



4/2	Summary of ranges
4/6	Introduction
4/15	D 4 form
4/16	M5 form
4/17	M12 form
4/19	M18 S form
4/21	M18 form
4/22	M18 P form
4/25	K 20 form
4/26	K 21, K 21 R forms
4/28	K 31 form
4/30	K 30 form
4/33	K 40 form
4/35	C 40 form
4/37	K 80 form
4/40	KL 40 form
4/41	CL 40 form – color sensors
4/42	C 80 form – color mark sensors
4/43	L 18 form – laser
4/45	L 50 form – laser
4/47	Light arrays
	Accessories
4/48	Plastic optical fibers
4/50	Mounting brackets
4/52	Reflectors

Summary of ranges

Overview

Function	Design	Sensing range														
		50 mm	120 mm	150 mm	50 cm	60 cm	1 m	1.2 m	2 m	2.5 m	4 m	6 m	12 m	15 m	50 m	70 m
Diffuse sensors 	D 4, M5	5 cm														
	M12		30 cm													
	M18P		30 cm													
	K 20			50 cm												
	M18S			60 cm												
	K 21, K 21 R			60 cm												
	K 31			60 cm												
	C40				70 cm											
	K 30						1.2 m									
	K 40							2 m								
	K 80							2 m								
Diffuse sensors with background suppression 	K 20	10 cm														
	M18P	10 cm														
	M 18		12 cm													
	K 31		15 cm													
	C 40			25 cm												
	K 80						1 m									
	Laser L 50			15 cm												
Sensors with fiber-optic conductors 	K 31		200 mm													
	KL 40		280 mm													
	K 30			400 mm												
Diffuse sensor with analog output 	Laser L 50		45 ... 85 mm													

Summary of ranges

	Operating voltage range		Output					Connection					Features					Design	Page
	DC	UC	pnp	nnp	Relays	AS-Interface	Analog output	M 8 connector	M 12 connector	Cable	Terminals	AS-Interface with FK block	Timing function	Anti-interference function	Test input	Molded plastic	Metal enclosure		
10 ... 30 V			■	■				■		■							■	D 4, M5	4/15
10 ... 36 V			■	■				■	■	■							■	M12	4/17
10 ... 30 V			■	■				■	■	■						■		M18P	4/22
10 ... 30 V			■	■				■		■				■			■	K 20	4/25
10 ... 36 V			■	■				■	■	■							■	M18S	4/19
10 ... 30 V			■	■				■		■						■		K 21, K 21 R	4/26
10 ... 36 V			■	■				■		■						■		K 31	4/28
10 ... 30 V			■	■				■	■	■				■			■	C40	4/35
10 ... 36 V			■	■				■		■						■		K 30	4/30
10 ... 36 V			■	■				■	■	■						■		K 40	4/33
10 ... 36 V 20 ... 320 V			■	■	■	■			■		■	■	■		■	■		K 80	4/37
10 ... 30 V			■	■				■		■				■		■		K 20	4/25
10 ... 30 V			■	■				■	■	■						■		M18P	4/22
10 ... 36 V			■	■				■	■	■							■	M 18	4/21
10 ... 36 V			■	■				■		■						■		K 31	4/28
10 ... 30 V			■	■				■	■	■				■		■		C 40	4/35
10 ... 36 V 20 ... 320 V			■	■	■	■		■	■		■	■	■		■	■		K 80	4/37
10 ... 30 V			■	■				■	■	■						■		L 50	3/57
10 ... 30 V			■	■				■		■						■		K 31	4/28
10 ... 36 V			■	■				■		■			■			■		KL 40	4/40
10 ... 36 V			■	■				■		■						■		K 30	4/30
18 ... 28 V							■			■						■		L 50	4/45

Summary of ranges

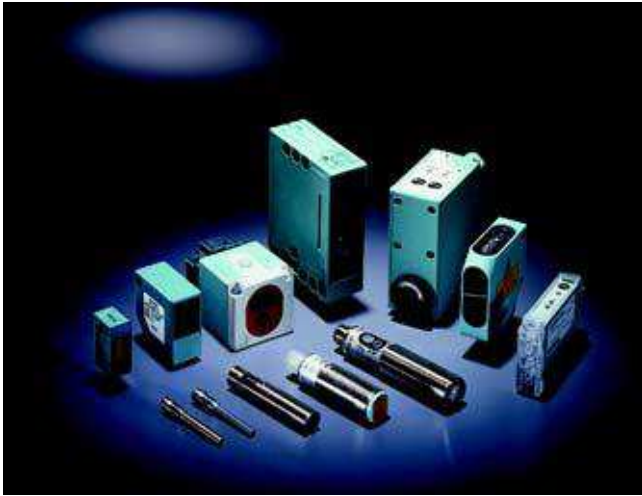
Function	Design	Sensing range														
		50 mm	120 mm	150 mm	50 cm	60 cm	1 m	1.2 m	2 m	2.5 m	4 m	6 m	12 m	15 m	25 m	50 m
Retroreflective sensor 	M12												1.5 m			
	M18S												2 m			
	M18P												2 m			
	K 31												2 m			
	K 21, K 21 R												3 m			
	K 30												4 m			
	K 40												6 m			
	C 40												6 m			
	K 80												6 m			
	Laser L 50												12 m			
	Light array												1.4 m			
Thru-beam sensor 	D 4, M5												25 cm			
	M12												4 m			
	M18S												6 m			
	K 31												6 m			
	M18P												12 m			
	K 30												12 m			
	K 40												15 m			
	K 80												50 m			
	Laser L 18												50 m			
Color sensors 	CL 40												15 mm			
Color mark sensors BERO 	C 80												18 mm			

Summary of ranges

Operating voltage range		Output				Connection					Features					Design	Page
DC	UC	pnp	nnp	Relays	AS-Interface	M 8 connector	M 12 connector	Cable	Terminals	AS-Interface with FK block	Timer function	Anti-interference function	Test input	Molded plastic	Metal enclosure		
10 ... 30 V		■	■				■	■							■	M12	4/17
10 ... 36 V		■	■				■	■							■	M18S	4/19
10 ... 30 V		■	■				■	■						■		M18P	4/22
10 ... 36 V		■	■			■		■						■		K 31	4/28
10 ... 30 V		■	■			■		■				■		■		K 21, K 21 R	4/26
10 ... 36 V		■	■			■		■						■		K 30	4/30
10 ... 36 V		■	■			■	■	■						■		K 40	4/33
10 ... 30 V		■	■				■					■		■		C 40	4/35
10 ... 36 V	20 ... 320 V	■	■	■	■		■		■	■	■		■			K 80	4/37
10 ... 36 V		■	■				■	■						■		L 50	4/45
12 ... 36 V		■				■								■		Light array	4/47
10 ... 30 V		■	■			■		■					■		■	D 4, M5	4/15
10 ... 36 V		■	■				■	■					■		■	M12	4/17
10 ... 36 V		■	■				■	■					■		■	M18S	4/20
10 ... 36 V		■	■			■		■					■	■		K 31	4/28
10 ... 30 V		■	■			■		■							■	M18P	4/22
10 ... 36 V		■	■			■		■					■	■		K 30	4/30
10 ... 36 V		■	■			■	■	■					■	■		K 40	4/33
10 ... 36 V	20 ... 320 V	■	■	■	■		■		■	■	■		■	■		K 80	4/37
10 ... 30 V		■					■	■							■	L 18	4/43
10 ... 30 V		■	■			■		■			■			■		CL 40	4/41
10 ... 30 V		■				■		■			■				■	C 80	4/42

Introduction

Overview



The Opto-BERO 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 BERO, the interruption or reflection of the light beam is evaluated. The following exist:

- Diffuse sensor or type D
- Retroreflective sensor or type R
- Thru-beam sensor or type T.

The devices can be provided with background suppression as an option, or also as fiber-optic devices.

The comprehensive range of Opto-BERO operates using infrared, red or laser light and covers sensing ranges between 3 cm and 50 m. Due to the different physical principles of these systems, thru-beam sensors have wider sensing ranges than retroreflective sensors. Diffuse sensors can also react to diffuse-reflecting materials. Thus the sensing range is smaller than with retroreflective sensors.

The Opto-BEROs can be set quickly and easily by means of a Teach-In or potentiometer. A large selection of cubic, cylindrical and miniature designs will satisfy every wish.

Area of application

The various versions of the Opto-BEROs are preferably used in the following sectors:

- 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 K 20 form in miniature enclosure and the C 40 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.

Safety-related applications



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

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 sensors

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.

Retroreflective sensors

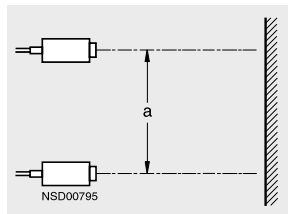
- Place the reflector at the required location and secure it firmly.
- Cover the reflector with adhesive tape so that only the center (approximately 25 % of the surface) remains free.
- Install the retroreflective sensor so that it switches reliably.
- Finally remove the adhesive tape from the reflector.

Thru-beam sensors

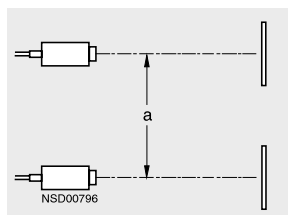
- Place the receiver in the required position and secure it firmly.
- Align the emitter with the receiver as accurately as possible.

Minimum clearance

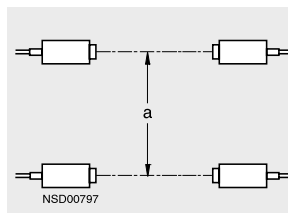
The proximity switches must not interfere with each other. Therefore a minimum distance **a** must be observed between two sensors. The following distances are recommended values only. The values given are for maximum sensitivity.



Diffuse sensor



Retroreflective sensor



Thru-beam sensor

Opto-BERO	Distance a
D 4/M5	50 mm
M12	250 mm
M18	250 mm
K 31	250 mm
K 30	500 mm
K 40	750 mm
K 80	500 mm
L 18 (laser retroreflective sensor)	150 mm ¹⁾
L 50 (laser diffuse sensor)	30 mm
L 50 (laser retroreflective sensor)	80 mm

1) Focusing at 50 m.

Setting the operating distance

The sensitivity is adjusted via the built-in multi-turn potentiometer. Turning it clockwise increases the sensitivity. The potentiometer cannot be overwound (no stops).

Diffuse sensors

The sensitivity and the distance should be set such that the object is reliably detected; if required, the surplus light LED should be activated. The object must then be removed. If the output remains On, the sensitivity must be reduced slightly.

Retroreflective sensors and thru-beam sensors

The potentiometer is normally set to maximum sensitivity (clockwise rotation). This results in maximum surplus light. It may be necessary to reduce the sensitivity in the case of transparent objects.

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.

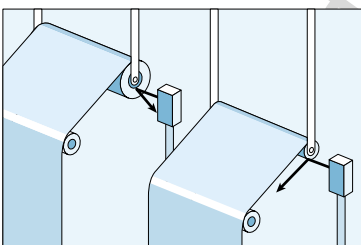
Functions

Diffuse sensors (energetic sensors)



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.

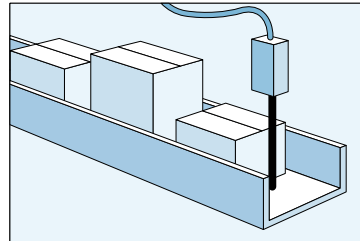
The sensing range depends on the size and color of the object involved as well as its surface texture. The sensing range can be varied within a wide range by means of the built-in potentiometer. The energetic sensor can therefore also be used to detect different colors.



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.

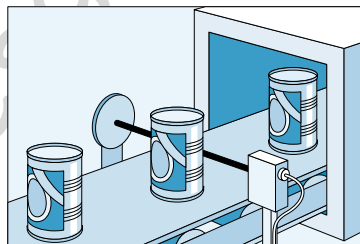


Retroreflective sensors



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.



Light array (7-beam retroreflective sensor)

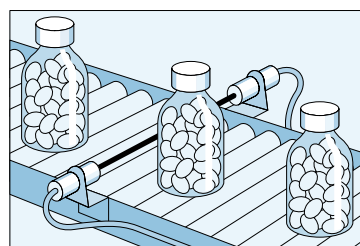
The light from all seven emitters of this special Opto-BERO is directed to one reflector and reflected to the seven receivers of the BERO. The switching output switches as soon as one of the beams is interrupted. A line of 42 mm can be completely covered. Typical applications are found, e.g. in conveyor systems.

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.



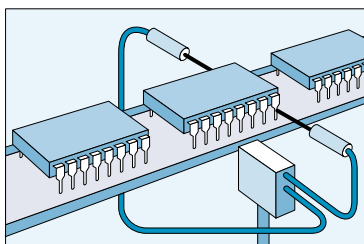
Introduction

Devices for fiber-optic conductors



The basic operation is the same for optical fibers made of glass or plastic. Optical fibers are fitted in front of the emitter and receiver. They represent the "extended eye" of the Opto-BERO.

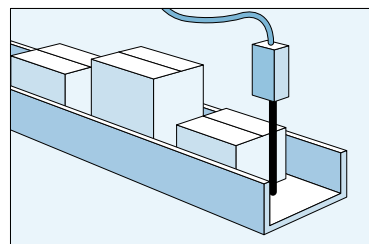
As optical fibers are very small and flexible, they provide a practical solution to the problem of sensing at points that are not easily accessible. Furthermore no electrical potential is transferred.



Laser diffuse sensor with analog output



The analog laser BERO 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 BEROs 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



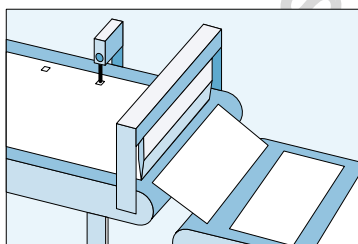
The color sensor uses three LEDs with the colors red, green and blue. The light is emitted to the object.

When the BERO is set, the color of the object is measured and assigned to an output state. During the learning phase, the BERO saves the detected color in a non-volatile EEPROM. This ensures that the setting procedure will not have to be repeated whenever the supply for the BERO is switched on. One color or a color range can be set.

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

This table lists data which are independent of the design.

Type		Solid-state output	Relay output (K 80)	Devices with laser (L 18, L 50)
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
Differential travel (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		
Protective measures				
• Overload protection		•	–	•
• Overvoltage protection		•	–	•
• Short-circuit protection		•	Backup fuse required	•
Max. cable length	m	Max. 250	Max. 250	Max. 100

For further technical specifications, see the respective form.

Options

Cable length

The designs with cable are normally supplied with a cable of 2 or 3 m in length (see selection data).

Longer cables can be ordered as necessary. In this case, the Order No. must be supplemented by "-Z" and the required length specified in plain text.

Circuit diagrams

Fig. 1

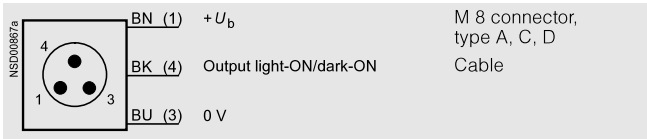


Fig. 2

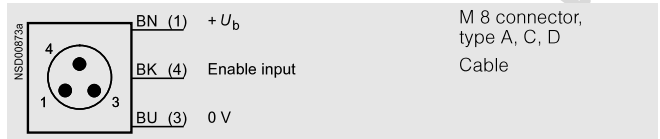


Fig. 3



Fig. 4

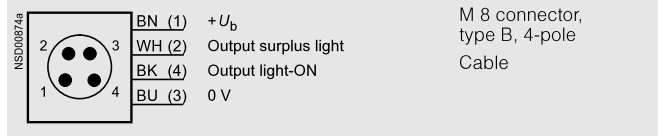


Fig. 5



Fig. 6

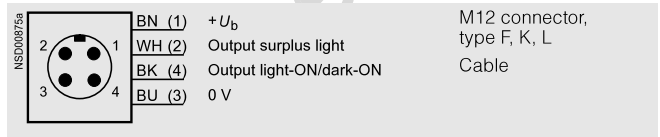


Fig. 7

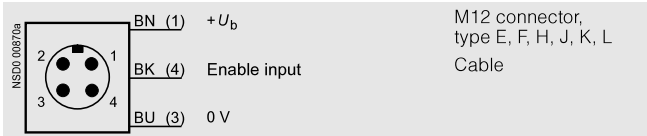


Fig. 8

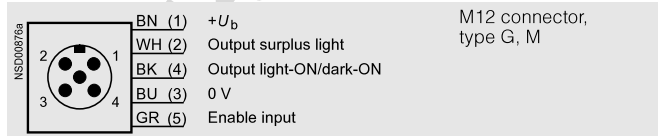


Fig. 9

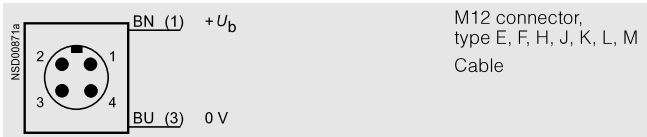


Fig. 10



Fig. 11



Fig. 12

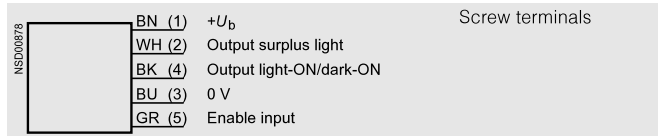


Fig. 13



Fig. 14



Fig. 15



Fig. 16

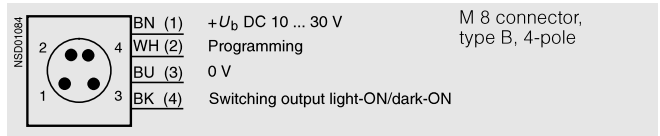


Fig. 17

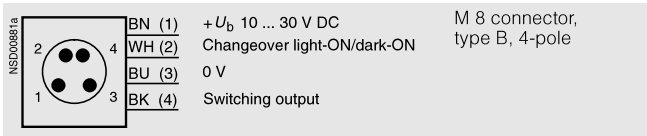


Fig. 18

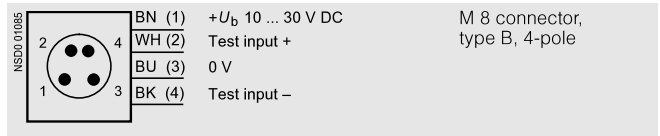


Fig. 19

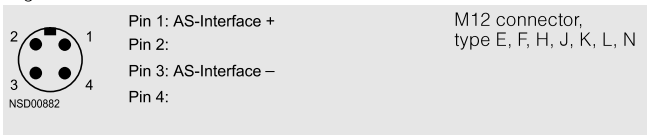
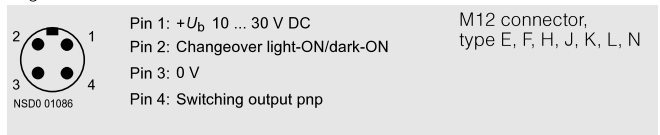


Fig. 20



BK = Black
BN = Brown
BU = Blue
GR = Gray
YE = Yellow
WH = White

Introduction

Fig. 21

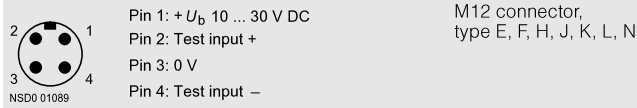


Fig. 23

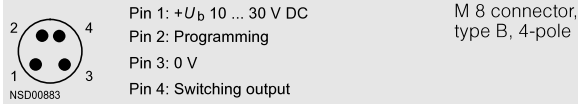


Fig. 25

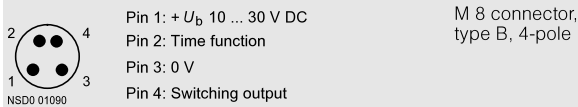


Fig. 27

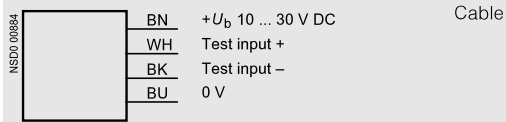


Fig. 29

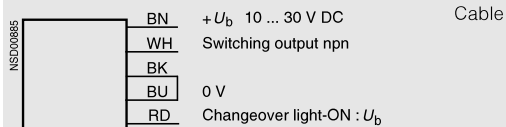


Fig. 31

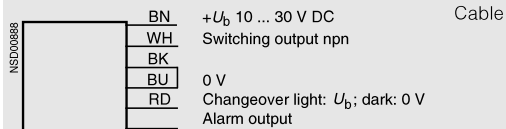


Fig. 33

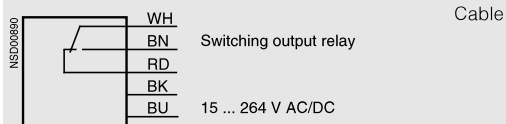


Fig. 35

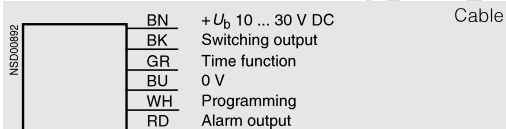


Fig. 37

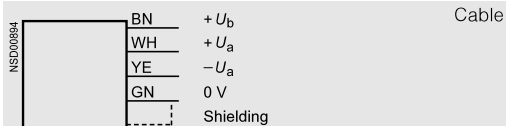


Fig. 39

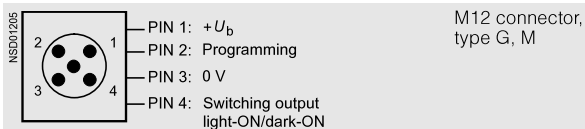


Fig. 22



Fig. 24

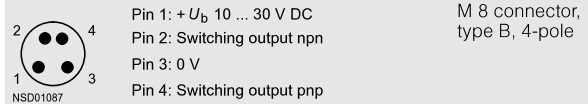


Fig. 26

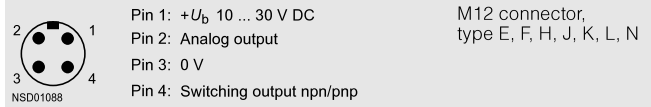


Fig. 28

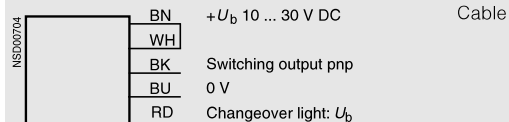


Fig. 30

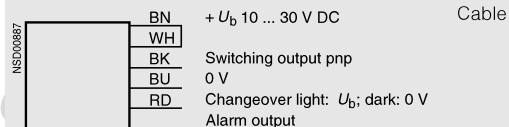


Fig. 32



Fig. 34

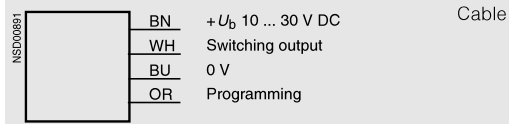


Fig. 36

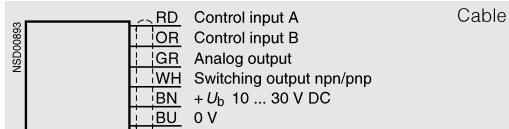


Fig. 38

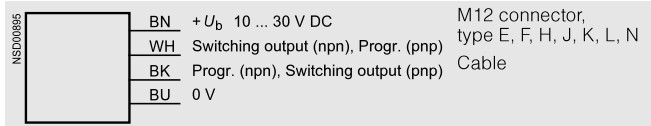
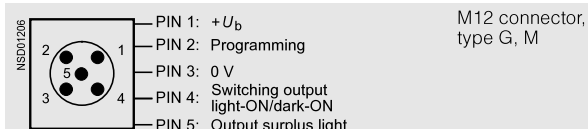


Fig. 40

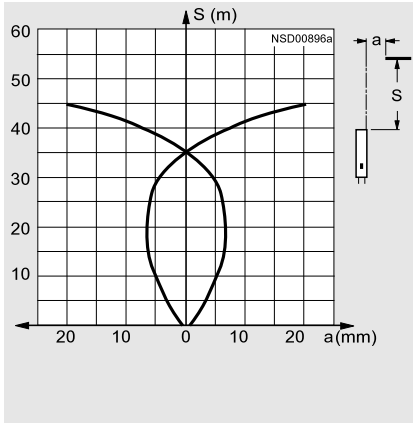


BK = Black BU = Blue OR = Orange WH = White
BN = Brown GR = Gray RD = Red YE = Yellow

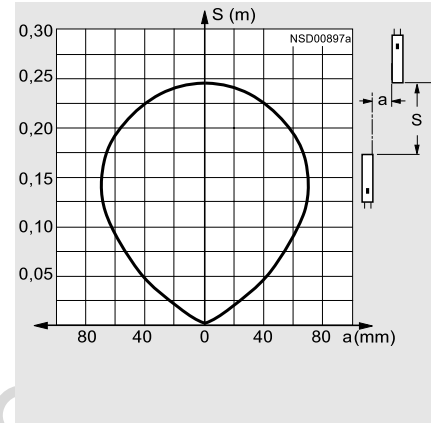
Characteristics

D 4 and M5 forms

Diffuse sensor

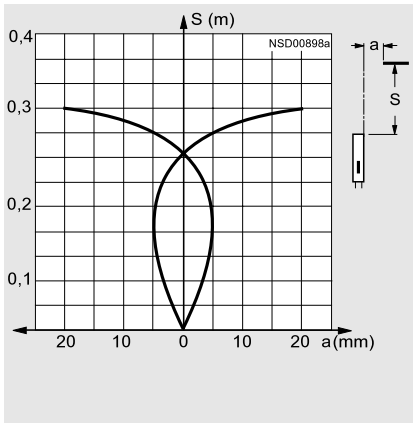


Thru-beam sensor

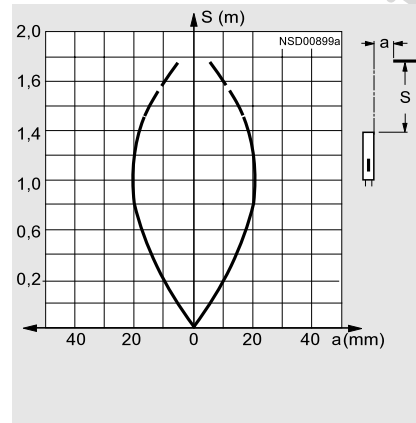


M12 form

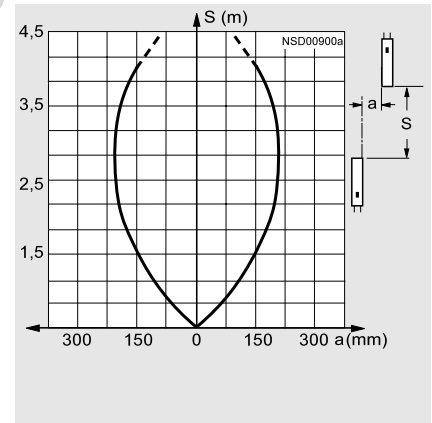
Diffuse sensor



Retroreflective sensor

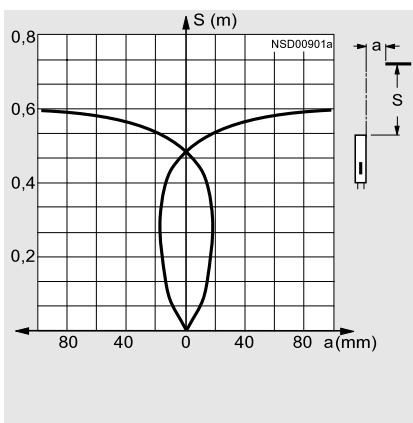


Thru-beam sensor

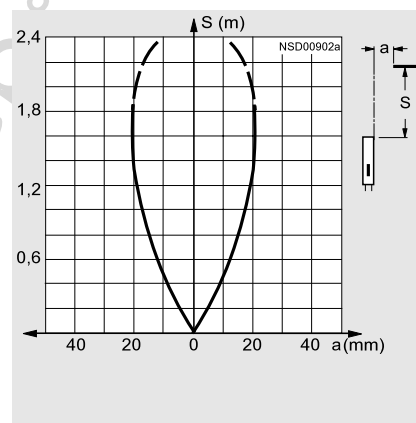


M18 form

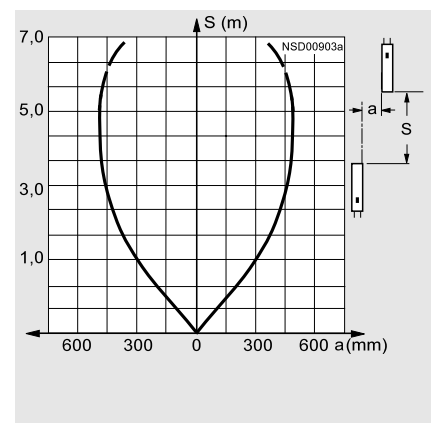
Diffuse sensor



Retroreflective sensor



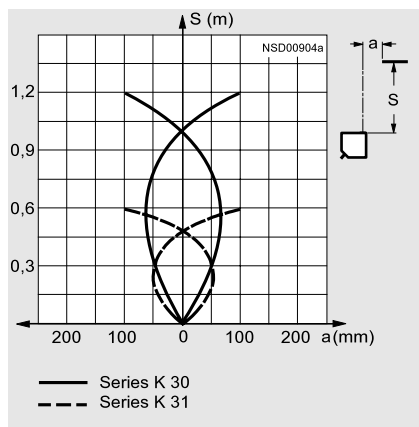
Thru-beam sensor



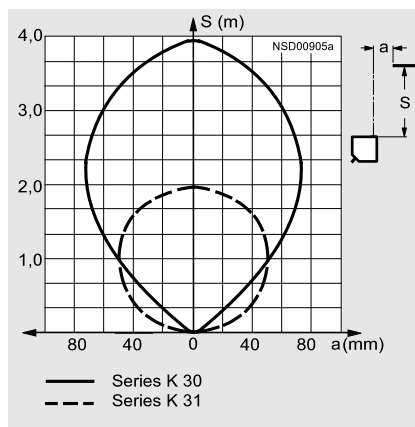
Introduction

K 30 and K 31 forms

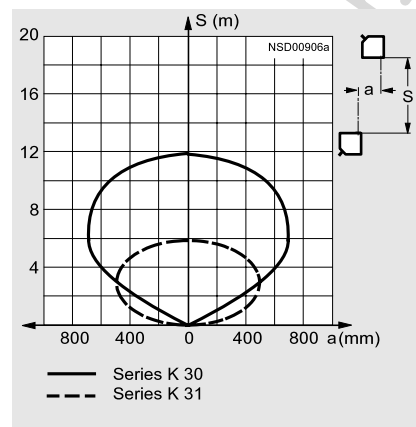
Diffuse sensor



Retroreflective sensor

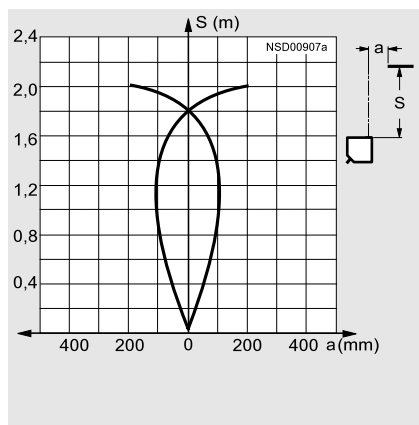


Thru-beam sensor

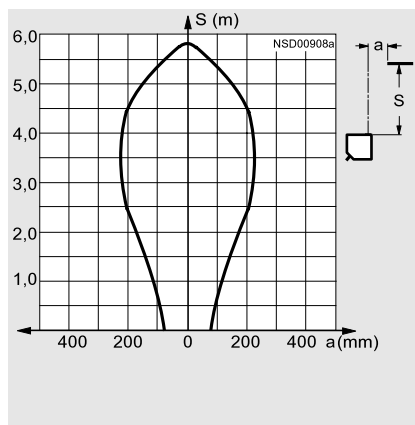


K 40 form

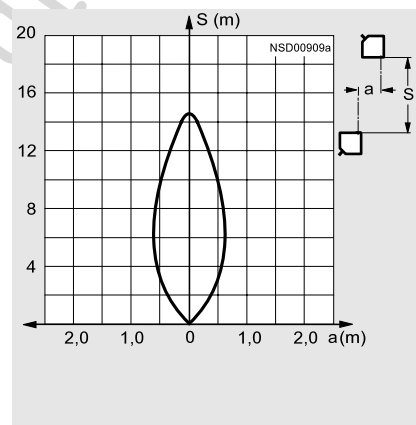
Diffuse sensor



Retroreflective sensor

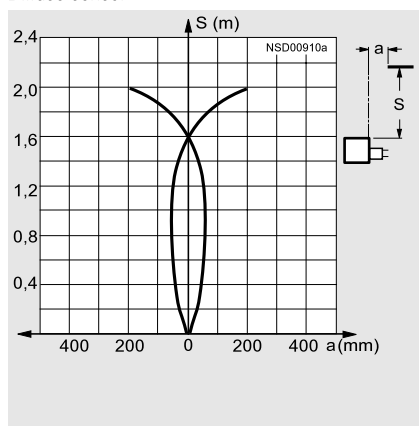


Thru-beam sensor

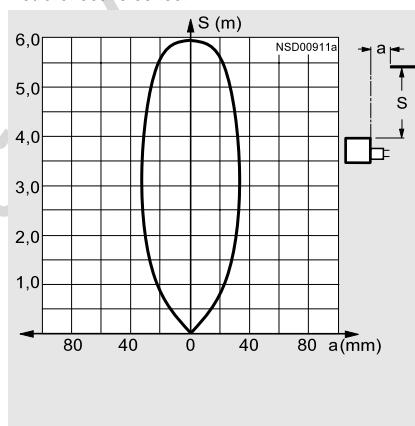


K 80 form

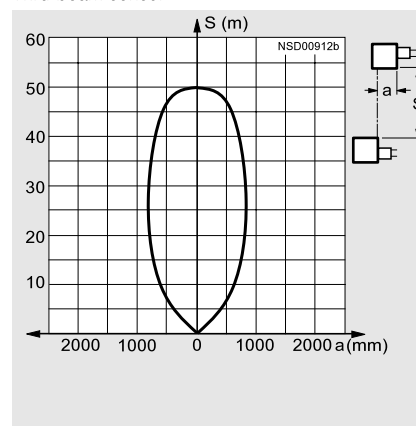
Diffuse sensor



Retroreflective sensor



Thru-beam sensor



Further information

Opto-BERO lexicon

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

Connection to AS-Interface

Assignment of data bits

Data bits	Meaning
D0	Switching signal
D1	Surplus light
D2	–
D3	Test input • 0 : emitter on • 1 : emitter out

Assignment of parameter bits

Parameter bits	Meaning
P0	–
P1	Inversion of D0 • 0 : inverted • 1 : not inverted
P2	–
P3	–

Anti-interference function

This function prevents mutual interference between Opto-BEROs. 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, e. g. two retroreflective sensors 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

Alternatively some of the devices are available with a different configuration of the outputs: one output is light-ON and the other is 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.

Autocollimation

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 close range in front of the BERO 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.

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

Enabling input

Opto-BEROs with a test input allow the emitter to be selectively switched on or off. The output signal can be evaluated to check that the sensor is functioning correctly (thru-beam sensors: no obstruction of light beam / diffuse sensors: reflecting object exists).

To disable the BERO, the enabling input must be connected to 0 V. For operation of the BERO, the enabling input does not have to be used.

Ambient light limit

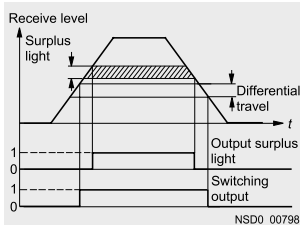
Ambient light is the light produced by external light sources. The luminescence level is measured on the light incidence surface. Thanks to the use of modulated light, the devices are insensitive to ambient light.

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 respective ambient light limit.

Introduction

Surplus light

The surplus light is the excess radiant power that falls on the light incidence surface and that is evaluated by the light receiver. The surplus light can decrease in the course of time due to pollution, changing of the reflection factor of the object and aging of the emitter diode, so that reliable operation is no longer guaranteed.



All devices are therefore equipped with a surplus light LED. Devices are also available in which this signal is connected to one of the outputs. This can be used to recognize states that are not operationally safe any longer.

Semiconductor lasers, laser diodes



These are characterized by an extremely high-density beam and emit extremely tightly bundled light rays in visible red.

The lasers used correspond to protection class 2!

Differential travel

The differential travel causes a defined switching response for the devices. The ranges are always specified with regard to the pick-up point on approach.

IR light

IR is the abbreviation for "infrared". It refers to electromagnetic radiation with a wavelength between 780 and 1500 nm which is longer than that of visible light (wavelength between 380 and 780 nm).

Fiber-optic conductors

Fiber-optic conductors consist of plastic or glass fibers in which the light can also be directed around bends. Fiber-optic conductors support applications in which space is at a premium and under critical environmental conditions.

Light-emitting diodes, LEDs

In the Opto-BEROs, LEDs are used as light beam sources. They have a narrow emission spectrum, can be easily modulated and have a long service life. In the Opto-BEROs, they also serve to signal the switching status or the surplus light emission.

Parallel connection

Devices can be connected in parallel for logic gating of the outputs. Different logic operations can be achieved by mixed use of dark-ON and light-ON outputs.

Note:

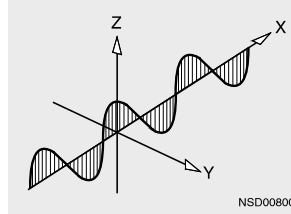


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The power consumption increases. Leakage currents add up so that even in the off state, the load may be energized. Diodes in the output leads serve to decouple the pull-up resistors. They can be omitted when a small number of devices are connected in parallel.

Polarized light

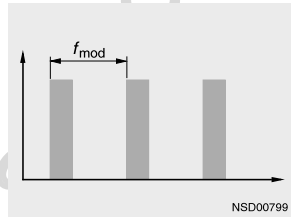
Natural light (including the light from the emitter diodes or laser diodes) is unpolarized. When the light has passed through a polarization filter, only that part of the light remains which oscillates in the polarization direction of the filter.



Retroreflective sensors use this polarized light to minimize the influence of unwanted reflections. With polarization filters in front of the emitter and receiver, the retroreflective sensor only reacts to light that is reflected by a special reflector, the so-called 3-way mirror. Other reflections do not cause a reaction.

Modulated light

Opto-BEROs operate with modulated light, i.e. the emitter is only active for a short time. Depending on the type, the modulation frequency f_{mod} of the modulated light is between 5 and 30 kHz.



If an Opto-BERO is operated in close proximity of another Opto-BERO with the same modulation frequency, this may cause interference (see minimum distance).

Operation with modulated light offers the following advantages:

- High degree of insensitivity to ambient light
- Larger sensing ranges
- Minimal temperature rise and therefore longer service life of the emitter diodes.

Overview

Cylindrical metal enclosure, IP67,
connection using cable or M 8 connector

Diffuse sensor (energetic sensor)

- Sensing range 5 cm (not adjustable)

Thru-beam sensor

- Sensing range 25 cm (not adjustable)

Rated operating voltage DC 24 V

Electronics output pnp or npn

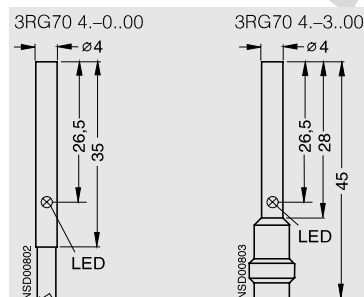
Technical specifications

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 supply 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 (type of light)	nm	880 (IR)	880 (IR)
Displays		Yellow LED Yellow LED flashing	
• Reliable detection			
• Surplus light fallen below			
Enclosure material		D 4: stainless steel; M5: brass, nickel-plated	
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	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	cm	nm							kg
Diffuse sensor	5	880 (IR)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	X	3RG70 40-0AB00	1 unit	0.039
				nnp, light-ON	1	X	3RG70 40-0GB00	1 unit	0.040
			M 8 connector, 3-pole, type A	pnp, light-ON	1	D	3RG70 40-7AB00	1 unit	0.015
				nnp, light-ON	1	X	3RG70 40-7GB00	1 unit	0.016
Thru-beam sensor	25	880 (IR)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	X	3RG70 42-0AB00	1 unit	0.039
				nnp, light-ON	1	X	3RG70 42-0GB00	1 unit	0.041
			M 8 connector, 3-pole, type A	Emitter	2	X	3RG70 42-0BG00	1 unit	0.040
				pnp, light-ON	1	D	3RG70 42-7AB00	1 unit	0.011
				nnp, light-ON	1	X	3RG70 42-7GB00	1 unit	0.011
				Emitter	2	D	3RG70 42-7BG00	1 unit	0.012

Dimension drawings



M5 form

Overview

Cylindrical metal enclosure, IP67,
connection using cable or M 8 connector

Diffuse sensor (energetic sensor)

- Sensing range 5 cm (not adjustable)

Thru-beam sensor

- Sensing range 25 cm (not adjustable)

Rated operating voltage DC 24 V

Electronics output pnp or npn

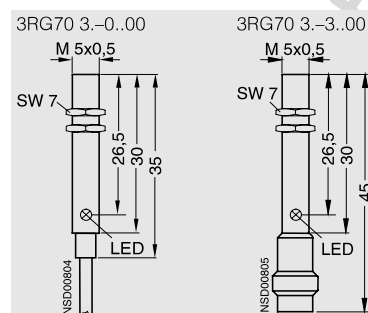
Technical specifications

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)	10
No-load supply current I_0 (typ.)	mA	10	5 / 5 (emitter / receiver)
Rated operational current I_e	mA	100	10
Switching frequency	Hz	250	250
Switching time	ms	2.5	2.5
Wavelength (type of light)	nm	880 (IR)	880 (IR)
Displays		Yellow LED Yellow LED flashing	
Enclosure material		D 4: stainless steel; M5: 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	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	cm	nm							kg
Diffuse sensor	5	880 (IR)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	A	3RG70 30-0AB00	1 unit	0.041
				nnp, light-ON	1	X	3RG70 30-0GB00	1 unit	0.044
			M 8 connector, 3-pole, type A	pnp, light-ON	1	A	3RG70 30-7AB00	1 unit	0.015
				nnp, light-ON	1	X	3RG70 30-7GB00	1 unit	0.019
Thru-beam sensor	25	880 (IR)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON	1	D	3RG70 32-0AB00	1 unit	0.041
				nnp, light-ON	1	A	3RG70 32-0GB00	1 unit	0.038
				Emitter	2	D	3RG70 32-0BG00	1 unit	0.040
			M 8 connector, 3-pole, type A	pnp, light-ON	1	D	3RG70 32-7AB00	1 unit	0.016
				nnp, light-ON	1	A	3RG70 32-7GB00	1 unit	0.012
				Emitter	2	D	3RG70 32-7BG00	1 unit	0.015

Dimension drawings



Wherever you find the abbreviation SW in dimension drawings please note that SW means "spanner width" and Sg means "connecting thread".

Overview

Cylindrical metal enclosure, IP67,
connection using cable or M 12 connector

Diffuse sensor (energetic sensor)

- Sensing range 30 cm (adjustable using potentiometer)

Retroreflective sensor

- Sensing range 1.5 m (adjustable using potentiometer)
- Supplied without reflector

Thru-beam sensor

- Sensing range 4 m (adjustable using potentiometer)
- Enabling input for test purposes

Rated operating voltage DC 24 V

Electronics output pnp or npn

Technical specifications

Operating mode		Diffuse sensor	Retroreflective sensor with polarization filter	Thru-beam sensor
				
Sensing range	cm	30 (adjustable)	150 (adjustable)	400 (adjustable)
Standard target/reflector	mm	200 x 200 (white)	Reflector type D 84	–
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)		
No-load supply current I_0 (typ.)	mA	15	15	15 / 15 (emitter / receiver)
Rated operational current I_e	mA	200		
Switching frequency	Hz	1000	1000	1000
Switching time	ms	0.5	0.5	0.5
Wavelength (type of light)	nm	660 (red)	660 (red, polarized)	660 (red)
Displays		Yellow LED Green LED		
• Switching status				
• Surplus light				
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

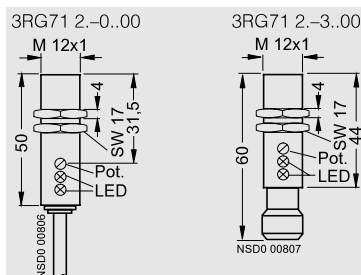
M12 form

Selection and ordering data



Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	cm	nm							kg
Diffuse sensor	30 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 x 0.34 mm ²	pnp, light-ON	13	▶	3RG71 20-0AB00	1 unit	0.102
				pnp, dark-ON	14	A	3RG71 20-0AA00	1 unit	0.104
				nnp, light-ON	13	X	3RG71 20-0GB00	1 unit	0.104
				nnp, dark-ON	14	X	3RG71 20-0GA00	1 unit	0.104
			M12 connector 4-pole, type F	pnp, light-ON	13	▶	3RG71 20-3AB00	1 unit	0.046
				pnp, dark-ON	14	A	3RG71 20-3AA00	1 unit	0.042
				nnp, light-ON	13	X	3RG71 20-3GB00	1 unit	0.042
				nnp, dark-ON	14	X	3RG71 20-3GA00	1 unit	0.038
Retroreflective sensor	150 (adjustable via potentiometer)	660 (red, polarized)	2 m cable, PUR, 3 x 0.34 mm ²	pnp, light-ON	14	A	3RG71 21-0AB00	1 unit	0.098
				pnp, dark-ON	13	A	3RG71 21-0AA00	1 unit	0.098
				nnp, light-ON	14	A	3RG71 21-0GB00	1 unit	0.105
				nnp, dark-ON	13	X	3RG71 21-0GA00	1 unit	0.104
			M12 connector 4-pole, type F	pnp, light-ON	14	A	3RG71 21-3AB00	1 unit	0.038
				pnp, dark-ON	13	A	3RG71 21-3AA00	1 unit	0.039
				nnp, light-ON	14	X	3RG71 21-3GB00	1 unit	0.034
				nnp, dark-ON	13	X	3RG71 21-3GA00	1 unit	0.036
Thru-beam sensor	400 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 x 0.34 mm ²	pnp, light-ON	14	A	3RG71 22-0AB00	1 unit	0.098
				pnp, dark-ON	13	X	3RG71 22-0AA00	1 unit	0.100
				nnp, light-ON	14	X	3RG71 22-0GB00	1 unit	0.101
				nnp, dark-ON	13	X	3RG71 22-0GA00	1 unit	0.101
			M12 connector 4-pole, type F	Emitter	7	▶	3RG71 22-0BG00	1 unit	0.098
				pnp, light-ON	14	A	3RG71 22-3AB00	1 unit	0.038
				pnp, dark-ON	13	A	3RG71 22-3AA00	1 unit	0.038
				nnp, light-ON	14	X	3RG71 22-3GB00	1 unit	0.037
				nnp, dark-ON	13	X	3RG71 22-3GA00	1 unit	0.037
				Emitter	7	▶	3RG71 22-3BG00	1 unit	0.039

Dimension drawings



Overview

Cylindrical metal enclosure, IP67,
connection using cable or M 12 connector

Diffuse sensor (energetic sensor)

- Sensing range 80 cm (adjustable using potentiometer)

Retroreflective sensor

- Sensing range 3 m
- Supplied without reflector

Thru-beam sensor

- Sensing range 6 m

Rated operating voltage DC 24 V

Electronics output pnp

Technical specifications

Operating mode		Diffuse sensor	Retroreflective sensor with polarization filter	Thru-beam sensor
				
Sensing range	cm	80 (adjustable)	300	600
Standard target/reflector	mm	200 × 200 (white)	Reflector type D 84	—
Operating voltage range (DC)	V	10 ... 30 (max. 20 % residual ripple)		
No-load supply current I_0 (typ.)	mA			
Rated operational current I_e	mA	150		
Switching frequency	Hz			
Switching time	ms			
Wavelength (type of light)	nm	660 (red)	660 (red, polarized)	660 (red)
Displays		Yellow LED Green LED		
• Switching status				
• Surplus light				
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	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	cm	nm							kg
Straight sensor									
	Diffuse sensor	80 (adjustable via potentiometer)	2 m cable, PUR, 3 × 0.34 mm ²	pnp, light-ON	13	A	3RG76 40-0AB00	1 unit	0.115
				pnp, dark-ON	13	A	3RG76 40-0AA00	1 unit	0.115
				pnp, light-ON and dark-ON	5	A	3RG76 40-0CC00	1 unit	0.115
				pnp, light-ON and surplus light function	6	D	3RG76 40-0CD00	1 unit	0.115
			M12 connector 4-pole, type F	pnp, light-ON	13	A	3RG76 40-3AB00	1 unit	0.040
				pnp, dark-ON	14	A	3RG76 40-3AA00	1 unit	0.040
				pnp, light-ON and dark-ON	5	A	3RG76 40-3CC00	1 unit	0.040
				pnp, light-ON and surplus light function	6	D	3RG76 40-3CD00	1 unit	0.040
	Retroreflective sensor	300	2 m cable, PUR, 3 × 0.34 mm ²	pnp, light-ON	13	A	3RG76 41-0AB00	1 unit	0.115
				pnp, dark-ON	13	A	3RG76 41-0AA00	1 unit	0.115
				pnp, light-ON and dark-ON	5	A	3RG76 41-0CC00	1 unit	0.115
				pnp, light-ON and surplus light function	6	D	3RG76 41-0CD00	1 unit	0.115
			M12 connector 4-pole, type F	pnp, light-ON	13	A	3RG76 41-3AB00	1 unit	0.040
				pnp, dark-ON	14	A	3RG76 41-3AA00	1 unit	0.040
				pnp, light-ON and dark-ON	5	A	3RG76 41-3CC00	1 unit	0.040
				pnp, light-ON and surplus light function	6	D	3RG76 41-3CD00	1 unit	0.040

Start of delivery: beginning of 2004.

M18 S form

	Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU		
		cm	nm							kg		
Straight sensor												
	Thru-beam sensor	600	660 (red)	2 m cable, PUR, 3 × 0.34 mm ²	pnnp, light-ON	13	A	3RG76 42-0AB00	1 unit	0.115		
				4 × 0.34 mm ²	pnnp, dark-ON	13	A	3RG76 42-0AA00	1 unit	0.115		
					pnnp, light-ON and dark-ON	5	A	3RG76 42-0CC00	1 unit	0.115		
					pnnp, light-ON and surplus light function	6	D	3RG76 42-0CD00	1 unit	0.115		
					2 × 0.34 mm ²	Emitter	9	A	3RG76 42-0BG00	1 unit	0.115	
				M12 connector 4-pole, type F	pnnp, light-ON	13	A	3RG76 42-3AB00	1 unit	0.040		
					pnnp, dark-ON	14	A	3RG76 42-3AA00	1 unit	0.040		
					pnnp, light-ON and dark-ON	5	A	3RG76 42-3CC00	1 unit	0.040		
					pnnp, light-ON and surplus light function	6	D	3RG76 42-3CD00	1 unit	0.040		
					Emitter	9	A	3RG76 42-3BG00	1 unit	0.040		
Angled sensor												
Diffuse sensor	80 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 × 0.34 mm ²	pnnp, light-ON	13	A	3RG76 50-0AB00	1 unit	0.115			
				pnnp, dark-ON	13	A	3RG76 50-0AA00	1 unit	0.115			
				4 × 0.34 mm ²	pnnp, light-ON and dark-ON	5	A	3RG76 50-0CC00	1 unit	0.115		
					pnnp, light-ON and surplus light function	6	D	3RG76 50-0CD00	1 unit	0.115		
			M12 connector 4-pole, type F	pnnp, light-ON	13	A	3RG76 50-3AB00	1 unit	0.040			
				pnnp, dark-ON	14	A	3RG76 50-3AA00	1 unit	0.040			
				pnnp, light-ON and dark-ON	5	A	3RG76 50-3CC00	1 unit	0.040			
				pnnp, light-ON and surplus light function	6	D	3RG76 50-3CD00	1 unit	0.040			
			Retroreflective sensor	300	660 (red, polarized)	2 m cable, PUR, 3 × 0.34 mm ²	pnnp, light-ON	13	A	3RG76 51-0AB00	1 unit	0.115
							pnnp, dark-ON	13	A	3RG76 51-0AA00	1 unit	0.115
						4 × 0.34 mm	pnnp, light-ON and dark-ON	5	A	3RG76 51-0CC00	1 unit	0.115
							pnnp, light-ON and surplus light function	6	D	3RG76 51-0CD00	1 unit	0.115
						M12 connector 4-pole, type F	pnnp, light-ON	13	A	3RG76 51-3AB00	1 unit	0.040
							pnnp, dark-ON	14	A	3RG76 51-3AA00	1 unit	0.040
							pnnp, light-ON and dark-ON	5	A	3RG76 51-3CC00	1 unit	0.040
							pnnp, light-ON and surplus light function	6	D	3RG76 51-3CD00	1 unit	0.040
			Thru-beam sensor	600	660 (red)	2 m cable, PUR, 3 × 0.34 mm ²	pnnp, light-ON	13	A	3RG76 52-0AB00	1 unit	0.115
							pnnp, dark-ON	13	A	3RG76 52-0AA00	1 unit	0.115
						4 × 0.34 mm	pnnp, light-ON and dark-ON	5	A	3RG76 52-0CC00	1 unit	0.115
							pnnp, light-ON and surplus light function	6	D	3RG76 52-0CD00	1 unit	0.115
						2 × 0.34 mm ²	Emitter	9	A	3RG76 52-0BG00	1 unit	0.115
						M12 connector 4-pole, type F	pnnp, light-ON	13	A	3RG76 52-3AB00	1 unit	0.040
							pnnp, dark-ON	14	A	3RG76 52-3AA00	1 unit	0.040
							pnnp, light-ON and dark-ON	5	A	3RG76 52-3CC00	1 unit	0.040
							pnnp, light-ON and surplus light function	6	D	3RG76 52-3CD00	1 unit	0.040
							Emitter	9	A	3RG76 52-3BG00	1 unit	0.040

Start of delivery: beginning of 2004.

For dimension drawings, see M 18.

Overview

Cylindrical metal enclosure, IP67,
connection using cable or M 12 connector

Diffuse sensor with background suppression

- Sensing range 1 ... 12 cm (adjustable using potentiometer)

Rated operating voltage DC 24 V

Electronics output pnp or npn

Technical specification

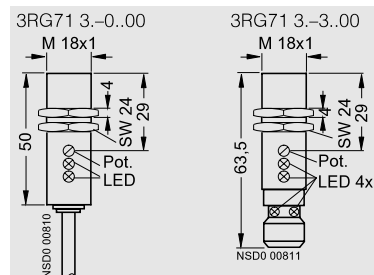
Operating mode		Diffuse sensor with background suppression	
			
Sensing range	cm	1 ... 12 (adjustable)	
Standard target	mm	50 x 50 (white)	
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)	
No-load supply current I_0 (typ.)	mA	25	
Rated operational current I_e	mA	200	
Switching frequency	Hz	500	
Switching time	ms	1	
Wavelength (type of light)	nm	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 54-...00	

Selection and ordering data

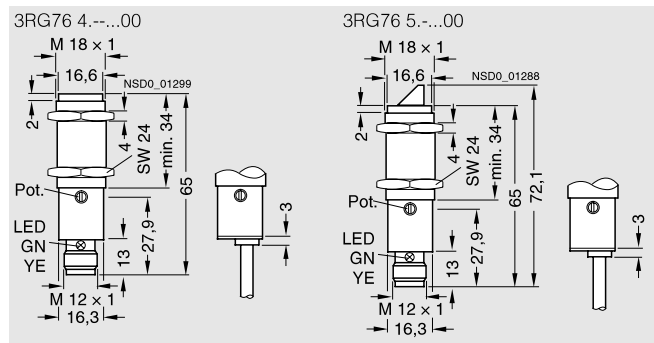
Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	cm	nm							kg
	Diffuse sensor with background suppression	1 ... 12 (adjustable via potentiometer)	2 m cable, PUR, 3 x 0.34 mm ²	pnp, light-ON	13	A	3RG71 34-0AB00	1 unit	0.125
				pnp, dark-ON	14	X	3RG71 34-0AA00	1 unit	0.127
				nnp, light-ON	13	X	3RG71 34-0GB00	1 unit	0.125
				nnp, dark-ON	14	X	3RG71 34-0GA00	1 unit	0.130
			M12 connector 4-pole, type F	pnp, light-ON	13	A	3RG71 34-3AB00	1 unit	0.066
				pnp, dark-ON	14	A	3RG71 34-3AA00	1 unit	0.067
				nnp, light-ON	13	X	3RG71 34-3GB00	1 unit	0.066
				nnp, dark-ON	14	X	3RG71 34-3GA00	1 unit	0.066

Dimension drawings

M18 form



M18S form



M18 P form

Overview

Cylindrical molded-plastic enclosure, IP67, connection using cable or M 12 connector

Diffuse sensor (energetic sensor)

- Sensing range 30 cm (adjustable using potentiometer)
- Sensing range 10 cm (not adjustable)

Diffuse sensor with background suppression

- Sensing range 2 ... 10 cm (not adjustable)
- Special design with straight or angular optic system

Retroreflective sensor

- Sensing range 1.5 m (adjustable using potentiometer)
- Sensing range 2 m (not adjustable)
- Supplied without reflector

Thru-beam sensor

- Sensing range 12 m (not adjustable)

Rated operating voltage DC 24 V

Electronics output pnp and npn, programmable as light-ON or dark-ON.
Exception with background suppression:
Electronics output pnp or npn

Technical specification

Operating mode		Diffuse sensor	Diffuse sensor	Diffuse sensor with background suppression
				
Sensing range	cm	30 (adjustable)	10 (not adjustable)	2 ... 10 (not adjustable)
Standard target	mm	100 × 100 (white)	100 × 100 (white)	100 × 100 (gray, 18 %)
Operating voltage range (DC)	V	10 ... 30		
No-load supply current I_0 , max.	mA	30		
Rated operational current I_e	mA	150		100
Switching frequency	Hz	500		200
Switching time	ms	1		2.5
Wavelength (type of light)	nm	880 (IR)		660 (red)
Display				
• Switching status		Yellow LED		Yellow LED
• Surplus light		–		Green LED
Enclosure material		Molded plastic (ABS)		
Degree of protection		IP67		
Ambient temperature	°C	–15 ... +55		
Temperature coefficient	%/K			
Type		3RG76 20–...00	3RG76 20–...60	3RG76 24–...00, 3RG76 34–...00

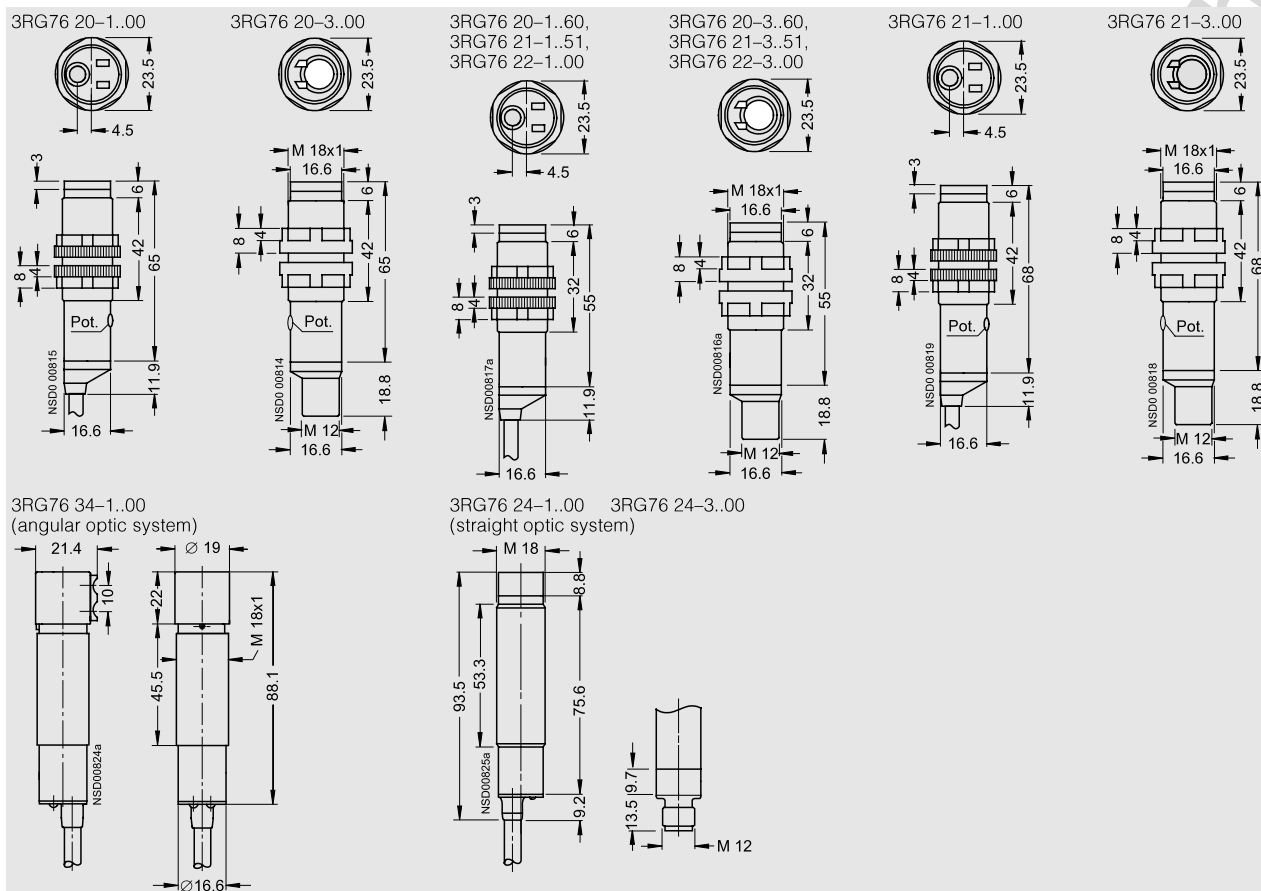
Operating mode		Retroreflective sensor with polarization filter	Retroreflective sensor without polarization filter	Thru-beam sensor
				
Sensing range	cm	150 (adjustable)	200 (not adjustable)	1200 (not adjustable)
Reflector	mm	Reflector type S 48	Reflector type S 48	–
Operating voltage range (DC)	V	10 ... 30		
No-load supply current I_0 , max.	mA	30		
Rated operational current I_e	mA	150		
Switching frequency	Hz	500		250
Switching time	ms	1		2
Wavelength (type of light)	nm	660 (red, polarized)	880 (IR)	880 (IR)
Display				
• Switching status		Yellow LED		
• Surplus light		–		
Enclosure material		Molded plastic (ABS)		
Degree of protection		IP67		
Ambient temperature	°C	–15 ... +55		
Temperature coefficient	%/K			
Type		3RG76 21–...00	3RG76 21–...51	3RG76 22–...00

Selection and ordering data

Operating mode	Sensing range cm	Light type nm	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU kg
	30 (adjustable via potentiometer)	880 (IR)	2 m cable, PVC, 4 x 0.25 mm ²	pnp/npn, light-ON or dark-ON	38	▶	3RG76 20-1RH00	1 unit	0.113
			M12 connector 4-pole, type F	pnp/npn, light-ON or dark-ON		A	3RG76 20-3RH00	1 unit	0.037
	10	880 (IR)	2 m cable, PVC, 4 x 0.25 mm ²	pnp/npn, light-ON or dark-ON	38	A	3RG76 20-1RH60	1 unit	0.119
			M12 connector 4-pole, type F	pnp/npn, light-ON or dark-ON		X	3RG76 20-3RH60	1 unit	0.033
	Retroreflective sensor with polarization filter	150 (adjustable via potentiometer)	2 m cable, PVC, 4 x 0.25 mm ²	pnp/npn, light-ON or dark-ON	38	A	3RG76 21-1RH00	1 unit	0.112
			M12 connector 4-pole, type F	pnp/npn, light-ON or dark-ON		A	3RG76 21-3RH00	1 unit	0.043
Retroreflective sensor	200	880 (IR)	2 m cable, PVC, 4 x 0.25 mm ²	pnp/npn, light-ON or dark-ON	38	A	3RG76 21-1RH51	1 unit	0.108
			M12 connector 4-pole, type F	pnp/npn, light-ON or dark-ON		X	3RG76 21-3RH51	1 unit	0.034
Thru-beam sensor	1200	880 (IR)	2 m cable, PVC, 4 x 0.25 mm ²	pnp/npn, light-ON or dark-ON	38	A	3RG76 22-1RH00	1 unit	0.111
				Emitter	21	A	3RG76 22-1BG00	1 unit	0.108
			M12 connector 4-pole, type F	pnp/npn, light-ON or dark-ON		A	3RG76 22-3RH00	1 unit	0.035
				Emitter		A	3RG76 22-3BG00	1 unit	0.038
	2 ... 10	660 (red)	2 m cable, PVC, 4 x 0.25 mm ²	Light-ON, dark-ON (compatible)	pnp 15 npn 15	X	3RG76 24-1CC00	1 unit	0.123
				Light-ON, dark-ON (compatible)	pnp 15 npn 15	X	3RG76 24-1HC00	1 unit	0.123
			M12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pnp 15 npn 15	X	3RG76 24-3CC00	1 unit	0.057
				Light-ON, dark-ON (compatible)	pnp 15 npn 15	X	3RG76 24-3HC00	1 unit	0.057
	2 ... 10	660 (red)	2 m cable, PVC, 4 x 0.25 mm ²	Light-ON, dark-ON (compatible)	pnp 15 npn 15	X	3RG76 34-1CC00	1 unit	0.125
				Light-ON, dark-ON (compatible)	pnp 15 npn 15	X	3RG76 34-1HC00	1 unit	0.124
			M12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pnp 15 npn 15	X	3RG76 34-3CC00	1 unit	0.059
				Light-ON, dark-ON (compatible)	pnp 15 npn 15	X	3RG76 34-3HC00	1 unit	0.059

M18 P form

Dimension drawings



Overview

Cubic molded-plastic enclosure, IP67,
connection using cable or M 8 connector

Diffuse sensor with background suppression

- Sensing range 2 ... 10 cm (adjustable via teach-in)

Retroreflective sensor for transparent objects
(adjustable via teach-in)

- Sensing range 50 cm

Rated operating voltage DC 24 V

Anti-interference function

Electronics output pnp or npn

Supplied without fixing accessories and without reflector

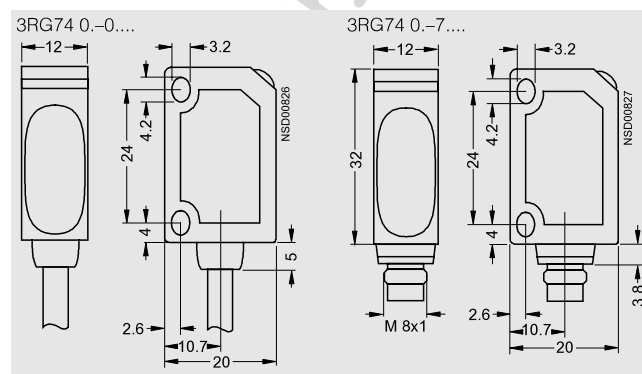
Technical specification

Operating mode		Diffuse sensor with background suppression	Retroreflective sensor for transparent objects
			
Sensing range	cm	2 ... 10 (adjustable)	50 (adjustable)
Standard target/reflector	mm	100 x 100 (gray 18 %)	Reflector type R 60
Operating voltage range (DC)	V	10 ... 30	
No-load supply current I_0 , max.	mA	35	
Rated operational current I_e	mA	100	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (type of light)	nm	660 (red)	
Displays			
• 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	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	cm	nm							kg
	Diffuse sensor with back-ground suppression	2 ... 10 (adjustable via "teach-in")	660 (red)	2 m cable, PUR, 4 x 0.14 mm ²	Light-ON or dark-ON	pnp 16	A 3RG74 04-0CH00	1 unit	0.044
						npn 16	C 3RG74 04-0HH00	1 unit	0.049
				M 8 connector, 4-pole, type B	Light-ON or dark-ON	pnp 16	▶ 3RG74 04-7CH00	1 unit	0.013
						npn 16	X 3RG74 04-7HH00	1 unit	0.016
Retroreflective sensor for transparent objects	50 (adjustable via "teach-in")	660 (red)	2 m cable, PUR, 4 x 0.14 mm ²	Light-ON or dark-ON	pnp 16	A 3RG74 01-0CH52	1 unit	0.044	
					npn 16	C 3RG74 01-0HH52	1 unit	0.048	
				M 8 connector, 4-pole, type B	Light-ON or dark-ON	pnp 16	A 3RG74 01-7CH52	1 unit	0.013
						npn 16	X 3RG74 01-7HH52	1 unit	0.014
Accessories									
Mounting bracket for K 20						A	3RX7 308	1 unit	0.013

Dimension drawings



K 21, K 21 R forms

Overview

Cubic molded-plastic enclosure, IP68,
connection using cable or M 8 connector

Diffuse sensor (energetic sensor)

- Sensing range 60 cm

Retroreflective sensor

- Sensing range 3 m

Rated operating voltage DC 24 V

Electronics output pnp or npn

Supplied without mounting material and without reflector

Technical specifications

Operating mode		Diffuse sensor		Retroreflective sensor	
					
Sensing range	cm	60		300	
Standard target/reflector	mm	100 × 100 (white 90 %)		Reflector type R 60	
Operating voltage range (DC)	V	10 ... 30		25 ... 30	
No-load supply current I_0 (typ.)	mA	28		25	
Rated operational current I_e	mA	100		30	
Switching frequency	Hz	700			
Switching time	ms	0.5			
Wavelength (type of light)	nm	660 (red)			
Displays		Yellow LED			
• Switching status		Green LED			
• Surplus light					
Enclosure material		Molded plastic (PBTP)			
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	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
		cm	nm							kg
	Diffuse sensor	60	660 (red)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON		A	3RG74 00-0AB00	1 unit	0.040
					pnp, dark-ON		A	3RG74 00-0AA00	1 unit	0.040
					nnp, light-ON		D	3RG74 00-0GB00	1 unit	0.044
					nnp, dark-ON		D	3RG74 00-0GA00	1 unit	0.040
				M 8 connector, 3-pole, type A	pnp, light-ON		A	3RG74 00-7AB00	1 unit	0.010
					pnp, dark-ON		A	3RG74 00-7AA00	1 unit	0.010
					nnp, light-ON		D	3RG74 00-7GB00	1 unit	0.013
					nnp, dark-ON		D	3RG74 00-7GA00	1 unit	0.010
	Retroreflective sensor	300	660 (red)	2 m cable, PUR, 3 × 0.14 mm ²	pnp, light-ON		A	3RG74 01-0AB00	1 unit	0.040
					pnp, dark-ON		A	3RG74 01-0AA00	1 unit	0.040
					nnp, light-ON		D	3RG74 01-0GB00	1 unit	0.045
					nnp, dark-ON		D	3RG74 01-0GA00	1 unit	0.040
				M 8 connector, 3-pole, type A	pnp, light-ON		▶	3RG74 01-7AB00	1 unit	0.010
					pnp, dark-ON		▶	3RG74 01-7AA00	1 unit	0.010
					nnp, light-ON		D	3RG74 01-7GB00	1 unit	0.013
					nnp, dark-ON		D	3RG74 01-7GA00	1 unit	0.010

K 21 thru-beam sensor with 6 m sensing range on request.

K 31 form

Overview

Cubic molded-plastic enclosure, IP65,
connection using cable or M 8 connector

Diffuse sensor; energetic sensor

- Sensing range 60 cm (adjustable using potentiometer)

Diffuse sensor with background suppression

- Sensing range 3 ... 15 cm (adjustable using potentiometer)

Retroreflective sensor

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

Thru-beam sensor

- Sensing range 6 m (adjustable using potentiometer)

Sensors for plastic optical fibers

- Sensing range depending on type of optical fiber

Rated operating voltage DC 24 V

Electronics output pnp or npn

Supplied without fixing accessories

Technical specifications

Operating mode		Diffuse sensor	Diffuse sensor with background suppression	Retroreflective sensor with polarization filter
				
Sensing range	cm	60 (adjustable)	3 ... 15 (adjustable)	200 (adjustable)
Standard target/reflector	mm	200 × 200 (white)	100 × 100 (white)	Reflector type D 84
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)		
No-load supply current I_0 (typ.)	mA	15	25	15
Rated operational current I_e	mA	200		
Switching frequency	Hz	1000	500	1000
Switching time	ms	0.5	1	0.5
Wavelength (type of light)	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-...00	3RG70 14-...00	3RG70 11-...00

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 ... 36 (max. 20 % residual ripple)	
No-load supply current I_0 (typ.)	mA	15	
Rated operational current I_e	mA	200	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (type of light)	nm	880 (IR)	660 (red)
Display			
• 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-...00	3RG70 13-...00

Selection and ordering data

	Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
		cm	nm							kg
	Diffuse sensor	60 (adjustable via potentiometer)	880 (IR)	2 m cable, PUR, 3 x 0.14 mm ²	pnp, light-ON	1	▶	3RG70 10-0AB00	1 unit	0.052
					pnp, dark-ON	1	C	3RG70 10-0AA00	1 unit	0.056
					npn, light-ON	1	X	3RG70 10-0GB00	1 unit	0.052
					npn, dark-ON	1	A	3RG70 10-0GA00	1 unit	0.054
				M 8 connector, 3-pole, type A	pnp, light-ON	1	▶	3RG70 10-7AB00	1 unit	0.027
					pnp, dark-ON	1	C	3RG70 10-7AA00	1 unit	0.027
	Diffuse sensor with back-ground suppression	3 ... 15 (adjustable via potentiometer)	660 (red)	2 m cable, PUR, 3 x 0.14 mm ²	pnp, light-ON	1	▶	3RG70 14-0AB00	1 unit	0.053
					pnp, dark-ON	1	X	3RG70 14-0AA00	1 unit	0.054
					npn, light-ON	1	X	3RG70 14-0GB00	1 unit	0.050
					npn, dark-ON	1	X	3RG70 14-0GA00	1 unit	0.052
				M 8 connector, 3-pole, type A	pnp, light-ON	1	A	3RG70 14-7AB00	1 unit	0.028
					pnp, dark-ON	1	A	3RG70 14-7AA00	1 unit	0.028
	Retroreflective sensor	200 (adjustable via potentiometer)	660 (red, polarized)	2 m cable, PUR, 3 x 0.14 mm ²	pnp, light-ON	1	▶	3RG70 11-0AB00	1 unit	0.053
					pnp, dark-ON	1	▶	3RG70 11-0AA00	1 unit	0.055
					npn, light-ON	1	X	3RG70 11-0GB00	1 unit	0.052
					npn, dark-ON	1	X	3RG70 11-0GA00	1 unit	0.054
				M 8 connector, 3-pole, type A	pnp, light-ON	1	▶	3RG70 11-7AB00	1 unit	0.028
					pnp, dark-ON	1	▶	3RG70 11-7AA00	1 unit	0.028
	Thru-beam sensor	600 (adjustable via potentiometer)	880 (IR)	2 m cable, PUR, 3 x 0.14 mm ²	pnp, light-ON	1	▶	3RG70 12-0AB00	1 unit	0.055
					pnp, dark-ON	1	A	3RG70 12-0AA00	1 unit	0.051
					npn, light-ON	1	X	3RG70 12-0GB00	1 unit	0.053
					npn, dark-ON	1	X	3RG70 12-0GA00	1 unit	0.053
				Emitter	2	A	3RG70 12-0BG00	1 unit	0.057	
				M 8 connector, 3-pole, type A	pnp, light-ON	1	▶	3RG70 12-7AB00	1 unit	0.027
pnp, dark-ON	1	A	3RG70 12-7AA00		1 unit	0.025				
	Sensor for plastic optical fibers	Depends on FO conductor	660 (red)	2 m cable, PUR, 3 x 0.14 mm ²	pnp, light-ON	1	A	3RG70 13-0AB00	1 unit	0.054
					pnp, dark-ON	1	X	3RG70 13-0AA00	1 unit	0.053
					npn, light-ON	1	A	3RG70 13-0GB00	1 unit	0.054
					npn, dark-ON	1	X	3RG70 13-0GA00	1 unit	0.053
				M 8 connector, 3-pole, type A	pnp, light-ON	1	A	3RG70 13-7AB00	1 unit	0.029
					pnp, dark-ON	1	A	3RG70 13-7AA00	1 unit	0.026
	Accessories	Mounting bracket for K 30, K 31			npn, light-ON	1	D	3RG70 13-7GB00	1 unit	0.026
					npn, dark-ON	1	X	3RG70 13-7GA00	1 unit	0.025

Accessories

Mounting bracket for K 30, K 31

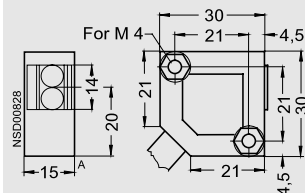
A **3RX7 910**

1 unit

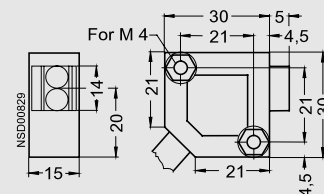
0.028

Dimension drawings

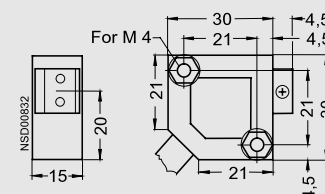
3RG70 10-0..00, 3RG70 12-0..00, 3RG70 14-0..00



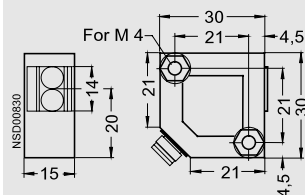
3RG70 11-0..00



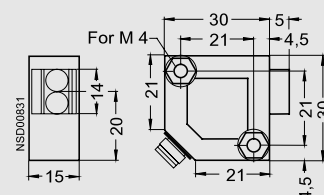
3RG70 13-0..00



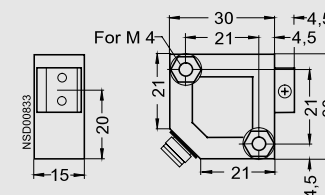
3RG70 10-7..00, 3RG70 12-7..00, 3RG70 14-7..00



3RG70 11-7..00



3RG70 13-7..00



K 30 form

Overview

Cubic molded-plastic enclosure, IP67,
connection using cable or M 8 connector

Diffuse sensor; energetic sensor

- Sensing range 1.2 m (adjustable using potentiometer)

Retroreflective sensor

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

Thru-beam sensor

- Sensing range 12 m (adjustable using potentiometer)

Sensors for plastic optical fibers

- Sensing range depending on type of optical fiber

Rated operating voltage DC 24 V

Electronics output pnp or npn

Supplied without mounting material

Technical specifications

Operating mode		Diffuse sensor	Retroreflective sensor with polarization filter
			
Sensing range	cm	120 (adjustable)	400 (adjustable)
Standard target/reflector	mm	200 × 200 (white)	Reflector type D 84
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)	
No-load supply current I_0 (typ.)	mA	15	15
Rated operational current I_e	mA	200	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (type of light)	nm	880 (IR)	660 (red, polarized)
Displays		Yellow LED Green LED	
• Switching status			
• Surplus light			
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 supply current I_0 (typ.)	mA	15	
Rated operational current I_e	mA	200	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (type of light)	nm	880 (IR)	660 (red)
Display		Yellow LED Green LED	
• Switching status			
• Surplus light			
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

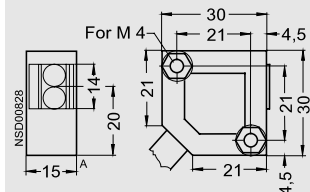
Selection and ordering data

	Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU				
		cm	nm							kg				
	Diffuse sensor	120 (adjustable via potentiometer)	880 (IR)	3 m cable, PUR, 4 × 0.14 mm ²	Light-ON, dark-ON (compatible)	pnp 3 npn 3	▶ X	3RG70 10-0CC00 3RG70 10-0HC00	1 unit	0.100 0.102				
					Light-ON and surplus light function	pnp 4 npn 4	X X	3RG70 10-0CD00 3RG70 10-0HD00	1 unit	0.096 0.104				
					M 8 connector, 4-pole, type B	Light-ON, dark-ON (compatible)	pnp 3 npn 3	▶ X	3RG70 10-7CC00 3RG70 10-7HC00	1 unit	0.050 0.048			
						Light-ON and surplus light function	pnp 4 npn 4	A X	3RG70 10-7CD00 3RG70 10-7HD00	1 unit	0.051 0.048			
				Retroreflective sensor	400 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 × 0.14 mm ²	Light-ON, dark-ON (compatible)	pnp 3 npn 3	A X	3RG70 11-0CC00 3RG70 11-0HC00	1 unit	0.100 0.100	
								Light-ON and surplus light function	pnp 4 npn 4	X X	3RG70 11-0CD00 3RG70 11-0HD00	1 unit	0.101 0.094	
								M 8 connector, 4-pole, type B	Light-ON, dark-ON (compatible)	pnp 3 npn 3	▶ X	3RG70 11-7CC00 3RG70 11-7HC00	1 unit	0.055 0.049
									Light-ON and surplus light function	pnp 4 npn 4	A X	3RG70 11-7CD00 3RG70 11-7HD00	1 unit	0.051 0.054
	Thru-beam sensor	1200 (adjustable via potentiometer)	880 (IR)	3 m cable, PUR, 4 × 0.14 mm ²	Light-ON, dark-ON (compatible)	pnp 3 npn 3	A X	3RG70 12-0CC00 3RG70 12-0HC00	1 unit	0.102 0.102				
					Light-ON and surplus light function	pnp 4 npn 4	X X	3RG70 12-0CD00 3RG70 12-0HD00	1 unit	0.101 0.102				
					3 × 0.14 mm ²	Emitter	2	A	3RG70 12-0BE00	1 unit	0.094			
						M 8 connector, 4-pole, type B	Light-ON, dark-ON (compatible)	pnp 3 npn 3	▶ X	3RG70 12-7CC00 3RG70 12-7HC00	1 unit	0.050 0.050		
				Light-ON and surplus light function	pnp 4 npn 4		A X	3RG70 12-7CD00 3RG70 12-7HD00	1 unit	0.050 0.048				
				Emitter	2	▶	3RG70 12-7BE00	1 unit	0.046					
				Sensor for plastic optical fibers	Depends on FO conductor	660 (red)	3 m cable, PUR, 4 × 0.14 mm ²	Light-ON, dark-ON (compatible)	pnp 3 npn 3	A X	3RG70 13-0CC00 3RG70 13-0HC00	1 unit	0.101 0.101	
								Light-ON and surplus light function	pnp 4 npn 4	X X	3RG70 13-0CD00 3RG70 13-0HD00	1 unit	0.105 0.107	
M 8 connector, 4-pole, type B	Light-ON, dark-ON (compatible)	pnp 3 npn 3	▶ X					3RG70 13-7CC00 3RG70 13-7HC00	1 unit	0.051 0.049				
	Light-ON and surplus light function	pnp 4 npn 4	X X					3RG70 13-7CD00 3RG70 13-7HD00	1 unit	0.050 0.049				
Accessories														
	Mounting bracket for K 30, K31						A	3RX7 910	1 unit	0.028				

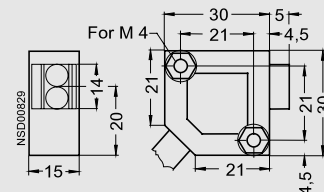
K 30 form

Dimension drawings

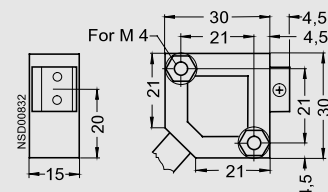
3RG70 10-0..00, 3RG70 12-0..00



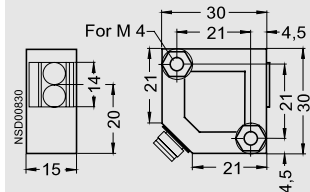
3RG70 11-0..00



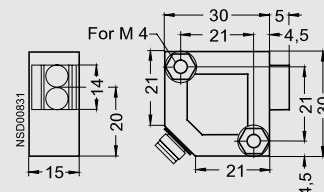
3RG70 13-0..00



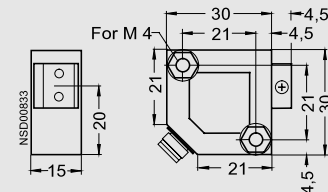
3RG70 10-7..00, 3RG70 12-7..00



3RG70 11-7..00



3RG70 13-7..00



Overview

Cubic molded-plastic enclosure, IP67,
connection using cable or M 8 or M 12 connector

Diffuse sensor; energetic sensor

- Sensing range 2 m (adjustable using potentiometer)

Retroreflective sensor

- Sensing range 6 m (adjustable using potentiometer)
- Supplied without reflector

Thru-beam sensor

- Sensing range 15 m (adjustable using potentiometer)

Rated operating voltage DC 24 V

Electronics output pnp or npn

Supplied with fixing accessories

Technical specifications

Operating mode		Diffuse sensor	Retroreflective sensor with polarization filter	Thru-beam sensor
				
Sensing range	cm	200 (adjustable)	600 (adjustable)	1500 (adjustable)
Standard target/reflector	mm	400 × 400 (white)	Reflector type D 84	–
Operating voltage range (DC)	V	10 ... 36 (max. 20 % residual ripple)		
No-load supply current I_0 (typ.)	mA	15	15	10 / 15 (emitter / receiver)
Rated operational current I_e	mA	200		
Switching frequency	Hz	1000		
Switching time	ms	0.5		
Wavelength (type of light)	nm	880 (IR)	660 (red, polarized)	880 (IR)
Displays		Yellow LED Green LED		
• Switching status				
• Surplus light				
Enclosure material		Molded plastic (PBTP, Crastin)		
Degree of protection		IP67		
Ambient temperature	°C	–25 ... +55		
Temperature coefficient	%/K	0.1		
Type		3RG70 20–...00	3RG70 21–...00	3RG70 22–...00

Selection and ordering data

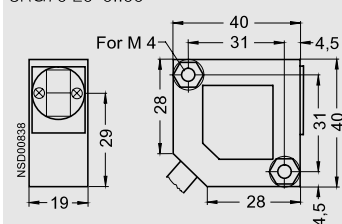
	Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
		cm	nm							kg
	Diffuse sensor	200 (adjustable via potentiometer)	880 (IR)	3 m cable, PUR, 4 × 0.14 mm ²	Light-ON, dark-ON (compatible)	pnp 3 nnp 3	A X	3RG70 20–0CC00 3RG70 20–0HC00	1 unit	0.120 0.123
					Light-ON and surplus light function	pnp 4 nnp 4	A X	3RG70 20–0CD00 3RG70 20–0HD00	1 unit	0.118 0.121
						pnp 3 nnp 3	X X	3RG70 20–7CC00 3RG70 20–7HC00	1 unit	0.068 0.069
					Light-ON and surplus light function	pnp 4 nnp 4	X X	3RG70 20–7CD00 3RG70 20–7HD00	1 unit	0.067 0.068
				M 8 connector, 4-pole, type B	Light-ON, dark-ON (compatible)	pnp 3 nnp 3	X X	3RG70 20–3CC00 3RG70 20–3HC00	1 unit	0.076 0.070
					Light-ON and surplus light function	pnp 4 nnp 4	X X	3RG70 20–3CD00 3RG70 20–3HD00	1 unit	0.072 0.074
				M12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pnp 3 nnp 3	X X	3RG70 20–3CC00 3RG70 20–3HC00	1 unit	0.076 0.070
					Light-ON and surplus light function	pnp 4 nnp 4	X X	3RG70 20–3CD00 3RG70 20–3HD00	1 unit	0.072 0.074
					Light-ON and surplus light function	pnp 4 nnp 4	X X	3RG70 20–3CD00 3RG70 20–3HD00	1 unit	0.072 0.074
						pnp 4 nnp 4	X X	3RG70 20–3CD00 3RG70 20–3HD00	1 unit	0.072 0.074

K 40 form

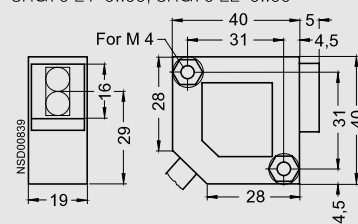
	Operating mode	Sensing range	Light type	Connection	Switching output		Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU			
		cm	nm								kg			
	Retroreflective sensor	600 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 x 0.14 mm ²	Light-ON, dark-ON (compatible)	pnp 3	3	X	3RG70 21-0CC00	1 unit	0.121			
						npn 3	3	X	3RG70 21-0HC00	1 unit	0.118			
					Light-ON and surplus light function	pnp 4	4	X	3RG70 21-0CD00	1 unit	0.120			
						npn 4	4	X	3RG70 21-0HD00	1 unit	0.119			
				M 8 connector, 4-pole, type B	Light-ON, dark-ON (compatible)	pnp 3	3	A	3RG70 21-7CC00	1 unit	0.072			
						npn 3	3	X	3RG70 21-7HC00	1 unit	0.070			
					Light-ON and surplus light function	pnp 4	4	X	3RG70 21-7CD00	1 unit	0.070			
						npn 4	4	X	3RG70 21-7HD00	1 unit	0.069			
				M12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pnp 3	3	A	3RG70 21-3CC00	1 unit	0.075			
						npn 3	3	X	3RG70 21-3HC00	1 unit	0.070			
					Light-ON and surplus light function	pnp 4	4	X	3RG70 21-3CD00	1 unit	0.075			
						npn 4	4	X	3RG70 21-3HD00	1 unit	0.071			
				Thru-beam sensor	1500 (adjustable via potentiometer)	660 (red)	3 m cable, PUR, 4 x 0.14 mm ²	Light-ON, dark-ON (compatible)	pnp 3	3	X	3RG70 22-0CC00	1 unit	0.119
									npn 3	3	X	3RG70 22-0HC00	1 unit	0.132
								Light-ON and surplus light function	pnp 4	4	X	3RG70 22-0CD00	1 unit	0.124
									npn 4	4	X	3RG70 22-0HD00	1 unit	0.117
3 x 0.14 mm ²	Emitter						X	3RG70 22-0BE00	1 unit	0.114				
M 8 connector, 4-pole, type B	Light-ON, dark-ON (compatible)	pnp 3	3				A	3RG70 22-7CC00	1 unit	0.069				
		npn 3	3				X	3RG70 22-7HC00	1 unit	0.071				
	Light-ON and surplus light function	pnp 4	4				X	3RG70 22-7CD00	1 unit	0.068				
		npn 4	4				X	3RG70 22-7HD00	1 unit	0.068				
	Emitter						X	3RG70 22-7BE00	1 unit	0.062				
M12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pnp 3	3				X	3RG70 22-3CC00	1 unit	0.074				
		npn 3	3				X	3RG70 22-3HC00	1 unit	0.070				
	Light-ON and surplus light function	pnp 4	4				X	3RG70 22-3CD00	1 unit	0.072				
		npn 4	4				X	3RG70 22-3HD00	1 unit	0.071				
	Emitter						X	3RG70 22-3BE00	1 unit	0.072				
Accessories														
Mounting bracket for K 40								A	3RX7 911	1 unit	0.030			

Dimension drawings

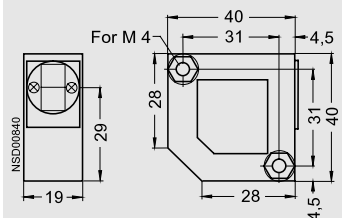
3RG70 20-0..00



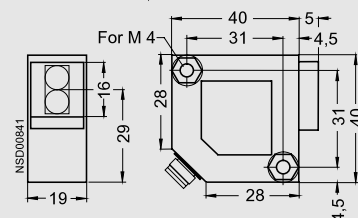
3RG70 21-0..00, 3RG70 22-0..00



3RG70 20-7..00



3RG70 21-7..00, 3RG70 22-7..00



Overview

Cubic molded-plastic enclosure, IP67, connection using M 12 connector

Diffuse sensor; energetic sensor

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

Diffuse sensor with background suppression

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

Retroreflective sensor

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

Retroreflective sensor for transparent objects

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

Rated operating voltage DC 24 V

Electronics output pnp or npn

Supplied with mounting material and 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 supply 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 (type of light)	nm	660 (red)	
Displays			
• 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		Retroreflective sensor with polarization filter	Retroreflective sensor for transparent objects
			
Sensing range	cm	600 (adjustable)	100 (adjustable)
Reflector	mm	Reflector type D 84	Reflector type D 84
Operating voltage range (DC)	V	10 ... 30	
No-load supply current I_0 , max.	mA	35	
Rated operational current I_e	mA	200	
Switching frequency	Hz	1000	
Switching time	ms	0.5	
Wavelength (type of light)	nm	660 (red, polarized)	
Displays			
• 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

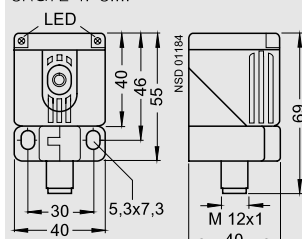
C 40 form

Selection and ordering data

	Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
		cm	nm							kg
	Diffuse sensor	70 (adjustable via "teach-in")	660 (red)	M12 connector 4-pole, type F	pnp, light-ON or dark-ON	39	A	3RG72 40-3CH00	1 unit	0.092
					npn, light-ON or dark-ON	39	D	3RG72 40-3HH00	1 unit	0.115
	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	40	A	3RG72 44-3CH00	1 unit	0.086
					npn, light-ON or dark-ON	40	D	3RG72 44-3HH00	1 unit	0.085
	Retroreflective sensor with polarization filter	600 (adjustable via "teach-in")	660 (red, polarized)	M12 connector 4-pole, type F	pnp, light-ON or dark-ON	39	A	3RG72 41-3CH00	1 unit	0.085
					npn, light-ON or dark-ON	39	D	3RG72 41-3HH00	1 unit	0.086
	Retroreflective sensor for transparent objects	100 (adjustable via "teach-in")	660 (red, polarized)	M12 connector 4-pole, type F	pnp, light-ON or dark-ON	40	A	3RG72 41-3CH52	1 unit	0.083
					npn, light-ON or dark-ON	40	D	3RG72 41-3HH52	1 unit	0.086

Dimension drawings

3RG72 4.-3....



Overview

Cubic molded-plastic enclosure, IP67, connection using M 12 connector or Pg 11 cable gland

Diffuse sensor (energetic sensor)

- Sensing range 2 m (adjustable using potentiometer)

Diffuse sensor with background suppression

- Sensing range 0.2 ... 1 m (adjustable using potentiometer)

Retroreflective sensor

- Sensing range 6 m (adjustable using potentiometer)
- Supplied without reflector

Thru-beam sensor

- Sensing range 50 m (adjustable using potentiometer)

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

Inputs and outputs

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

Supplied without fixing accessories

Versions with AS-Interface

- I/O configuration 1, ID code 1
- Assembly on FK coupling module
- Current consumption from AS-Interface max. 30 mA
- Switching time max. 5 s

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	–
No-load supply current I_0 , max.	mA	30	–	45	–
Operating voltage range (AC/DC)	V	–	20 ... 320	–	–
No-load power, max.	VA	–	2	–	–
Rated operational current I_e	mA	200	2000 (at AC 240 V)	200	–
Switching frequency, max.	Hz	1000	20	250	–
Switching time, max.	ms	0.5	20	2	–
Wavelength (type of light)	nm	880 (IR)		880 (IR)	
Display		Yellow LED			
• Switching status		Green LED			
• Surplus light					
Enclosure material		Molded plastic (PBTP)			
Degree of protection		IP67			
Ambient temperature	°C	–5 ... +55			
Temperature coefficient	%/K	0.3			
Type		3RG72 00–...00, 3RG72 10–...00	3RG72 10–6MC00	3RG72 04–...00, 3RG72 14–...00	

Operating mode		Retroreflective sensor with polarization filter		Thru-beam sensor	
					
Sensing range	m	6 (adjustable)		50 (adjustable)	
Reflector	mm	Reflector type D 84		–	
Operating voltage range (DC)	V	10 ... 36	–	10 ... 36	–
No-load supply current I_0 , max.	mA	30	–	30	–
Operating voltage range (AC/DC)	V	–	20 ... 320	–	20 ... 320
No-load power, max.	VA	–	2	–	2
Rated operational current I_e	mA	200	2000 (at AC 240 V)	200	2000 (at AC 240 V)
Switching frequency, max.	Hz	1000	20	1000	20
Switching time, max.	ms	0.5	20	0.5	20
Wavelength (type of light)	nm	660 (red, polarized)		880 (IR)	
Display					
• Switching status		Yellow LED			
• Surplus light		Green LED			
Enclosure material		Molded plastic (PBTP)			
Degree of protection		IP67			
Ambient temperature	°C	–5 ... +55			
Temperature coefficient	%/K	0.3			
Type		3RG72 01–...00, 3RG72 11–...00	3RG72 11–6MC00	3RG72 02–...00, 3RG72 12–...00	3RG72 12–6MC00, 3RG72 02–6FG00

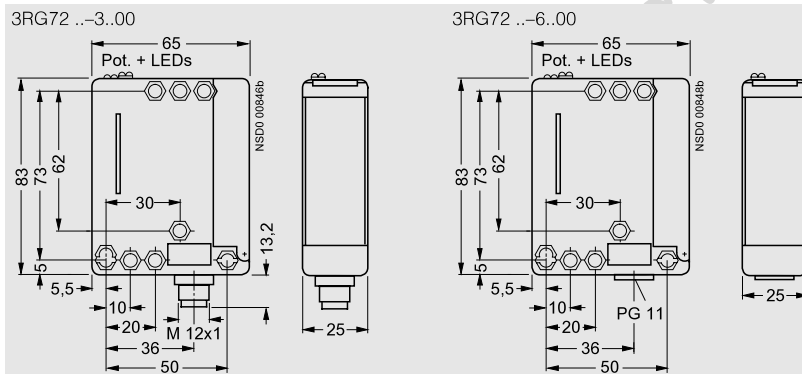
K 80 form

Selection and ordering data

Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	m	nm							kg
	Diffuse sensor 2 (adjustable via potentiometer)	880 (IR)	M 12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pn-p 5 npn 5	▶ C	3RG72 00-3CC00 3RG72 00-3HC00	1 unit 1 unit	0.123 0.124
			M 12 connector, 5-pole, type G, with enabling input	Light-ON or dark-ON, surplus light, with timing function (0.01 ... 1 s)	pn-p 8 npn 8	D C	3RG72 10-3DK00 3RG72 10-3EK00	1 unit 1 unit	0.126 0.127
			Pg 11	Light-ON, dark-ON (compatible)	pn-p 12 npn 12	C C	3RG72 00-6CC00 3RG72 00-6HC00	1 unit 1 unit	0.124 0.130
			Pg 11, with enabling input	Light-ON or dark-ON, surplus light, with timing function (0.01 ... 1 s)	pn-p 12 npn 12	▶ C	3RG72 10-6DK00 3RG72 10-6EK00	1 unit 1 unit	0.131 0.131
			Pg 11	Relay, light-ON and dark-ON, with timing function (0.1 ... 10 s)	– 11	▶	3RG72 10-6MC00	1 unit	0.144
			FK coupling module	AS-Interface, with timing function (0.01 ... 1 s)	– 10	D	3RG72 10-5WS00	1 unit	0.125
4	Diffuse sensor with background suppression	880 (IR)	M 12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pn-p 5 npn 5	A X	3RG72 04-3CC00 3RG72 04-3HC00	1 unit 1 unit	0.121 0.120
			M 12 connector, 5-pole, type G, with enabling input	Light-ON or dark-ON, surplus light, with timing function (0.01 ... 1 s)	pn-p 8 npn 8	X X	3RG72 14-3DK00 3RG72 14-3EK00	1 unit 1 unit	0.125 0.124
			Pg 11	Light-ON, dark-ON (compatible)	pn-p 12 npn 12	A X	3RG72 04-6CC00 3RG72 04-6HC00	1 unit 1 unit	0.130 0.130
			Pg 11, with enabling input	Light-ON or dark-ON, surplus light, with timing function (0.01 ... 1 s)	pn-p 12 npn 12	X X	3RG72 14-6DK00 3RG72 14-6EK00	1 unit 1 unit	0.132 0.130
			FK coupling module	AS-Interface, with timing function (0.01 ... 1 s)	– 10	X	3RG72 14-5WS00	1 unit	0.131
	Retroreflective sensor	660 (red, polarized)	M 12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pn-p 5 npn 5	▶ C	3RG72 01-3CC00 3RG72 01-3HC00	1 unit 1 unit	0.115 0.118
			M 12 connector, 5-pole, type G, with enabling input	Light-ON or dark-ON, surplus light, with timing function (0.01 ... 1 s)	pn-p 8 npn 8	▶ C	3RG72 11-3DK00 3RG72 11-3EK00	1 unit 1 unit	0.117 0.121
			Pg 11	Light-ON, dark-ON (compatible)	pn-p 12 npn 12	▶ D	3RG72 01-6CC00 3RG72 01-6HC00	1 unit 1 unit	0.122 0.123
			Pg 11, with enabling input	Light-ON or dark-ON, surplus light, with timing function (0.01 ... 1 s)	pn-p 12 npn 12	D C	3RG72 11-6DK00 3RG72 11-6EK00	1 unit 1 unit	0.125 0.125
			Pg 11	Relay, light-ON and dark-ON, with timing function (0.1 ... 10 s)	– 11	▶	3RG72 11-6MC00	1 unit	0.137
			FK coupling module	AS-Interface, with timing function (0.01 ... 1 s)	– 10	C	3RG72 11-5WS00	1 unit	0.125

Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU	
	m	nm							kg	
	Thru-beam sensor	50 (adjustable via potentiometer)	880 (IR)	M 12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pnp 5	▶	3RG72 02-3CC00	1 unit	0.117
						nnp 5	C	3RG72 02-3HC00	1 unit	0.118
					Light-ON or dark-ON, surplus light, with timing function (0.01 ... 1 s)	pnp 6	D	3RG72 12-3DK00	1 unit	0.120
				nnp 6			3RG72 12-3EK00			
				Emitter with enabling input	– 7	▶	3RG72 02-3BG00	1 unit	0.112	
				Pg 11	Light-ON, dark-ON (compatible)	pnp 12	A	3RG72 02-6CC00	1 unit	0.118
						nnp 12	D	3RG72 02-6HC00	1 unit	0.120
					Light-ON or dark-ON, surplus light, with timing function (0.01 ... 1 s)	pnp 12	D	3RG72 12-6DK00	1 unit	0.124
						nnp 12	C	3RG72 12-6EK00	1 unit	0.125
					Emitter with enabling input	– 12	A	3RG72 02-6BG00	1 unit	0.117
FK coupling module	Relay, light-ON and dark-ON, with timing function (0.1 ... 10 s)	– 11	▶	3RG72 12-6MC00	1 unit	0.136				
	Emitter with enabling input	– 12	A	3RG72 02-6FG00	1 unit	0.127				
	AS-Interface, with timing function (0.01 ... 1 s)	– 10	D	3RG72 12-5WS00	1 unit	0.121				
				Emitter	– 10	D	3RG72 02-5WG00	1 unit	0.120	
Accessories										
	Mounting bracket for K 80					A	3RX7 303	1 unit	0.247	

Dimension drawings



KL 40 form

Overview

Cubic molded-plastic enclosure, IP65,
connection using cable or M 8 connector

Sensor for plastic optical fibers

- Sensing range depending on type of optical fiber

Rated operating voltage DC 24 V

Programmable using teach-in

Electronics output pnp or npn

Supplied without fixing accessories

Technical specifications

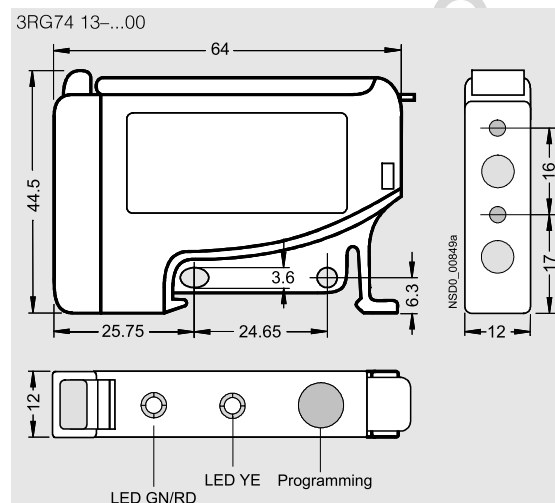
Operating mode		Sensor for plastic optical fibers	
			
Sensing range	mm	Max. 280	
Operating voltage range (DC)	V	10 ... 30	
No-load supply current I_0 , max.	mA	55	
Rated operational current I_e	mA	100	
Switching frequency	Hz	1500	
Switching time	ms	0.33	
Wavelength (type of light)	nm	660 (red)	
Displays			
• Switching status		Yellow LED	
• Set		Green/red LED	
Enclosure material		Molded plastic (ABS)	
Degree of protection		IP65	
Ambient temperature	°C	-10 ... +55	
Temperature coefficient	%/K		
Type		3RG74 13-...00	

Selection and ordering data



Operating mode	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU	
	nm							kg	
For plastic fiber-optic conductor	660 (red)	2 m cable, PVC, 4 × 0.088 mm ²	Light-ON or dark-ON	pnp 34	X	3RG74 13-1CH00	1 unit	0.130	
				nnp 34	X	3RG74 13-1HH00	1 unit	0.130	
		M 8 connector, 4-pole, type B	Light-ON or dark-ON	pnp 23	▶	3RG74 13-7CH00	1 unit	0.056	
				nnp 23	X	3RG74 13-7HH00	1 unit	0.054	
Accessories									
Mounting bracket for KL 40						A	3RX7 313	1 unit	0.017

Dimension drawing



Color sensors

Color sensors

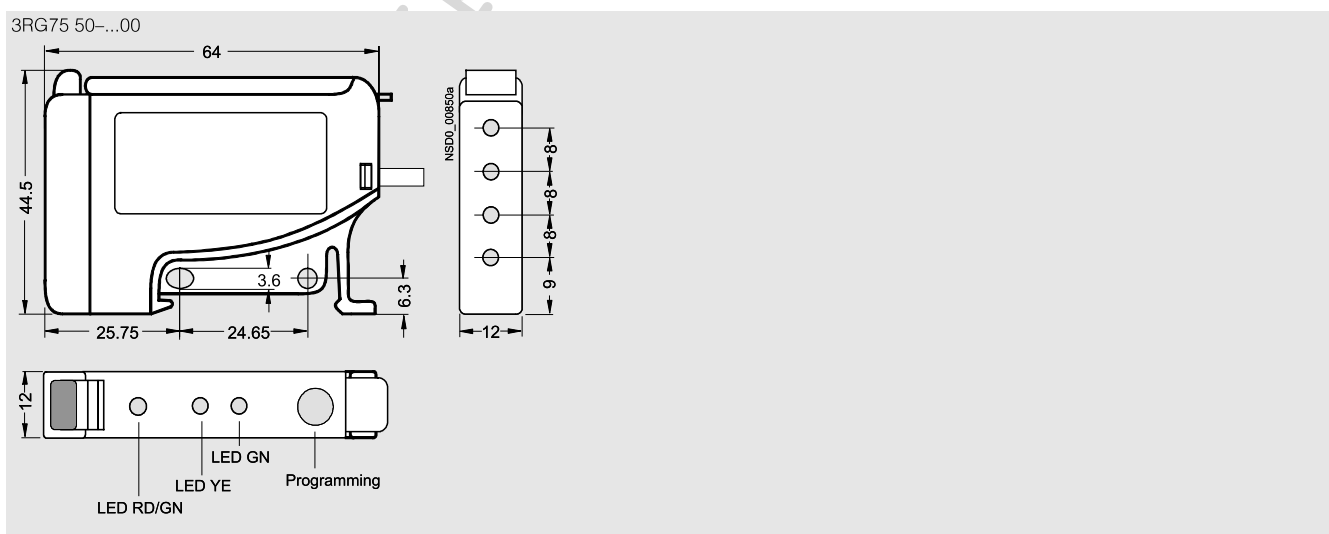
- ## Color sensors

Color sensors

Color sensors

3RG75 50 ...00		
Sensing range	Connection	Switching output
mm		
3 ... 15	2 m cable, PVC, 6 x 0.088 mm ²	Solid-state + alarm output
	M 8 connector, 4-pole, type B	Solid-state

et for CL 40



C 80 form – color mark sensors

Overview

Cubic metal enclosure, IP67,
connection using cable or M 12 connector

Color sensor with plastic optical fibers

- Sensing range 9 or 18 mm

Rated operating voltage DC 24 V

Programmable using teach-in

Electronics output pnp

Timing function

Supplied without fixing accessories

Technical specifications

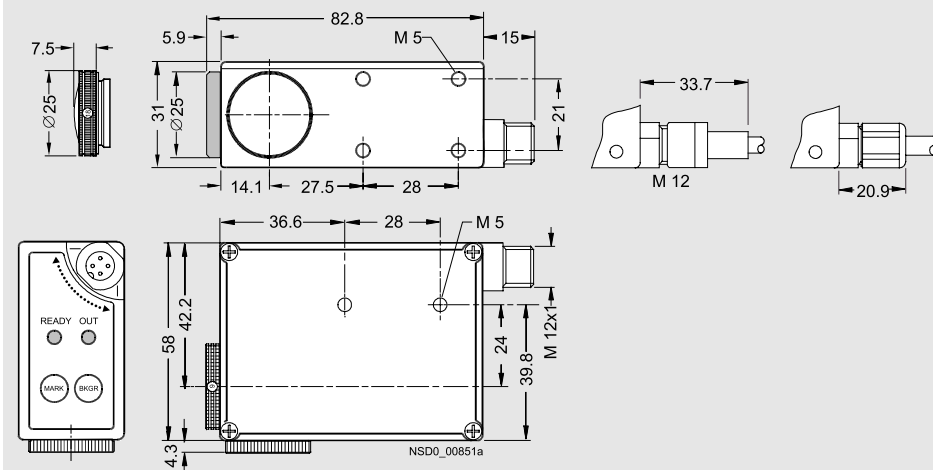
Operating mode	Color mark sensor BERO 	
Sensing range	mm	9 or 18 mm
Operating voltage range (DC)	V	10 ... 30
No-load supply current I_0 , max.	mA	80
Rated operational current I_e	mA	200
Analog output ($R_i = 22\text{ k}\Omega$)	V	0 ... 5.5
Switching frequency	Hz	10 000
Switching time	ms	0.05
Wavelength (type of light)	nm	660 (red) or 565 (green); automatic selection
Displays	• Switching status • Ready	
Enclosure material	Die-cast aluminum	
Degree of protection	IP67	
Ambient temperature	°C	-10 ... +55
Temperature coefficient	%/K	
Type	3RG75 60-3CH5.	

Selection and ordering data

Operating mode	Sensing range	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	m							kg
 Color mark sensor BERO	9	M 12 connector 4-pole, type F	Light-ON or dark-ON	pnp 26	A	3RG75 60-3CH55	1 unit	0.354
	18		Light-ON or dark-ON	pnp 26	X	3RG75 60-3CH54	1 unit	0.359

Dimension drawing

3RG75 60-3CH5.



Overview

Cylindrical metal enclosure, IP65,
connection using cable or M 12 connector

Visible laser light (red),
laser protection class 3 according to IEC 60825

Thru-beam sensor

- Sensing range 50 m (adjustable using potentiometer)

Rated operating voltage DC 24 V

Electronics output pnp

Supplied with focusing and adjustment aid,
without fixing accessories

Technical specifications

Operating mode		Laser thru-beam sensor
		
Sensing range	m	50 (adjustable)
Operating voltage range (DC)	V	10 ... 30
No-load supply 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 (type of light)	nm	660 (red laser light, polarized)
Displays		Yellow LED
• Switching status		Red LED
• Surplus light		Green LED
• Operating voltage range		
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

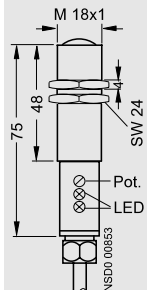
	Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
		m	nm							kg
Straight sensor										
	Laser thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 × 0.25 mm ²	pnp, light-ON, dark-ON (compatible)	5	A	3RG71 35-0CC00	1 unit	0.203
					pnp, light-ON and surplus light function	6	D	3RG71 35-0CD00	1 unit	0.178
					Emitter	9	A	3RG71 35-0BE00	1 unit	0.180
				M 12 connector 4-pole, type F	pnp, light-ON, dark-ON (compatible)	5	A	3RG71 35-3CC00	1 unit	0.081
					pnp, light-ON and surplus light function	6	D	3RG71 35-3CD00	1 unit	0.079
					Emitter	9	A	3RG71 35-3BE00	1 unit	0.080
Angled sensor										
	Laser thru-beam sensor	50 (adjustable via potentiometer)	660 (red, polarized)	3 m cable, PUR, 4 × 0.25 mm ²	pnp, light-ON, dark-ON (compatible)	5	C	3RG71 75-0CC00	1 unit	0.178
					pnp, light-ON and surplus light function	6	D	3RG71 75-0CD00	1 unit	0.176
					Emitter	9	C	3RG71 75-0BE00	1 unit	0.190
				M 12 connector 4-pole, type F	pnp, light-ON, dark-ON (compatible)	5	A	3RG71 75-3CC00	1 unit	0.076
					pnp, light-ON and surplus light function	6	D	3RG71 75-3CD00	1 unit	0.075
					Emitter	9	D	3RG71 75-3BE00	1 unit	0.082

L 18 form – laser

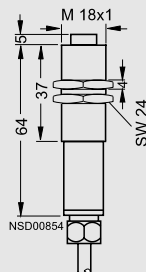
Dimension drawings

Straight sensor

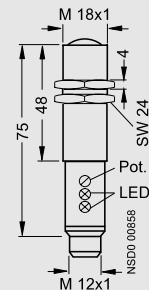
3RG71 35-0C.00



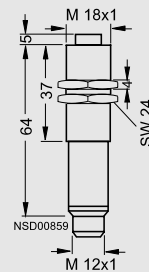
3RG71 35-0BE00



3RG71 35-3C.00

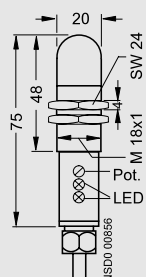
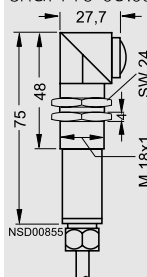


3RG71 35-3BE00

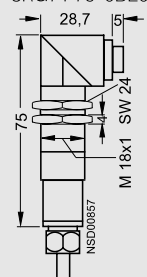


Angled sensor

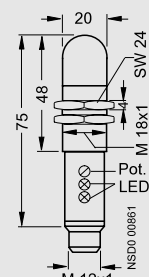
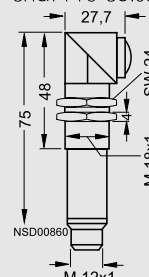
3RG71 75-0C.00



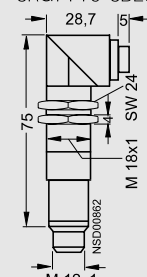
3RG71 75-0BE00



3RG71 75-3C.00



3RG71 75-3BE00



Overview

Cubic molded-plastic enclosure, IP67,
connection using cable or M 12 connector

Visible laser light (red),
laser protection class 3 according to IEC 60825

Diffuse sensor with background suppression

- Sensing range 3 ... 15 cm (adjustable using potentiometer)

Diffuse sensor with analog output

- Sensing range 4.5 ... 8.5 cm (adjustable using potentiometer)

Retroreflective sensor

- Sensing range 12 m (adjustable using potentiometer)
- Supplied without reflector

Rated operating voltage DC 24 V

Electronics output pnp

Analog output

Supplied without fixing accessories

Technical specifications

Operating mode		Laser diffuse sensor with background suppression	Laser diffuse sensor
Sensing range	cm	3 ... 15 (adjustable)	1200 (adjustable)
Standard target/reflector	mm	100 x 100 (white)	Reflector type RL 50
Operating voltage range (DC)	V	10 ... 30 (max. 10 % residual ripple)	
No-load supply current I_0 , max.	mA	50	
Rated operational current I_e	mA	200	
Switching frequency	Hz	2500	
Switching time	ms	< 0.2	
Wavelength (type of light)	nm	670 (red laser light)	
Displays		Yellow LED Red LED Green LED	
• Switching status			
• Surplus light			
• Operating voltage range			
Enclosure material		Molded plastic (ABS)	
Degree of protection		IP67	
Ambient temperature	°C	-20 ... +45	
Temperature drift	%/K	0.1	
Type		3RG70 56-...00	3RG70 57-...00

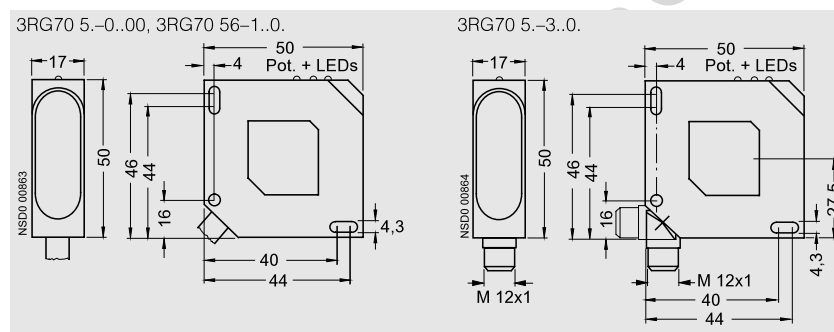
Operating mode		Laser diffuse sensor with analog output	
Sensing range	mm	45 ... 85 (adjustable)	
Resolution	µm	80	20
Linearity	ms	< 1 % of measuring range (40 mm)	
Target diameter (at distance of 65 mm)	mm	< 0.8	
Operating voltage range (DC)	V	18 ... 28 (max. 10 % residual ripple)	
No-load supply current 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 (type of light)	nm		
Displays		Red LED Green LED	
• Surplus light			
• Operating voltage range			
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

L 50 form – laser

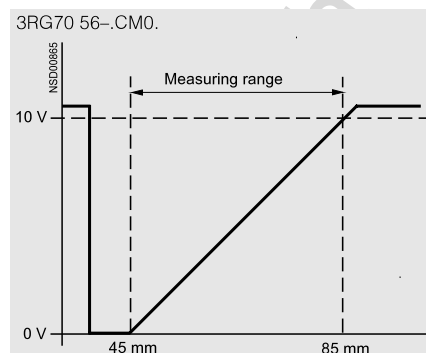
Selection and ordering data

Operating mode	Sensing range/resolution	Light type	Connection	Switching output/ analog output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU	
		nm							kg	
	Laser diffuse sensor with background suppression	3 ... 15 cm (adjustable via potentiometer)	670 (red laser light)	2 m cable, PUR, 4 × 0.25 mm ²	Light-ON, dark-ON (compatible)	pnp 5	D	3RG70 56-0CC00	1 unit	0.133
						npn 5	X	3RG70 56-0HC00	1 unit	0.130
					Light-ON and surplus light function	pnp 6	C	3RG70 56-0CD00	1 unit	0.132
						npn 6	X	3RG70 56-0HD00	1 unit	0.129
				M 12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pnp 5	▶	3RG70 56-3CC00	1 unit	0.040
						npn 5	X	3RG70 56-3HC00	1 unit	0.040
					Light-ON and surplus light function	pnp 6	A	3RG70 56-3CD00	1 unit	0.040
						npn 6	X	3RG70 56-3HD00	1 unit	0.042
	Laser diffuse sensor	1200 cm (adjustable via potentiometer)	670 (red laser light)	2 m cable, PUR, 4 × 0.25 mm ²	Light-ON, dark-ON (compatible)	pnp 5	C	3RG70 57-0CC00	1 unit	0.138
						npn 5	D	3RG70 57-0HC00	1 unit	0.135
					Light-ON and surplus light function	pnp 6	X	3RG70 57-0CD00	1 unit	0.136
						npn 6	D	3RG70 57-0HD00	1 unit	0.100
				M 12 connector 4-pole, type F	Light-ON, dark-ON (compatible)	pnp 5	A	3RG70 57-3CC00	1 unit	0.043
						npn 5	X	3RG70 57-3HC00	1 unit	0.043
Light-ON and surplus light function					pnp 6	A	3RG70 57-3CD00	1 unit	0.044	
					npn 6	D	3RG70 57-3HD00	1 unit	0.045	
Laser diffuse sensor with analog output	80 µm 20 µm		6 m cable, PVC, 4 × 0.34 mm ² , shielded	Analogue 0 ... 10 V, rising	– 37	C	3RG70 56-1CM00	1 unit	0.258	
					– 37	C	3RG70 56-1CM03	1 unit	0.286	
	80 µm 20 µm		M 12 connector 4-pole, type F	Analogue 0 ... 10 V, rising	– 37	A	3RG70 56-3CM00	1 unit	0.043	
					– 37	A	3RG70 56-3CM03	1 unit	0.044	
Accessories										
Mounting bracket for L 50						A	3RX7 302	1 unit	0.034	
Cable with connector, shielded, 4 × 0.34 mm ²						D	3RX1 680	1 unit	0.227	
Cable with right-angle connector, shielded, 4 × 0.34 mm ²						D	3RX1 681	1 unit	0.235	

Dimension drawings



Characteristics



Overview

Cubic molded-plastic enclosure, IP54, connection using M 8 connector

7-beam retroreflective sensor

- Sensing range 1.4 m

Rated operating voltage DC 24 V

Autocollimation principle

Electronics output pnp, switches on interruption in at least one light beam

Supplied with fixing accessories, without reflector

Technical specifications

Operating mode		Light array
		
Sensing range	cm	140
Reflector	mm	Reflector type R 45
Operating voltage range (DC)	V	12 ... 36
No-load supply current I_0 , max.	mA	30
Rated operational current I_e	mA	200
Switching frequency	Hz	50
Switching time	ms	10
Wavelength (type of light)	nm	660 (red, polarized)
Displays		Yellow LED
• Switching status		Red LED
• Contamination monitoring		
Enclosure material		Molded plastic (PBTP, Crastin)
Degree of protection		IP54
Ambient temperature	°C	-10 ... +50
Temperature coefficient	%/K	
Type		3RG70 71-7CD27

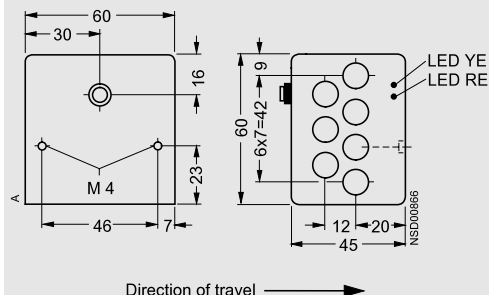
Selection and ordering data

Operating mode	Sensing range	Light type	Connection	Switching output	Circ. diag. No.	DT	Order No.	PS	Approx. weight per PU
	cm	nm							kg
Light array	140	660 (red, polarized)	M 8 connector, 4-pole, type B	Dark-ON and surplus light function	6	▶	3RG70 71-7CD27	1 unit	0.218



Dimension drawings

3RG70 71-7CD27



Opto-BERO Accessories

Plastic optical fibers

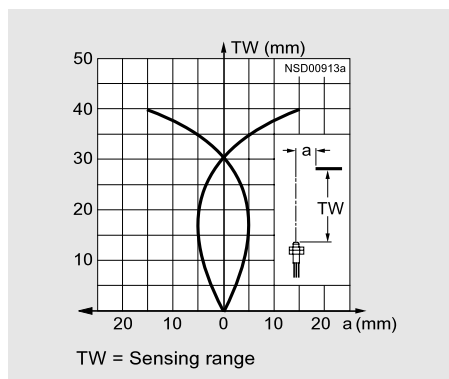
Overview

The plastic fiber-optic conductors are used in conjunction with the Opto-BEROs of K 30, K 31 and KL 40 forms.

The sensing range of the plastic fiber-optic conductors depends on the type of Opto-BERO used.

The main advantages are:

- Extremely small dimensions
- Small bending radii
- For cutting to length
- Visible light
- Wide range of types
- Attractively priced.



Typical beam diagram (type 3RX7 003)

Technical specifications

Attenuation at 660 nm, max.	dB/m	0.4
Angle of incidence, max.		$\pm 56^\circ$
Standard length	m	2 ± 0.1
Bending radius, min.	mm	25
Tensile load, max.	N	30
Sleeve material		Polyethylene
Degree of protection		
• Sensor head		IP67
• Sensor		IP65
Temperature range	°C	-40 ... +75
Solvent resistance		Not resistant

Selection and ordering data

Design	Sensing range for Opto-BERO	DT	Order No.	PS	Approx. weight per PU kg
Plastic fiber-optic conductors for diffuse sensors					
	2 individual fibers Ø 1 mm, can be cut Adapter sleeves for Ø 2.2 mm contained in the scope of supply 20 mm K 31 form 40 mm K 30 form 35 mm KL 40 form	X	3RX7 001	1 unit	0.054
	2 individual fibers Ø 2.2 mm, can be cut 60 mm K 31 form 120 mm K 30 form 110 mm KL 40 form	A	3RX7 002	1 unit	0.069
	2 individual fibers Ø 1 mm, can be cut Adapter sleeves for Ø 2.2 mm contained in the scope of supply 20 mm K 31 form 40 mm K 30 form 35 mm KL 40 form	X	3RX7 004	1 unit	0.053
	2 individual fibers Ø 2.2 mm, can be cut 60 mm K 31 form 120 mm K 30 form 100 mm KL 40 form	A	3RX7 005	1 unit	0.066

Plastic optical fibers

Design	Sensing range for Opto-BERO	DT	Order No.	PS	Approx. weight per PU kg
Plastic fiber-optic conductors for thru-beam sensors					
	2 individual fibers Ø 2.2 mm, can be cut (fine internal fibers) 60 mm K 31 form 120 mm K 30 form 90 mm KL 40 form	A	3RX7 006	1 unit	0.068
	2 individual fibers Ø 2.2 mm, can be cut 200 mm K 31 form 400 mm K 30 form 280 mm KL 40 form	X	3RX7 007	1 unit	0.069
	2 individual fibers Ø 2.2 mm, can be cut (fine internal fibers) 60 mm K 31 form 120 mm K 30 form 60 mm KL 40 form	A	3RX7 008	1 unit	0.071
	2 individual fibers Ø 2.2 mm, can be cut 200 mm K 31 form 400 mm K 30 form 280 mm KL 40 form	A	3RX7 010	1 unit	0.070
Front lenses					
	Front lenses (1 pair) for use with 3RX7 007 fiber type 1500 mm K 31 form 3000 mm K 30 form 2000 mm KL 40 form	A	3RX7 901	1 unit	0.008
	Front lenses 90° (1 pair) for use with 3RX7 007 fiber type 250 mm K 31 form 500 mm K 30 form 350 mm KL 40 form	D	3RX7 902	1 unit	0.007
Cutting tool for fiber-optic conductor					
	Cutting tool for plastic fiber-optic conductors	A	3RX7 918	1 unit	0.012

Opto-BERO

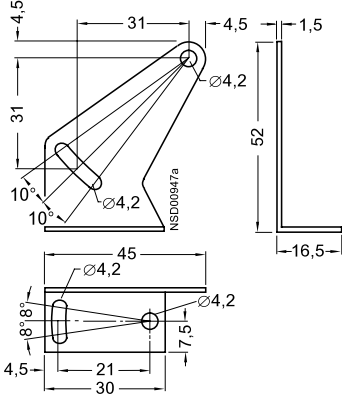
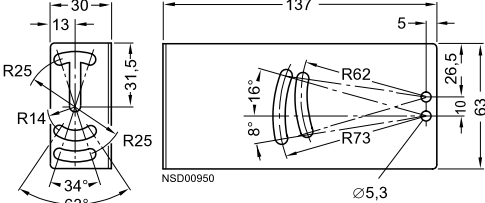
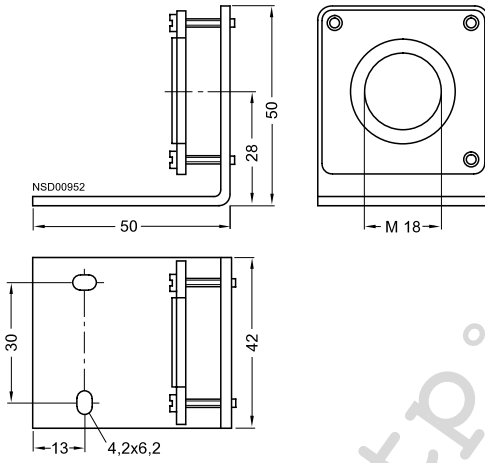
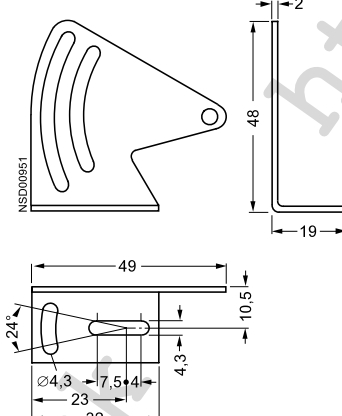
Accessories

Mounting brackets

Selection and ordering data

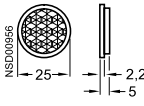
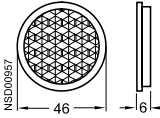
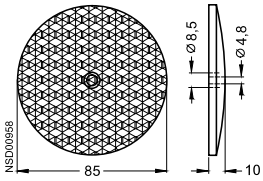
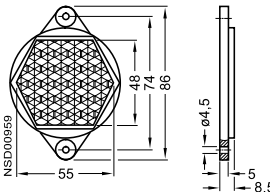
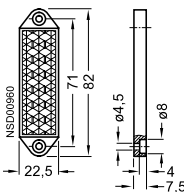
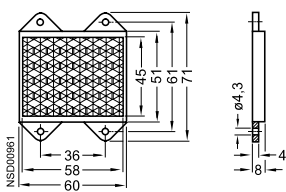
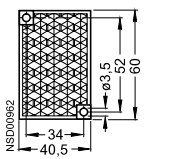
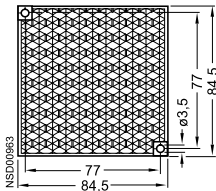
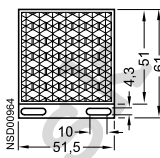
	Design	DT	Order No.	PS	Approx. weight per PU kg
	Mounting bracket for Opto-BEROs with cylindrical M 18 enclosure Material: Galvanized steel	A	3RX7 301	1 unit	0.019
	Mounting bracket for Opto-BEROs of K 20, K 21 forms	A	3RX7 308	1 unit	0.013
	Mounting bracket for Opto-BEROs of K 30, K 31 forms Material: Galvanized steel	A	3RX7 910	1 unit	0.028
	Mounting bracket for 35-mm DIN rail for Opto-BEROs of K 30, K 31 forms Material: Galvanized steel	A	3RX7 304	1 unit	0.032
	Mounting bracket for Opto-BEROs of KL 40, CL 40 forms	A	3RX7 313	1 unit	0.017

Mounting brackets

Design	DT	Order No.	PS	Approx. weight per PU kg
	A	3RX7 911	1 unit	0.030
Mounting bracket for Opto-BEROs of K 40 form (included in delivery) Material: Galvanized steel				
	A	3RX7 303	1 unit	0.247
Mounting bracket for Opto-BEROs of K 80 form Material: Galvanized steel				
	A	3RX7 300	1 unit	0.127
Mounting bracket, can be aligned, for Opto-BEROs with cylindrical enclosure M 18, par- ticularly for laser BEROs of L 18 form Material: Galvanized steel				
	A	3RX7 302	1 unit	0.034
Mounting bracket for laser BEROs of L 50 form Material: Galvanized steel				

Reflectors

Selection and ordering data

	Design	Standard for form	DT	Order No.	PS	Approx. weight per PU kg
	D 22 22 mm diameter Range typically approx. 40 %, referred to type D 84		A	3RX7 914	1 unit	0.003
	D 40 40 mm diameter Range typically approx. 60 %, referred to type D 84		A	3RX7 915	1 unit	0.008
	D 84 84 mm diameter	M 12, M 18, K 30, K 31, K 40, C 40, K 80	A	3RX7 916	1 unit	0.028
	S 48 48 mm diameter Range typically approx. 50 %, referred to type D 84	M 18 P, K 50	A	3RX7 922-1A	1 unit	0.019
	R 70 Range typically approx. 30 %, referred to type D 84		A	3RX7 920-1A	1 unit	0.010
	R 45 Reflector 45 mm x 58 mm Range typically approx. 60 %, referred to type D 84	Light array	A	3RX7 924	1 unit	0.021
	R 60 Reflector 40 mm x 60 mm Range typically approx. 40 to 50 %, referred to type D 84	K 20, K 21	A	3RX7 305	1 unit	0.016
	R 84 Reflector 84 mm x 84 mm high reflection factor for wide ranges		A	3RX7 306	1 unit	0.045
	RL 50 Reflector for laser light, 50 mm x 50 mm	L 50	A	3RX7 307	1 unit	0.013
	Reflecting foil 100 mm x 100 mm, range 50 ... 60 %, referred to type D 84		A	3RX7 917	1 unit	0.007