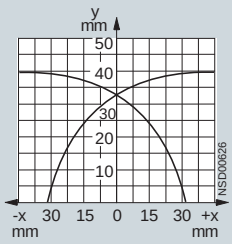
Operating distance 35 mm
(extra duty) 3RG41 48



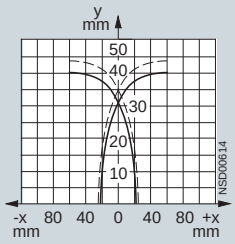
Operating distance 35 mm (PXI400)
3RG46 48



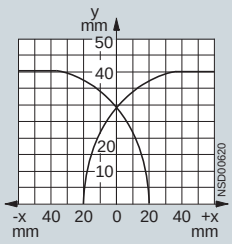
Operating distance 40 mm (normal)
3RG 40 33, 3RG40 43



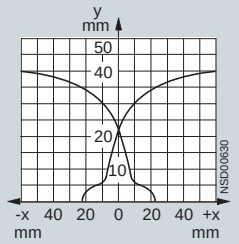
Operating distance 40 mm
(extra duty) 3RG46 24



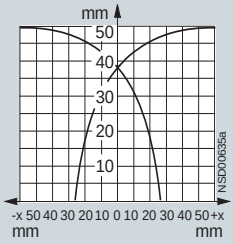
Operating distance 40 mm
(extra duty) 3RG41 41



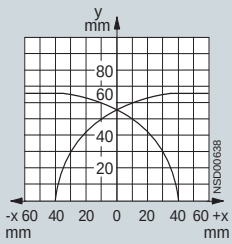
Operating distance 40 mm (PXI400)
3RG46 44



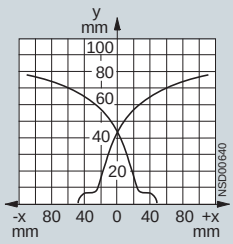
Operating distance 50 mm
(extra duty) 3RG41 42



Operating distance 65 mm
(extra duty) 3RG41 43



Operating distance 75 mm
(PXI400) 3RG46 43



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.

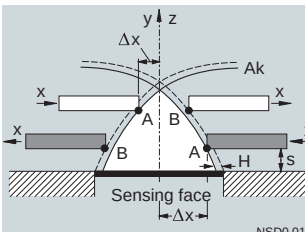
Sensing area

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:

- A_1 with NO function and
- A_2 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

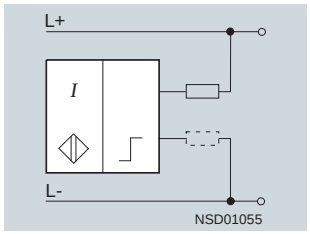
See operating distances

Axial distance to target Δx

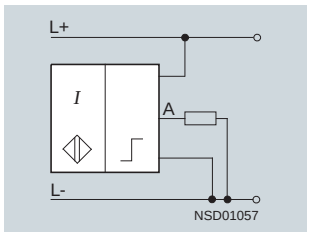
Distance between the actuating element and the proximity switch axis z at the response point A.

Output

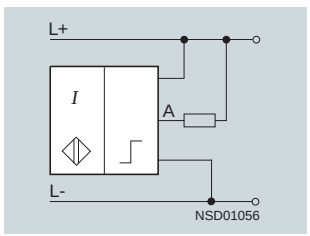
The proximity switches are available with different output connections.



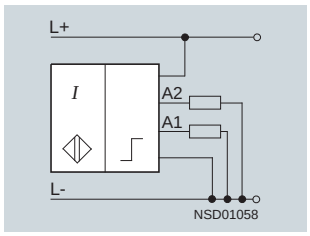
2-wire, DC or AC/DC, load connected in series with proximity switch



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 A_1, A_2 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).

Glossary for proximity switches

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

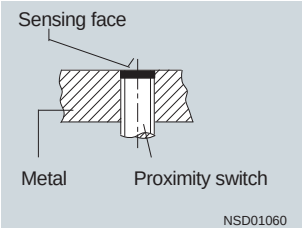
Axis running perpendicular to the active surface and through its center. See also mounting instructions.

Mounting

Shielded proximity switches

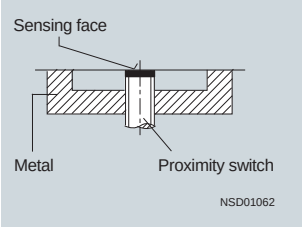
A proximity switch can be shielded if any attenuating material (metal) can be attached around the active surface without influencing the characteristic features.

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.

Glossary for proximity switches

Electromagnetic compatibility (EMC)

All inductive proximity switches meet the protection requirements of the EMC guideline No. 89/336/EWG. This is verified by application of the EN 60 947-5-2 standard.

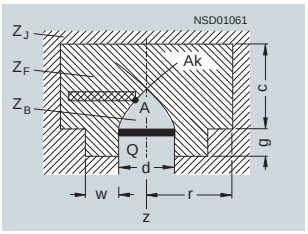
For the individual checks the following EMC standards apply:

- 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).

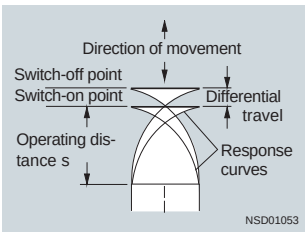


Ak	Response curve
A	Point of response
c, g	Partial heights of transition region
d	Diameter of the proximity switch
Q	Sensing area
r	Radius of free zone
w	Mounting condition
z	Reference axis
ZB	Attenuation zone
ZF	Free zone
ZJ	Inactive zone

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 Im (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 µF/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.

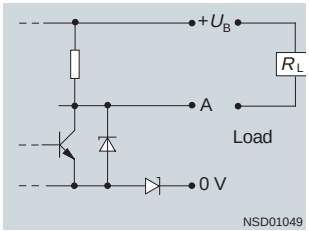
Material of standard target: St 37, 1 mm thick

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.

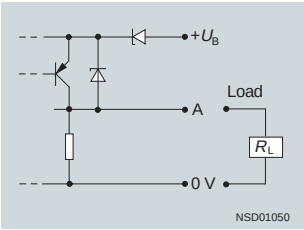
Please note:

- 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

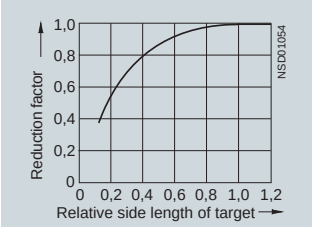
Selection of NO or NC function using slide switch in bottom part of enclosure or plug-in jumper in the electronics base. Only with certain cubic proximity switches.

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.

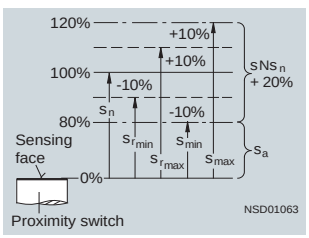
The usable operating distance is between 90% and 110% of the real operating distance. This results in the following for a reliable design: $0.81\ s_n < s_u < 1.21\ s_n$

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_{min}	min. usable operating distance s_u (= operating distance s_a)
s_{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

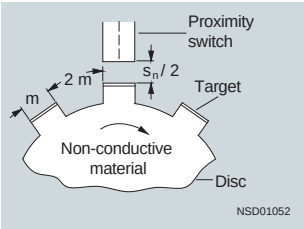
An NC function results in no flow of load current when the target is sensed, and a flow of load current when the target is not sensed.

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 sn. 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 ql. 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 °C ± 5 °C
- Test fluid: Tap water,
- Temperature of test fluid: 105 °C – 5 °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 °C ± 5 °C. The permissible change is ± 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 to +70 °C, the operating distance varies by max. ±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 sr at defined conditions.

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 difference between any two measurements must not exceed 10% of the real operating distance sr. The repeat accuracy is usually far better in the case of measurements immediately following one another.

Notes

2

Capacitive proximity switches – Monitoring fill levels and more

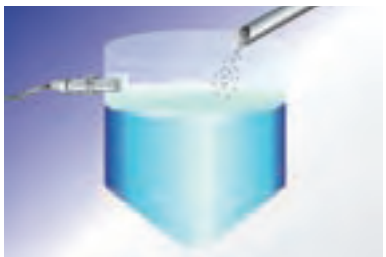
Capacitive proximity switches are also non-contact sensors and respond to the same degree almost instinctively when conducting and non-conducting materials in solid, powder or liquid state are to be measured. They impress customers especially in the case of fill level monitoring through non-metalic materials 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.

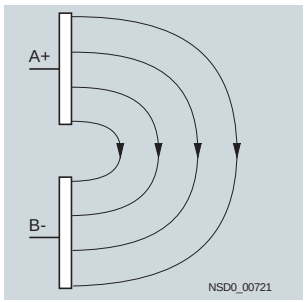
Type

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.



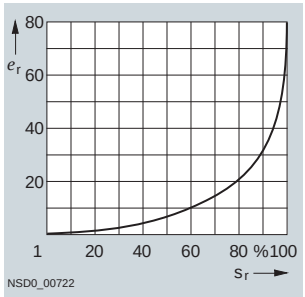
When an object approaches the active face of the sensor, it enters the electric field in front of the electrode surfaces and causes a change in the coupling capacitance. The oscillator starts to oscillate; the amplitude is recorded by an evaluation circuit and converted into a switching command.

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

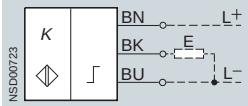
Technical specifications

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

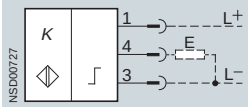
DC

Fig. 1



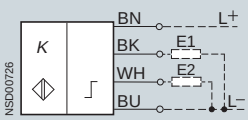
Proximity switch activated
Load E switched on (NO function)
e.g. contactor relays, solenoid valves

Fig. 2



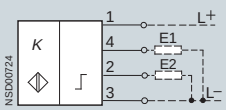
Proximity switch activated
Load E switched on (NO function)
e.g. contactor relays, solenoid valves

Fig. 3



Proximity switch activated
Load E1 switched on (NO function)
Load E2 switched off (NC function)
e.g. contactor relays, solenoid valves

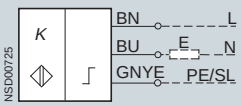
Fig. 4



Proximity switch activated
Load E1 switched on (NO function)
Load E2 switched off (NC function)
e.g. contactor relays, solenoid valves

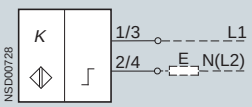
AC

Fig. 5



Proximity switch activated
Load E switched on (NO function) or
Load E switched off (NC function)
e.g. contactor relays, solenoid valves
NO or NC function according to type

Fig. 6



Proximity switch activated
Load E switched on (NO function) or
Load E switched off (NC function)
e.g. contactor relays, solenoid valves
NO or NC function, programmable

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**

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.

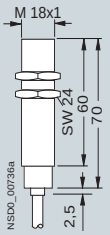
Selection and Ordering data

Switching output	Circuit diagram number	Connector type	Order No.	Order No.	Order No.
With LiYY cable, 2 m			3 × 0.5 mm²	3 × 0.25 mm²	4 × 0.34 mm²
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**	–

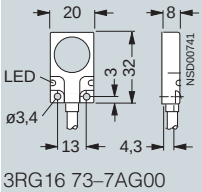
► Preferred type, available from stock.

Dimensions

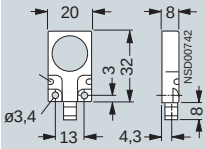
3RG16 13–0AB00



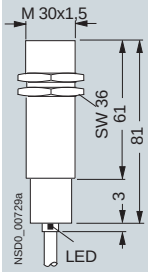
3RG16 73–0AG00



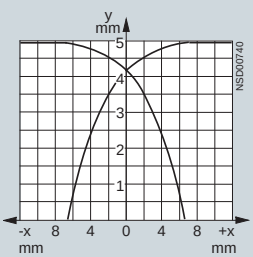
3RG16 73–7AG00



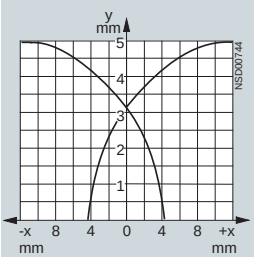
3RG16 14–0AC00



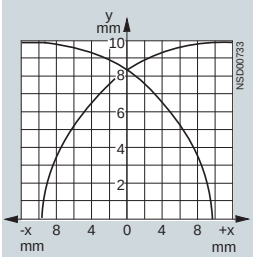
Characteristic curves



Standard target:
Metal, 20 mm × 20 mm × 1 mm, with direct connection to ground



Standard target:
Metal, 20 mm × 20 mm × 1 mm, with direct connection to ground



Standard target:
Metal, 30 mm × 30 mm × 1 mm, with direct connection to ground

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.

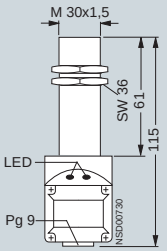
Selection and Ordering data

Switching output	Circuit diagram number	Connector type	Order No.	Order No.	Order No.
With terminal box			to 2.5 mm²	to 2.5 mm²	to 2.5 mm²
NO contact and NC contact, pnp (antivalent)	4	►	**3RG16 14–6AC00**	**3RG16 55–6AC00**	**3RG16 30–6AC00**

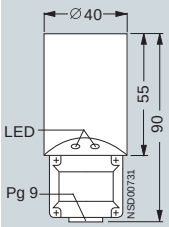
► Preferred type, available from stock.

Dimensions

3RG16 14–6AC00

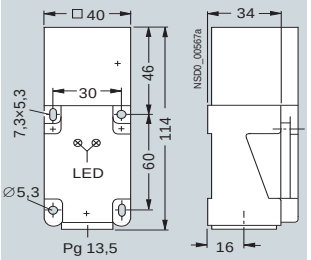


3RG16 55–6AC00

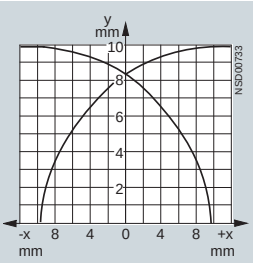


Fixing clamp, Ø 40 mm, included in scope of supply.

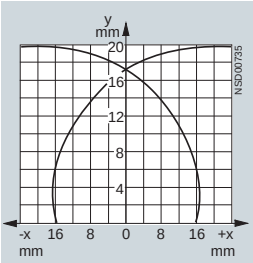
3RG16 30–6AC00



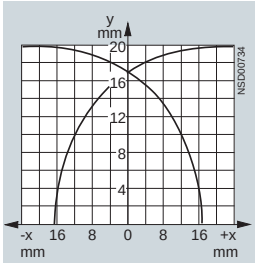
Characteristic curves



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

Technical specifications

Number of wires		**2 + PE**	**2**	**2**	**2**
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		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.

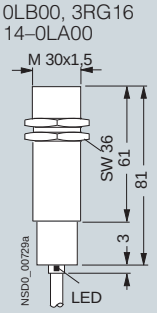
Selection and Ordering data

Switching output	Circuit diagram number	Connector type	Order No.	Order No.	Order No.
With LiYY cable, 2 m			3 × 0.5 mm²		
NO contact	5	►	**3RG16 14–0LB00**	–	–
NC contact	5	►	**3RG16 14–0LA00**	–	–
With terminal box			to 2.5 mm²	to 2.5 mm²	to 2.5 mm²
NO contact or NC contact programmable	6	►	**3RG16 14–6LD00**	► **3RG16 55–6LD00**	► **3RG16 30–6LD00**

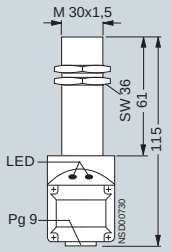
► Preferred type, available from stock.

Dimensions

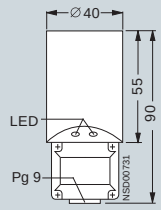
3RG16 14–0LB00, 3RG16 14–0LA00



3RG16 14–6LD00

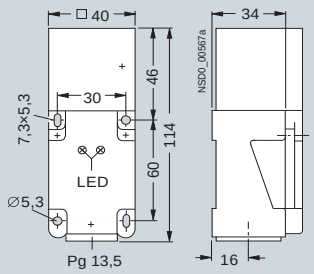


3RG16 55–6LD00

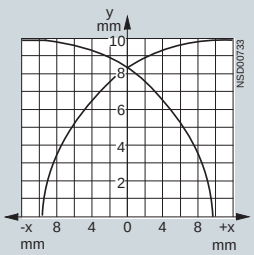


Fixing clamp, Ø 40 mm, included in scope of supply.

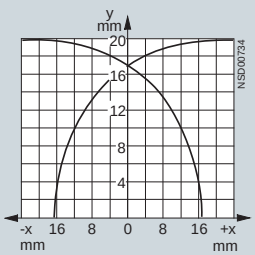
3RG16 30–6LD00



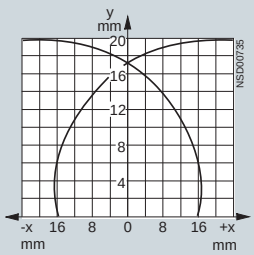
Characteristic curves



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

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.

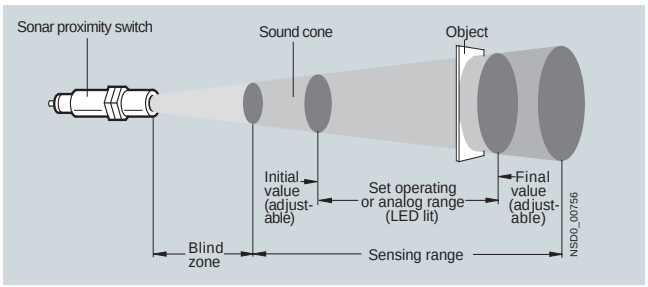
Parameters

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.

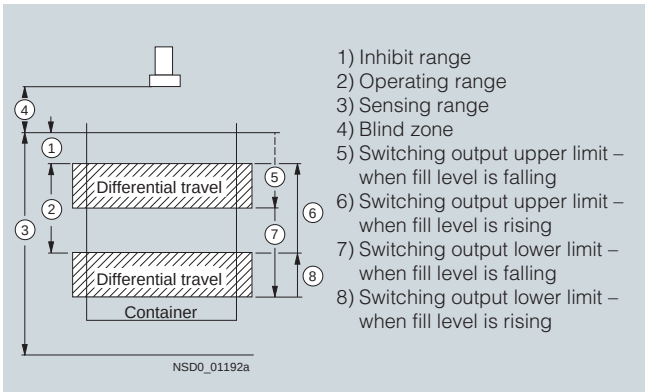
In the case of Sonar proximity switch of M30 K2 compact range with two switching outputs, the second switching output is active when an object is located between the blind zone and the operating range.



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.

SONPROG programming device for SIMATIC PXS

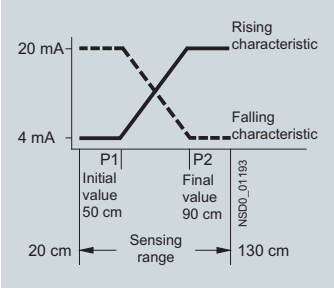
Switching rate

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.

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**

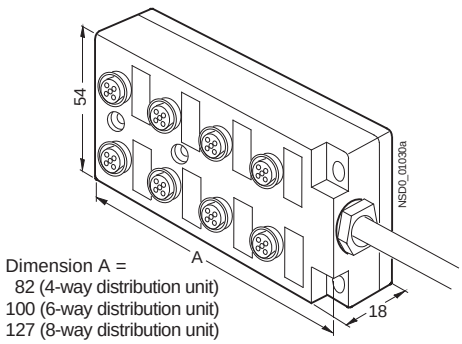
► Preferred type, available from stock.

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		
• 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

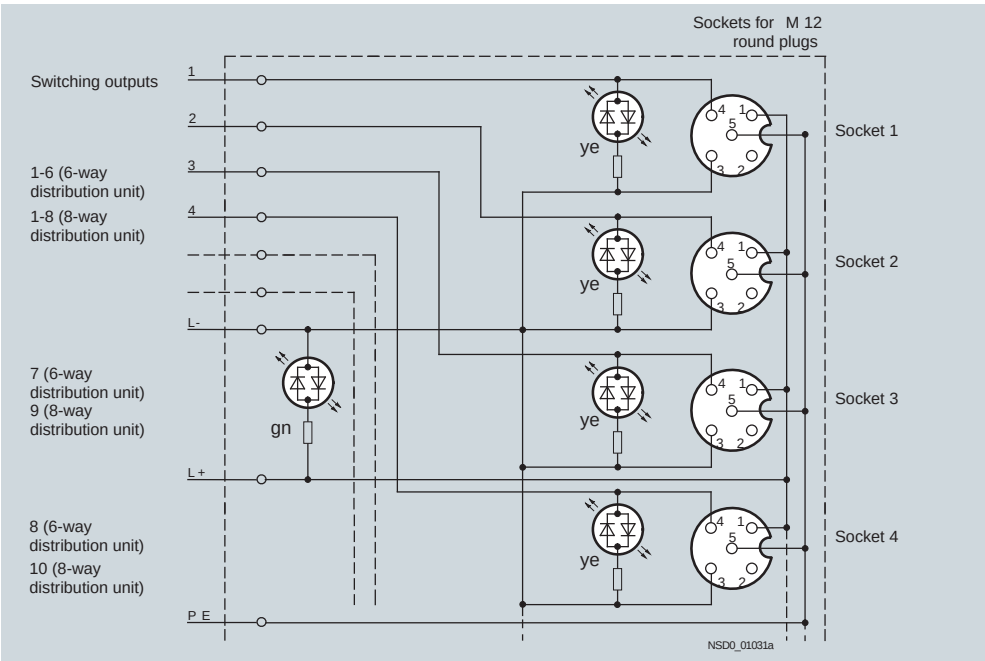


Dimension A =
82 (4-way distribution unit)
100 (6-way distribution unit)
127 (8-way distribution unit)

	Type	Order No.
Distribution units, quadruple		
• 5 m PUR line	►	**3RX8 000-0JA40-1AF0**
• 10 m PUR line	►	**3RX8 000-0JA40-1AL0**
Distribution units, 6x		
• 5 m PUR line	►	**3RX8 000-0JA60-1AF0**
• 10 m PUR line	►	**3RX8 000-0JA60-1AL0**
Distribution units, 8x		
• 5 m PUR line	►	**3RX8 000-0JA80-1AF0**
• 10 m PUR line	►	**3RX8 000-0JA80-1AL0**
Distributors Preassembly possible, with connecting hood	►	**3RX8 000-0JA80**

► Preferred type, available from stock.

Schematics



Plastic fiber-optic conductor for SIMATIC PXO

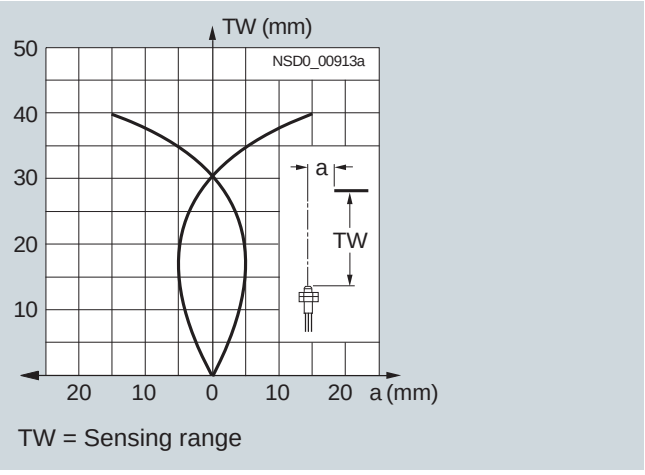
Overview

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.



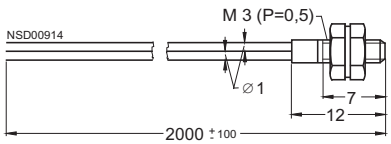
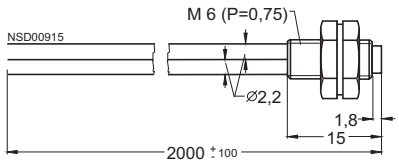
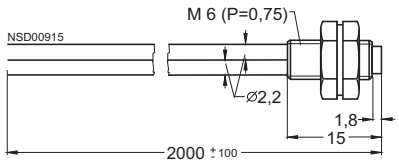
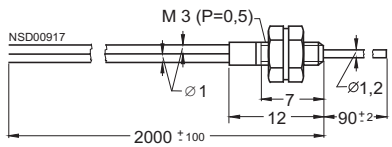
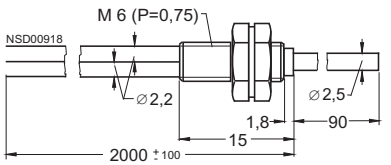
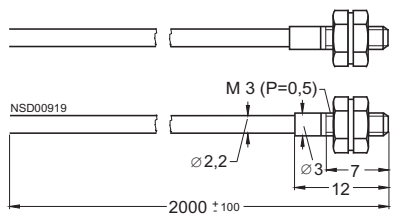
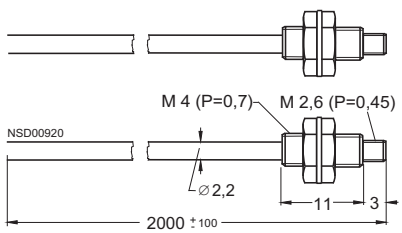
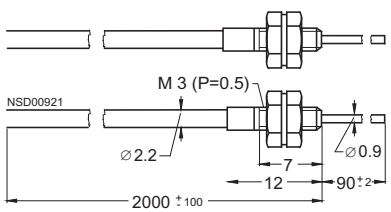
Typical shape of switching zone

Technical specifications

Attenuation at 660 nm, max.	dB/m	0.4
Angle of incidence, max.		± 56°
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	°C	–40 ... +75
Solvent resistance		Not resistant

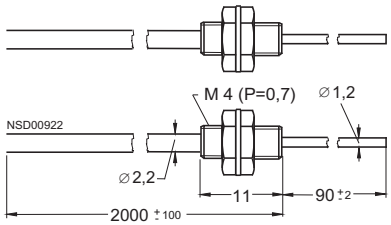
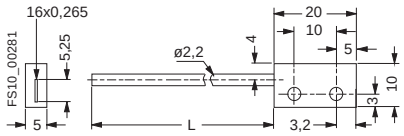
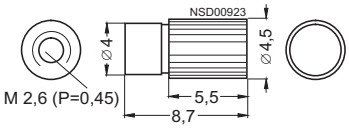
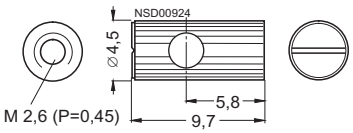
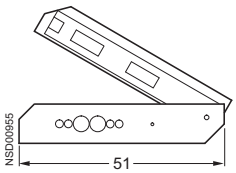
Plastic fiber-optic conductor for SIMATIC PXO

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.

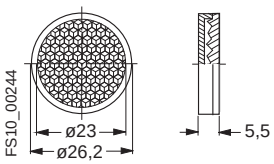
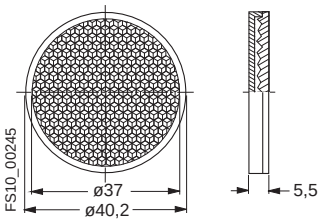
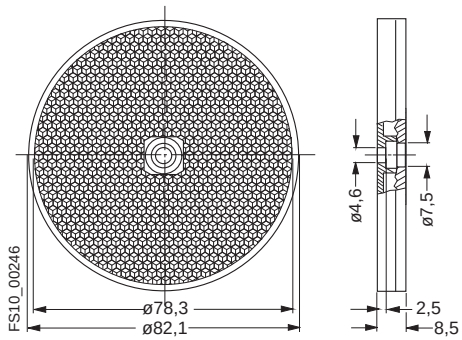
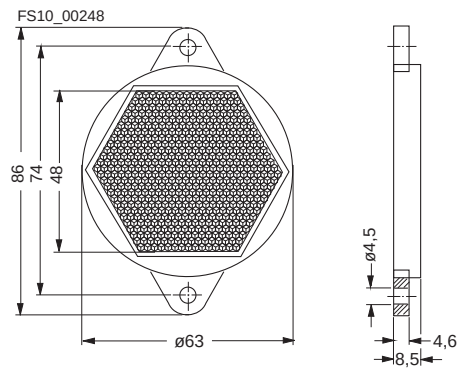
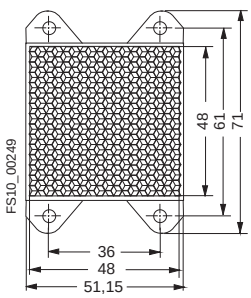
Plastic fiber-optic conductor for SIMATIC PXO

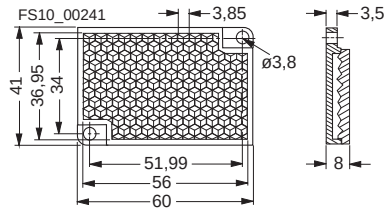
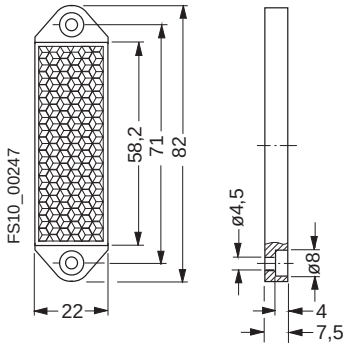
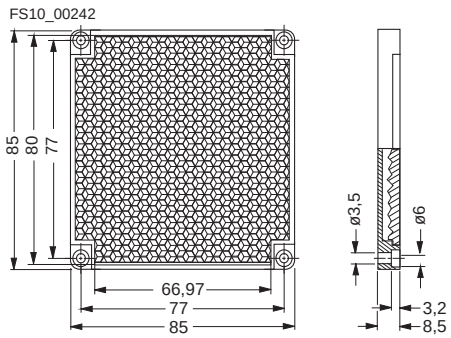
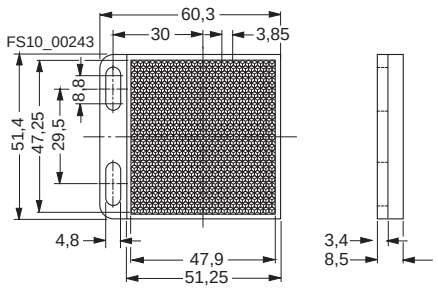
	Type	Sensing range	For photoelectric proximity switch		Order No.
	2 single fibers, Ø 2.2 mm, for cutting	200 mm 400 mm 350 mm	K31 design K30 design LV70 design		**3RX7 010**
 L=2000 mm	2 single fibers, Ø 2.2 mm, for cutting	250 mm	LV70 design		**3RX7 012**
Front lenses					
	Front lenses (1 pair) for use with fiber type 3RX7 007	1500 mm 3000 mm	K31 design K30 design	►	**3RX7 901**
	Front lenses 90° (1 pair) for use with fiber type 3RX7 007	250 mm 500 mm	K31 design K30 design		**3RX7 902**
Cutting tool for fiber-optic cable					
	**Cutting tool** for plastic fibers				**3RX7 918**

► Preferred type, available from stock.

Reflectors for SIMATIC PXO

Selection and Ordering data

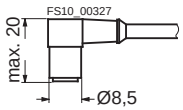
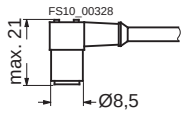
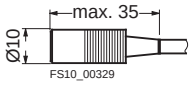
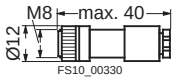
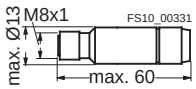
	Version	Standard for form		Order No.
	**D25** Typical range approx. 40 %, referred to D84 design		▶	**3RX7 914-0AA01**
	**D40** Typical range approx. 60%, referred to D84 design		▶	**3RX7 915-0AA01**
	**D84**	M12, M18, K30, K31, C40, K80	▶	**3RX7 916-0AA01**
	**S48** Typical range approx. 50%, referred to D84 design	M18P	▶	**3RX7 922-0AA01**
	**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 × 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.

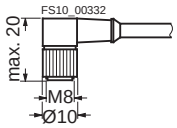
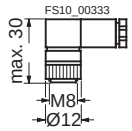
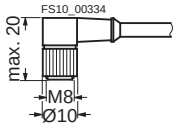
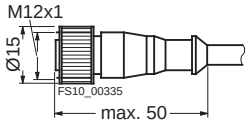
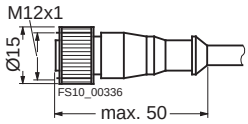
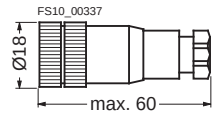
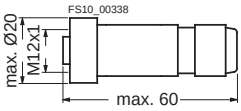
Plug-in connections

Selection and Ordering data

	Fig.	Type[1]	Cable[2]	Length m	Color		Order No.
Fig. 1	**8 mm cable sockets (female) for snap-on mounting, degree of protection IP65**						
	3-pole, 3 × 0.34 mm²						
	1	A	PUR	5	Black	►	**3RX8 000-0BH32-1AF0**
	1	A	PUR	10	Black	►	**3RX8 000-0BH32-1AL0**
Fig. 2	4-pole, 4 × 0.34 mm²						
	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						
Fig. 3	3-pole, 3 × 0.34 mm²						
	2	A	PUR	5	Black	►	**3RX8 000-0BJ32-1AF0**
	2	A	PUR	10	Black	►	**3RX8 000-0BJ32-1AL0**
	4-pole, 4 × 0.34 mm²						
	2	B	PUR	5	Black	►	**3RX8 000-0BJ42-1AF0**
	2	B	PUR	10	Black	►	**3RX8 000-0BJ42-1AL0**
	3-pole, 3 × 0.34 mm², 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**
Fig. 4	**M8 cable sockets (female) for screw mounting, degree of protection IP67**						
	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 mm²		Black	►	**3RX8 000-0BB35**
	6	A	Coupling plug, can be assembled		Black	►	**3RX8 000-0BB37**
	4-pole, 4 × 0.34 mm²						
	4	B	PUR	5	Black	►	**3RX8 000-0BB42-1AF0**
Fig. 6	4	B	PUR	10	Black	►	**3RX8 000-0BB42-1AL0**
	5	B	Coupling plug with soldering pins, max. 0.25 mm²		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.
Fig. 7	**M8 angular cable sockets (female) for screw mounting, degree of protection IP67**						
	3-pole, 3 × 0.34 mm²						
	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 mm²		Black	▶	**3RX8 000-0BC35**
Fig. 8	3-pole, 3 × 0.34 mm², with LEDs						
	9	C	PUR	5 (pnp)	Black	▶	**3RX8 000-0BC34-1AF0**
	9	C	PUR	10	Black	▶	**3RX8 000-0BC34-1AL0**
	9	D	PUR	5 (npn)	Black	▶	**3RX8 000-0BC30-1AF0**
Fig. 9	9	D	PUR	10	Black	▶	**3RX8 000-0BC30-1AL0**
	4-pole, 4 × 0.34 mm²						
	7	B	PUR	5	Black	▶	**3RX8 000-0BC42-1AF0**
	7	B	PUR	10	Black	▶	**3RX8 000-0BC42-1AL0**
	8	B	Coupling plug with soldering pins, max. 0.25 mm²		Black	▶	**3RX8 000-0BC45**
Fig. 10	**M12 cable sockets (female) for screw mounting, degree of protection IP67**						
	10	E	PUR	5	Black	▶	**3RX8 000-0CB32-1AF0**
	10	E	PUR	10	Black	▶	**3RX8 000-0CB32-1AL0**
	11	E	PUR, shielded	2	Black	▶	**3RX8 000-0CB32-1GC0**
	11	E	PUR, shielded	10	Black	▶	**3RX8 000-0CB32-1GL0**
Fig. 11	4-pole, 4 × 0.34 mm²						
	10	F	PUR	5	Black	▶	**3RX8 000-0CB42-1AF0**
	10	F	PUR	10	Black	▶	**3RX8 000-0CB42-1AL0**
	12	F	Coupling plug with terminal compartment, preassembly possible		Black	▶	**3RX8 000-0CB45**
	13	F	Coupling plug with quick-connection technology		Black	▶	**3RX8 000-0CB47**
Fig. 12	5-pole, 5 × 0.34 mm²						
	10	G	PUR	5	Black	▶	**3RX8 000-0CB52-1AF0**
	10	G	PUR	10	Black	▶	**3RX8 000-0CB52-1AL0**
	11	G	PUR, shielded	5	Black	▶	**3RX8 000-0CB52-1GF0**
Fig. 13	11	G	PUR, shielded	10	Black	▶	**3RX8 000-0CB52-1GL0**
	12	G	Coupling plug with terminal compartment, preassembly possible		Black	▶	**3RX8 000-0CB55**
	8-pole, 8 × 0.25 mm²						
	11	O	PUR, shielded	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.

Plug-in connections

Fig. 14

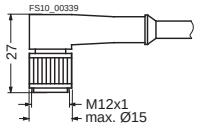


Fig. 15

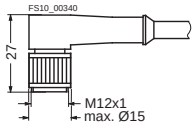


Fig. 16

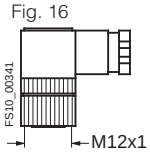


Fig. 17

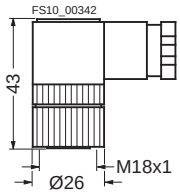


	Fig.	Type[1]	Cable[2]	Length m	Color		Order No.
M12 angular cable sockets (female) for screw mounting, degree of protection IP67							
3-pole, 3 × 0.34 mm²,							
	14	E	PUR	5	Black	►	**3RX8 000-0CC32-1AF0**
	14	E	PUR	10	Black	►	**3RX8 000-0CC32-1AL0**
	14	E	PVC	5	Black	►	**3RX8 000-0CC32-1BF0**
	14	E	PVC	10	Black	►	**3RX8 000-0CC32-1BL0**
3-pole, 3 × 0.34 mm², 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			►	**3RX8 000-0CC36**
3-pole, 3 × 0.34 mm², 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 mm²							
	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 mm², 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			►	**3RX8 000-0CA06**
5-pole, 5 × 0.34 mm²							
	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**

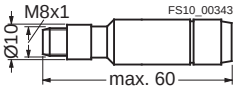
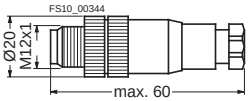
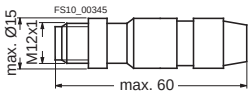
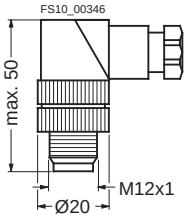
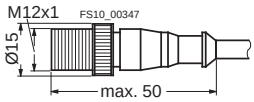
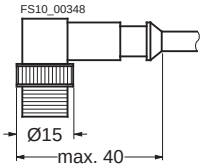
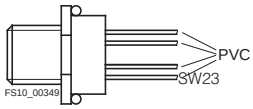
Cable sockets (female) with special lengths available as options:
- Minimum order quantity: 50 units
- Delivery time on request.
- Extra charge per m.

[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 mm²						
	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**
Fig. 20 	20	L	4-pole	Can be assembled; max. 0.34 mm²	Black	▶	**3RX8 000-0CD47**
	M12 angled coupling sockets (female), degree of protection IP67 for extension cable (metal screw cap) with terminal compartment, cable gland max. 6 mm						
Fig. 21 	21	L	4-pole	–	Black	▶	**3RX8 000-0CE45**
	21	M	5-pole	–	Black	▶	**3RX8 000-0CE55**
	For AS-Interface, degree of protection IP67						
	M12 cable plugs (male) 4 × 0.34 mm² (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 mm² (metal screw cap)						
	23	L	PUR	5	Black	▶	**3RX8 000-0CE42-1AF0**
	23	L	PUR	10	Black	▶	**3RX8 000-0CE42-1AL0**
Fig. 23 							
Fig. 24 	**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**

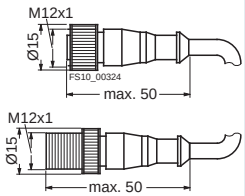
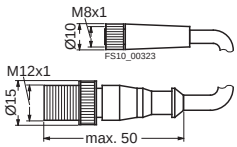
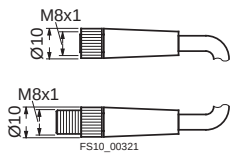
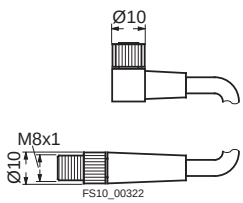
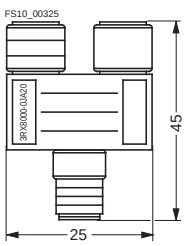
Cable sockets (female) with special lengths available as options:
- Minimum order quantity: 50 units
- Delivery time on request.
- Extra charge per m.

[1] For terminal assignment, see page 2/273.

[2] Suitable for trailing.

▶ Preferred type, available from stock.

Plug-in connections

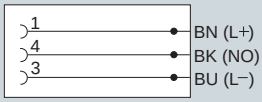
	Version	Type[1]	Wire cross-section/color	Length m		Order No.
	**Cable** with M12 socket (female) and M12 plug (male) Connection to 3RX8 000-0JA0 distributor (metal union nut), PUR cable Caution: Only terminal 4 (NO) is connected.	E, L	3 × 0.34 mm², Black	0.6	►	**3RX8 000-0GF32-1AA6**
				1	►	**3RX8 000-0GF32-1AB0**
				1.5	►	**3RX8 000-0GF32-1AB5**
		F, L	4 × 0.34 mm², 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 mm², Black	0.6	►	**3RX8 000-0FF32-1AA6**
				1	►	**3RX8 000-0FF32-1AB0**
				1.5	►	**3RX8 000-0FF32-1AB5**
		B, L	4 × 0.34 mm², Black	0.6	►	**3RX8 000-0FF42-1AA6**
				1	►	**3RX8 000-0FF42-1AB0**
				1.5	►	**3RX8 000-0FF42-1AB5**
	**Cable** with M8 socket (female) and M8 plug (male), PUR cable	A	3 × 0.34 mm², Black	1	►	**3RX8 000-0EF32-1AB0**
				2	►	**3RX8 000-0EF32-1AC0**
	**Cable** with M8 angular socket (female) and M8 plug (male), PUR cable	A	3 × 0.34 mm², Black	1	►	**3RX8 000-0EG32-1AB0**
				2	►	**3RX8 000-0EG32-1AC0**
	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.					
	• PUR		3 × 0.34 mm²		►	**3RX8 000-0KA32-1AR0**
	• PUR		4 × 0.34 mm²		►	**3RX8 000-0KA42-1AR0**
	• PUR, shielded		4 × 0.34 mm²		►	**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

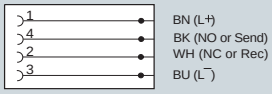
Type A, E



NSD01032a

proximity switches with NO contact

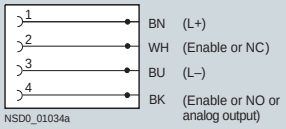
Type B, F, L, N, P



NSD0_01033a

proximity switches with NC/NO contact

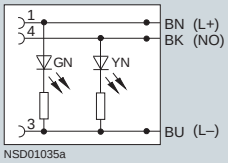
Type B, F, L, N, P



NSD0_01034a

sonar proximity switches in M18 compact series

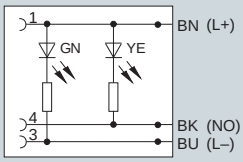
Type C, H



NSD01035a

proximity switches with NO contact, pnp

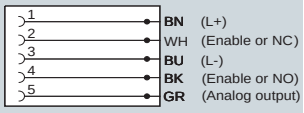
Type D



NSD01036a

proximity switches with NO contact, npn

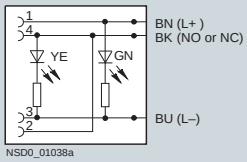
Type G, M



NSD0_01037a

proximity switches with NC/NO contact, sonar proximity switches M30 K2 and M30 K3 compact series

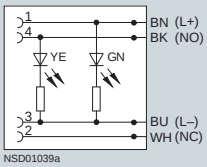
Type J



NSD0_01038a

proximity switch with NC or NO contact, pnp

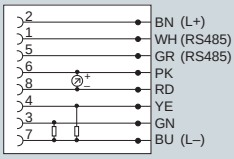
Type K



NSD01039a

proximity switch with NO contact or NC/NO contact, pnp

Type O



FS10_00139

PXO530/540 proximity switch

BN = Brown
BK = Black
WH = White

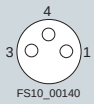
BU = Blue
GR = Gray
GN = Green

YE = Yellow
PK = Pink
RD = Red

Pin assignment

M8 wiring for cable plugs and angular cable plugs

Type A, C, D



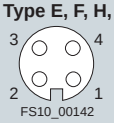
FS10_00140

Type B

FS10_00141

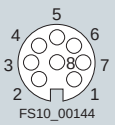
M12 wiring for cable plugs and angular cable plugs

Type E, F, H, J, K, L, N



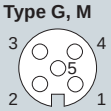
FS10_00142

Type O



FS10_00144

Type G, M



FS10_00143

Sensor assembly system

Overview

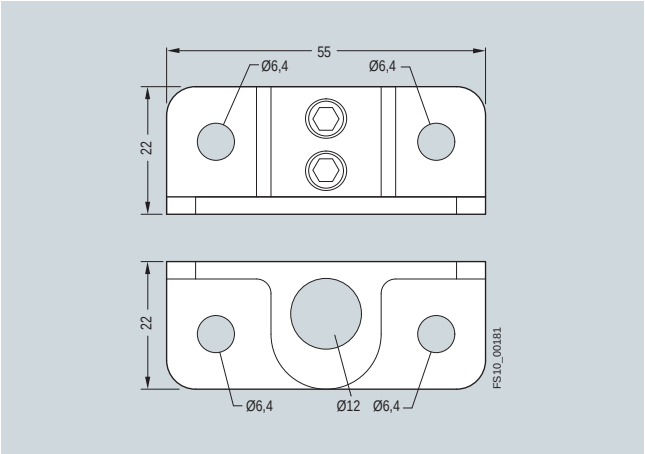
Sensor assembly system

Selection and Ordering data

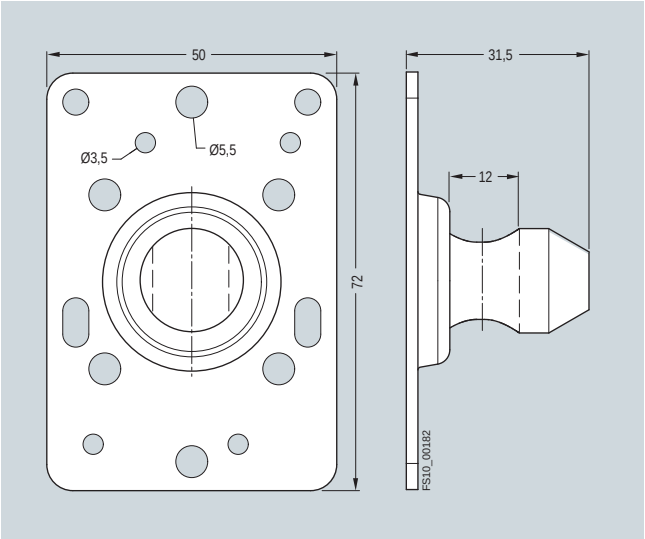
		Order No.
Sensor assembly system		
Consisting of:		
Mounting base for sensor assembly system, with 12 mm hole for inserting round rod	►	**3RX7 322**
Holding plate for sensor assembly system, for mounting on 12 mm round rod, suitable for all cubic proximity switches	►	**3RX7 326**
Round rod for sensor assembly system, 12 mm diameter		
• 200 mm long	►	**3RX7 315**
• 300 mm long	►	**3RX7 316**

► Preferred type, available from stock.

Dimensions

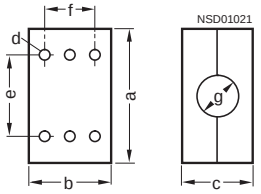
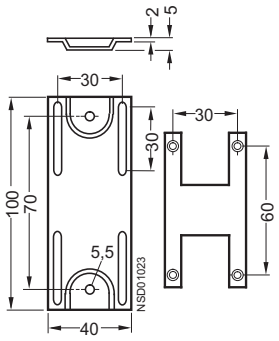
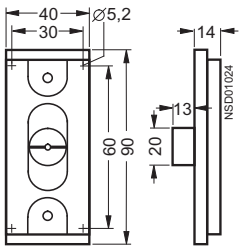


Mounting base 3RX7 322



Holding plate for accommodating 3RX7 326 sensors

Selection and Ordering data

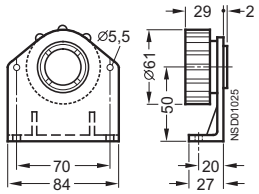
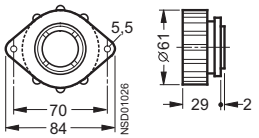
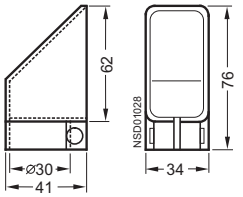
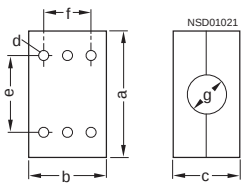
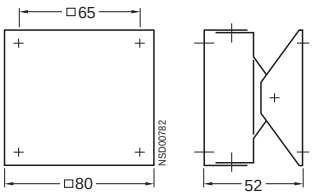
	Type		Order No.
32SX6 281 to 3SX6 284 	**Fixing clamp (molded plastic, supplied without fixing screws)** for proximity switches with thread 3SX6 281 / 3SX6 282 / 3SX6 283 / 3SX6 284 a 26 / 36 / 45 / 58 b 22 / 30 / 30 / 30 c 11,6 / 18 / 26 / 36 d Ø 3.5 / Ø 4.5 / Ø 4.5 / Ø 4.5 e 16 / 24 / 32 / 44 f 12.6 / 18.5 / 19.6 / 19.6 g 7.9 (for M8) / 11.9 (for M12) / 18.0 (for M18) / 29.8 (for M30)	M8 M12 ► M18 ► M30 ►	**3SX6 281** **3SX6 282** **3SX6 283** **3SX6 284**
3SX9 910 	**Adapter** from Pg 13.5 to NPT ½, for proximity switches with Pg 13.5 connecting thread	►	**3SX9 910**
	Adapter from M20 x 1.5 to NPT ½, for proximity switches with M20 connecting thread		**3SX9 918**
	Molded plastic M20 × 1.5 screwed joint 6 mm long, with seal, for proximity switches with M20 connecting thread		**3SB39 01–0CK**
3RX1 303 	**Alignment plate** for cubic proximity switches 3RG16 30, 3RG40 30, 3RG40 31, 3RG40 34, 3RG40 41, 3RG41 31, 3RG41 41, 3RG46 31	►	**3RX1 303**
3RX1 304 	**Mounting bracket** For snapping onto C-shaped rails, can slide up to 20 mm lengthwise, rotatable through 360° for cubic proximity switches 3RG16 30, 3RG40 30, 3RG40 31, 3RG40 34, 3RG40 41, 3RG41 31, 3RG41 41, 3RG46 31		**3RX1 304**

► Preferred type, available from stock.

Mounting hardware for SIMATIC PXS

2

Selection and Ordering data

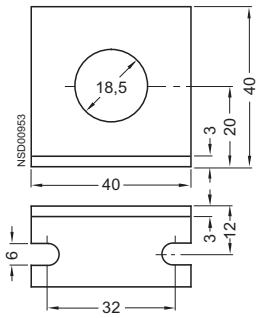
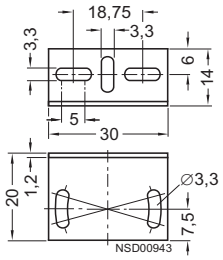
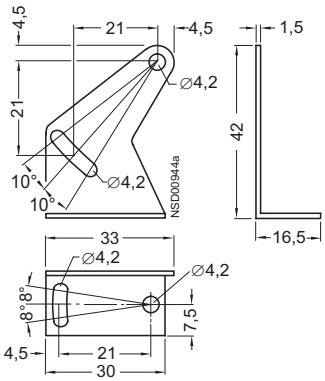
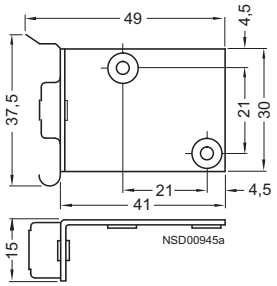
	Type		Order No.
	**Aligning unit with mounting bracket** for M30 Sonar proximity switch Swivel range approx. 20° around longitudinal axis of proximity switch. Following alignment, the proximity switch is screwed tight in the selected position.		**3RX1 301**
	**Aligning unit with mounting flange** for 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) • for Sonar proximity switch, M18 design • for Sonar proximity switch, M30 design	► ►	**3SX6 283** **3SX6 284**
	**Aligning unit** for 3SG16 67 Sonar proximity switch		**3SX6 287**

	3SX6 283	3SX6 284
a	45	58
b	30	30
c	26	36
d	Ø 4.5	Ø 4.5
e	32	44
f	19.6	19.6
g	18.0 (for M18)	29.8 (for M30)

► Preferred type, available from stock.

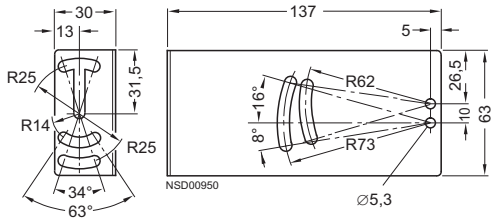
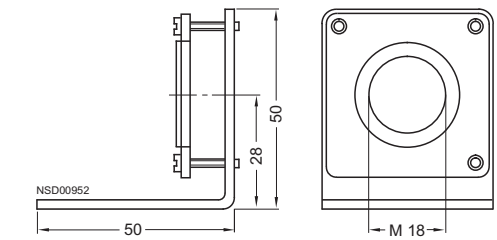
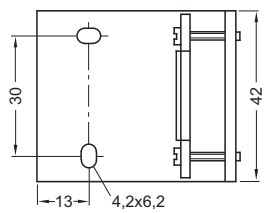
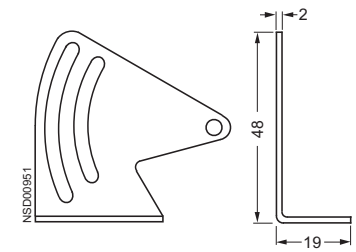
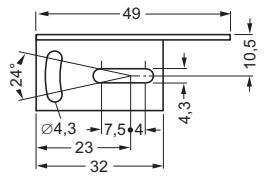
For plug-in connections and cables see from page 2/268.

Selection and Ordering data

	Type		Order No.
	Mounting brackets for photoelectric proximity switches with M18 cylindrical enclosure Material: galvanized steel	►	**3RX7 301**
	Mounting brackets for photoelectric proximity switches in K20 or K21 design	►	**3RX7 308–0AA00**
	Mounting brackets for photoelectric proximity switches in K30 or K31 design Material: galvanized steel	►	**3RX7 910**
	Mounting brackets for 35 mm DIN rail for photoelectric proximity switches in K30 or K31 design Material: galvanized steel		**3RX7 304**

► Preferred type, available from stock.

Montagematerial für SIMATIC PXO

	Type		Order No.
	Mounting brackets for photoelectric proximity switches in K80 design Material: galvanized steel	▶	**3RX7 303**
	Mounting brackets for photoelectric proximity switches with M18 cylindrical enclosure, especially for laser proximity switches in L18 design Material: galvanized steel		**3RX7 300**
			
	Mounting brackets for laser proximity switches in L50 design Material: galvanized steel	▶	**3RX7 302**
			

▶ Preferred type, available from stock.