



GR18

RELIABLE. ECONOMICAL. VERSATILE.

Cylindrical photoelectric sensor

SICK
Sensor Intelligence.

THE GR18 PRODUCT FAMILY: RELIABLE AND EXTREMELY VERSATILE

Thanks to their versatility, the cylindrical photoelectric sensors from the GR18 product family cover a very wide range of applications. With their seven different housing types, they are ideally suited for both space-saving and flexible mounting solutions.

One product family for all applications

GR18 cylindrical photoelectric sensors in the cylindrical M18 housing are outstanding in both the short length version (GR18S) and the standard length version (GR18), and offer an optimal price-performance ratio.

These sensors can be used universally in many applications thanks to the seven different housing designs:

- Photoelectric proximity sensors
- Photoelectric retro-reflective sensors
- Through-beam photoelectric sensors
- Photoelectric retro-reflective sensors for transparent objects

THE GR18 PRODUCT FAMILY

GR18S (SHORT HOUSING)

GR18 (LONG HOUSING)

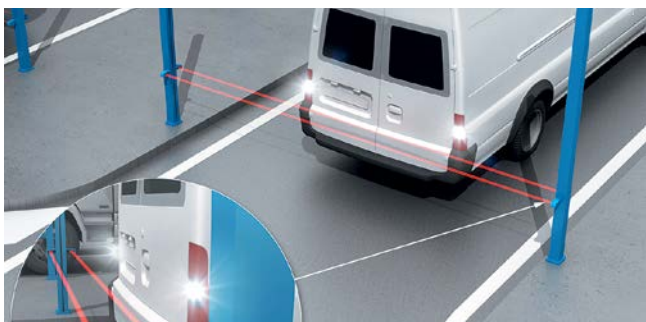


At a glance

- Cylindrical M18 sensor with greater cost-effectivity
- Seven different housing designs
- Plastic or metal versions with straight or right angle optics
- Very bright and highly visible PinPoint LED
- Highly visible status indicator
- Rugged and reliable due to proven SICK technology
- Enclosure rating IP 67
- Special "fully flush" metal variant (GR18S)

Ideal for a broad range of applications

SICK's reliable photoelectric sensors are perfectly suited for numerous applications in the field of logistics: From mechanical engineering, through the automotive and electronics industries, right up to the packaging and shipping of goods of all varieties. This is because in any area in which material flows are automated or where sorting and warehousing processes are to be optimized, photoelectric sensors from SICK can guarantee maximum reliability and efficiency. Thanks to the simple hole mounting system of the standard M18 housing, the sensors can be flexibly integrated into automated environments.



THE GR18 CYLINDRICAL PHOTOELECTRIC SENSOR: OPTIMALLY DESIGNED DOWN TO THE SMALLEST DETAIL



Housing material for every application

The housing for the GR18 cylindrical photoelectric sensors is available in plastic and metal variants. This allows you to choose the right variant for every application and cost situation.

Metal and plastic housing



Optimal installation, even where space is limited

The GR18S housing is very short and therefore requires little installation space. Additional space can be saved through the use of housing versions with an angled radial design. These are ideal conditions for applications where there is very little space available for installation.

Straight and right angle optics (GR18S only)



For smooth processes

The front is flush with the installation area:
In this way the flush mounting kits of the GR18S cylindrical photoelectric sensors provide superior solutions for all challenges in which it is essential that the objects to be captured can pass without a hindrance.

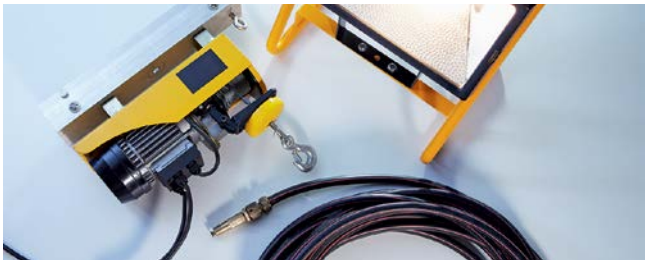
Special "fully flush" designs



Rugged design

Photoelectric sensors from the GR18 product family run absolutely flawlessly, and are not sensitive to ambient light, dirt, moisture, or electrical interference. This makes these photoelectric sensors the ideal solution for every application.

Sensor technology from SICK



Maximum detection reliability

PinPoint technology from SICK, with its highly visible light spot, will facilitate commissioning, and increase the sensing range within the red emitted light area, without the need for any protective measures against lasers.

PinPoint technology from SICK



Comfortable: status indicator visible from any direction

Each GR18 cylindrical photoelectric sensor is equipped with a very bright LED status indicator. The current operational status can be recognized at a glance even from great distances. As a result, sensor commissioning and maintenance times are significantly reduced.

Highly visible status indicator



Sensing range: Quick and easy to adjust

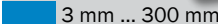
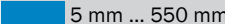
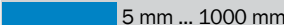
The sensing range of the GR18 cylindrical photoelectric sensors can be quickly and easily adjusted using a standard Phillips-head screwdriver. No special tools are required.

Easy adjustment

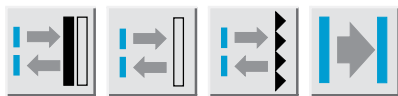


A RANGE OF OPTIONS: THE RIGHT SENSOR FOR EVERY SITUATION

Cylindrical photoelectric sensors			 Housing					 Optics/Technology			
			Material		Enclosure rating	Housing design		Type of light/Light sender			
		 M18									
		Example installation	Plastic	Metal	IP 67	Cylindrical, axial	Cylindrical, radial	LED, infrared light	LED, red light	PinPoint LED, red light	
GR18											
											
GR18S											
											
											
											
											

	 Sensor principle				 Special applications			
	 Maximum sensing range							
			 	 				
	Photoelectric proximity sensors (background suppression)	Photoelectric proximity sensors (energetic)	Photoelectric retro-reflective sensor (dual lens)	Through-beam photoelectric sensors	Detecting transparent objects	Detecting small objects		
	 3 mm ... 300 mm	 3 mm ... 115 mm  5 mm ... 550 mm  5 mm ... 1000 mm	 0.03 m ... 7.2 m	 0 m ... 15 m				
	Page							
	11	12	14	15				
	11	13	14	15				
	27	29	34	40				
	-	31	35	41				
	27	30	35	40				
	28	32	36	41				
	-	33	37	42				

ROUND, AND COST-EFFECTIVE STANDARD



Additional information

Detailed technical data	9
Ordering information	11
Dimensional drawings	16
Adjustment options	18
Operating reserve	18
Sensing range	20
Light spot diameter	21
Response curve	22
Connection diagram	23

Product description

The GR18 product family is enclosed in a cylindrical M18 housing and provides an optimal price-performance ratio. Due to its standard M18 housing design, it is suitable for universal use in many differ-

ent applications. PinPoint LEDs, plastic and metal housing versions as well as status indicators that are easily visible from all angles round off the sensor's features.

At a glance

- Economical M18 cylindrical sensors with standard housing design
- Choice of plastic and metal housing variants with straight optical output
- Very bright and highly visible PinPoint LEDs
- Highly visible status indicator
- IP67 enclosure rating

Your benefits

- A whole range of mounting options thanks to the different housing types
- Simple alignment and precise detection using PinPoint LEDs
- Easy to mount with simple M18 hole mounting. No special mounting brackets required.
- Rugged and reliable operation due to proven SICK sensing technology
- Clearly visible status display reduces maintenance and service time

→ www.mysick.com/en/GR18

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



Detailed technical data

Features

	GRTB18	GRTE18	GRL18	GRSE18
Sensor principle	Photoelectric proximity sensor		Photoelectric retro-reflective sensor	Through-beam photo-electric sensor
Detection principle	Background suppression	Energetic	Dual lens	–
Housing design (light emission)	Cylindrical, straight			
Thread diameter (housing)	M18 x 1			
Sensing range max.	3 mm ... 300 mm ¹⁾	3 mm ... 115 mm ¹⁾ 5 mm ... 550 mm ¹⁾ 5 mm ... 1.000 mm ¹⁾ (depending on type)	0.03 m ... 7.2 m ²⁾	0 m ... 15 m
Sensing range	20 mm ... 150 mm ¹⁾	5 mm 100 mm ¹⁾ 10 mm 400 mm ¹⁾ 10 mm 800 mm ¹⁾ (depending on type)	0.06 m ... 6 m ²⁾	0 m ... 10 m
Type of light	Visible red light	Infrared light / visible red light (depending on type)	Visible red light	Infrared light / visible red light (depending on type)
Light source	PinPoint LED ³⁾	LED ³⁾ PinPoint LED ³⁾ (depending on type)	PinPoint LED ³⁾	LED ³⁾ PinPoint LED ³⁾ (depending on type)
Light spot size (distance)	Visible red light	Ø 7 mm (100 mm)	Ø 175 mm (7 m)	Ø 250 mm (10 m)
	Infrared light	–		Ø 420 mm (10 m)
Wave length	Visible red light	650 nm		
	Infrared light	–	850 nm	–
Adjustment	Potentiometer			

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)²⁾ PL80A.³⁾ Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

	GRTB18	GRTE18	GRL18	GRSE18
Supply voltage ¹⁾	10 V DC ... 30 V DC			
Ripple ²⁾	± 5 V _{pp}			
Power consumption	≤ 30 mA			
Output type	PNP / NPN (depending on type)			
Output function	Complementary			
Switching mode	Light/dark switching			
Signal voltage	PNP HIGH/LOW	V _S - (≤ 3 V) / approx. 0 V		
	NPN HIGH/LOW	Approx. V _S / ≤ 3 V		
Switching frequency ⁵⁾	1,000 Hz	500 Hz	1,000 Hz	

	GRTB18	GRTE18	GRL18	GRSE18
Connection type	Cable, 2 m ⁶⁾ Male connector, M12 (depending on type)			
Circuit protection	A ⁷⁾ B ⁸⁾ D ⁹⁾			
Protection class	III			
Polarisation filter	–		✓	–
Housing material				
Plastic axial	ABS			
Metal axial	Nickel-plated brass and ABS			
Optics material	Plastic, PMMA			
Enclosure rating	IP 67			
Items supplied	Fastening nuts (2 x)		Fastening nuts (2 x), Reflector P250 (depending on type)	Fastening nuts (4 x)
EMC	EN 60947-5-2			
Test input	–			Sender OFF at "Test" 0 V
Ambient operating temperature ¹⁰⁾	–25 °C ... +55 °C			
Ambient storage temperature	–40 °C ... +70 °C			

¹⁾ Limit values when operated in short-circuit protected network: max. 8 A.

²⁾ May not exceed or fall below U_v tolerances.

³⁾ At $U_v > 24$ V or ambient temperature > 49 °C, I_A max. = 50 mA.

⁴⁾ Signal transit time with resistive load.

⁵⁾ With light/dark ratio 1:1.

⁶⁾ Do not bend below 0 °C.

⁷⁾ A = V_s connections reverse-polarity protected.

⁸⁾ B = inputs and output reverse-polarity protected.

⁹⁾ D = outputs overcurrent and short-circuit protected.

¹⁰⁾ At $U_v \leq 24$ V and $I_A < 50$ mA.

Ordering information

Other models → www.mysick.com/en/GR18

GRTB18, metal, axial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** Background suppression
- **Light spot size (distance):** Ø 7 mm (100 mm)
- **Switching mode:** Light/dark switching
- **Adjustment:** potentiometer
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Connection	Con- nection diagram	Type	Part no.
	3 mm ... 300 mm	20 mm ... 150 mm	Visible red light	PinPoint LED	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18-N1112	1076119
						M12, 4-pin male connector	Cd-084	GRTB18-N2412	1076121
					PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18-P1112	1076115
						M12, 4-pin male connector	Cd-084	GRTB18-P2412	1076117

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTB18, plastic, axial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** Background suppression
- **Light spot size (distance):** Ø 7 mm (100 mm)
- **Switching mode:** Light/dark switching
- **Adjustment:** potentiometer
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Connection	Con- nection diagram	Type	Part no.
	3 mm ... 300 mm	20 mm ... 150 mm	Visible red light	PinPoint LED	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18-N1117	1076118
						M12, 4-pin male connector	Cd-084	GRTB18-N2417	1076120
					PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18-P1117	1076114
						M12, 4-pin male connector	Cd-084	GRTB18-P2417	1076116

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTE18, metal, axial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** energetic
- **Switching mode:** Light/dark switching
- **Adjustment:** potentiometer
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Light spot size (distance)	Output type	Connection	Con- nection diagram	Type	Part no.
	3 mm ... 115 mm	5 mm ... 100 mm	Visible red light	PinPoint LED	Ø 8 mm (100 mm)	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-N1112	1066541
							M12, 4-pin male connector	Cd-084	GRTE18-N2412	1067972
						PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-P1112	1066542
							M12, 4-pin male connector	Cd-084	GRTE18-P2412	1066543
	5 mm ... 550 mm	10 mm ... 400 mm	Infrared light	LED	Ø 26 mm (400 mm)	PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-P1152	1074997
			Visible red light	PinPoint LED	Ø 9 mm (400 mm)	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-N1142	1066547
							M12, 4-pin male connector	Cd-084	GRTE18-N2442	1064243
						PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-P1142	1066548
							M12, 4-pin male connector	Cd-084	GRTE18-P2442	1066549
			Infrared light	LED	Ø 42 mm (800 mm)	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-N1172	1075728
	5 mm ... 1,000 mm	10 mm ... 800 mm	Visible red light	LED	Ø 45 mm (800 mm)	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-N1162	1066551
							M12, 4-pin male connector	Cd-084	GRTE18-N2462	1067978
						PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-P1162	1067976
							M12, 4-pin male connector	Cd-084	GRTE18-P2462	1066552

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTE18, plastic, axial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** energetic
- **Switching mode:** Light/dark switching
- **Adjustment:** potentiometer
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Light spot size (distance)	Output type	Connection	Con- nection diagram	Type	Part no.
	3 mm ... 115 mm	5 mm ... 100 mm	Visible red light	PinPoint LED	Ø 8 mm (100 mm)	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-N1117	1066539
							M12, 4-pin male con- nector	Cd-084	GRTE18-N2417	1067971
						PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-P1117	1066540
							M12, 4-pin male con- nector	Cd-084	GRTE18-P2417	1064923
	5 mm ... 550 mm	10 mm ... 400 mm	Visible red light	PinPoint LED	Ø 9 mm (400 mm)	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-N1147	1066544
							M12, 4-pin male con- nector	Cd-084	GRTE18-N2447	1067973
						PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-P1147	1066545
							M12, 4-pin male con- nector	Cd-084	GRTE18-P2447	1066546
	5 mm ... 1,000 mm	10 mm ... 800 mm	Infrared light	LED	Ø 42 mm (800 mm)	PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-P1177	1073145
			Visible red light	LED	Ø 45 mm (800 mm)	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-N1167	1064925
							M12, 4-pin male con- nector	Cd-084	GRTE18-N2467	1067975
						PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18-P1167	1067974
							M12, 4-pin male con- nector	Cd-084	GRTE18-P2467	1066550

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRL18, metal, axial

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Switching mode:** Light/dark switching
- **Adjustment:** potentiometer

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Connection	Connection diagram	Items supplied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	Fastening nuts (2 x)	GRL18-N1132	1067980
								Fastening nuts (2 x), Reflector P250	GRL18-N1152	1076985
						M12, 4-pin male connector	Cd-084	Fastening nuts (2 x)	GRL18-N2432	1067981
								Fastening nuts (2 x), Reflector P250	GRL18-N2452	1076986
					PNP	Cable, 4-wire, 2 m, PVC	Cd-094	Fastening nuts (2 x)	GRL18-P1132	1066556
								Fastening nuts (2 x), Reflector P250	GRL18-P1152	1076982
						M12, 4-pin male connector	Cd-084	Fastening nuts (2 x)	GRL18-P2432	1066557
								Fastening nuts (2 x), Reflector P250	GRL18-P2452	1076983

¹⁾ PL80A.

GRL18, plastic, axial

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Switching mode:** Light/dark switching
- **Adjustment:** potentiometer

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Connection	Connection diagram	Items supplied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	Fastening nuts (2 x)	GRL18-N1137	1066553
								Fastening nuts (2 x), Reflector P250	GRL18-N1157	1076979
						M12, 4-pin male connector	Cd-084	Fastening nuts (2 x)	GRL18-N2437	1067979
								Fastening nuts (2 x), Reflector P250	GRL18-N2457	1076984
					PNP	Cable, 4-wire, 2 m, PVC	Cd-094	Fastening nuts (2 x)	GRL18-P1137	1066554
								Fastening nuts (2 x), Reflector P250	GRL18-P1157	1076980
						M12, 4-pin male connector	Cd-084	Fastening nuts (2 x)	GRL18-P2437	1066555
								Fastening nuts (2 x), Reflector P250	GRL18-P2457	1076981

¹⁾ PL80A.

GRSE18, metal, axial

- **Sensor principle:** Through-beam photoelectric sensor
- **Switching mode:** Light/dark switching
- **Adjustment:** potentiometer
- **Items supplied:** fastening nuts (4 x)

	Sensing range max.	Sensing range	Type of light	Light source	Light spot size (distance)	Output type	Connection	Con- nection diagram	Type	Part no.
	0 m ... 15 m	0 m ... 10 m	Infrared light	LED	Ø 420 mm (10 m)	NPN	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18-N1122	1068334
							M12, 4-pin male connector	Cd-072	GRSE18-N2422	1068335
						PNP	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18-P1122	1068333
							M12, 4-pin male connector	Cd-072	GRSE18-P2422	1068336
			Visible red light	PinPoint LED	Ø 250 mm (10 m)	NPN	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18-N1142	1066572
							M12, 4-pin male connector	Cd-072	GRSE18-N2442	1067985
						PNP	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18-P1142	1067984
							M12, 4-pin male connector	Cd-072	GRSE18-P2442	1066573

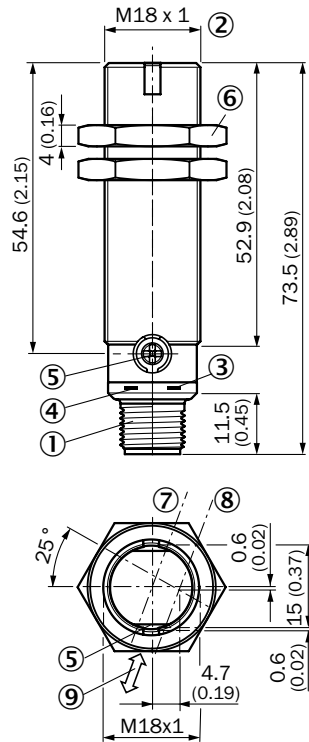
GRSE18, plastic, axial

- **Sensor principle:** Through-beam photoelectric sensor
- **Switching mode:** Light/dark switching
- **Adjustment:** potentiometer
- **Items supplied:** fastening nuts (4 x)

	Sensing range max.	Sensing range	Type of light	Light source	Light spot size (distance)	Output type	Connection	Con- nection diagram	Type	Part no.
	0 m ... 15 m	0 m ... 10 m	Infrared light	LED	Ø 420 mm (10 m)	NPN	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18-N1127	1068331
							M12, 4-pin male connector	Cd-072	GRSE18-N2427	1068332
						PNP	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18-P1127	1068329
							M12, 4-pin male connector	Cd-072	GRSE18-P2427	1064922
			Visible red light	PinPoint LED	Ø 250 mm (10 m)	NPN	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18-N1147	1066558
							M12, 4-pin male connector	Cd-072	GRSE18-N2447	1067983
						PNP	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18-P1147	1067982
							M12, 4-pin male connector	Cd-072	GRSE18-P2447	1064921

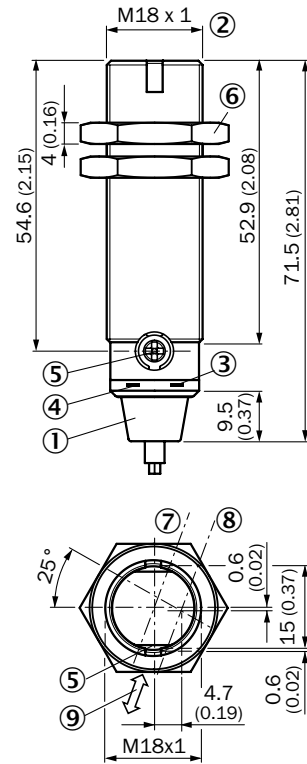
Dimensional drawings (Dimensions in mm (inch))

GRTB18, metal, connector, straight



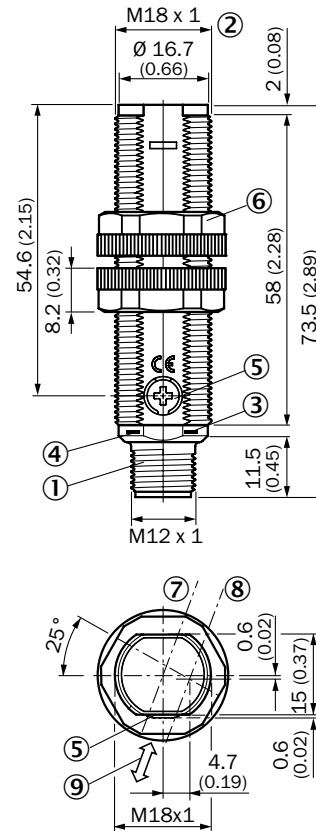
- ① M12, 4-pin male connector
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 24, metal
- ⑦ Optical axis receiver
- ⑧ Optical axis sender
- ⑨ Standard direction of the material being detected

GRTB18, metal, cable, straight



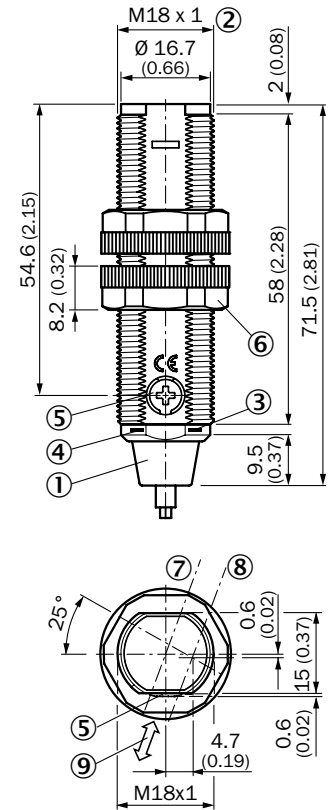
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 24, metal
- ⑦ Optical axis receiver
- ⑧ Optical axis sender
- ⑨ Standard direction of the material being detected

GRTB18, plastic, connector, straight



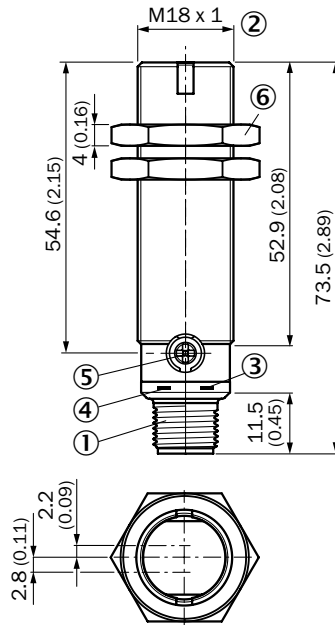
- ① M12, 4-pin male connector
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2 x); width across 22, plastic
- ⑦ Optical axis receiver
- ⑧ Optical axis sender
- ⑨ Standard direction of the material being detected

GRTB18, plastic, cable, straight



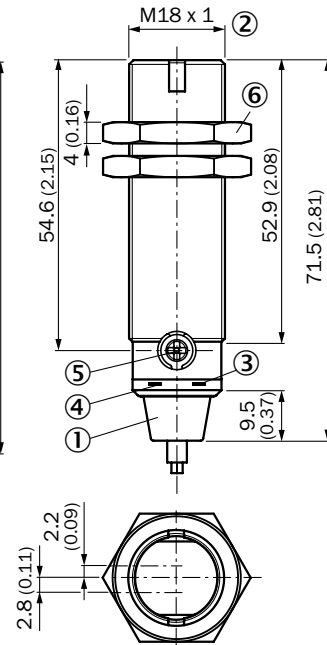
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2 x); width across 22, plastic
- ⑦ Optical axis receiver
- ⑧ Optical axis sender
- ⑨ Standard direction of the material being detected

GRTE18, GRL18, GRSE18,
metal, connector, straight



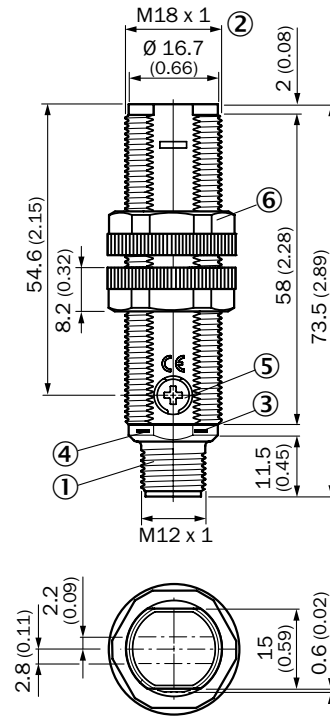
- ① M12, 4-pin male connector
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 24, metal

GRTE18, GRL18, GRSE18,
metal, cable, straight



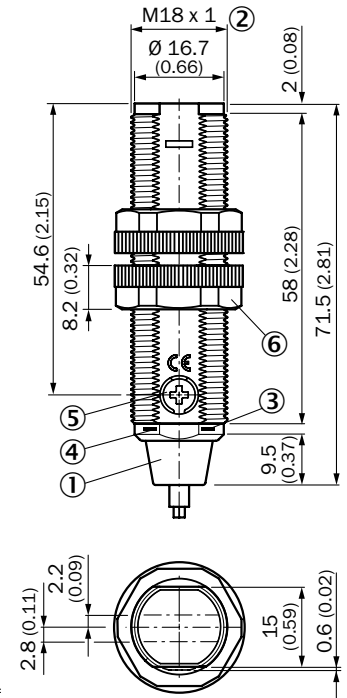
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 24, metal

GRTE18, GRL18, GRSE18,
plastic, connector, straight



- ① M12, 4-pin male connector
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 22, plastic

GRTE18, GRL18, GRSE18,
plastic, cable, straight

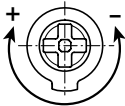


- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2 x); width across 22, plastic

Adjustment options

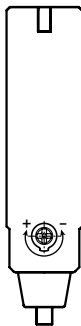
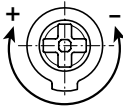
GRTB18, GRTE18,
Sensing range adjustment:
potentiometer, 270°

Sensing range



GRTB18, GRTE18,
Sensitivity adjustment:
potentiometer, 270°

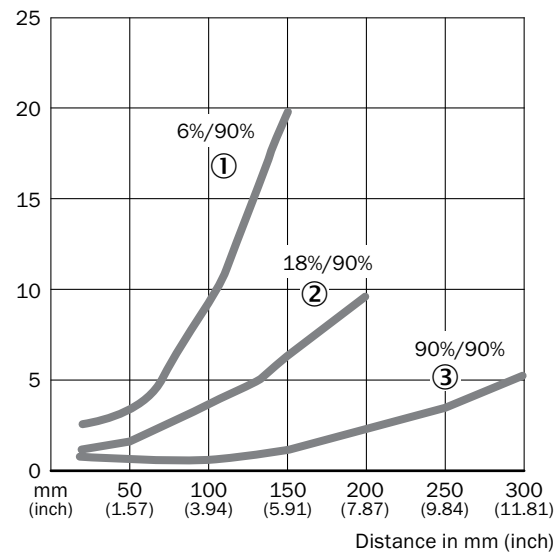
Sensitivity



Operating reserve

GRTB18

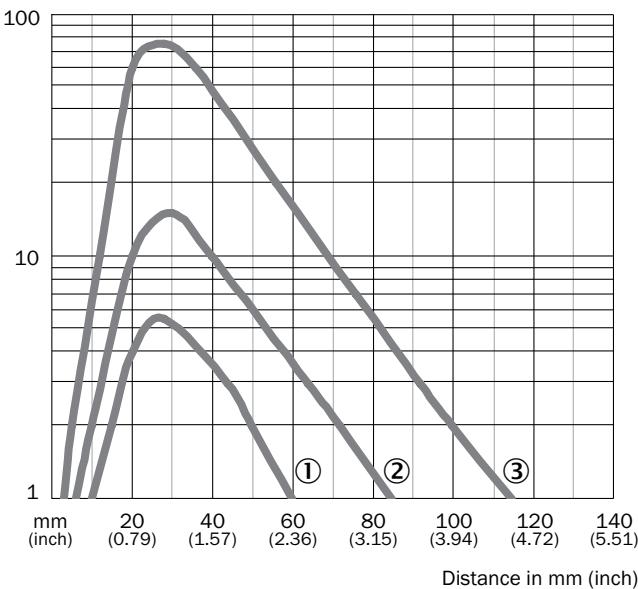
% of sensing range



- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

GRTE18, 100 mm

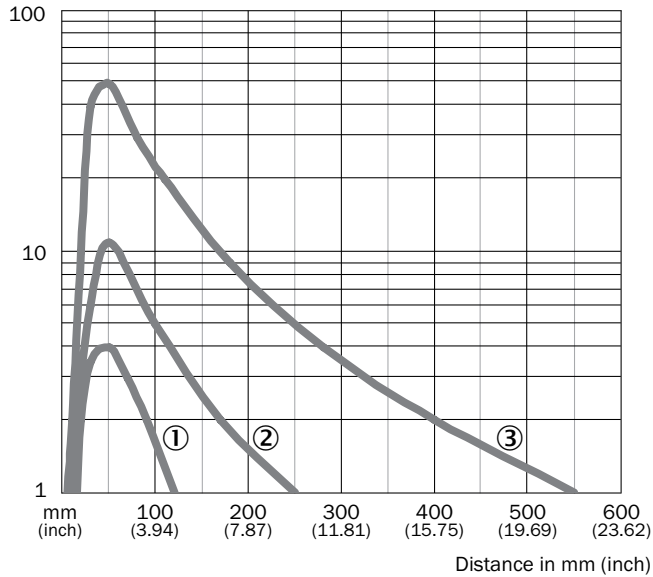
Operating reserve



- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

GRTE18, 400 mm

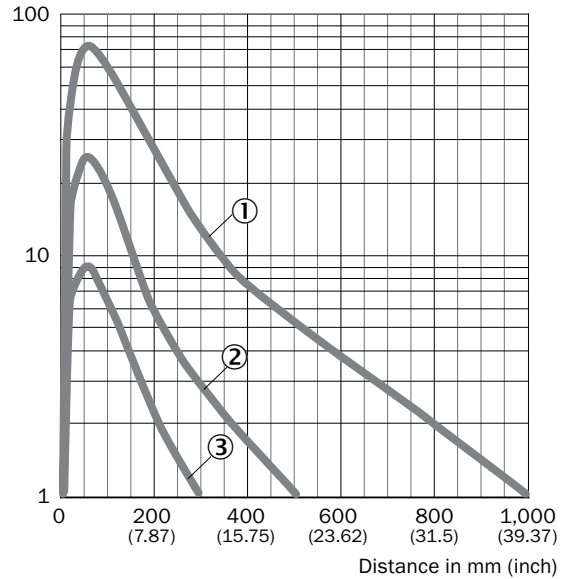
Operating reserve



- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20% remission
- ③ Sensing range on white, 90% remission

GRTE18, 800 mm

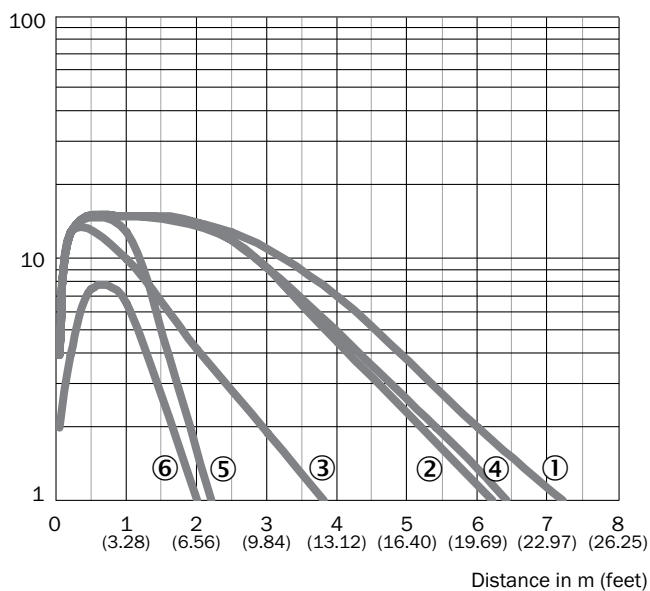
Operating reserve



- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20% remission
- ③ Sensing range on white, 90% remission

GRL18

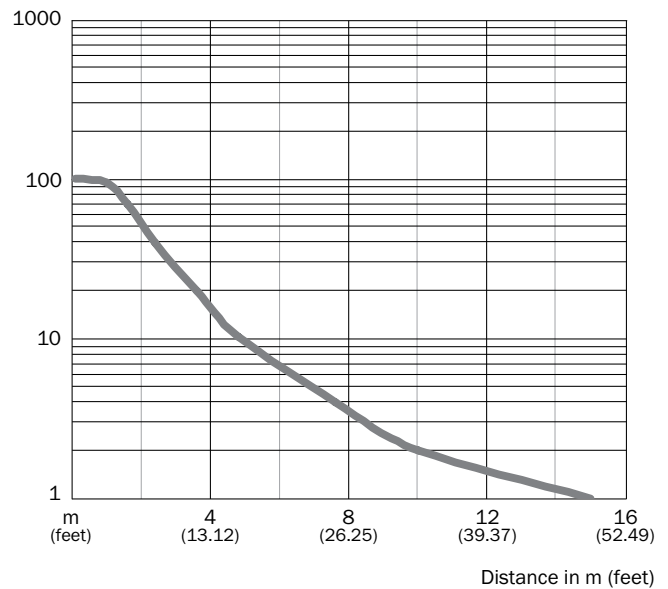
Operating reserve



- ① Reflector type PL80A
- ② Reflector type PL40A
- ③ Reflector type PL20A
- ④ Reflector type P205
- ⑤ Reflector type PL22-2
- ⑥ Reflective tape REF-Plus 3436

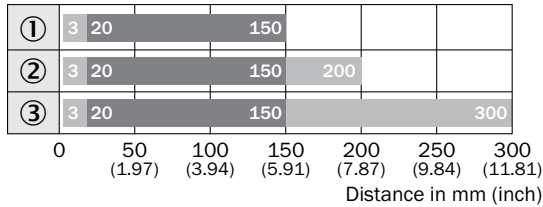
GRSE18

Operating reserve



Sensing range

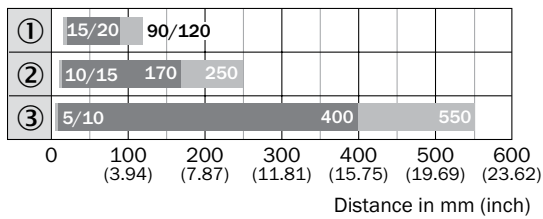
GRTB18



■ Sensing range ■ Sensing range max.

- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 18 % remission
- ③ Sensing range on white, 90% remission

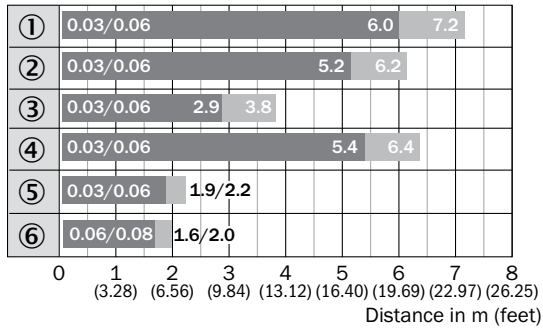
GRTE18, 400 mm



■ Sensing range ■ Sensing range max.

- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

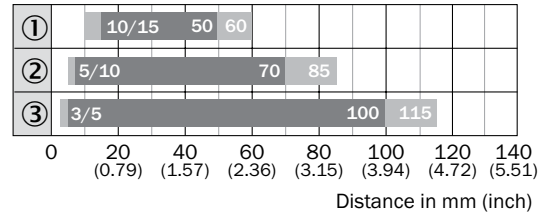
GRL18



■ Sensing range ■ Sensing range max.

- ① Reflector type PL80A
- ② Reflector type PL40A
- ③ Reflector type PL20A
- ④ Reflector type P205
- ⑤ Reflector type PL22-2
- ⑥ Reflective tape REF-Plus 3436

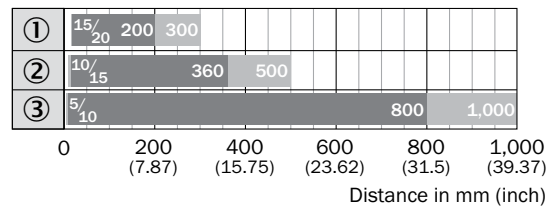
GRTE18, 100 mm



■ Sensing range ■ Sensing range max.

- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

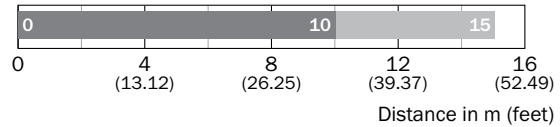
GRTE18, 800 mm



■ Sensing range ■ Sensing range max. typ.

- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

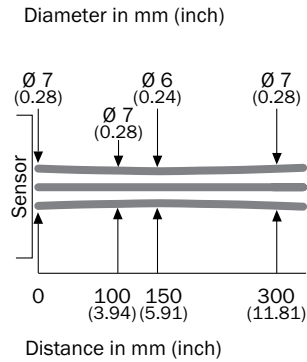
GRSE18



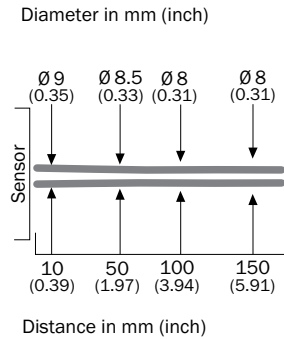
■ Operating range ■ Sensing range typ. max.

Light spot diameter

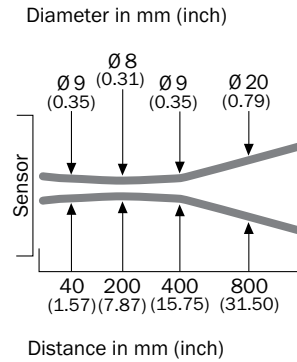
GRTB18



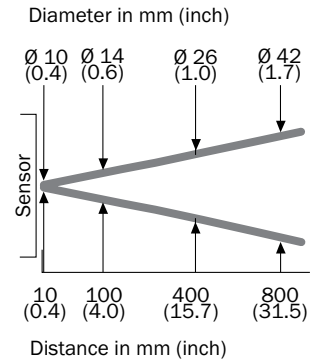
GRTE18, 100 mm, visible red light



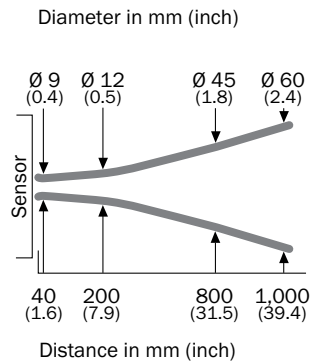
GRTE18, 400 mm, visible red light



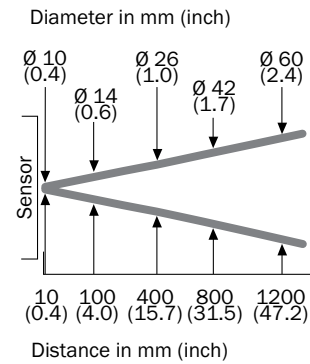
GRTE18, 400 mm, infrared light



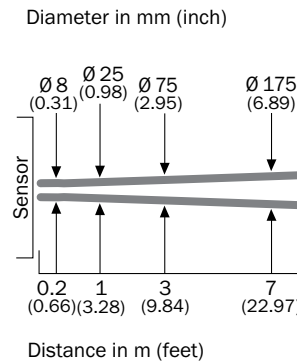
GRTE18, 800 mm, visible red light



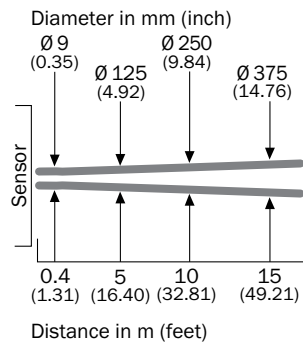
GRTE18, 800 mm, infrared light



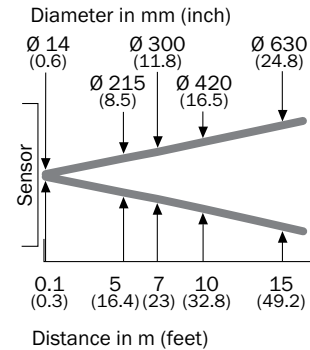
GRL18



GRSE18, visible red light

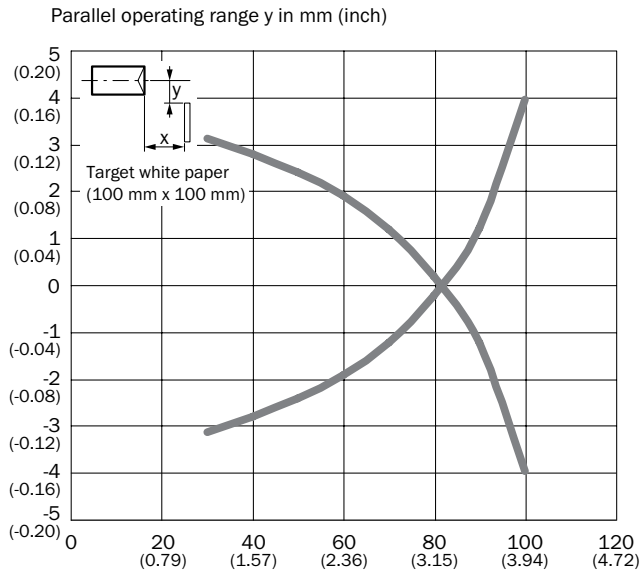


GRSE18, infrared light

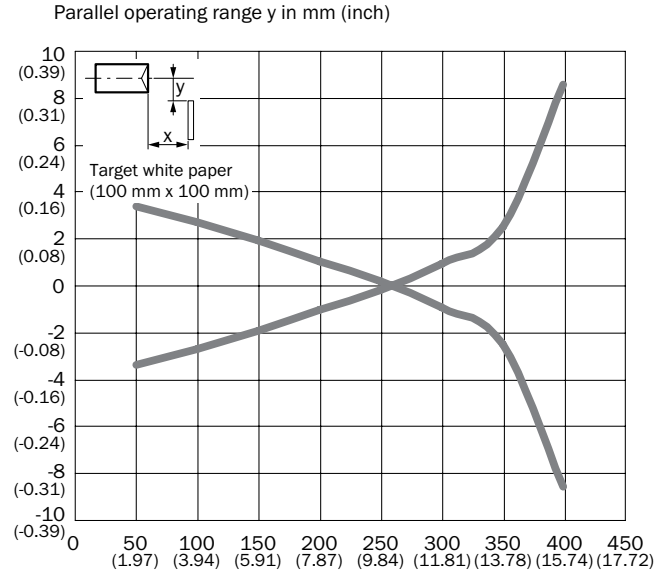


Response curve

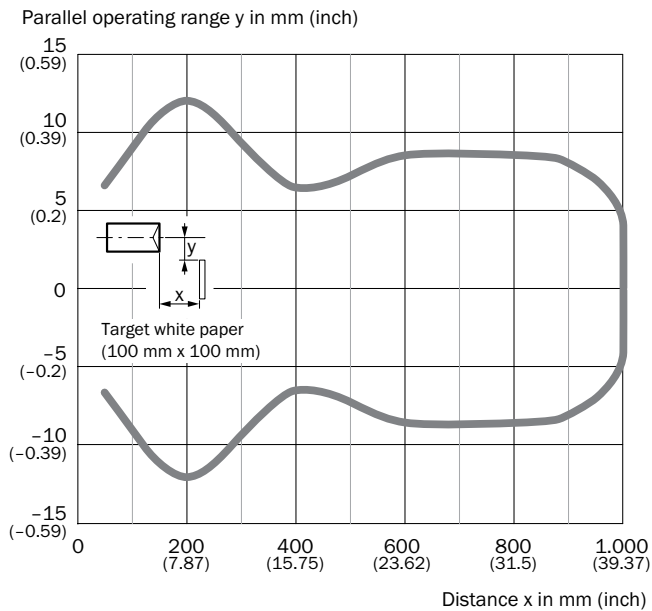
GRTE18, 100 mm



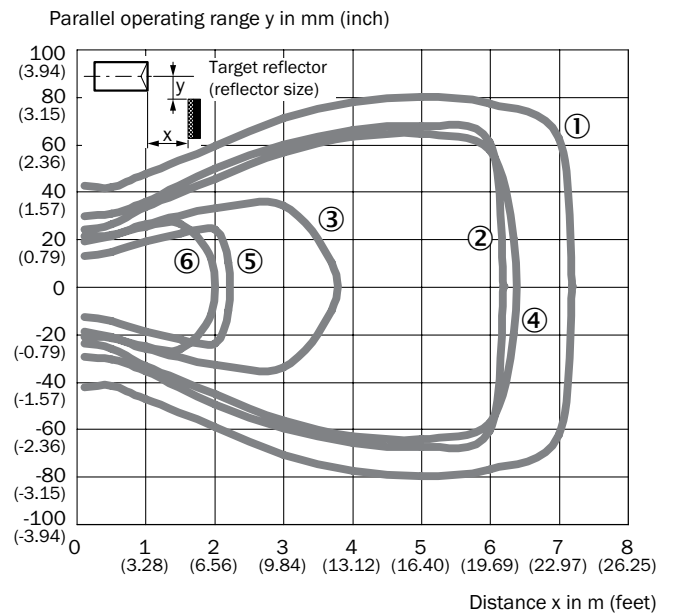
GRTE18, 400 mm



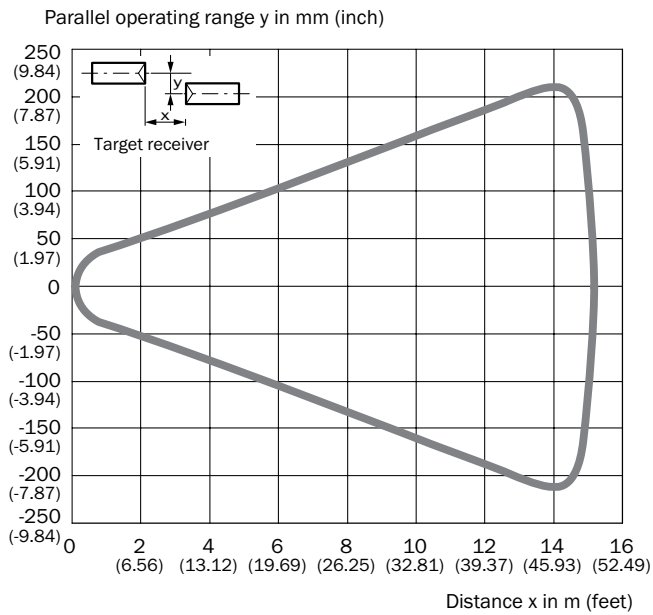
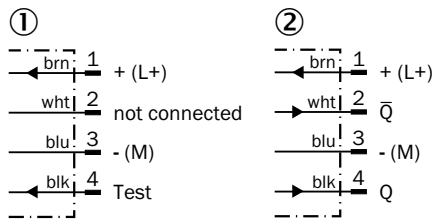
GRTE18, 800 mm



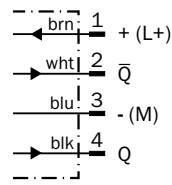
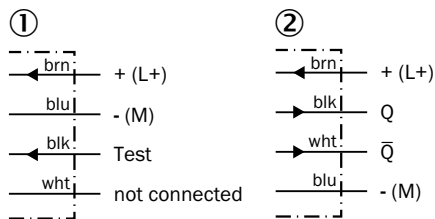
GRL18



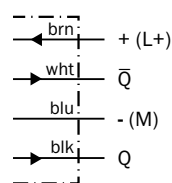
- ① Reflector type PL80A
- ② Reflector type PL40A
- ③ Reflector type PL20A
- ④ Reflector type P205
- ⑤ Reflector type PL22-2
- ⑥ Reflective tape REF-Plus 3436

GRSE18**Connection diagram****Cd-072**

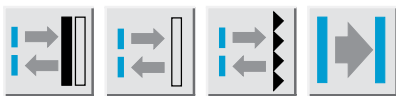
① Sender
② Receiver

Cd-084**Cd-088**

① Sender
② Receiver

Cd-094

ROUND, SHORT AND ECONOMICALLY UNBEATABLE



Product description

The GR18S family of photoelectric sensors in cylindrical M18-housings has a special shortened design and offers an optimal price/performance ratio. It can be used universally in many applications thanks to five different housing designs. PinPoint LEDs, plastic and metal housing versions as well as status indicators

that are easily visible from all angles round off the sensor family's features. One highlight is the fully-flush metal variant, which has been especially designed for use in harsh industrial environments found in handling and warehousing systems.

At a glance

- Low-cost cylindrical M18 sensor with extra short housing
- Five different housing styles
- Variety of plastic and metal housing styles, with straight or right angle optics
- Bright and highly visible PinPoint-LED
- Potentiometer for adjustment of switching threshold (depending on type)
- Special flush type, one-piece metal housing
- Highly visible signal indicator LED
- IP 67 rating

Your benefits

- Space-saving solution due to short housing
- Flexible mounting options due to versatile housing styles
- Easy installation and precise detection due to PinPoint LED
- Reduced maintenance costs due to high tightening torque of single piece flush metal housing
- Rugged and reliable with proven SICK technology
- Highly visible signal indicator LED saves maintenance and commissioning time



Additional information

Detailed technical data	25
Ordering information	27
Dimensional drawings	42
Adjustment options	48
Operating reserve	49
Sensing range	50
Light spot diameter	51
Response curve	52
Connection diagram	53

→ www.mysick.com/en/GR18S

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



Detailed technical data

Features

	GRTB18S	GRTE18S	GRL18S	GRL18SG	GRSE18S
Sensor principle	Photoelectric proximity sensor		Photoelectric retro-reflective sensor		Through-beam photoelectric sensor
Detection principle	Background suppression	Energetic	Dual lens		–
Housing design (light emission)	Cylindrical, straight Cylindrical, straight, fully flush (depending on type)	Cylindrical, straight Cylindrical, straight, fully flush Cylindrical, angled Cylindrical, angled, fully flush (depending on type)			
Thread diameter (housing)	M18 x 1				
Sensing range max.	3 mm ... 300 mm ¹⁾	3 mm ... 115 mm ¹⁾ 5 mm ... 550 mm ¹⁾ 5 mm ... 1.000 mm ¹⁾ (depending on type)	0.03 m ... 7.2 m ²⁾		0 m ... 15 m
Sensing range	20 mm ... 150 mm ¹⁾	5 mm ... 100 mm ¹⁾ 10 mm ... 400 mm ¹⁾ 10 mm ... 800 mm ¹⁾ (depending on type)	0.06 m ... 6 m ²⁾		0 m ... 10 m
Type of light	Visible red light	Visible red light / Infrared light (depending on type)	Visible red light		Visible red light / Infrared light (depending on type)
Light source	PinPoint LED ³⁾	PinPoint LED ³⁾ LED ³⁾ (depending on type)	PinPoint LED ³⁾		PinPoint LED ³⁾ LED ³⁾ (depending on type)
Light spot size (distance)					
Visible red light	Ø 7 mm (100 mm)	Ø 8 mm (100 mm) Ø 9 mm (400 mm) Ø 45 mm (800 mm) (depending on type)	Ø 175 mm (7 m)		Ø 250 mm (10 m)
Infrared light	–	Ø 26 mm (400 mm)	–		Ø 420 mm (10 m)
Wave length					
Visible red light	650 nm				
Infrared light	–				850 nm
Adjustment	Potentiometer, 270°		None	None Potentiometer, 270° (depending on type)	
Special feature	–			Detecting transparent objects	–

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)²⁾ PL80A.³⁾ Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

	GRTB18S	GRTE18S	GRL18S	GRL18SG	GRSE18S
Supply voltage ¹⁾	10 V DC ... 30 V DC				
Ripple ²⁾	± 5 V _{pp}				
Power consumption	≤ 30 mA				
Output type	PNP / NPN (depending on type)				
Output function	Complementary				
Switching mode	Light switching Dark switching Light/dark switching (depending on type)				
Signal voltage					
PNP HIGH/LOW	V _S - (≤ 3 V) / approx. 0 V				
NPN HIGH/LOW	Approx. V _S / ≤ 3 V				
Switching frequency ⁵⁾	1,000 Hz	500 Hz	± 1,000 Hz	1,000 Hz	
Connection type	Cable, 2 m ⁶⁾ Cable, 5 m ⁶⁾ Male connector, M12 (depending on type)	Cable, 2 m ⁶⁾ Male connector, M12 (depending on type)	Cable, 5 m ⁶⁾ Cable, 2 m ⁶⁾ Male connector, M12 Cable with male connector, M8, 300 mm ⁶⁾ (depending on type)	Cable, 2 m Male connector, M12 (depending on type)	Cable, 2 m ⁶⁾ Male connector, M12 (depending on type)
Circuit protection	A ⁷⁾ B ⁸⁾ D ⁹⁾				
Protection class	III				
Polarisation filter	–			✓	–
Housing material					
Plastic	ABS				
Metal	Nickel-plated brass and ABS				
Optics material	Plastic, PMMA				
Enclosure rating	IP 67				
Items supplied	Fastening nuts (2 x)		Fastening nuts (2 x), Reflector P250 (depending on type)		Fastening nuts (4 x)
EMC	EN 60947-5-2				
Test input	–				Sender OFF at “Test” 0 V
Ambient operating temperature ¹⁰⁾	–25 °C ... +55 °C			–25 °C ... +55 °C ¹¹⁾	–25 °C ... +55 °C
Ambient storage temperature	–40 °C ... +70 °C				

¹⁾ Limit values when operated in short-circuit protected network: max. 8 A.

²⁾ May not exceed or fall below U_V tolerances.

³⁾ At $U_V > 24 \text{ V}$ or ambient temperature $> 49 \text{ }^{\circ}\text{C}$, $I_A \text{ max.} = 50 \text{ mA}$.

⁴⁾ Signal transit time with resistive load.

⁵⁾ With light/dark ratio 1:1.

⁶⁾ Do not bend below $0 \text{ }^{\circ}\text{C}$.

⁷⁾ A = V_S connections reverse-polarity protected.

⁸⁾ B = inputs and output reverse-polarity protected.

⁹⁾ D = outputs overcurrent and short-circuit protected.

¹⁰⁾ At $U_V \leq 24 \text{ V}$ and $I_A < 50 \text{ mA}$.

¹¹⁾ Temperature stability following adjustment $\pm 10 \text{ }^{\circ}\text{C}$.

Ordering information

Other models → www.mysick.com/en/GR18S

GRTB18S, metal, axial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** Background suppression
- **Light spot size (distance):** Ø 7 mm (100 mm)
- **Switching mode:** Light/dark switching
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Connection	Con- nection diagram	Type	Part no.
	3 mm ... 300 mm	20 mm ... 150 mm	Visible red light	PinPoint LED	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18S-N1112	1076105
						M12, 4-pin male connector	Cd-084	GRTB18S-N2412	1076108
					PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18S-P1112	1076099
						M12, 4-pin male connector	Cd-084	GRTB18S-P2412	1076102

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTB18S, metal, axial, fully flush

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** Background suppression
- **Light spot size (distance):** Ø 7 mm (100 mm)
- **Switching mode:** Light/dark switching
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Connection	Con- nection diagram	Type	Part no.
	3 mm ... 300 mm	20 mm ... 150 mm	Visible red light	PinPoint LED	NPN	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18S-N111Z	1076106
						M12, 4-pin male connector	Cd-084	GRTB18S-N241Z	1076109
					PNP	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18S-P111Z	1076100
						M12, 4-pin male connector	Cd-084	GRTB18S-P241Z	1076103

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTB18S, plastic, axial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** Background suppression
- **Light spot size (distance):** Ø 7 mm (100 mm)
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Switching mode	Connection	Con- nection diagram	Type	Part no.
	3 mm ... 300 mm	20 mm ... 150 mm	Visible red light	PinPoint LED	NPN	Dark switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTB18S-E1317	1076112
							Connector M12, 3-pin	Cd-045	GRTB18S-E2317	1076113
						Light/ dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18S-N1117	1076104
							M12, 4-pin male connector	Cd-084	GRTB18S-N2417	1076107
						Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTB18S-N1317	1076096
							Cable, 3-wire, 5 m, PVC	Cd-044	GRTB18S-N1417	1077894
							Connector M12, 3-pin	Cd-045	GRTB18S-N2317	1076097
					PNP	Dark switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTB18S-F1317	1076110
							Connector M12, 3-pin	Cd-045	GRTB18S-F2317	1076111
						Light/ dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	GRTB18S-P1117	1076098
							M12, 4-pin male connector	Cd-084	GRTB18S-P2417	1076101
						Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTB18S-P1317	1076094
							Cable, 3-wire, 5 m, PVC	Cd-044	GRTB18S-P1417	1077893
							Connector M12, 3-pin	Cd-045	GRTB18S-P2317	1076095

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTE18S, metal, axial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** energetic
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)
- **Type of light:** visible red light

	Sensing range max. ¹⁾	Sensing range ¹⁾	Light source	Light spot size (dis- tance)	Output type	Switching mode	Connection	Con- nection diagram	Type	Part no.
	3 mm ... 115 mm	5 mm ... 100 mm	PinPoint LED	Ø 8 mm (100 mm)	NPN	Light/dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18S-N1112	1069584
						Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-N1312	1058201
							Connector M12, 3-pin	Cd-045	GRTE18S-N2312	1059408
					PNP	Light/dark switching	M12, 4-pin male connector	Cd-084	GRTE18S-P2412	1069583
						Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-P1312	1058203
							Connector M12, 3-pin	Cd-045	GRTE18S-P2312	1058204
	5 mm ... 550 mm	10 mm ... 400 mm	PinPoint LED	Ø 9 mm (400 mm)	NPN	Light/dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18S-N1142	1069580
						Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-N1342	1058202
							Connector M12, 3-pin	Cd-045	GRTE18S-N2342	1059482
					PNP	Light/dark switching	M12, 4-pin male connector	Cd-084	GRTE18S-P2442	1069579
						Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-P1342	1058205
							Connector M12, 3-pin	Cd-045	GRTE18S-P2342	1058200
	5 mm ... 1,000 mm	10 mm ... 800 mm	LED	Ø 45 mm (800 mm)	NPN	Light/dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18S-N1162	1069578
						Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-N1362	1069500
							Connector M12, 3-pin	Cd-045	GRTE18S-N2362	1069501
					PNP	Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-P1362	1069503
							Connector M12, 3-pin	Cd-045	GRTE18S-P2362	1069504
						Light/dark switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-P1362	1069503

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTE18S, metal, axial, fully flush

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** energetic
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Light spot size (distance)	Output type	Switching mode	Connection	Connection diagram	Type	Part no.
	3 mm ... 115 mm	5 mm ... 100 mm	Visible red light	Pin-Point LED	Ø 8 mm (100 mm)	NPN	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-E231Z	1059409
							Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-N231Z	1059432
						PNP	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-F231Z	1059435
							Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-P231Z	1059436
	5 mm ... 550 mm	10 mm ... 400 mm	Infrared light	LED	Ø 26 mm (400 mm)	PNP	Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-P135ZS01	1065711
			Visible red light	Pin-Point LED	Ø 9 mm (400 mm)	NPN	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-E234Z	1059483
							Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-N234Z	1059484
						PNP	Dark switching	Cable, 3-wire, 2 m	Cd-044	GRTE18S-F134Z	1062423
								Connector M12, 3-pin	Cd-045	GRTE18S-F234Z	1059486
							Light switching	Cable, 3-wire, 2 m	Cd-044	GRTE18S-P134Z	1064171
								Connector M12, 3-pin	Cd-045	GRTE18S-P234Z	1059487
	5 mm ... 1,000 mm	10 mm ... 800 mm	Visible red light	LED	Ø 45 mm (800 mm)	NPN	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-E236Z	1069554
							Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-N236Z	1069555
						PNP	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-F236Z	1069556
							Light/dark switching	M12, 4-pin male connector	Cd-084	GRTE18S-P246Z	1069123
							Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-P236Z	1069557

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTE18S, metal, radial, fully flush

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** energetic
- **Output type:** PNP
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Light spot size (distance)	Switching mode	Connection	Connection diagram	Type	Part no.
	3 mm ... 115 mm	5 mm ... 100 mm	Visible red light	PinPoint LED	Ø 8 mm (100 mm)	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-F231X	1059438
						Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-P231X	1059440
	5 mm ... 550 mm	10 mm ... 400 mm	Visible red light	PinPoint LED	Ø 9 mm (400 mm)	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-F234X	1059488
						Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-P234X	1059489
	5 mm ... 1,000 mm	10 mm ... 800 mm	Visible red light	LED	Ø 45 mm (800 mm)	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-F236X	1069558
						Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-P236X	1069559

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTE18S, plastic, axial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** energetic
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Light spot size (distance)	Output type	Switching mode	Connection	Connection diagram	Type	Part no.
	3 mm ... 115 mm	5 mm ... 100 mm	Visible red light	Pin-Point LED	Ø 8 mm (100 mm)	NPN	Light/dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18S-N1117	1069581
							Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-N1317	1058194
								Connector M12, 3-pin	Cd-045	GRTE18S-N2317	1059378
						PNP	Light/dark switching	M12, 4-pin male connector	Cd-084	GRTE18S-P2417	1069582
							Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-P1317	1058195
								Connector M12, 3-pin	Cd-045	GRTE18S-P2317	1058196
	5 mm ... 550 mm	10 mm ... 400 mm	Visible red light	Pin-Point LED	Ø 9 mm (400 mm)	NPN	Light/dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18S-N1147	1062024
							Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-N1347	1058393
								Connector M12, 3-pin	Cd-045	GRTE18S-N2347	1059441
						PNP	Light/dark switching	M12, 4-pin male connector	Cd-084	GRTE18S-P2447	1069073
							Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-P1347	1058197
								Connector M12, 3-pin	Cd-045	GRTE18S-P2347	1058193
	5 mm ... 1,000 mm	10 mm ... 800 mm	Visible red light	LED	Ø 45 mm (800 mm)	NPN	Light/dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	GRTE18S-N1167	1069121
							Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-N1367	1069494
								Connector M12, 3-pin	Cd-045	GRTE18S-N2367	1069495
						PNP	Light/dark switching	M12, 4-pin male connector	Cd-084	GRTE18S-P2467	1069122
							Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	GRTE18S-P1367	1069496
								Connector M12, 3-pin	Cd-045	GRTE18S-P2367	1069497

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRTE18S, plastic, radial

- **Sensor principle:** Photoelectric proximity sensor
- **Detection principle:** energetic
- **Output type:** PNP
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Light spot size (distance)	Switching mode	Connection	Connection diagram	Type	Part no.
	3 mm ... 115 mm	5 mm ... 100 mm	Visible red light	PinPoint LED	Ø 8 mm (100 mm)	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-F2319	1059406
						Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-P2319	1059407
	5 mm ... 550 mm	10 mm ... 400 mm	Visible red light	PinPoint LED	Ø 9 mm (400 mm)	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-F2349	1059480
						Light/dark switching	M12, 4-pin male connector	Cd-084	GRTE18S-P2449	1069074
						Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-P2349	1059481
	5 mm ... 1,000 mm	10 mm ... 800 mm	Visible red light	LED	Ø 45 mm (800 mm)	Dark switching	Connector M12, 3-pin	Cd-045	GRTE18S-F2369	1069498
						Light switching	Connector M12, 3-pin	Cd-045	GRTE18S-P2369	1069499

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

GRL18S, metal, axial

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Adjustment:** none
- **Type of light:** visible red light
- **Light source:** PinPoint LED

	Sensing range max. ¹⁾	Sensing range ¹⁾	Output type	Switching mode	Connection	Con- nection diagram	Items sup- plied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	NPN	Dark switching	Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-E1331	1059537
							Fastening nuts (2 x), Reflector P250	GRL18S-E1351	1064153
				Light/dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	Fastening nuts (2 x)	GRL18S-N1131	1069588
				Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-N1331	1059538
							Fastening nuts (2 x), Reflector P250	GRL18S-N1351	1064154
			PNP	Dark switching	Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-F1331	1059541
							Fastening nuts (2 x), Reflector P250	GRL18S-F1351	1064155
					Cable, 3-wire, 5 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-P1431	1078580
					Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18S-F2331	1058198
							Fastening nuts (2 x), Reflector P250	GRL18S-F2351	1064156
				Light/dark switching	M12, 4-pin male connector	Cd-084	Fastening nuts (2 x)	GRL18S-P2431	1069586
				Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-P1331	1059542
							Fastening nuts (2 x), Reflector P250	GRL18S-P1351	1064157
					Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18S-P2331	1058199
							Fastening nuts (2 x), Reflector P250	GRL18S-P2351	1064158

¹⁾ PL80A.

GRL18S, metal, axial, fully flush

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Output type:** PNP
- **Adjustment:** none

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Switching mode	Connection	Connection diagram	Items supplied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	Dark switching	Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18S-F233Y	1058206
								Fastening nuts (2 x), Reflector P250	GRL18S-F235Y	1064159
					Light switching	Cable, 3-wire, 2 m	Cd-043	Fastening nuts (2 x)	GRL18S-P133Y	1072117
						Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18S-P233Y	1058207
								Fastening nuts (2 x), Reflector P250	GRL18S-P235Y	1064160

¹⁾ PL80A.

GRL18S, metal, radial, fully flush

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Output type:** PNP
- **Adjustment:** none

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Switching mode	Connection	Connection diagram	Items supplied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	Dark switching	Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18S-F233W	1058209
								Fastening nuts (2 x), Reflector P250	GRL18S-F235W	1064161
					Light switching	Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18S-P233W	1058210
								Fastening nuts (2 x), Reflector P250	GRL18S-P235W	1064162

¹⁾ PL80A.

GRL18S, plastic, axial

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Adjustment:** none
- **Type of light:** visible red light
- **Light source:** PinPoint LED

	Sensing range max. ¹⁾	Sensing range ¹⁾	Output type	Switching mode	Connection	Con- nection diagram	Items sup- plied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	NPN	Dark switch- ing	Cable with M8 male con- nector, 4-pin, 300 mm, PVC	Cd-066	Fastening nuts (2 x)	GRL18S-E3036S01	1065604
					Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-E1336	1059530
							Fastening nuts (2 x), Reflector P250	GRL18S-E1356	1064143
				Light/dark switching	Cable, 4-wire, 2 m, PVC	Cd-094	Fastening nuts (2 x)	GRL18S-N1136	1069585
					M12, 4-pin male connector	Cd-084	Fastening nuts (2 x)	GRL18S-N2436	1077674
				Light switch- ing	Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-N1336	1059531
							Fastening nuts (2 x), Reflector P250	GRL18S-N1356	1064144
			PNP	Dark switch- ing	Cable with M8 male con- nector, 4-pin, 300 mm, PVC	Cd-066	Fastening nuts (2 x)	GRL18S-F3036S02	1067943
					Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-F1336	1059532
							Fastening nuts (2 x), Reflector P250	GRL18S-F1356	1064145
							Fastening nuts (2 x)	GRL18S-F2336	1059533
					Connector M12, 3-pin	Cd-045	Fastening nuts (2 x), Reflector P250	GRL18S-F2356	1064146
				Light/dark switching	M12, 4-pin male connector	Cd-101	Fastening nuts (2 x)	GRL18S-K2436	1069997
						Cd-084	Fastening nuts (2 x)	GRL18S-P2436	1069072
				Light switch- ing	Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-P1336	1059534
							Fastening nuts (2 x), Reflector P250	GRL18S-P1356	1064147
							Fastening nuts (2 x)	GRL18S-P2336	1058192
					Connector M12, 3-pin	Cd-045	Fastening nuts (2 x), Reflector P250	GRL18S-P2356	1064148

¹⁾ PL80A.

GRL18S, plastic, radial

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Output type:** PNP
- **Adjustment:** none

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Switching mode	Con- nection	Con- nection diagram	Items supplied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	Dark switching	Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-F1338	1059535
								Fastening nuts (2 x), Reflector P250	GRL18S-F1358	1064149
						Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18S-F2338	1058211
								Fastening nuts (2 x), Reflector P250	GRL18S-F2358	1064150
					Light/dark switching	M12, 4-pin male con- nector	Cd-101	Fastening nuts (2 x)	GRL18S-K2438	1069996
							Cd-084	Fastening nuts (2 x)	GRL18S-P2438	1069071
					Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	Fastening nuts (2 x)	GRL18S-P1338	1059536
								Fastening nuts (2 x), Reflector P250	GRL18S-P1358	1064151
						Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18S-P2338	1058212
								Fastening nuts (2 x), Reflector P250	GRL18S-P2358	1064152

¹⁾ PL80A.

GRL18SG, metal, axial, detecting transparent objects

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Output type:** PNP
- **Adjustment:** Potentiometer, 270°
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Switching mode	Connection	Connection diagram	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	Dark switching	Connector M12, 3-pin	Cd-045	GRL18SG-F233Z	1059555
					Light switching	Connector M12, 3-pin	Cd-045	GRL18SG-P233Z	1060323

¹⁾ PL80A.

GRL18SG, metal, axial, fully flush, detecting transparent objects

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Adjustment:** none
- **Items supplied:** fastening nuts (2 x)

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Switching mode	Connection	Connection diagram	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	NPN	Dark switching	Connector M12, 3-pin	Cd-045	GRL18SG-E233Z	1061927
						Light switching	Connector M12, 3-pin	Cd-045	GRL18SG-N233Z	1061928
					PNP	Dark switching	Connector M12, 3-pin	Cd-045	GRL18SG-F233Z	1059556
						Light switching	Connector M12, 3-pin	Cd-045	GRL18SG-P233Z	1068113

¹⁾ PL80A.

GRL18SG, metal, radial, fully flush, detecting transparent objects

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Output type:** PNP
- **Switching mode:** Dark switching

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Adjustment	Connection	Connection diagram	Items supplied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	None	Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18SG-F233X	1059557

¹⁾ PL80A.

GRL18SG, plastic, axial, detecting transparent objects

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Adjustment:** none

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Output type	Switching mode	Con-nection	Con-nection diagram	Items supplied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	NPN	Light/dark switching	Cable, 4-wire, 2 m	Cd-094	Fastening nuts (2 x)	GRL18SG-N1137	1062031
									Fastening nuts (2 x), Reflector P250	GRL18SG-N1157	1068942
					PNP	Dark switching	Cable, 3-wire, 2 m	Cd-044	Fastening nuts (2 x)	GRL18SG-F1337	1062231
							Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18SG-F2337	1059553
						Light/dark switching	Cable, 4-wire, 2 m	Cd-094	Fastening nuts (2 x)	GRL18SG-P1137	1066421
									Fastening nuts (2 x), Reflector P250	GRL18SG-P1157	1066940

¹⁾ PL80A.

GRL18SG, plastic, radial, detecting transparent objects

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Dual lens
- **Light spot size (distance):** Ø 175 mm (7 m)
- **Output type:** PNP
- **Switching mode:** Dark switching

	Sensing range max. ¹⁾	Sensing range ¹⁾	Type of light	Light source	Adjustment	Con-nection	Con-nection diagram	Items supplied	Type	Part no.
	0.03 m ... 7.2 m	0.06 m ... 6 m	Visible red light	PinPoint LED	None	Connector M12, 3-pin	Cd-045	Fastening nuts (2 x)	GRL18SG-F2339	1059554

¹⁾ PL80A.

GRSE18S, metal, axial

- **Sensor principle:** Through-beam photoelectric sensor
- **Light spot size infrared light (distance):** Ø 420 mm (10 m)
- **Light spot size visible red light (distance):** Ø 250 mm (10 m)
- **Items supplied:** fastening nuts (4 x)

	Sensing range max.	Sensing range	Type of light	Light source	Output type	Switching mode	Adjustment	Connection	Connection diagram	Type	Part no.
	0 m ... 15 m	0 m ... 10 m	Infrared light	LED	NPN	Light/dark switching	Potentiometer, 270°	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-N1122	1069638
								M12, 4-pin male connector	Cd-072	GRSE18S-N2422	1069635
					PNP	Light/dark switching	Potentiometer, 270°	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-P1122	1069637
								M12, 4-pin male connector	Cd-072	GRSE18S-P2422	1069636
			Visible red light	PinPoint LED	NPN	Dark switching	None	Cable, 3-wire, 2 m, PVC	Cd-049	GRSE18S-E1331	1059548
						Light/dark switching	Potentiometer, 270°	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-N1142	1069630
								M12, 4-pin male connector	Cd-072	GRSE18S-N2442	1069628
					PNP	Dark switching	None	Connector M12, 3-pin	Cd-051	GRSE18S-F2331	1059549
						Light/dark switching	Potentiometer, 270°	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-P1142	1069629
								M12, 4-pin male connector	Cd-072	GRSE18S-P2442	1069125
						Light switching	None	Connector M12, 3-pin	Cd-051	GRSE18S-P2331	1059550

GRSE18S, metal, axial, fully flush

- **Sensor principle:** Through-beam photoelectric sensor
- **Light spot size (distance):** Ø 250 mm (10 m)
- **Output type:** PNP
- **Switching mode:** Light switching
- **Adjustment:** none
- **Items supplied:** fastening nuts (4 x)

	Sensing range max.	Sensing range	Type of light	Light source	Connection	Connection diagram	Type	Part no.
	0 m ... 15 m	0 m ... 10 m	Visible red light	PinPoint LED	Cable, 3-wire, 2 m	Cd-044	GRSE18S-P133Y	1062422
					Connector M12, 3-pin	Cd-045	GRSE18S-P233Y	1062420

GRSE18S, metal, radial, fully flush

- **Sensor principle:** Through-beam photoelectric sensor
- **Light spot size (distance):** Ø 250 mm (10 m)
- **Output type:** PNP
- **Adjustment:** none
- **Items supplied:** fastening nuts (4 x)

	Sensing range max.	Sensing range	Type of light	Light source	Switching mode	Connection	Con- nection diagram	Type	Part no.
	0 m ... 15 m	0 m ... 10 m	Visible red light	PinPoint LED	Dark switching	Connector M12, 3-pin	Cd-051	GRSE18S-F233W	1059551
					Light switching	Connector M12, 3-pin	Cd-051	GRSE18S-P233W	1059552

GRSE18S, plastic, axial

- **Sensor principle:** Through-beam photoelectric sensor
- **Light spot size infrared light (distance):** Ø 420 mm (10 m)
- **Light spot size visible red light (distance):** Ø 250 mm (10 m)
- **Items supplied:** fastening nuts (4 x)

	Sensing range max.	Sensing range	Type of light	Light source	Output type	Switching mode	Adjustment	Connection	Con- nection diagram	Type	Part no.
	0 m ... 15 m	0 m ... 10 m	Infrared light	LED	NPN	Light/ dark switching	Potenti- ometer, 270°	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-N1127	1069634
								M12, 4-pin male con- nector	Cd-072	GRSE18S-N2427	1069631
					PNP	Light/ dark switching	Potenti- ometer, 270°	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-P1127	1069632
								M12, 4-pin male con- nector	Cd-072	GRSE18S-P2427	1069633
					NPN	Dark switching	None	Cable, 3-wire, 2 m, PVC	Cd-049	GRSE18S-E1336	1059543
						Light/ dark switching	None	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-N1136	1062122
							Potenti- ometer, 270°	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-N1147	1069124
							Potenti- ometer, 270°	M12, 4-pin male con- nector	Cd-072	GRSE18S-N2447	1069625
			Visible red light	Pin- Point LED	NPN	Dark switching	None	Cable, 3-wire, 2 m, PVC	Cd-049	GRSE18S-F1336	1059544
								Connector M12, 3-pin	Cd-051	GRSE18S-F2336	1058214
					PNP	Light/ dark switching	Potenti- ometer, 270°	Cable, 4-wire, 2 m, PVC	Cd-088	GRSE18S-P1147	1069626
								M12, 4-pin male con- nector	Cd-072	GRSE18S-P2447	1069627
						Light switching	None	Cable, 3-wire, 2 m, PVC	Cd-049	GRSE18S-P1336	1059545
								Connector M12, 3-pin	Cd-051	GRSE18S-P2336	1058215

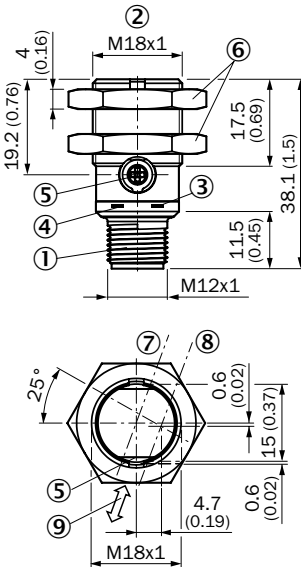
GRSE18S, plastic, radial

- **Sensor principle:** Through-beam photoelectric sensor
- **Light spot size (distance):** Ø 250 mm (10 m)
- **Output type:** PNP
- **Adjustment:** none
- **Items supplied:** fastening nuts (4 x)

	Sensing range max.	Sensing range	Type of light	Light source	Switching mode	Connection	Con- nection diagram	Type	Part no.
	0 m ... 15 m	0 m ... 10 m	Visible red light	PinPoint LED	Dark switching	Connector M12, 3-pin	Cd-051	GRSE18S-F2338	1059546
					Light switching	Connector M12, 3-pin	Cd-051	GRSE18S-P2338	1059547

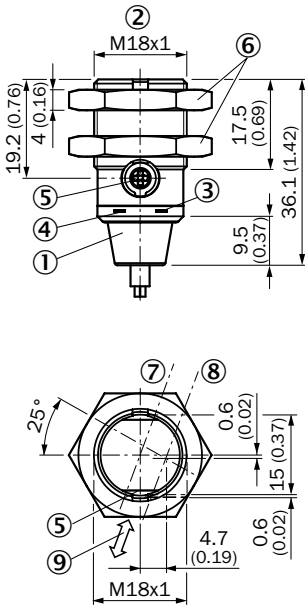
Dimensional drawings (Dimensions in mm (inch))

GRTB18S, metal, connector, straight, adjustable



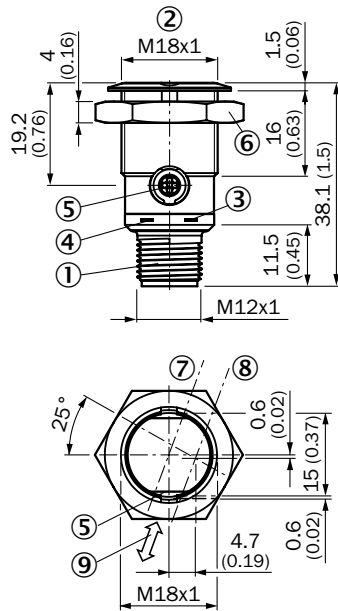
- ① M12, 4-pin male connector
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 24, metal
- ⑦ Optical axis receiver
- ⑧ Optical axis sender
- ⑨ Standard direction of the material being detected

GRTB18S, metal, cable, straight, adjustable



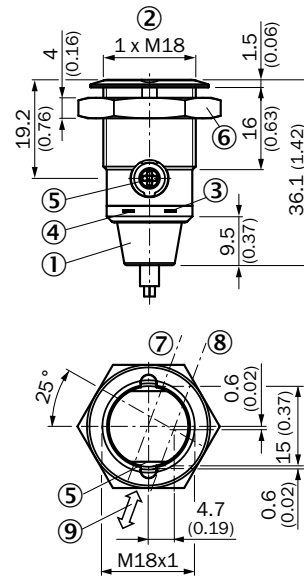
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 24, metal
- ⑦ Optical axis receiver
- ⑧ Optical axis sender
- ⑨ Standard direction of the material being detected

GRTB18S, metal, connector, straight, fully flush, adjustable



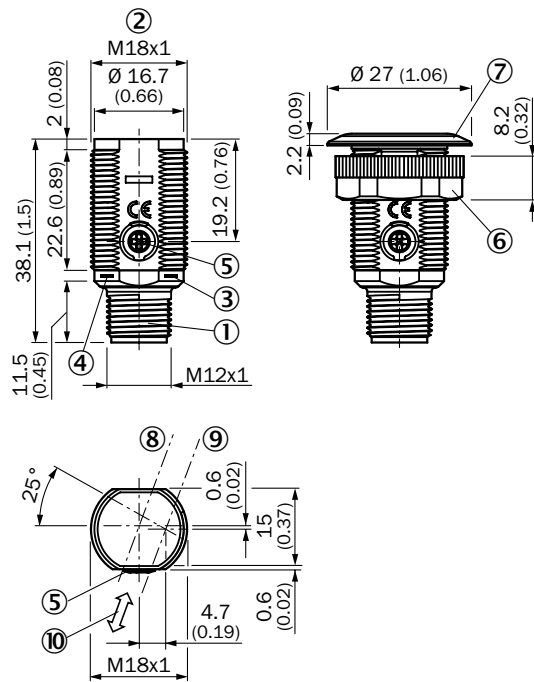
- ① M12, 4-pin male connector
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 24 mm hex, metal
- ⑦ Optical axis receiver
- ⑧ Optical axis sender
- ⑨ Standard direction of the material being detected

GRTB18S, metal, cable, straight, fully flush, adjustable



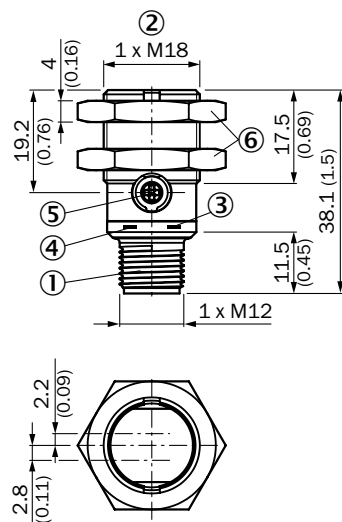
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 24 mm hex, metal
- ⑦ Optical axis receiver
- ⑧ Optical axis sender
- ⑨ Standard direction of the material being detected

GRTB18S, plastic, connector, straight, adjustable



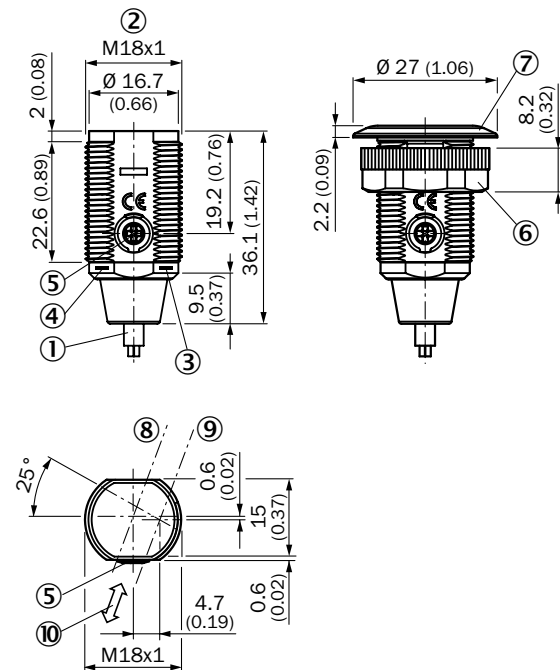
- ① Connector M12
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 22 mm hex, plastic
- ⑦ Mounting ring
- ⑧ Optical axis receiver
- ⑨ Optical axis sender
- ⑩ Standard direction of the material being detected

GR18S, metal, connector, straight, adjustable



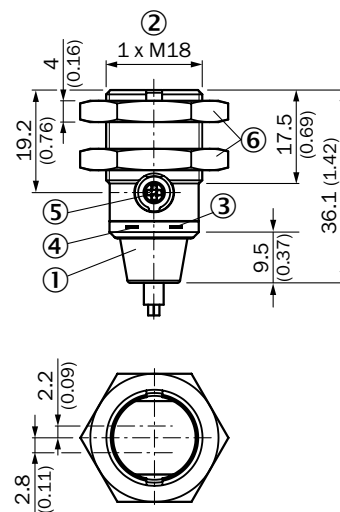
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 24, metal

GRTB18S, plastic, cable, straight, adjustable



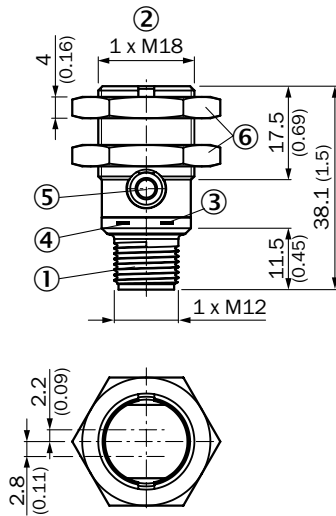
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 22 mm hex, plastic
- ⑦ Mounting ring
- ⑧ Optical axis receiver
- ⑨ Optical axis sender
- ⑩ Standard direction of the material being detected

GR18S, metal, cable, straight, adjustable



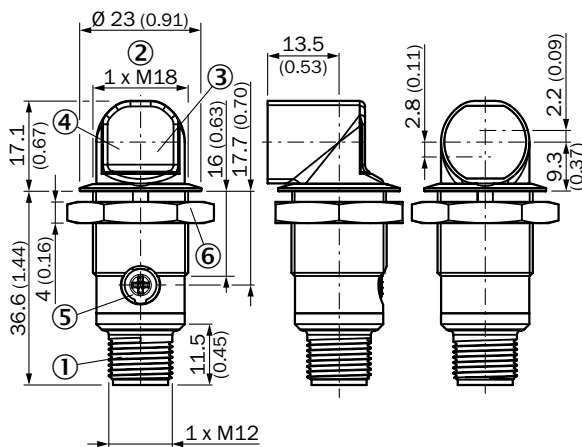
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nuts (2x); width across 24, metal

GR18S, metal, connector, straight,
no adjustment possibility



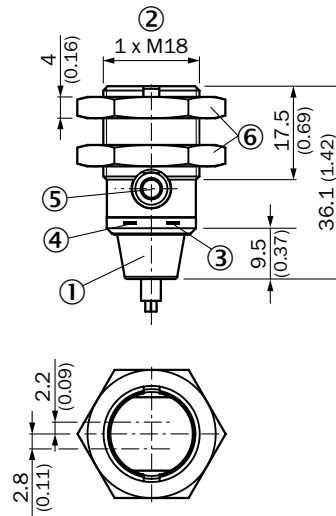
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Dummy plug
- ⑥ Fastening nuts (2x); width across 24, metal

GR18S, metal, connector, angled, fully flush, adjustable



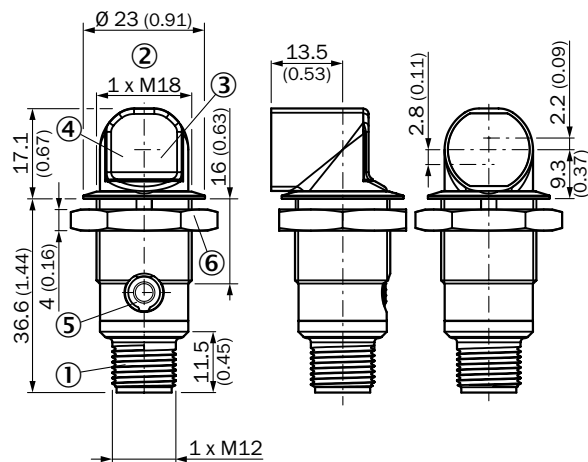
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 24 mm hex, metal

GR18S, metal, cable, straight,
no adjustment possibility



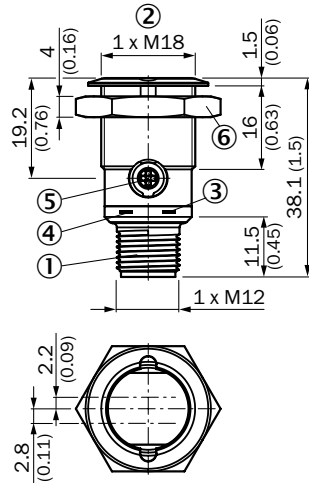
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Dummy plug
- ⑥ Fastening nuts (2x); width across 24, metal

GR18S, metal, connector, angled, fully flush,
no adjustment possibility



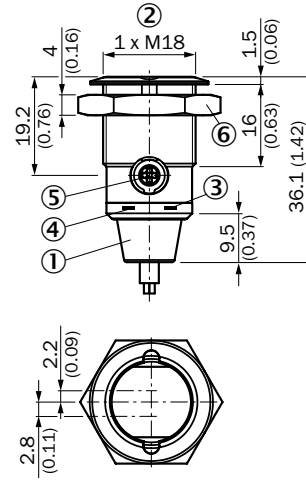
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Dummy plug
- ⑥ Fastening nut; 24 mm hex, metal

GR18S, metal, connector, straight, fully flush, adjustable



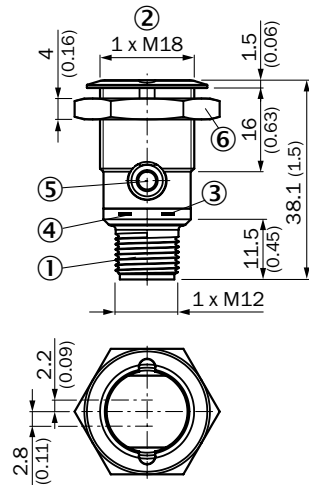
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 24 mm hex, metal

GR18S, metal, cable, straight, fully flush, adjustable



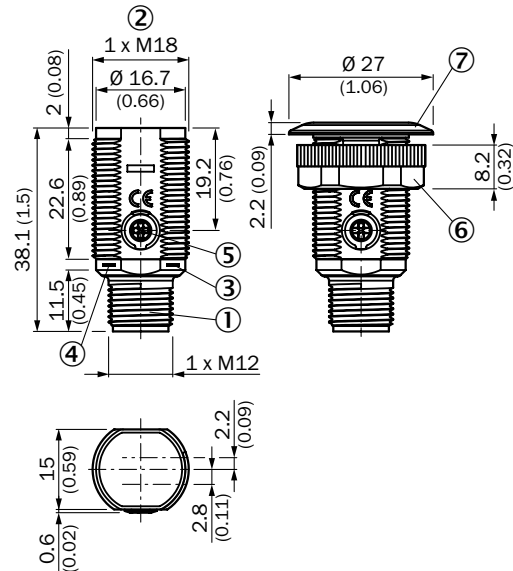
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 24 mm hex, metal

GR18S, metal, connector, straight, fully flush, no adjustment possibility



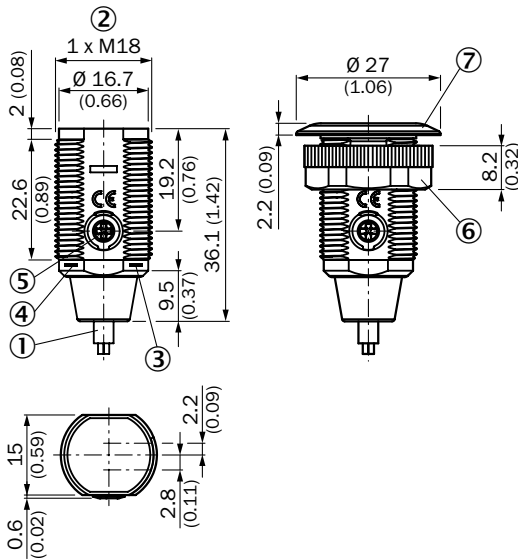
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Dummy plug
- ⑥ Fastening nut; 24 mm hex, metal

GR18S, plastic, connector, straight, adjustable



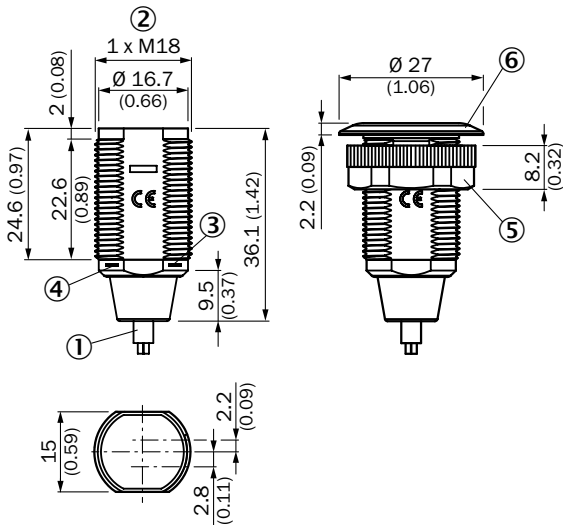
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 22 mm hex, plastic
- ⑦ Mounting ring

GR18S, plastic, cable, straight, adjustable



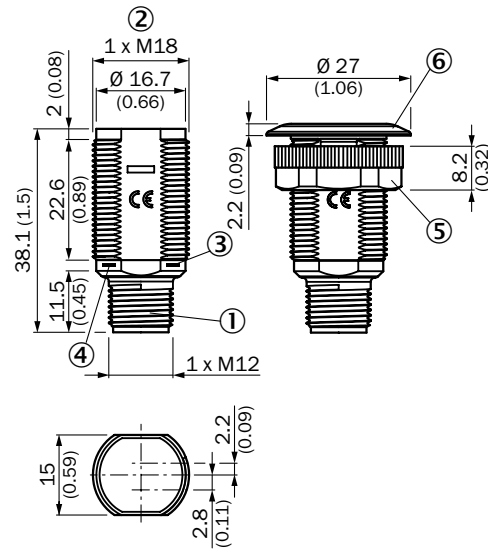
- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 22 mm hex, plastic
- ⑦ Mounting ring

GR18S, plastic, cable (with plug), straight,
no adjustment possibility



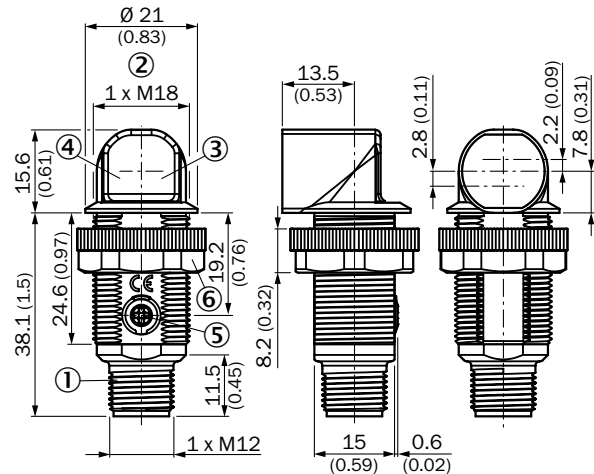
- ① Cable (with male connector)
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Fastening nut; 22 mm hex, plastic
- ⑥ Mounting ring

GR18S, plastic, connector, straight, fully flush,
no adjustment possibility



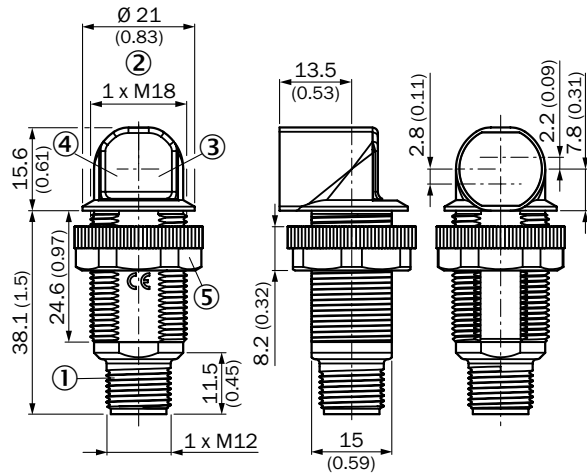
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Fastening nut; 22 mm hex, plastic
- ⑥ Mounting ring

GR18S, plastic, connector, angled, adjustable



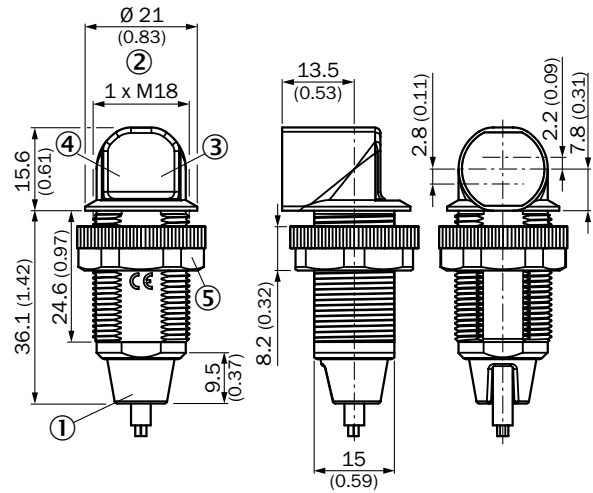
- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Sensitivity control: potentiometer 270°
- ⑥ Fastening nut; 22 mm hex, plastic

GR18S, plastic, connector, angled,
no adjustment possibility



- ① Connector M12, 3-pin
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Fastening nut; 22 mm hex, plastic

GR18S, plastic, cable, angled,
no adjustment possibility

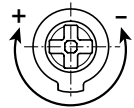


- ① Connection cable 2 m
- ② Threaded mounting hole M18 x 1
- ③ LED indicator yellow
- ④ LED indicator green
- ⑤ Fastening nut; 22 mm hex, plastic

Adjustment options

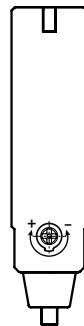
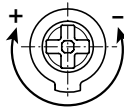
GRTB18S, GRTE18S,
Sensing range adjustment:
potentiometer, 270°

Sensing range



GRTB18S, GRTE18S,
Sensitivity adjustment:
potentiometer, 270°

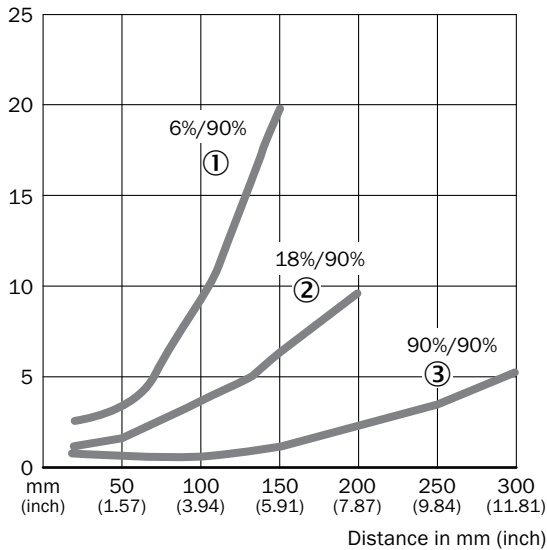
Sensitivity



Operating reserve

GRTB18S

% of sensing range

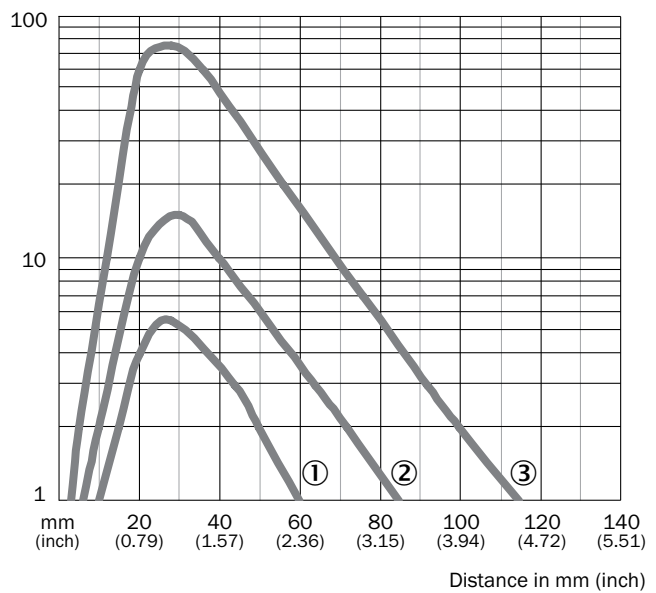


- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

GRTE18S, 100 mm

GRTE18S, 100 mm

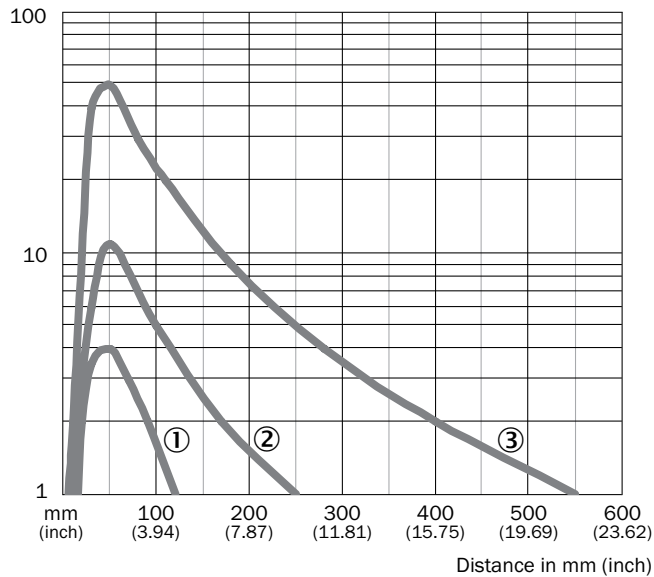
Operating reserve



- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

GRTE18S, 400 mm

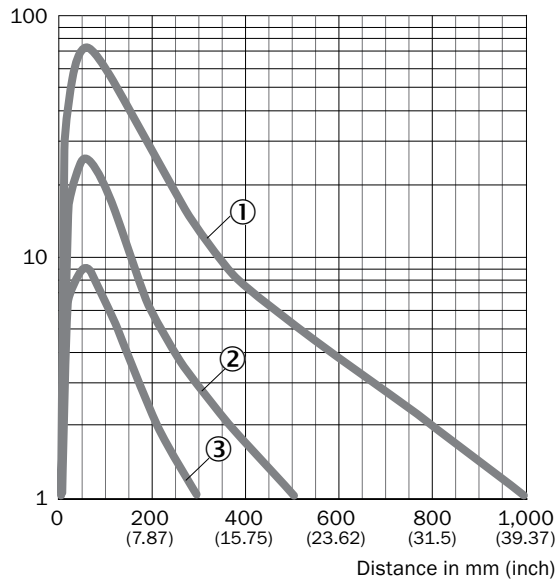
Operating reserve



- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

GRTE18S, 800 mm

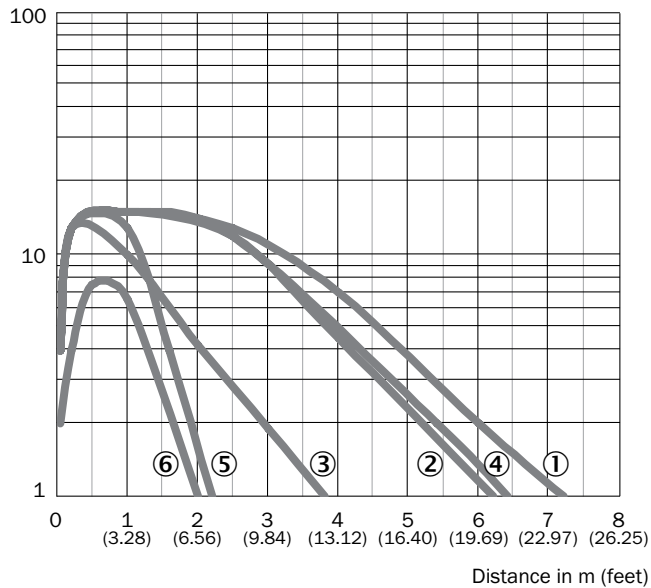
Operating reserve



- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

GR18S

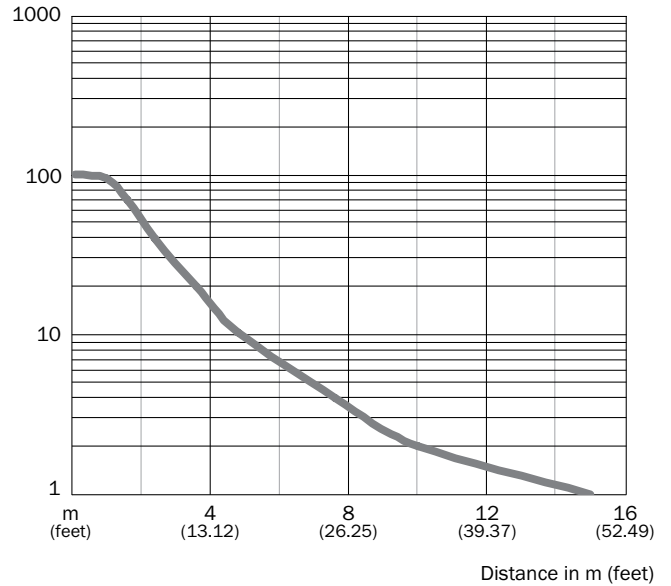
Operating reserve



- ① Reflector type PL80A
- ② Reflector type PL40A
- ③ Reflector type PL20A
- ④ Reflector type P205
- ⑤ Reflector type PL22-2
- ⑥ Reflective tape REF-Plus 3436

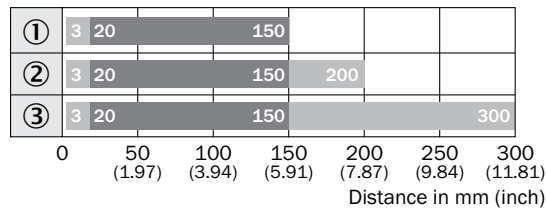
GRSE18S

Operating reserve



Sensing range

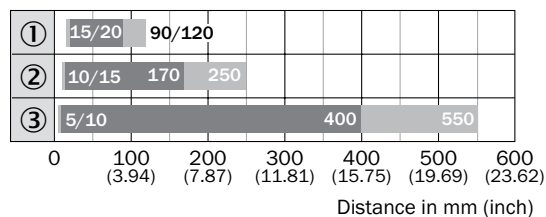
GRTB18S



Sensing range Sensing range max.

- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 18 % remission
- ③ Sensing range on white, 90% remission

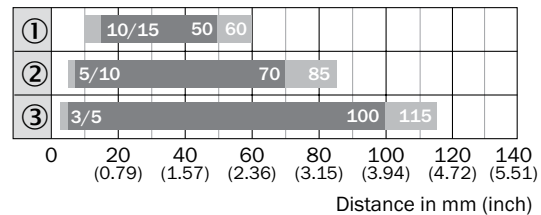
GRTE18S, 400 mm



Sensing range Sensing range max.

- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

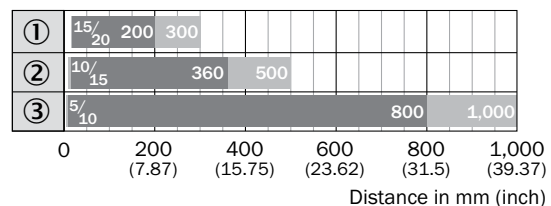
GRTE18S, 100 mm



Sensing range Sensing range max.

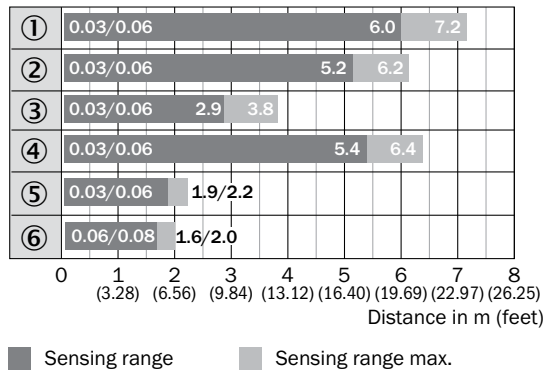
- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

GRTE18S, 800 mm

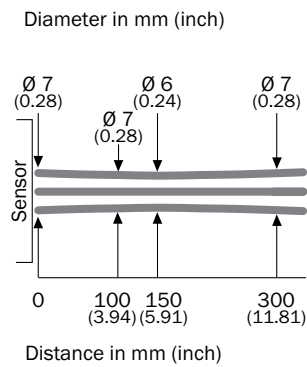
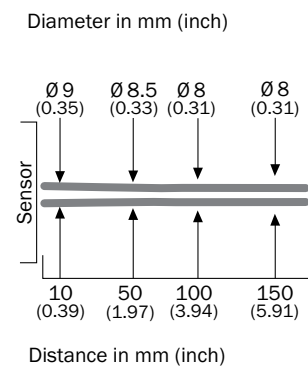
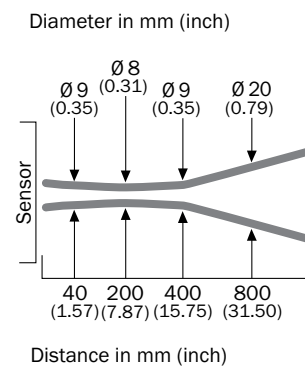
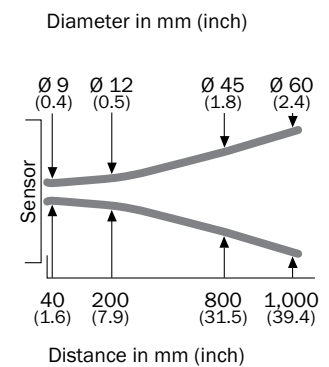
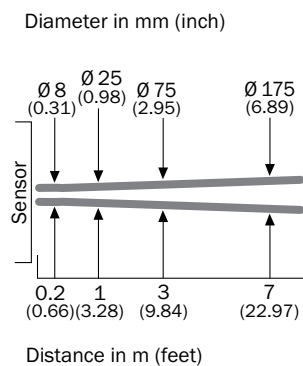
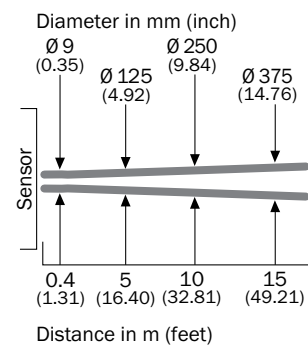
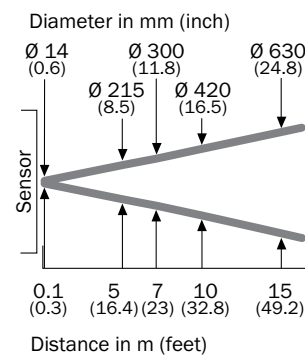


Sensing range Sensing range max. typ.

- ① Sensing range on black, 6% remission
- ② Sensing range on gray, 20 % remission
- ③ Sensing range on white, 90% remission

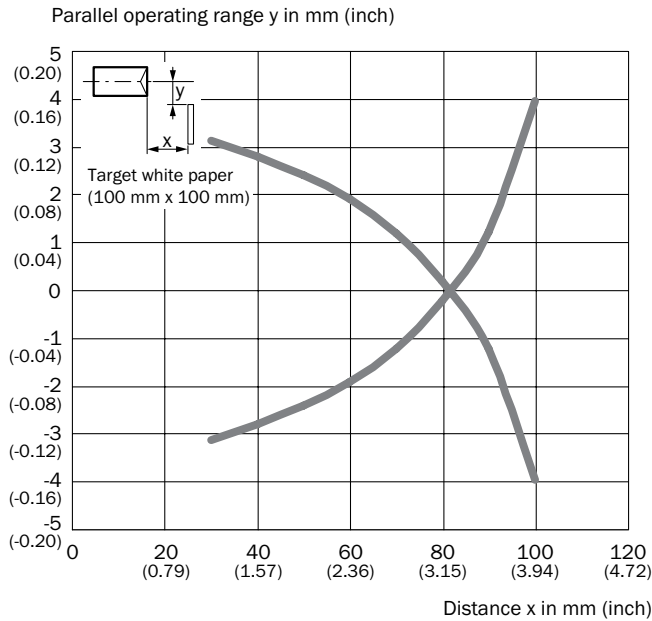
GRL18S

- ① Reflector type PL80A
- ② Reflector type PL40A
- ③ Reflector type PL20A
- ④ Reflector type P205
- ⑤ Reflector type PL22-2
- ⑥ Reflective tape REF-Plus 3436

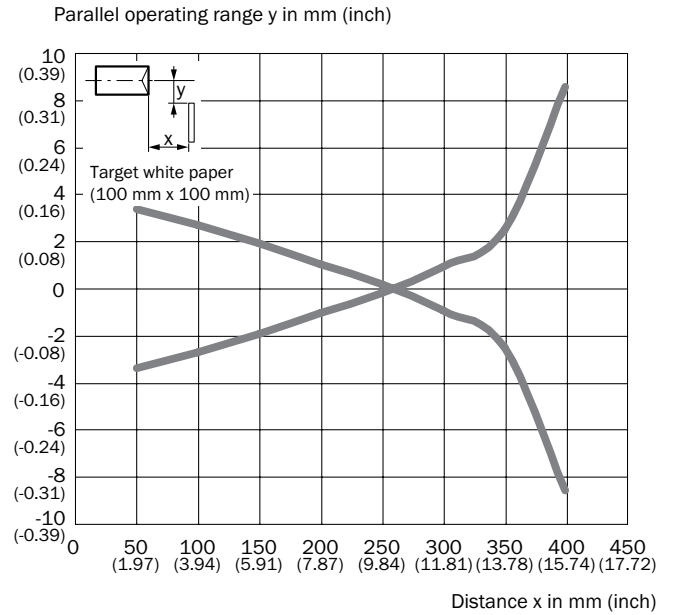
Light spot diameter**GRTB18S****GRTE18S, 100 mm****GRTE18S, 400 mm****GRTE18S, 800 mm****GRL18S****GRSE18S, red light****GRSE18S, infrared light**

Response curve

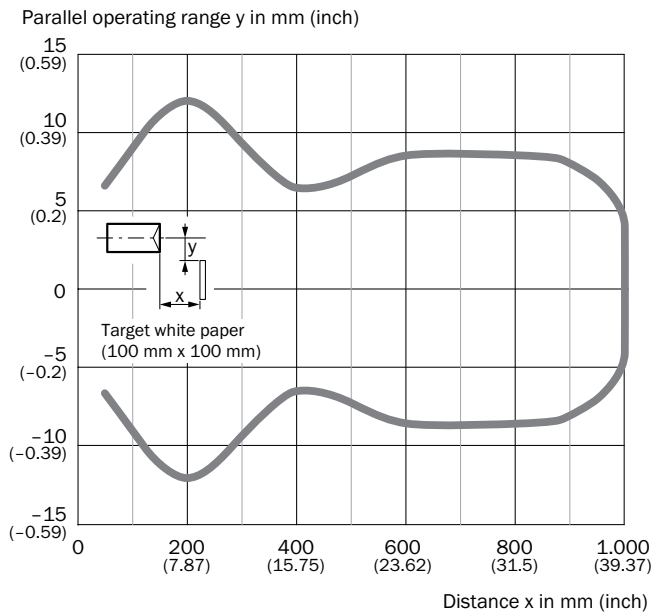
GRTE18S, 100 mm



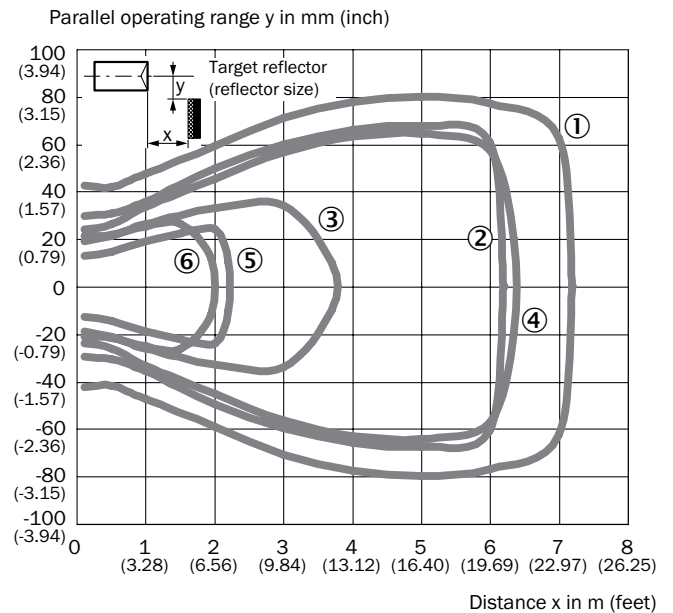
GRTE18S, 400 mm



GRTE18S, 800 mm

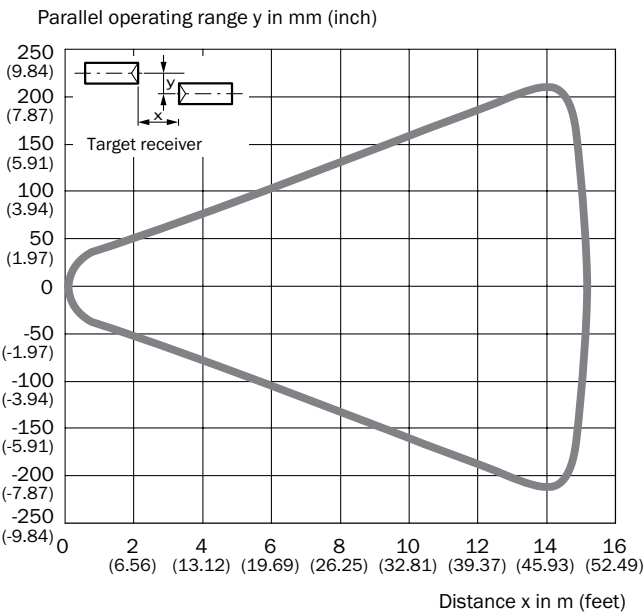


GRL18S



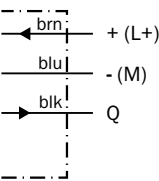
- ① Reflector type PL80A
- ② Reflector type PL40A
- ③ Reflector type PL20A
- ④ Reflector type P205
- ⑤ Reflector type PL22-2
- ⑥ Reflective tape REF-Plus 3436

GRSE18S

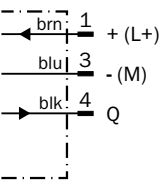


Connection diagram

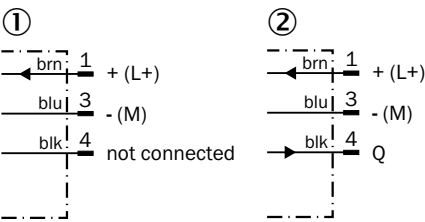
Cd-043



Cd-045

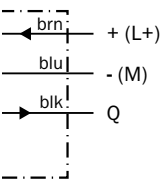


Cd-051

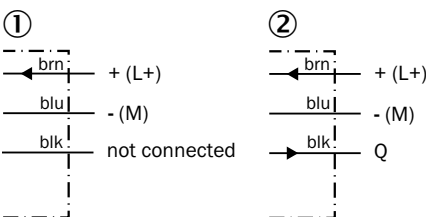


① Sender
② Receiver

Cd-044

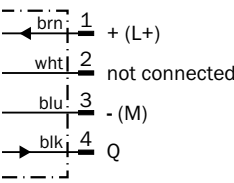


Cd-049

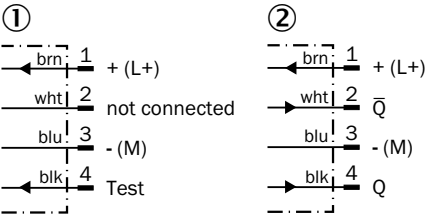


① Sender
② Receiver

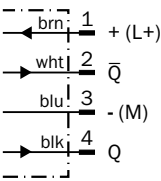
Cd-066



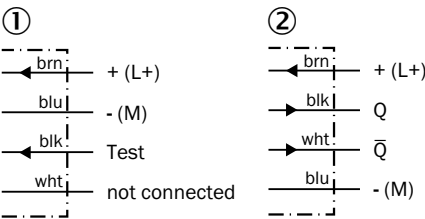
Cd-072



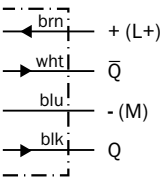
Cd-084



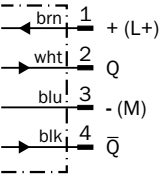
Cd-088



Cd-094



Cd-101



Accessories**Mounting systems**

Universal bar clamp systems

	Material	Description	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Zinc diecast	Universal bar clamp for mounting bars with 12 mm diameter	BEF-KHS-KH3	5322626	●	●	●	●
	Zinc plated steel (sheet), Zinc die cast (clamping bracket)	Plate N06 for universal clamp bracket, M18	BEF-KHS-N06	2051612	●	●	●	●
	Stainless steel 1.4571 (sheet), Stainless steel 1.4408 (clamp)	Plate N06N for universal clamp bracket, M18	BEF-KHS-N06N	2051622	●	●	●	●
	Steel, zinc coated	Mounting bar, straight, 200 mm, steel	BEF-MS12G-A	4056054	●	●	●	●
		Mounting bar, straight, 300 mm, steel	BEF-MS12G-B	4056055	●	●	●	●
		Mounting bar, L-shaped, 150 mm x 150 mm, steel	BEF-MS12L-A	4056052	●	●	●	●
		Mounting bar, L-shaped, 250 x 250 mm, steel	BEF-MS12L-B	4056053	●	●	●	●
		Mounting bar, Z-shaped, 150 mm x 70 mm x 150 mm, steel	BEF-MS12Z-A	4056056	●	●	●	●
		Mounting bar, Z-shaped, 150 mm x 70 mm x 250 mm, steel	BEF-MS12Z-B	4056057	●	●	●	●
	Aluminum	Bar clamp for bar diameter of 12 mm (fixing the mounting rod)	BEF-RMC-D12	5321878	●	●	●	●

Reflectors and optics

Masks

	Description	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Front window protection designed for M18 cylindrical photoelectric sensors, nickel-plated brass, glass	BEF-M18-GW	2075708	●	●	●	●

Mounting systems

Mounting brackets and mounting plates

Mounting brackets

	Material	Description	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Steel, zinc coated	Mounting plate for M18 sensors	BEF-WG-M18	5321870	●	●	●	●
	Stainless steel	Mounting plate for M18 housing	BEF-WG-M18N	5320948	●	●	●	●

	Material	Description	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Steel, zinc coated	Mounting bracket, M18 thread	BEF-WN-M18	5308446	●	●	●	●
	Stainless steel	Mounting bracket for M18 housing	BEF-WN-M18N	5320947	●	●	●	●

Other mounting accessories

Others

	Brief description	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Mounting tool for "fully flush" variants	BEF-TO-GR18S	4072132	●	●	●	●

Terminal and alignment brackets

Alignment brackets

	Material	Description	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Plastic	Mounting bracket with ball-and-socket	BEF-WN-M18-ST02	5312973	●	●	●	●

Terminal brackets

	Material	Description	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Plastic (PA12), glass-fiber reinforced	Clamping block for round sensors M18, without fixed stop	BEF-KH-M18	2051481	●	●	●	●
		Clamping block for round sensors M18, with fixed stop	BEF-KHF-M18	2051482	●	●	●	●
	Plastic (PA12)	Integrated adapter	BEF-WN-MH15-1	4039533	●	●	●	●
	Stainless steel	Mounting ring	BEF-WN-MH15-2V	4053358	●	●	●	●

Connection systems

Plug connectors and cables

Connecting cables with female connector M12, 4-pin, PUR, halogen-free

	Connection type head A	Connection type head B	Connecting cable	Cable material	Connector material	Locking nut material	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Female connector, M12, 4-pin, angled, unshielded	Cable, open conductor heads	5 m, 4-wire	PUR, halogen-free	TPU	Zinc die-cast, nickel-plated	DOL-1204-W05MD	6020399	●	●	●	●

Connecting cables with female connector M12, 4-pin, PUR, halogen-free, Oil / grease resistant

- **Cable material:** PUR, halogen-free
- **Connector material:** TPU
- **Locking nut material:** zinc die-cast, nickel-plated

	Connection type head A	Connection type head B	Connecting cable	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Female connector, M12, 4-pin, straight, unshielded	Cable, open conductor heads	2 m, 4-wire	DOL-1204-G02MC	6025900	●	●	●	●
			5 m, 4-wire	DOL-1204-G05MC	6025901	●	●	●	●
			10 m, 4-wire	DOL-1204-G10MC	6025902	●	●	●	●
	Female connector, M12, 4-pin, angled, with 3 LEDs, unshielded	Cable, open conductor heads	2 m, 4-wire	DOL-1204-L02MC	6039086	●	●	●	●
			5 m, 4-wire	DOL-1204-L05MC	6020398	●	●	●	●
			10 m, 4-wire	DOL-1204-L10MC	6039088	●	●	●	●
	Female connector, M12, 4-pin, angled, unshielded	Cable, open conductor heads	2 m, 4-wire	DOL-1204-W02MC	6025903	●	●	●	●
			5 m, 4-wire	DOL-1204-W05MC	6025904	●	●	●	●
			10 m, 4-wire	DOL-1204-W10MC	6025905	●	●	●	●

Connecting cables with female connector M12, 4-pin, PVC, chemical resistant

- **Cable material:** PVC
- **Connector material:** TPU
- **Locking nut material:** CuZn, nickel-plated brass

	Connection type head A	Connection type head B	Connecting cable	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Female connector, M12, 4-pin, straight, unshielded	Cable, open conductor heads	2 m, 4-wire	DOL-1204-G02M	6009382	●	●	●	●
			5 m, 4-wire	DOL-1204-G05M	6009866	●	●	●	●
			10 m, 4-wire	DOL-1204-G10M	6010543	●	●	●	●
			15 m, 4-wire	DOL-1204-G15M	6010753	●	●	●	●
	Female connector, M12, 4-pin, angled, with 3 LEDs, unshielded	Cable, open conductor heads	2 m, 4-wire	DOL-1204-L02M	6027945	●	●	●	●
			5 m, 4-wire	DOL-1204-L05M	6027944	●	●	●	●
			10 m, 4-wire	DOL-1204-L10M	6027946	●	●	●	●
	Female connector, M12, 4-pin, angled, unshielded	Cable, open conductor heads	2 m, 4-wire	DOL-1204-W02M	6009383	●	●	●	●
			5 m, 4-wire	DOL-1204-W05M	6009867	●	●	●	●
			10 m, 4-wire	DOL-1204-W10M	6010541	●	●	●	●

Connecting cables with male connector M12, 4-pin, PUR, halogen-free, Oil / grease resistant

	Connection type head A	Connection type head B	Connecting cable	Cable material	Connector material	Locking nut material	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Male connector, M12, 4-pin, straight, unshielded	Cable, open conductor heads	2 m, 4-wire	PUR, halogen-free	TPU	Zinc die-cast, nickel-plated	STL-1204-G02MC	6028077	●	●	●	●

Female connectors (ready to assemble) M12, 4-pin

- **Locking nut material:** CuZn

	Connection type head A	Connection type head B	Connector material	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Female connector, M12, 4-pin, straight, unshielded	Screw-type terminals	PA	DOS-1204-G	6007302	●	●	●	●
				DOS-1204-GX	6026528	●	●	●	●
	Female connector, M12, 4-pin, angled, unshielded	Screw-type terminals	PBT	DOS-1204-W	6007303	●	●	●	●
				DOS-1204-WX	6025570	●	●	●	●

Female connectors (ready to assemble) M12, 4-pin, hygienic systems

- **Locking nut material:** stainless steel (V4A/1.4404/316L)

	Connection type head A	Connection type head B	Connector material	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Female connector, M12, 4-pin, straight, unshielded	Screw-type terminals	PA	DOS-1204-GN	6028357	●	●	●	●
	Female connector, M12, 4-pin, angled, unshielded	Screw-type terminals	PBT	DOS-1204-WN	6028358	●	●	●	●

Male connectors (ready to assemble) M12, 4-pin

- **Locking nut material:** CuZn

	Connection type head A	Connection type head B	Connector material	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Male connector, M12, 4-pin, straight, unshielded	Screw-type terminals	PA	STE-1204-G	6009932	●	●	●	●

	Connection type head A	Connection type head B	Connector material	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Male connector, M12, 4-pin, angled, unshielded	Screw-type terminals	PBT	STE-1204-W	6022084	●	●	●	●

Male connectors (ready to assemble) M12, 4-pin, hygienic systems

- **Locking nut material:** stainless steel (V4A/1.4404)

	Connection type head A	Connection type head B	Connector material	Description	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Male connector, M12, 4-pin, straight, unshielded	Screw-type terminals	PA	–	STE-1204-GN	6028359	●	●	●	●
			PBT	For 2 cable connections	STE-1204-TN	6028360	●	●	●	●

Reflectors and optics

Reflectors

Angular

	Material	Description	Dimensions	Type	Part no.	GRTB18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	PMMA/ABS	Rectangular, screw connection	47 mm x 47 mm	P250	5304812	–	–	●	–
	Plastic	Chemically resistant, screw connection	47 mm x 47 mm	P250 CHEM	5321097	–	–	●	–
	PMMA/ABS	Rectangular, screw connection	38 mm x 15 mm	PL20A	1012719	–	–	●	–
			56 mm x 28 mm	PL30A	1002314	–	–	●	–
			37 mm x 56 mm	PL40A	1012720	–	–	●	–
			–	PL50A	1000132	–	–	●	–
		Rectangular, screw connection	80 mm x 80 mm	PL80A	1003865	–	–	●	–

Fine triple reflectors

	Material	Description	Dimensions	Type	Part no.	GRTE18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	PMMA/ABS	Fine triple, screw connection, suitable for laser sensors	47 mm x 47 mm	P250F	5308843	-	-	●	-
			18 mm x 18 mm	PL10F	5311210	-	-	●	-
	Plastic	Fine triple, chemically resistant, screw connection	18 mm x 18 mm	PL10F CHEM	5321636	-	-	●	-
			20 mm x 32 mm	PL10FB-CHEM	5327722	-	-	●	-
	PMMA/ABS	Fine triple, screw connection, suitable for laser sensors	38 mm x 16 mm	PL20F	5308844	-	-	●	-
	Plastic	Chemically resistant, screw connection, suitable for laser sensors	16 mm x 38 mm	PL20F-CHEM	5326089	-	-	●	-
	PMMA/ABS	Fine triple, screw connection, suitable for laser sensors	56 mm x 28 mm	PL30F	5326523	-	-	●	-
			76 mm x 45 mm	PL81-1F	5325060	-	-	●	-

Reflective tape

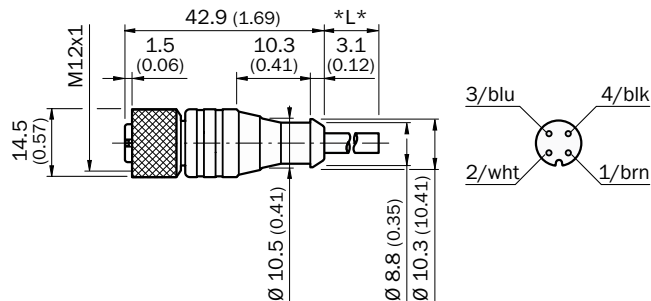
	Description	Dimensions	Type	Part no.	GRTE18(S)	GRTE18(S)	GRL18(S)(G)	GRSE18(S)
	Self-adhesive	50 mm x 60 mm	REF-IRF-56	5314244	-	-	●	-
	Self-adhesive, customizable length by roll	5 cm x 22.8 m ¹⁾	REF-PLUS-50-K	4051185	-	-	●	-
	Self-adhesive, roll	50 mm x 22.8 m	REF-PLUS-R50	5319981	-	-	●	-
	REF-Plus reflective tape, 100 pieces per pack, suitable for photoelectric retro-reflective sensors with polarisation filter	34 mm x 36 mm	REF-Plus-3436	5321337	-	-	●	-

Round

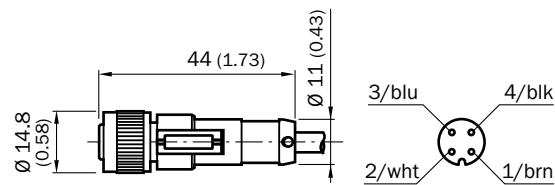
	Material	Description	Diameter	Type	Part no.	GRTE18(S)	GRTE18(S)	GRTE18(S)(G)	GRSE18(S)
	PMMA/ABS	Fine triple, not self-adhesive, ø 10 mm, ø Reflexionsfläche 8 mm	10 mm	PL8F	5327934	-	-	●	-
		Round, screw connection	80 mm	C110A	5304549	-	-	●	-
		Round, self-adhesive	22 mm	PL22-2	1003621	-	-	●	-

Dimensional drawings Connection systems

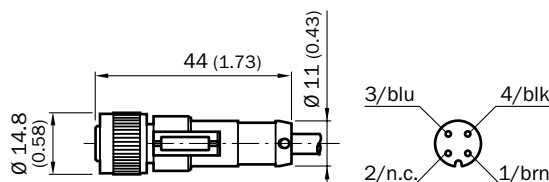
DOL-1204-G02M, DOL-1204-G05M,
DOL-1204-G10M, DOL-1204-G15M



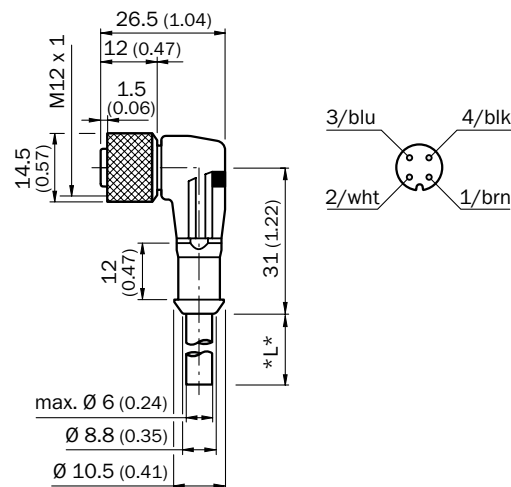
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DOL-1204-G10MC



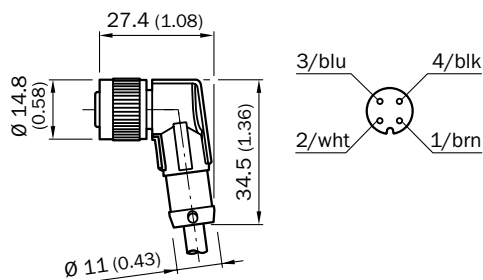
DOL-1204-G25MN



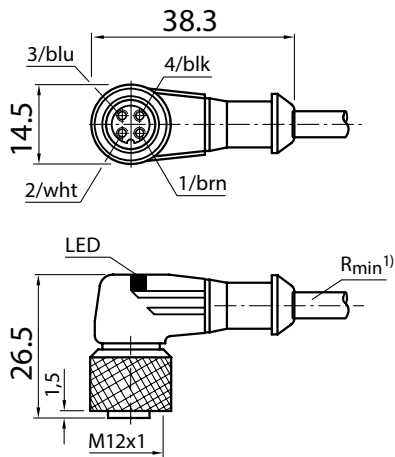
DOL-1204-L02M, DOL-1204-L05M
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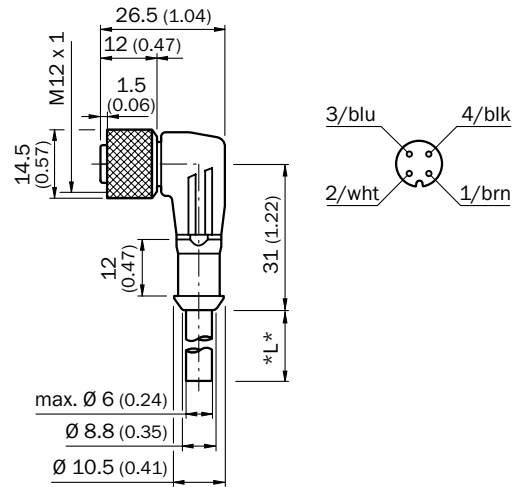
DOL-1204-W02MC, DOL-1204-W05MC
DOL-1204-W10MC



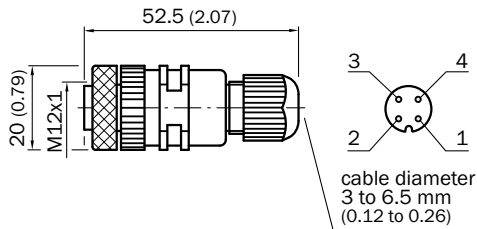
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DOL-1204-L10MC



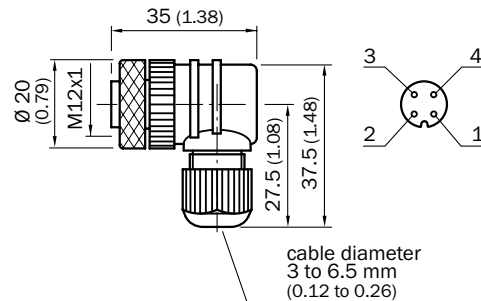
DOL-1204-W02M, DOL-1204-W05M
DOL-1204-W10M



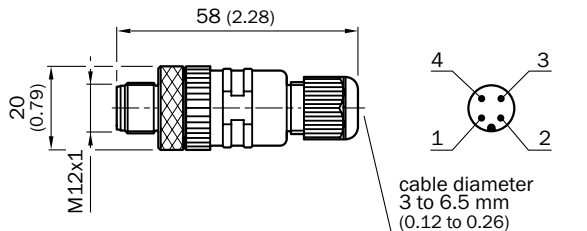
DOS-1204-G



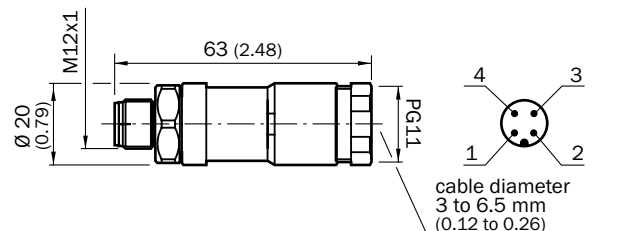
DOS-1204-W



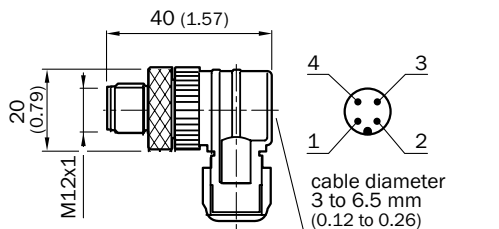
STE-1204-G



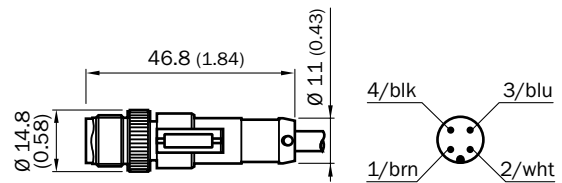
STE-1204-TN



STE-1204-W

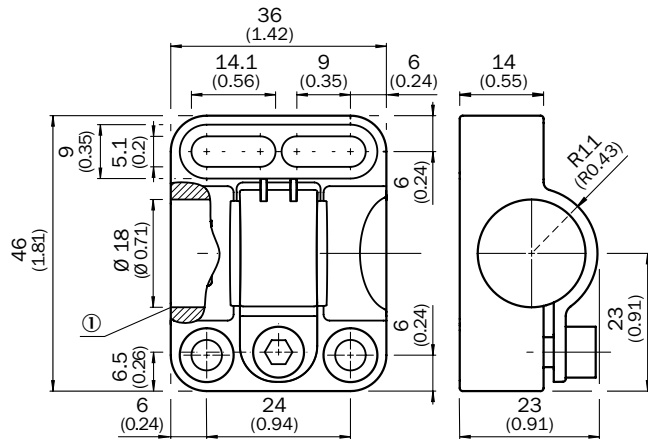


STL-1204-G02MC



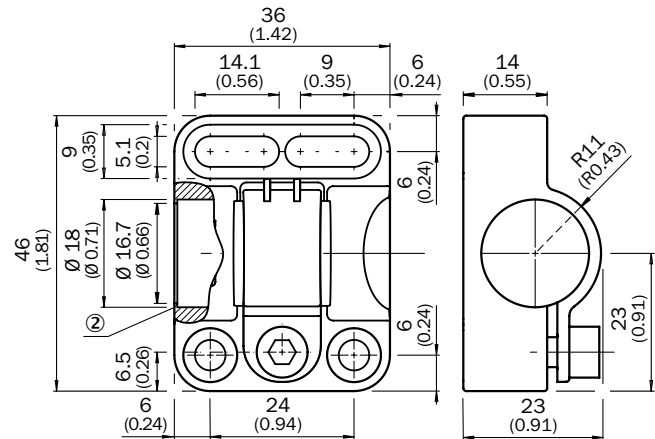
Dimensional drawings Mounting systems

BEF-KH-M18



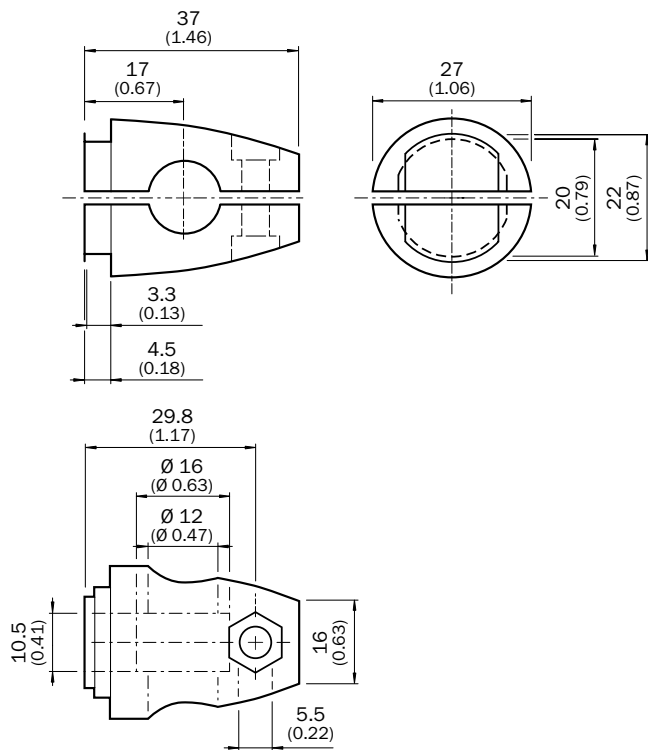
① Without fixed stop

BEF-KHF-M18



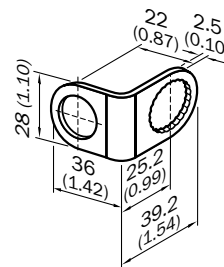
② With fixed stop

BEF-KHS-KH3



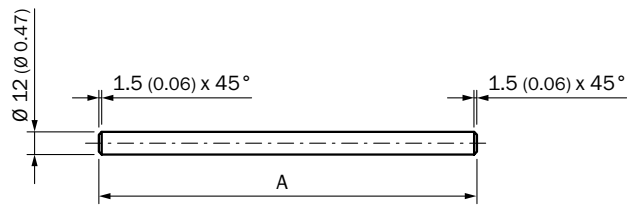
BEF-KHS-N06

BEF-KHS-N06N



BEF-MS12G-A

BEF-MS12G-B

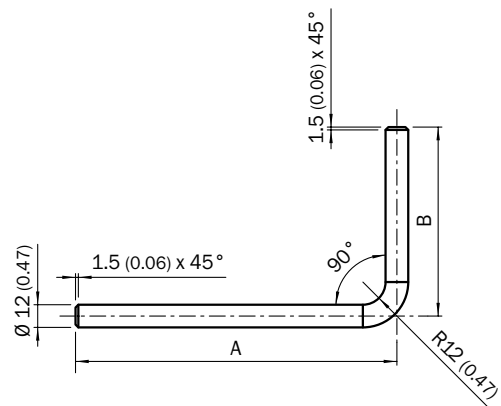


BEF-MS12G-(N)A: A = 200 mm

BEF-MS12G-(N)B: A = 300 mm

BEF-MS12L-A

BEF-MS12L-B

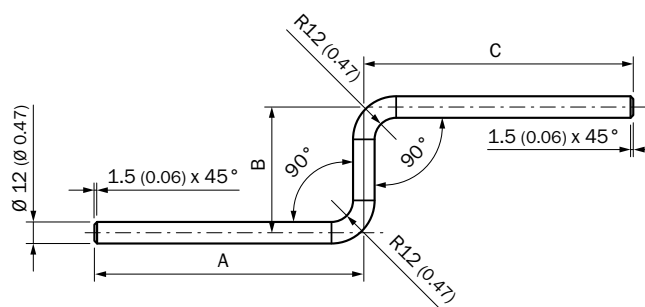


BEF-MS12L-(N)A: A = 200 mm, B = 150 mm

BEF-MS12L-(N)B: A = 250 mm, B = 250 mm

BEF-MS12Z-A

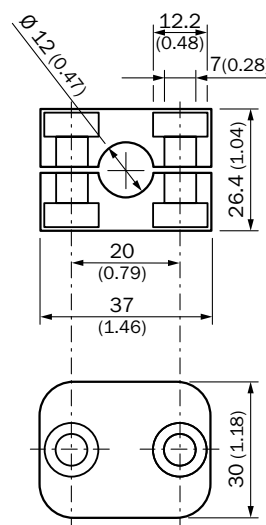
BEF-MS12Z-B



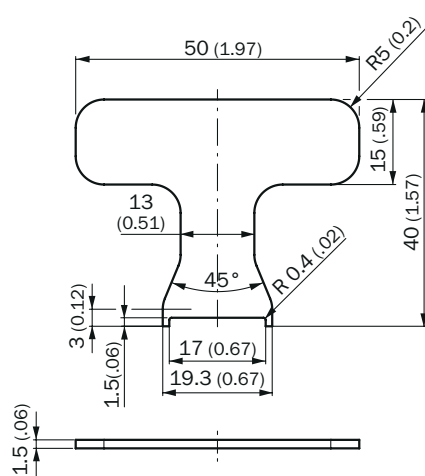
BEF-MS12Z-(N)A: A = 150 mm, B = 70 mm, C = 150 mm

BEF-MS12Z-(N)B: A = 150 mm, B = 70 mm, C = 250 mm

BEF-RMC-D12

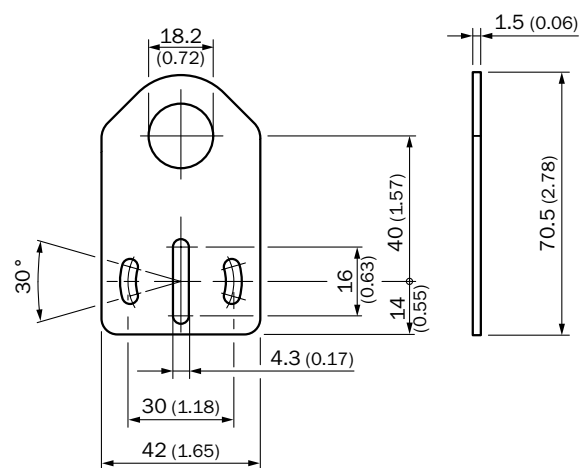


BEF-TO-GR18S

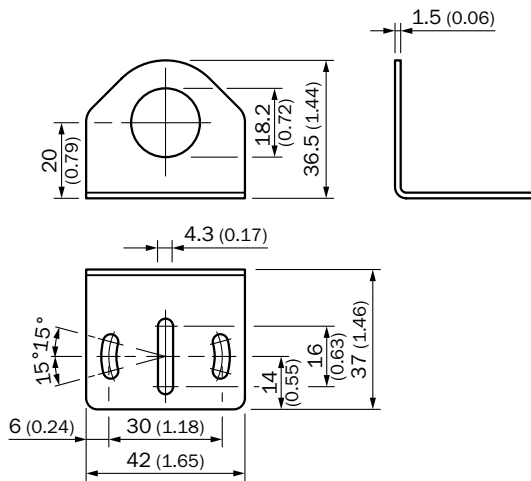


BEF-WG-M18

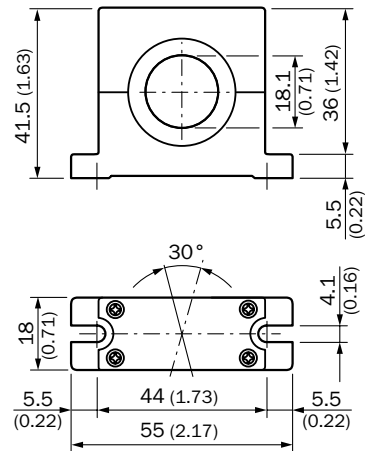
BEF-WG-M18N



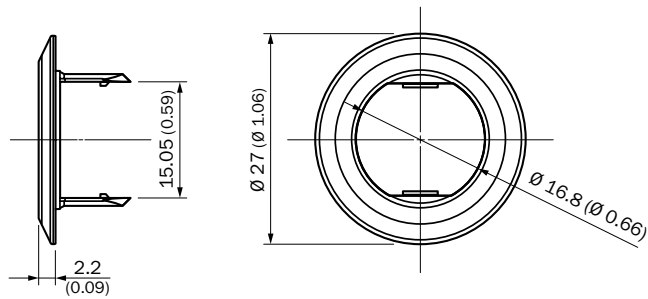
BEF-WN-M18
BEF-WN-M18N



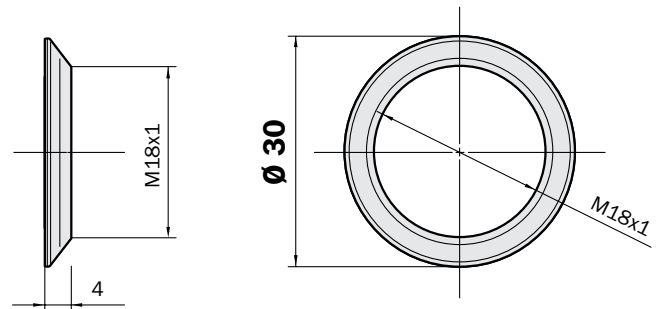
BEF-WN-M18-ST02



BEF-WN-MH15-1

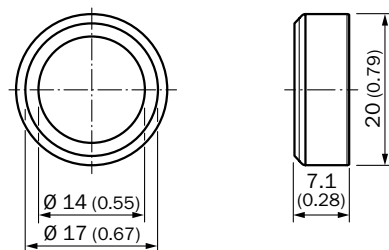


BEF-WN-MH15-2V

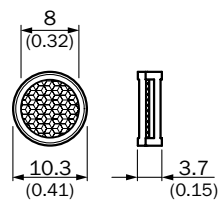


Dimensional drawings Reflectors and optics

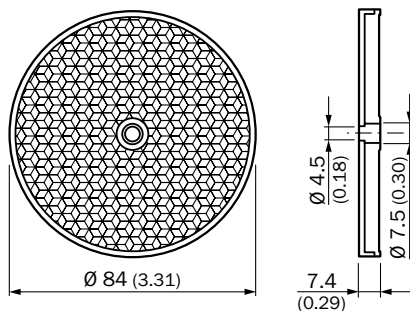
BEF-M18-GW



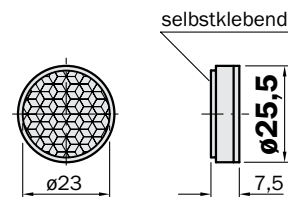
PL8F



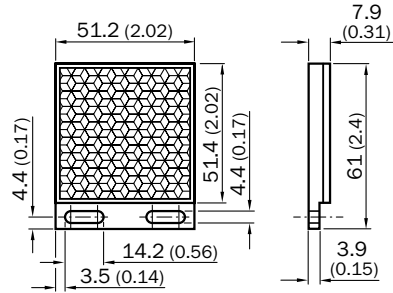
C110A



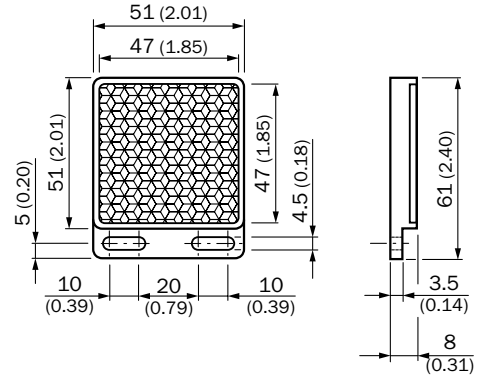
PL22-2



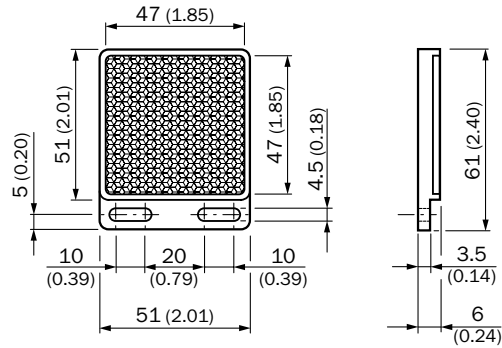
P250



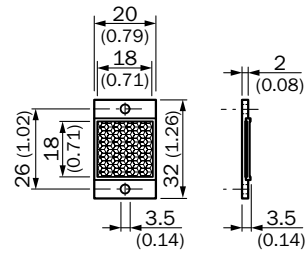
P250 CHEM



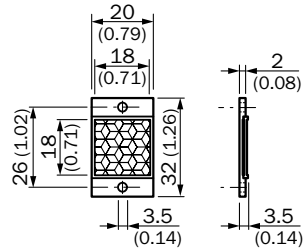
P250F



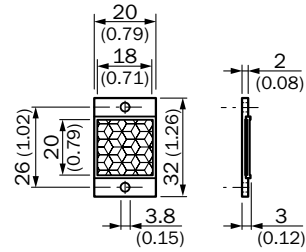
PL10F



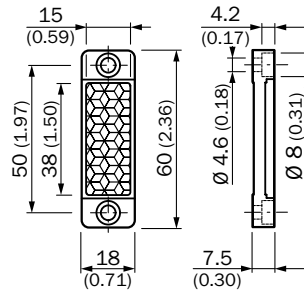
PL10F CHEM



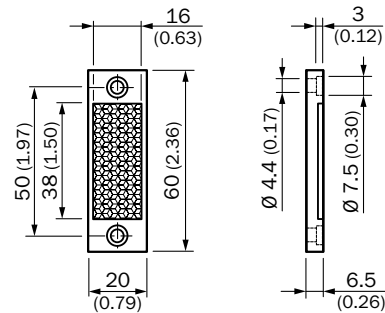
PL10FB-CHEM

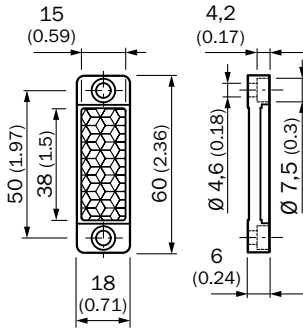
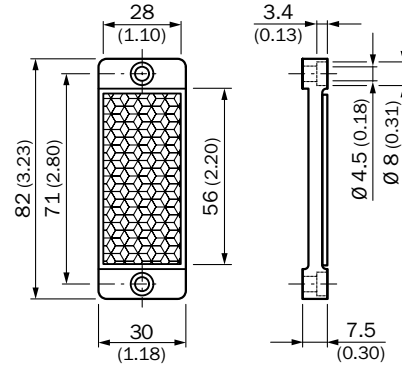
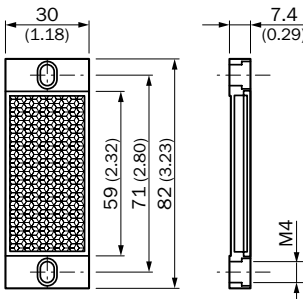
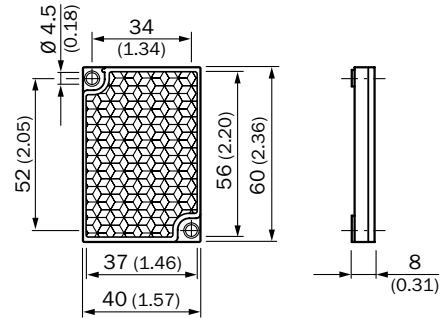
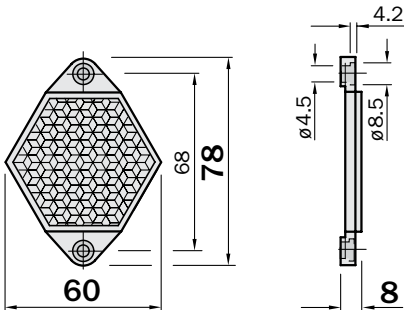
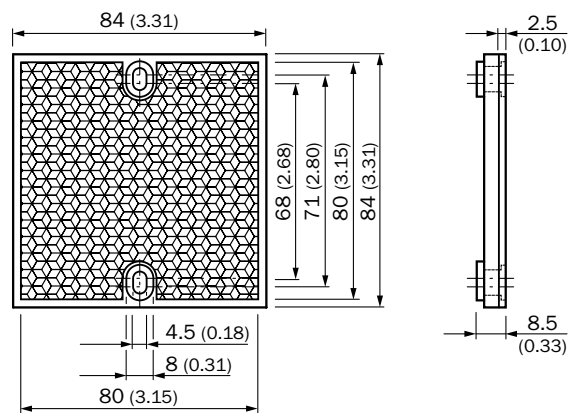
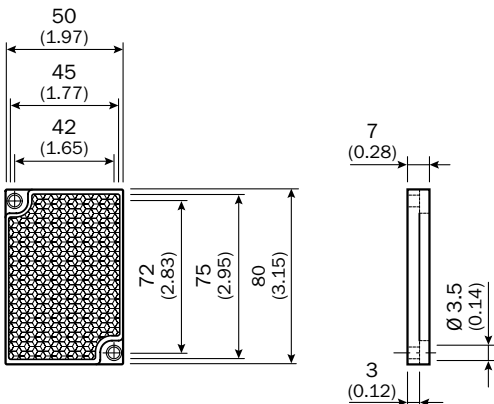
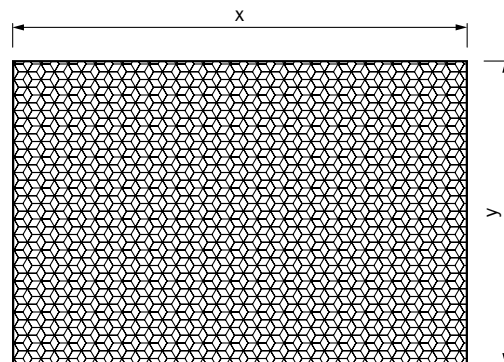


PL20A



PL20F

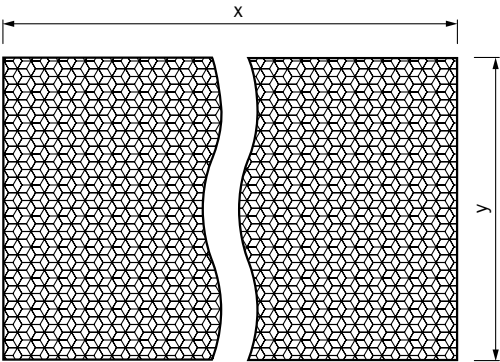


PL20F-CHEM

PL30A

PL30F

PL40A

PL50A

PL80A

PL81-1F

REF-IRF-56


X = 50 mm

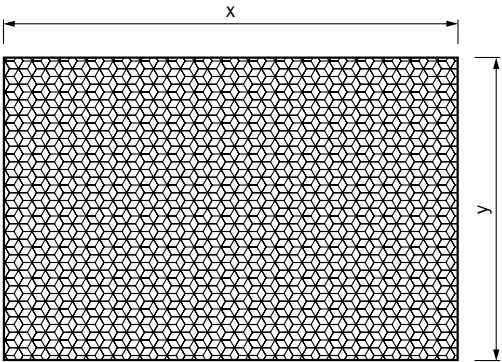
Y = 60 mm

REF-PLUS-R50



X = 50 mm
Y = 22.8 m

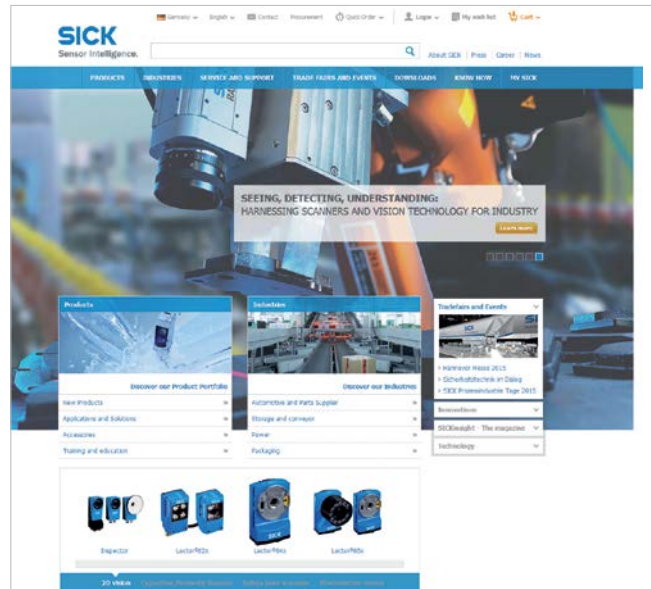
REF-Plus-3436



X = 34 mm
Y = 36 mm

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