


Series M1


Short and sweet – the metric M18, a highlight among many

 up to 35 m

Through-beam sensors M1S/M1E

 up to 6,2 m

Retro-reflective sensors M1R

 up to 5,4 m

Retro-reflective sensors
with polarizing filters M1P and M1C

 up to 55 cm

Diffuse-reflective sensors M1T

 10 cm

Diffuse-reflective sensors
with background rejection M1H



High functionality

Diverse operating principles

ELESTA's M1 sensors are available as through-beam sensors, retro-reflective sensors with and without polarizing filters, diffuse-reflective sensors, as well as retro-reflective sensors for transparent objects. Additionally, diffuse-reflective sensors with background rejection are available.

Light reserve warning indicator

All of the sensors in the M1 series contain a *light-reserve warning indicator* (blinking function indicator) for controlling dirt build-up on the lenses and as an *alignment aid*.

High switching frequency

All M1 sensors have a 1000 Hz switching frequency, allowing for the reliable detection of even fast moving objects.

Low power consumption

The M1 sensors distinguish themselves with an extremely small power consumption of less than 15 mA.

Test input

The M1 through-beam sensors are available standard with *test input*, for confirming that the sensor is operating properly.

Simple installation and operation

Unique angle optics

The diameter of the right angle optics head is no greater than that of the sensor housing. Therefore, the right angle optics sensors are very easy to bore mount. These sensors are optionally available with an extended stainless steel case for protection of the right angle optic head.



Various connection versions

All M1 sensors are available standard with a 4 wire 2 m cable or a 4 pin M12 connector.

User friendly adjustment button with integrated function indicator

The optical range of each M1 sensor can be adjusted to meet the specific application. The range is comfortably adjusted with a Nr. 2 screwdriver on a robust range adjustment button. The function indicator is integrated in the adjustment button and is visible over a wide angle even under bright ambient light conditions.



Reliable for the highest demands

Robust construction with IP 67 sealing

The M1 photoelectric sensors are built with a polyamide 12 or stainless steel housing, and are protected against water and dust. The sensors meet the *sealing* requirements of IP 67.

EMC-tested

The M1 sensors are tested according to IEC 801, EN50081-1 and EN50082-2. This assures trouble free use even in high electromagnetically contaminated environments.

High ambient light rejection

Thanks to pulse modulation and a multilevel disturbance rejection, the M1 sensors are extremely insensitive to foreign light sources.

Reverse polarity protection

All of the M1 sensor's electrical connections are protected against reverse wiring.

Short-circuit protection

The M1 sensor's transistor outputs are electronically protected against short circuit.

Power-up output suppression

During power-up the outputs of the M1 sensors are blocked for typically 30 msec.

Glass-protected optics

As an option, the M1 sensors are available with a glass window to protect the optics against aggressive chemicals and mechanical damage (scratching).

Designation code

M1 X XXX XXX XXX

Housing
: Polyamid
M : Stainless steel
S : Stainless steel (protected angle optic head)

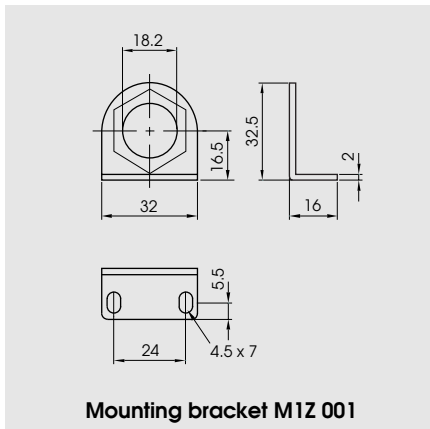
Principle	Supply	Outputs	Connection	Electr. option	Light	Range
C: Retro-reflective for transparent objects E: Through-beam receiver H: Diffuse-reflective with background rejection P: Retro-reflective with polarizing filters R: Retro-reflective S: Through-beam emitter T: Diffuse-reflective Z: Accessory	1: 10-30 VDC	KA: No output NA: NPN <i>light- and dark-on</i> PA: PNP <i>light- and dark-on</i>	1: Cable 2 m 4: Connector M12	00: Range adjustable 01: Range adjustable, <i>test input</i> 40: Range not adjustable 41: Range not adjustable, <i>test input</i>	A: Right angle optic, red I: Straight optic, infrared R: Straight optic, red W: Right angle optic, infrared	M1S/M1E: 1: 15 m 2: 10 m 3: 10 m 4: 35 m M1R/M1P/M1C: 1: 2,5 m 2: 3 m 3: 2 m 4: 2,5 m 5: 1,5 m M1T/H: 1: 10 cm 2: 20 cm 3: 40 cm 4: 55 cm 5: 5 cm 6: 10 cm

Accessories

Retroreflectors: see page 130

Connector cables: see page 128

Mounting:



Diffuse-reflective sensors, range 10/20 cm, M18 housing



- Range adjustable
- Light reserve warning indicator
- Dual transistor outputs, NPN or PNP
- 1000 Hz switching frequency
- Short-circuit protection, reverse polarity protection, and power-up output suppression
- Connections: Straight cable, 2 meter
Connector, M12
- EMC tested according to IEC 801 and EN50081-1/EN 50082-2



Product designation Plastic housing ¹⁾

Product designation Stainless steel ¹⁾

Output

Connection

Range adjustment

Optical data ²⁾

Max. range

Emitter

Electrical data ²⁾

Supply voltage U_s

Allowable ripple

Current consumption (without load)

Max. load current I_L

Residual voltage

Max. switching frequency

Environmental data

Sealing

Temperature T_A
(operating and storage)

Weight Plastic/Stainless steel

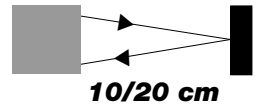
M1T 1NA 100 I1	M1T 1NA 400 I1	M1T 1PA 100 I1	M1T 1PA 400 I1	M1T 1NA 100 I2	M1T 1NA 400 I2	M1T 1PA 100 I2	M1T 1PA 400 I2
M1T 1NA 100 I1M	M1T 1NA 400 I1M	M1T 1PA 100 I1M	M1T 1PA 400 I1M	M1T 1NA 100 I2M	M1T 1NA 400 I2M	M1T 1PA 100 I2M	M1T 1PA 400 I2M
NPN (light-/dark-on)		PNP (light-/dark-on)		NPN (light-/dark-on)		PNP (light-/dark-on)	
Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12
Yes							
10 cm (Kodak card white, 10 x 10 cm)				20 cm (Kodak card white, 10 x 10 cm)			
Infrared-LED, 880 nm, pulsed							
10...30 VDC							
+/- 10% of U_{sp}							
< 15 mA							
100 mA							
< 1,6 V							
1000 Hz							
IP 67							
-25...+65 °C							
Connector M12: ca.15/25 g , Cable 2 m: ca. 100/110 g							

1) For product designation of sensors with options see designation code on page 23.

2) When not otherwise noted, all technical data at $T_A = 25\text{ °C}$ and $U_s = 24\text{ V}$.

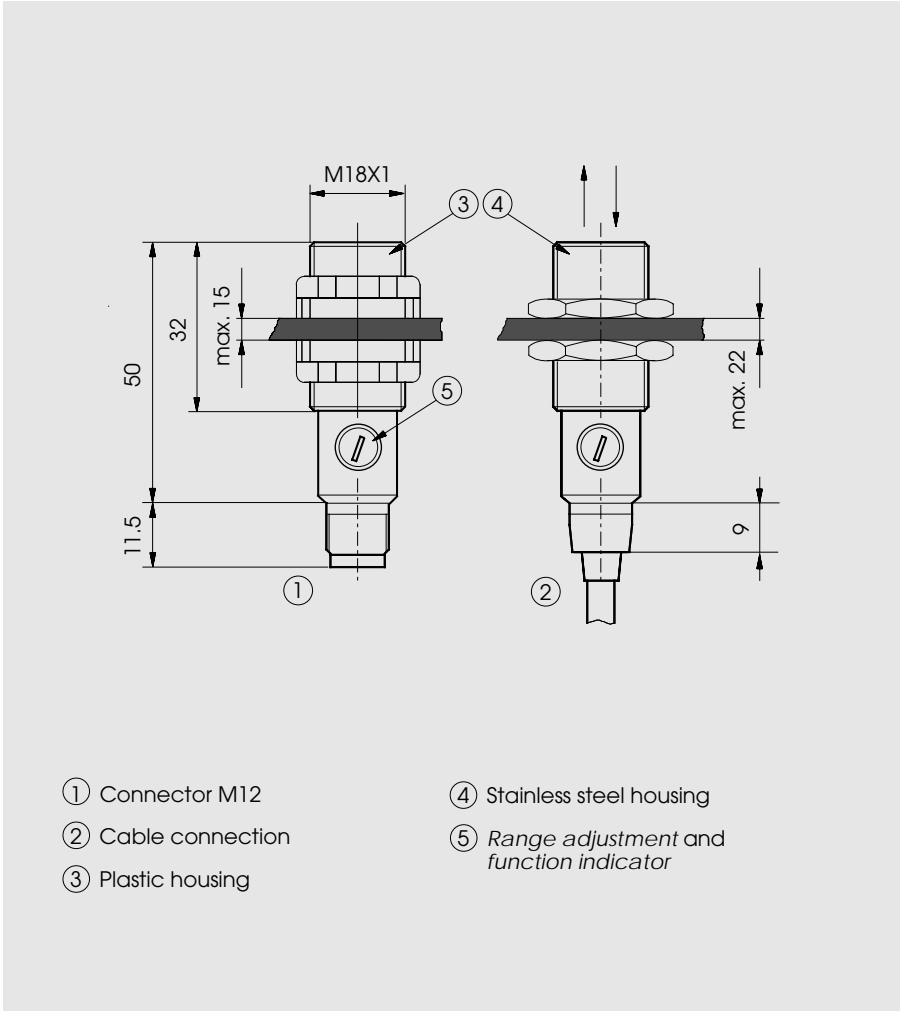
10...30 VDC

NPN / PNP
light-on and
dark-on output



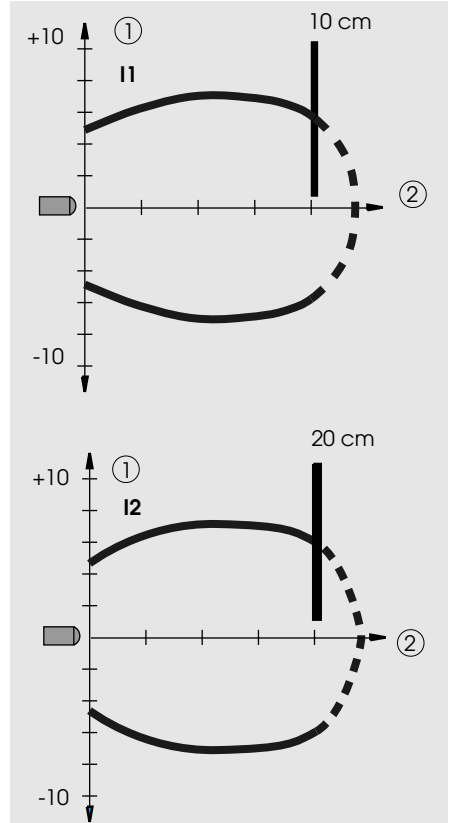
M1T

Dimensions (50 mm, M18 x 1)



- ① Connector M12
- ② Cable connection
- ③ Plastic housing
- ④ Stainless steel housing
- ⑤ Range adjustment and function indicator

Optical diagrams

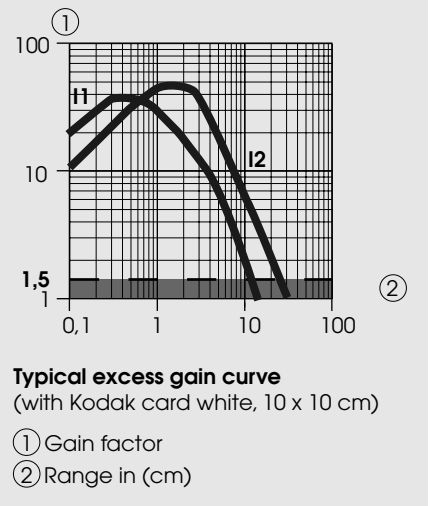
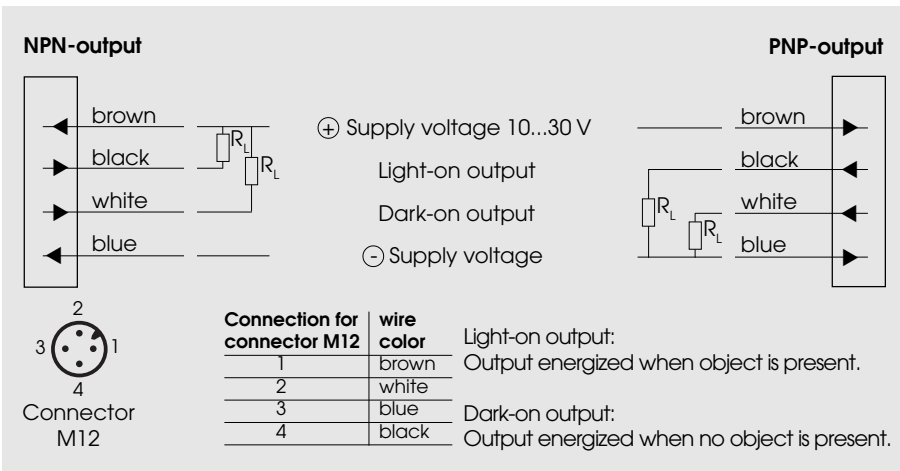


Typical beam diameter

(with Kodak card white, 10 x 10 cm)

- ① Diameter in (cm)
- ② Range in (cm)

Wiring diagram



Typical excess gain curve

(with Kodak card white, 10 x 10 cm)

- ① Gain factor
- ② Range in (cm)

Diffuse-reflective sensors, range 40/55 cm, M18 housing



- Range adjustable
- Light reserve warning indicator
- Dual transistor outputs, NPN or PNP
- 1000 Hz switching frequency
- Short-circuit protection, reverse polarity protection, and power-up output suppression
- Connections: Straight cable, 2 meter
Connector, M12
- EMC tested according to IEC 801 and EN50081-1/EN 50082-2



Product designation Plastic housing ¹⁾

Product designation Stainless steel ¹⁾

Output

Connection

Range adjustment

Optical data ²⁾

Max. range

Emitter

Electrical data ²⁾

Supply voltage U_s

Allowable ripple

Current consumption (without load)

Max. load current I_L

Residual voltage

Max. switching frequency

Environmental data

Sealing

Temperature T_A
(operating and storage)

Weight Plastic/Stainless steel

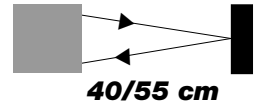
M1T 1NA 100 I3	M1T 1NA 400 I3	M1T 1PA 100 I3	M1T 1PA 400 I3	M1T 1NA 100 I4	M1T 1NA 400 I4	M1T 1PA 100 I4	M1T 1PA 400 I4
M1T 1NA 100 I3M	M1T 1NA 400 I3M	M1T 1PA 100 I3M	M1T 1PA 400 I3M	M1T 1NA 100 I4M	M1T 1NA 400 I4M	M1T 1PA 100 I4M	M1T 1PA 400 I4M
NPN (light-/dark-on)		PNP (light-/dark-on)		NPN (light-/dark-on)		PNP (light-/dark-on)	
Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12
Yes							
40 cm (Kodak card white, 10 x 10 cm)				55 cm (Kodak card white, 10 x 10 cm)			
Infrared-LED, 880 nm, pulsed							
10...30 VDC							
+/- 10% of U_{sp}							
< 15 mA							
100 mA							
< 1,6 V							
1000 Hz							
IP 67							
-25...+65 °C							
Connector M12: ca.15/25 g , Cable 2 m: ca. 100/110 g							

1) For product designation of sensors with options see designation code on page 23.

2) When not otherwise noted, all technical data at $T_A = 25\text{ °C}$ and $U_s = 24\text{ V}$.

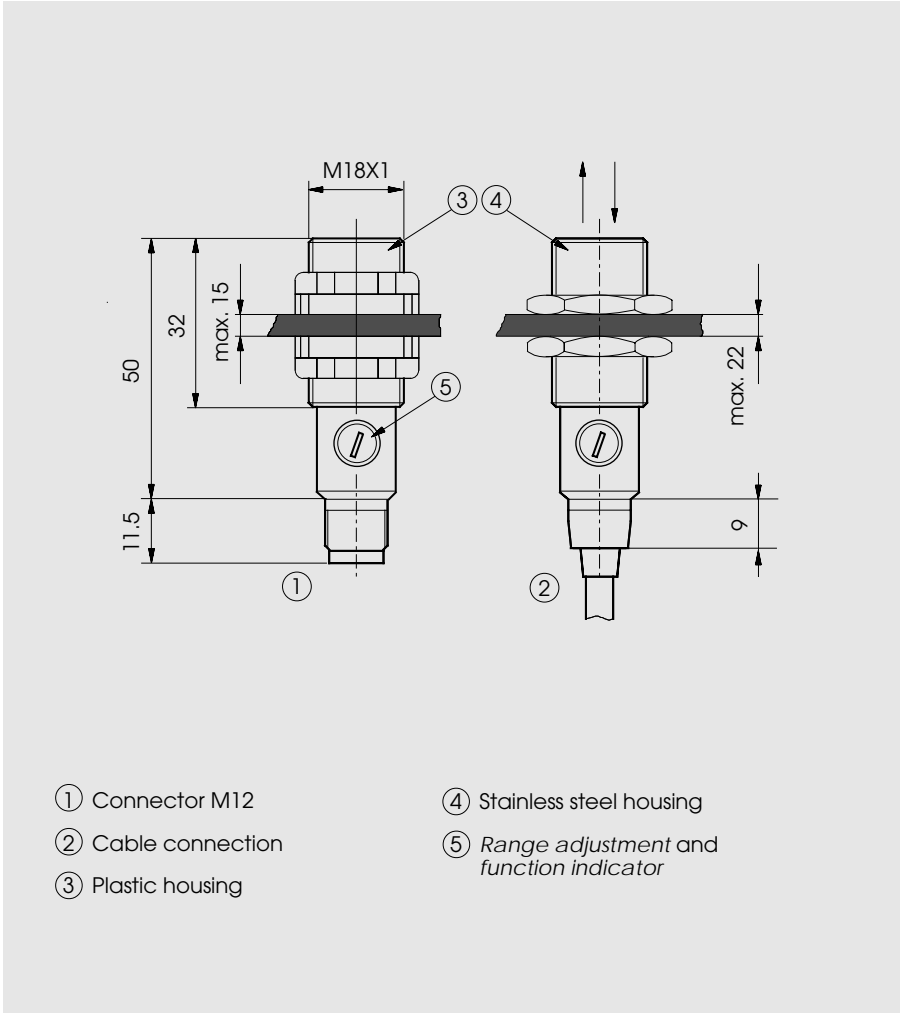
10...30 VDC

NPN / PNP
light-on and
dark-on output

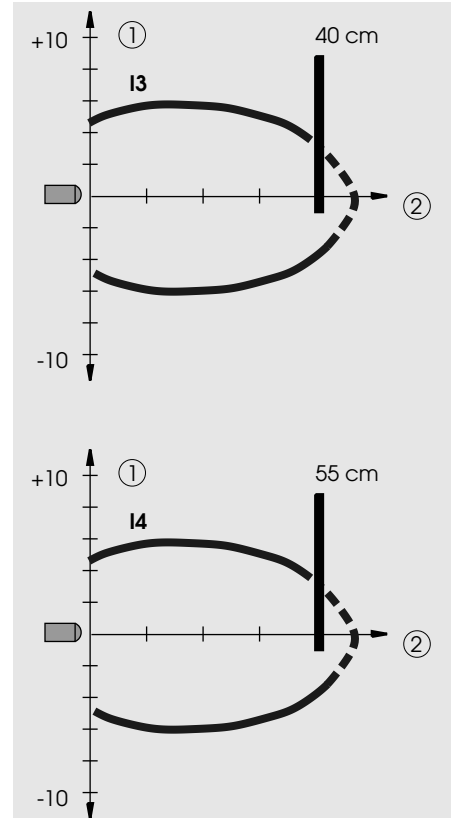


M1T

Dimensions (50 mm, M18 x 1)



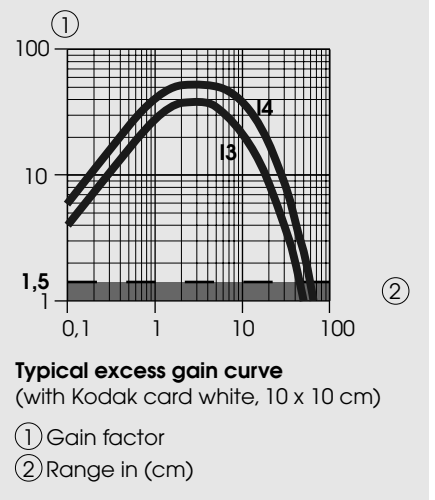
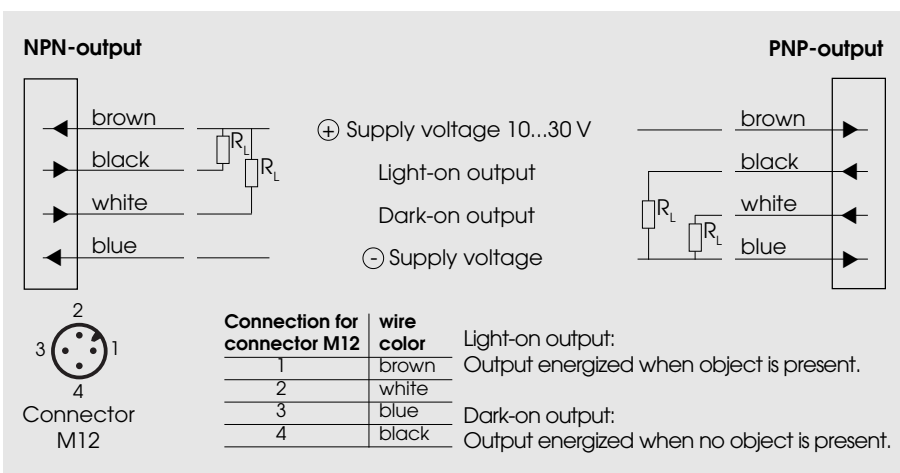
Optical diagrams



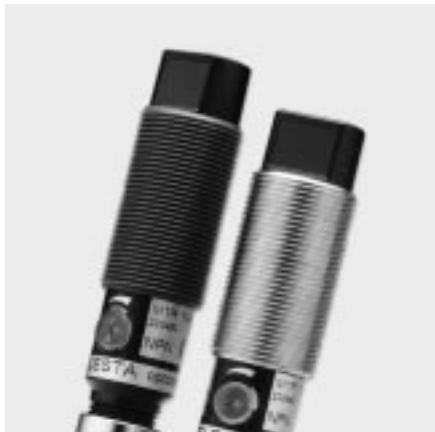
Typical beam diameter
(with Kodak card white, 10 x 10 cm)

- ① Diameter in (cm)
- ② Range in (cm)

Wiring diagram



Diffuse-reflective sensors, range 10/40 cm, right angle optics, M18 housing



- Range adjustable
- Light reserve warning indicator
- Dual transistor outputs, NPN or PNP
- 1000 Hz switching frequency
- Short-circuit protection, reverse polarity protection, and power-up output suppression
- Extended stainless steel case for protection of angle optic head (option)
- Connections: Straight cable, 2 meter
Connector, M12
- EMC tested according to IEC 801 and EN50081-1/EN 50082-2



Product designation Plastic housing ¹⁾

Product designation Stainless steel ¹⁾

Output

Connection

Range adjustment

Optical data ²⁾

Max. range

Emitter

Electrical data ²⁾

Supply voltage U_s

Allowable ripple

Current consumption (without load)

Max. load current I_L

Residual voltage

Max. switching frequency

Environmental data

Sealing

Temperature T_A
(operating and storage)

Weight Plastic/Stainless steel

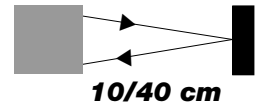
M1T 1NA 100 W1	M1T 1NA 400 W1	M1T 1PA 100 W1	M1T 1PA 400 W1	M1T 1NA 100 W3	M1T 1NA 400 W3	M1T 1PA 100 W3	M1T 1PA 400 W3
M1T 1NA 100 W1M	M1T 1NA 400 W1M	M1T 1PA 100 W1M	M1T 1PA 400 W1M	M1T 1NA 100 W3M	M1T 1NA 400 W3M	M1T 1PA 100 W3M	M1T 1PA 400 W3M
NPN (light-/dark-on)		PNP (light-/dark-on)		NPN (light-/dark-on)		PNP (light-/dark-on)	
Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12
Yes							
10 cm (Kodak card white, 10 x 10 cm)				40 cm (Kodak card white, 10 x 10 cm)			
Infrared-LED, 880 nm, pulsed							
10...30 VDC							
+/- 10% of U_{sp}							
< 15 mA							
100 mA							
< 1,6 V							
1000 Hz							
IP 67							
-25...+65 °C							
Connector M12: ca.15/25 g , Cable 2 m: ca. 100/110 g							

1) For product designation of sensors with options see designation code on page 23.

2) When not otherwise noted, all technical data at $T_A = 25\text{ °C}$ and $U_s = 24\text{ V}$.

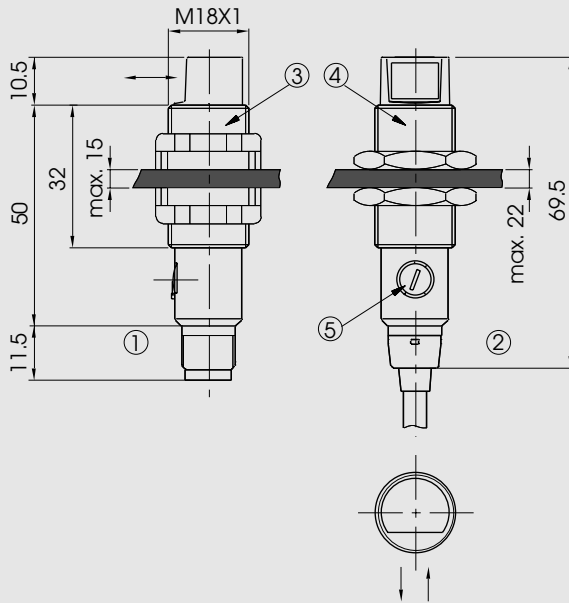
10...30 VDC

NPN / PNP
light-on and
dark-on output



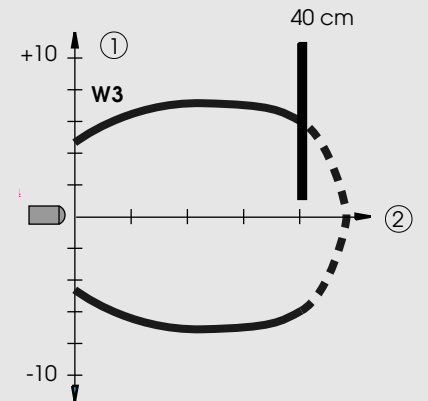
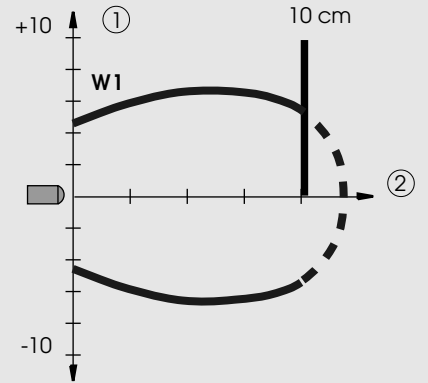
M1T right angle optics

Dimensions (60.5 mm, M18 x 1)



- ① Connector M12
- ② Cable connection
- ③ Plastic housing
- ④ Stainless steel housing
- ⑤ Range adjustment and function indicator

Optical diagrams

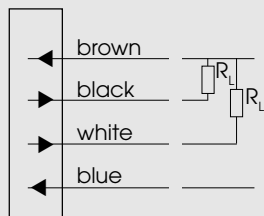


Typical beam diameter
(with Kodak card white, 10 x 10 cm)

- ① Diameter in (cm)
- ② Range in (cm)

Wiring diagram

NPN-output



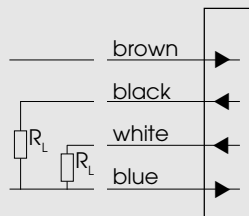
⊕ Supply voltage 10...30 V

Light-on output

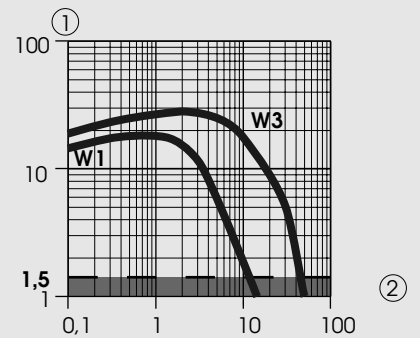
Dark-on output

⊖ Supply voltage

PNP-output



Connection for connector M12	wire color	Light-on output: Output energized when object is present.	Dark-on output: Output energized when no object is present.
1	brown		
2	white		
3	blue		
4	black		



Typical excess gain curve
(with Kodak card white, 10 x 10 cm)

- ① Gain factor
- ② Range in (cm)

Diffuse-reflective sensors, range 5/10 cm, with background suppression, M18 housing



- Background suppression with V-optics
- Enormous excess gain (light reserve)
- Enhanced black and white ratio
- Light reserve warning indicator
- Dual transistor outputs, NPN or PNP
- 1000 Hz switching frequency
- Short-circuit protection, reverse polarity protection, and power-up output suppression
- Connections: Straight cable, 2 meter Connector, M12
- EMC tested according to IEC 801 and EN50081-1/EN 50082-2



Product designation Plastic housing ¹⁾

Product designation Stainless steel ¹⁾

Output

Connection

Range adjustment

Optical data ²⁾

Max. range

Emitter

Electrical data ²⁾

Supply voltage U_s

Allowable ripple

Current consumption (without load)

Max. load current I_L

Residual voltage

Max. switching frequency

Environmental data

Sealing

Temperature T_A
(operating and storage)

Weight Plastic/Stainless steel

M1T 1NA 100 I5	M1T 1NA 400 I5	M1T 1PA 100 I5	M1T 1PA 400 I5	M1T 1NA 100 I6	M1T 1NA 400 I6	M1T 1PA 100 I6	M1T 1PA 400 I6
M1T 1NA 100 I5M	M1T 1NA 400 I5M	M1T 1PA 100 I5M	M1T 1PA 400 I5M	M1T 1NA 100 I6M	M1T 1NA 400 I6M	M1T 1PA 100 I6M	M1T 1PA 400 I6M
NPN (light-/dark-on)		PNP (light-/dark-on)		NPN (light-/dark-on)		PNP (light-/dark-on)	
Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12
Yes							
5 cm (Kodak card white, 10 x 10 cm)				10 cm (Kodak card white, 10 x 10 cm)			
Infrared-LED, 880 nm, pulsed							
10...30 VDC							
+/- 10% of U_{sp}							
< 15 mA							
100 mA							
< 1,6 V							
1000 Hz							
IP 67							
-25...+65 °C							
Connector M12: ca.15/25 g , Cable 2 m: ca. 100/110 g							

1) For product designation of sensors with options see designation code on page 23.

2) When not otherwise noted, all technical data at $T_A = 25\text{ °C}$ and $U_s = 24\text{ V}$.