µP inside

W 9 L: Laser photoelectric switches: small, light and reliable

DATA SHEET

	Photoelectric proximity switches, BGS
	Photoelectric reflex switches
	Through-beam photoelectric switches

The W 9 Laser series provides a complete series with innovative laser technology in compact plastic housing.

Because our devices are controlled using the most modern µP technology, we can provide a laser series that has excellent performance data in addition to its small size and slight weight.

- Proximity switch with background suppression, which can be set very precisely,
- Photoelectric switch with simple Teach-in operation,
- Through-beam photoelectric switch with simple Teach-in operation,
- Temperature-compensated laser-protection electronics make constant performance of the laser possible in laser protection class 2.

Objects as small as hairs are detected just as reliably as fast operations are processed. Interference from external light sources is ignored, and cell phones are not detected. Innovative Teach-in technology means a simple push of a button for operating the W 9 Laser series.

To ensure that the W 9 Laser series can be used without problems in the whole world, we have complied with all regulations and fulfilled all standards, for example, CE and CDRH.

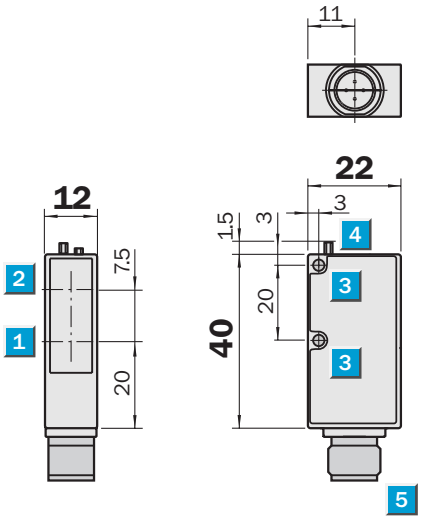
SICK

Scanning distance 150 mm

Photoelectric proximity switches

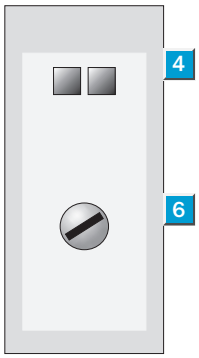
- Laser red light, class 2
- Background suppression adjustable
- Switching frequency 1000/s
- Compact housing made of ABS

Dimensional drawing



Adjustments possible

WT 9L-P330
WT 9L-P430
WT 9L-N330
WT 9L-N430

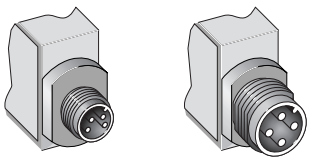


1 Centre of optical axis, sender
2 Centre of optical axis, receiver
3 Mounting hole Ø 3.2 mm
4 Power indicator green;
LED signal strength indicator yellow
5 Plug M 12 or M 8, 4-pin
6 Scanning distance adjustment

CE CDRH

Connection types

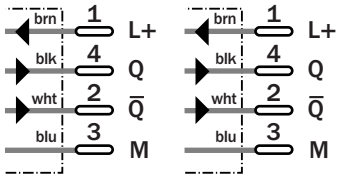
WT 9L-P330	WT 9L-P430
WT 9L-N330	WT 9L-N430



Accessories

Connectors
Mounting systems

4-pin, M 8	4-pin, M 12



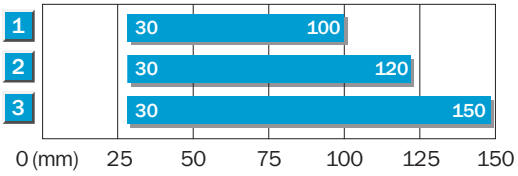
Technical data	WT 9L-	P330	P430	N330	N430
Scanning distance [1]	30 ... 150 mm, adjustable	■	■	■	■
Supply voltage V_S	10 ... 30 V DC [2]	■	■	■	■
Ripple [3]	< 5 V_{PP}	■	■	■	■
Current consumption [4]	< 35 mA	■	■	■	■
Light source [5], **light type**	Laser, red light; class 2	■	■	■	■
Focusing position/light spot diameter	60 mm/< 0.5 mm	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■		
	NPN			■	■
PNP; signal voltage HIGH	V_S – 2 V	■	■		
PNP; signal voltage LOW	Approx. 0 V	■	■		
NPN; signal voltage HIGH	V_S			■	■
NPN; signal voltage LOW [6]	V_S < 2 V			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Response time [7]	< 0.6 ms	■	■	■	■
Max. switching frequency [8]	1000/s	■	■	■	■
Connection types	Plug M 12, 4-pin		■		■
	Plug M 8, 4-pin	■		■	
VDE protection class [9]	⧈ (plug M 12)		■		■
	III (plug M 8)	■		■	
Enclosure rating	IP 67	■	■	■	■
Circuit protection [10]	A, B, C	■	■	■	■
Ambient temperature T_A [11]	Operation – 10 ... + 50 °C	■	■	■	■
	Storage – 25 ... + 70 °C	■	■	■	■
Weight with plug	Approx. 20 g	■	■	■	■
Housing material	ABS	■	■	■	■

1) Object with 90 % remission (based on standard white DIN 5033)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Average service life 50,000 h at T_A = + 25 °C
6) At T_A = + 25 °C and 100 mA output current
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Reference voltage 50 V
10) A = V_S connections reverse-polarity protected
B = Outputs reverse-polarity protected
C = Interference pulse suppression
11) Do not stack devices

Laser protection

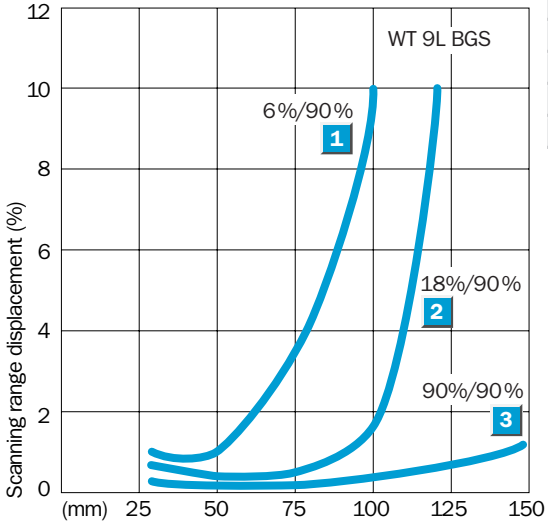
EN 60825-1, class 2
CDRH 1040.10, class 2

Scanning distance



Operating distance

1	Scanning range on black, 6 % remission
2	Scanning range on grey, 18 % remission
3	Scanning range on white, 90 % remission



Order information

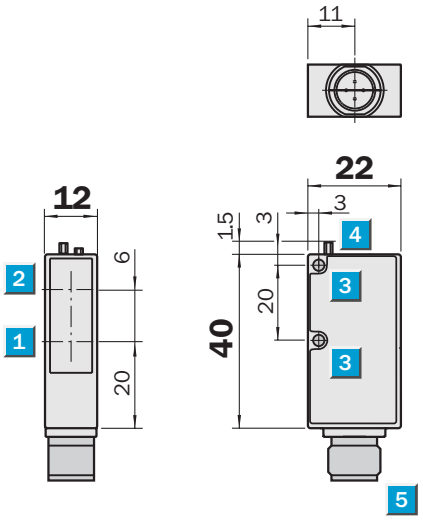
Type	Part no.
WT 9L-P330	1 023 977
WT 9L-P430	1 023 959
WT 9L-N330	1 023 991
WT 9L-N430	1 023 990

Scanning range 12 m

Photoelectric reflex switches

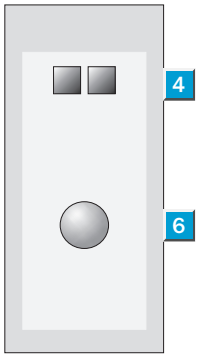
- Laser red light, class 2
- Teach-in
- Switching frequency 1000/s
- Polarising filter
- Compact housing made of ABS

Dimensional drawing



Adjustments possible

- WL 9L-P330
- WL 9L-P430
- WL 9L-N330
- WL 9L-N430

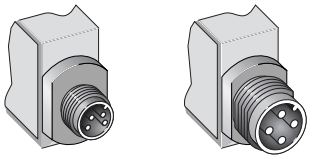


1 Centre of optical axis, sender
2 Centre of optical axis, receiver
3 Mounting hole Ø 3.2 mm
4 Power indicator green;
LED signal strength indicator yellow
5 Plug M 12 or M 8, 4-pin
6 Teach-in button

CE CDRH

Connection types

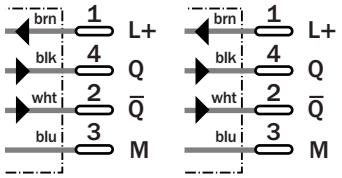
WL 9L-P330	WL 9L-P430
WL 9L-N330	WL 9L-N430



Accessories

- Connectors
- Mounting systems

4-pin, M 8	4-pin, M 12



Technical data	WL 9L-	P330	P430	N330	N430
Scanning range, max. typ./on Reflector	0.1–12 m/PL 80 A	■	■	■	■
Supply voltage V_S	10 ... 30 V DC [1]	■	■	■	■
Ripple [2]	< 5 V_{PP}	■	■	■	■
Current consumption [3]	< 35 mA	■	■	■	■
Light source [4], light type	Laser 650 mm, red, class 2	■	■	■	■
Focusing position/light spot diameter	100 mm/< 0.5 mm	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■		
	NPN			■	■
PNP; signal voltage HIGH	V_S – 2 V	■	■		
PNP; signal voltage LOW	Approx. 0 V	■	■		
NPN; signal voltage HIGH	V_S			■	■
NPN; signal voltage LOW [5]	V_S – 2 V			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Response time [6]	< 0.6 ms	■	■	■	■
Max. switching frequency [7]	1000/s	■	■	■	■
Connection types	Plug M 12, 4-pin		■		■
	Plug M 8, 4-pin	■		■	
VDE protection class [8]	⧈ (plug M 12)		■		■
	III (plug M 8)	■		■	
Enclosure rating	IP 67	■	■	■	■
Circuit protection [9]	A, B, C	■	■	■	■
Ambient temperature T_A [10]	Operation – 10 ... + 50 °C	■	■	■	■
	Storage – 25 ... + 75 °C	■	■	■	■
Weight with plug	Approx. 20 g	■	■	■	■
Housing material	ABS	■	■	■	■

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Average service life 50,000 h at T_A = + 25 °C
5) At T_A = + 25 °C and 100 mA output current
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs reverse-polarity protected
C = Interference pulse suppression
10) Do not stack devices

Teach-in function standard

1. Align the photoelectric switch with the reflector. LED yellow/green = on.
2. Press Teach-in button > 2 s. LED green = off/on. Teach-in is initiated. LED yellow/green = blinking.
3. The signal is stored permanently after you release the button. The switching threshold is set to standard sensitivity.

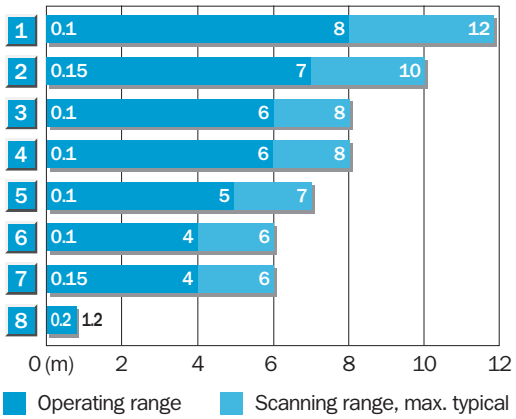
Precise setting:

1. Align the photoelectric switch with the reflector. LED yellow/green = on.
2. Press Teach-in button > 5 s. LED green = off/on. Teach-in is initiated. LED yellow/green = blinking.
3. The signal is stored permanently after you release the button. The switching threshold is set to a low degree of sensitivity (detection of transparent objects is possible).

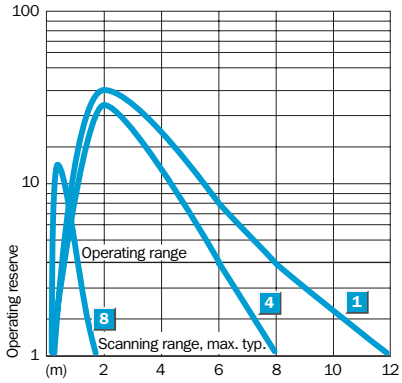
Laser protection

EN 60825-1, class 2
CDRH 1040.10, class 2

Scanning range



	Reflector type	Operating range
1	PL 80 A	0 – 8.0 m
2	PL 250 F	0 – 7.0 m
3	PL 50 A	0 – 6.0 m
4	PL 40 A	0 – 6.0 m
5	PL 30 A	0 – 5.0 m
6	PL 20 A	0 – 4.0 m
7	PL 20 F	0 – 4.0 m
8	Reflective tape	0 – 1.2 m



Order information

Type	Part no.
WL 9L-P330	1 023 976
WL 9L-P430	1 023 958
WL 9L-N330	1 023 989
WL 9L-N430	1 023 988

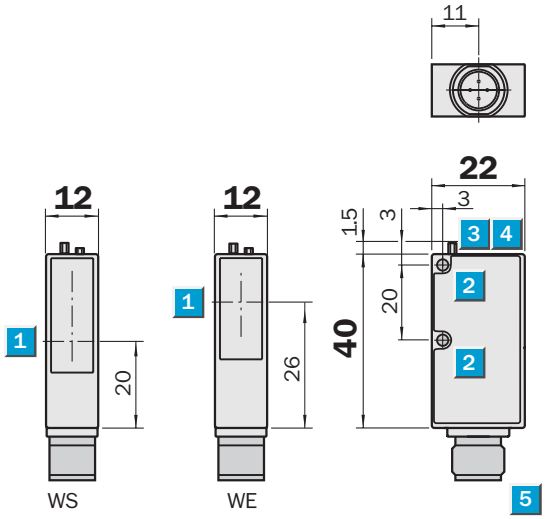
Scanning range
0 ... 50 m

Through-beam photoelectric switches

- Laser red light, class 2
- Teach-in
- Switching frequency 1000/s
- Compact housing made of ABS

CE CDRH

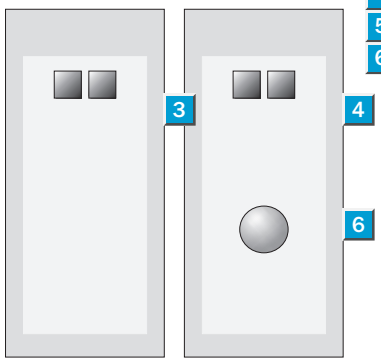
Dimensional drawing



Adjustments possible

WS/WE 9L-P330	WS/WE 9L-N330
WS/WE 9L-P430	WS/WE 9L-N430

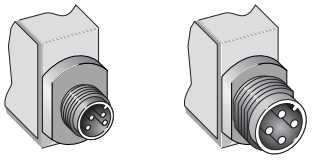
1 Centre of optical axis
2 Mounting hole Ø 3.2 mm
3 Power indicator green, WS in operation
4 LED signal strength indicator yellow
5 Plug M 12 or M 8, 4-pin
6 Teach-in button



Sender WS | Receiver WE

Connection types

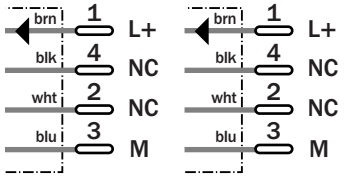
WS/WE 9L-P330	WS/WE 9L-P430
WS/WE 9L-N330	WS/WE 9L-N430



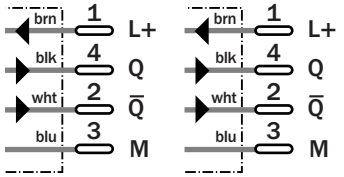
4-pin, M 8 | 4-pin, M 12

Accessories
Connectors
Mounting systems

Sender



Receiver



Technical data	WS/WE 9L-	P330	P430	N330	N430
Scanning range, max. typ.	50 m	■	■	■	■
Supply voltage V_S	10 ... 30 V DC [1]	■	■	■	■
Ripple [2]	< 5 V_{PP}	■	■	■	■
Current consumption [3]	< 25 mA (WE), < 35 mA (WS)	■	■	■	■
Light source [4], light type	Laser, red, class 2	■	■	■	■
Focusing position/light spot diameter	500 mm/< 0.5 mm	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■		
	NPN			■	■
PNP; signal voltage HIGH	V_S – 2 V	■	■		
PNP; signal voltage LOW	Approx. 0 V	■	■		
NPN; signal voltage HIGH	V_S			■	■
NPN; signal voltage LOW [5]	V_S – 2 V			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Response time [6]	< 0.6 ms	■	■	■	■
Max. switching frequency [7]	1000/s	■	■	■	■
Connection types	Plug M 12, 4-pin		■		■
	Plug M 8, 4-pin	■		■	
VDE protection class [8]	⧈ (plug M 12)		■		■
	III (plug M 8)	■		■	
Enclosure rating	IP 67	■	■	■	■
Circuit protection [9]	A, B, C	■	■	■	■
Ambient temperature T_A [10]	Operation – 10 ... + 50 °C	■	■	■	■
	Storage – 25 ... + 70 °C	■	■	■	■
Weight with plug	Approx. 20 g	■	■	■	■
Housing material	ABS	■	■	■	■

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Average service life 50,000 h at T_A = + 25 °C
5) At T_A = + 25 °C and 100 mA output current
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs reverse-polarity protected
C = Interference pulse suppression
10) Do not stack devices

Teach-in function standard

1. Align the sender and receiver with respect to each other. Receiver LED yellow/green = on.
2. Press Teach-in button > 2 s. LED green = off/on. Teach-in is initiated. LED yellow/green = blinking.
3. The signal is stored permanently after you release the button. The switching threshold is set to standard sensitivity.

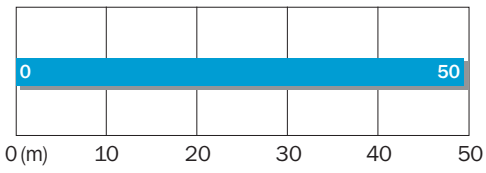
Precise setting:

1. Align the sender and receiver with respect to each other. Receiver LED yellow/green = on.
2. Press Teach-in button > 5 s. LED green = off/on. Teach-in is initiated. LED yellow/green = blinking.
3. The signal is stored permanently after you release the button. The switching threshold is set to a low degree of sensitivity (detection of transparent objects is possible).

Laser protection

EN 60825-1, class 2
CDRH 1040.10, class 2

Scanning range



Operating range/Scanning range, max. typical

Order information

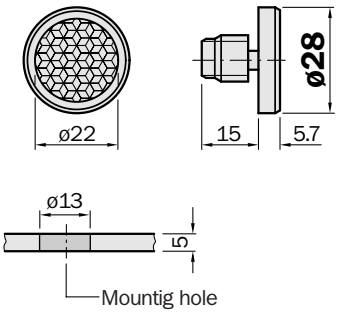
Type	Part no.
WS/WE 9L-P330	1 023 993
WS/WE 9L-P430	1 023 992
WS/WE 9L-N330	1 023 995
WS/WE 9L-N430	1 023 994

Dimensional drawings and order information

Plastic design for temperatures up to 65 °C

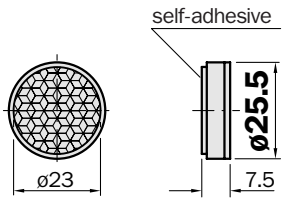
Reflector, Ø 22 mm, plug-in style

Type	Part no.
PL 22-1	1 003 546



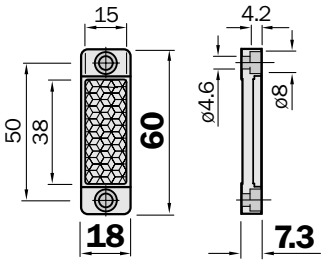
Reflector, Ø 22 mm
self-adhesive

Type	Part no.
PL 22-2	1 003 621



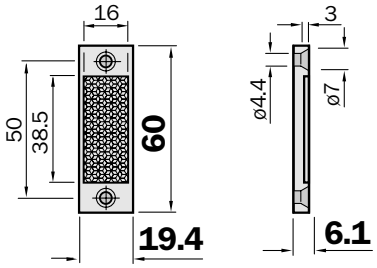
Reflector 20 x 40 mm²

Type	Part no.
PL 20 A	1 012 719



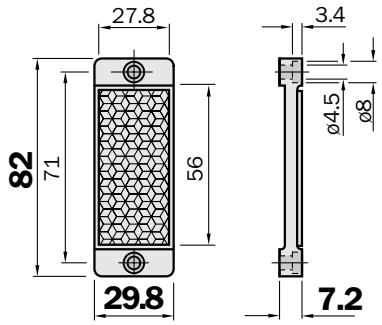
Reflector 20 x 40 mm²
micro triple, 2 hole mounting

Type	Part no.
PL 20 F	5 308 844



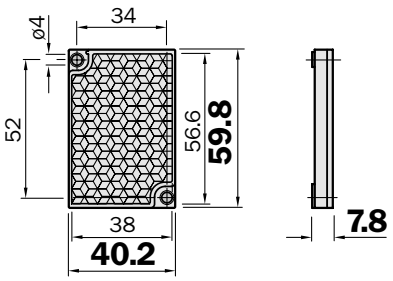
Reflector 30 x 50 mm²

Type	Part no.
PL 30 A	1 002 314



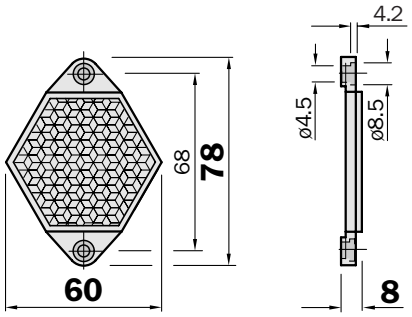
Reflector 40 x 60 mm²

Type	Part no.
PL 40 A	1 012 720



Reflector 6-sided, width across flats 48 mm

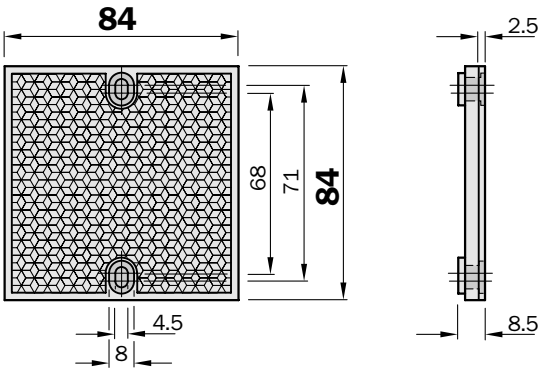
Type	Part no.
PL 50 A	1 000 132



Also available in heatable model:
Permanent heating: PL 50HK, part no. 1 001 545
Controlled heating: PL 50HS, part no. 1 009 871

Reflector 80 x 80 mm²

Type	Part no.
PL 80	1 003 865

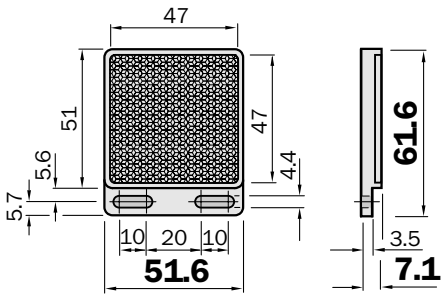


Dimensional drawings and order information

Plastic design for temperatures up to 65 °C

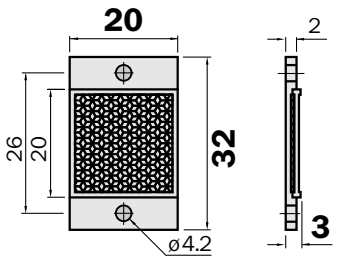
Reflector 47 x 47 mm²
micro triple, 2 hole mounting

Type	Part no.
P 250 F	5 308 843



Reflector 20 x 20 mm²

Type	Part no.
PL 10 F	5 311 210



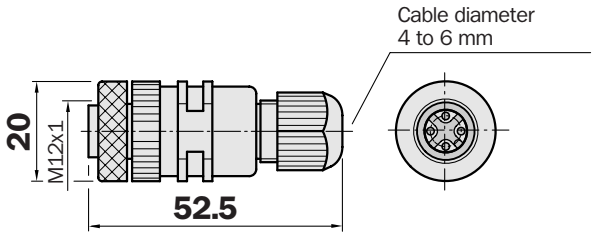
Reflective tape "Diamond Grade"
Cut to size, sheet 749 x 914 mm²

Type	Part no.
REF-DG-K	4 019 634
REF-DG	5 304 334

SENSICK screw-in system M 12, 4-pin, enclosure rating IP 67

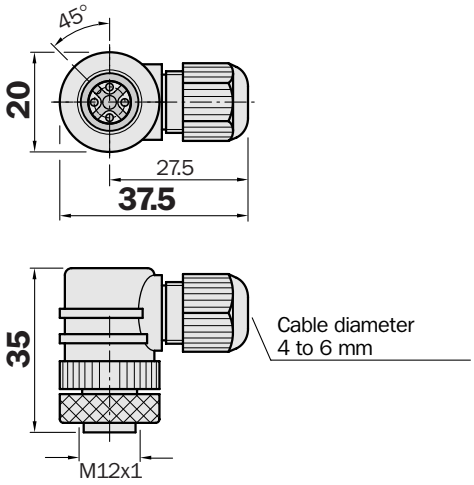
Female connector M 12, 4-pin, straight

Type	Part no.	Contacts	
DOS-1204-G	6 007 302	4	Can be adapted for cables Ø 4.5 to 6.5 mm



Female connector M 12, 4-pin, right angle

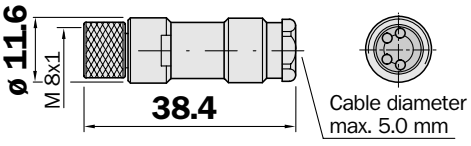
Type	Part no.	Contacts	
DOS-1204-W	6 007 303	4	Can be adapted for cables Ø 4.5 to 6.5 mm



SENSICK screw-in system M 8, 4-pin, enclosure rating IP 67

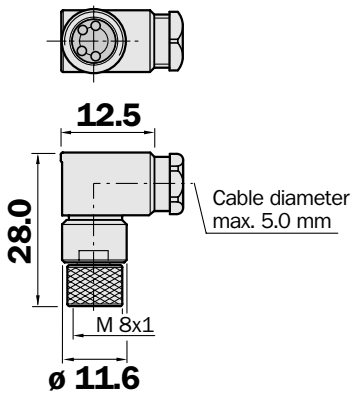
Female connector M 8, 4-pin, straight

Type	Part no.
DOS-0804-G	6 009 974



Female connector M 8, 4-pin, right angle

Type	Part no.
DOS-0804-W	6 009 975

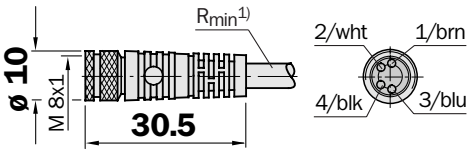


Dimensional drawings and order information

SENSICK screw-in system M 8, 4-pin, enclosure rating IP 67

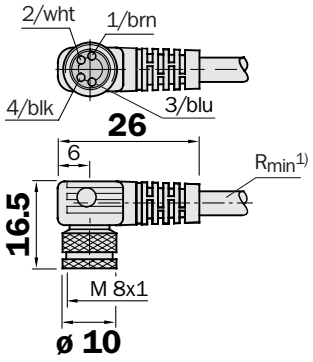
Female connector M 8, 4-pin, straight
Cable diameter 5 mm, 4 x 0.25 mm², sheath PVC

Type	Part no.	Cable length
DOL-0804-G02M	6 009 870	2 m
DOL-0804-G05M	6 009 872	5 m
DOL-0804-G10M	6 010 754	10 m



Female connector M 8, 4-pin, right angle
Cable diameter 5 mm, 4 x 0.25 mm², sheath PVC

Type	Part no.	Cable length
DOL-0804-W02M	6 009 871	2 m
DOL-0804-W05M	6 009 873	5 m
DOL-0804-W10M	6 010 755	10 m

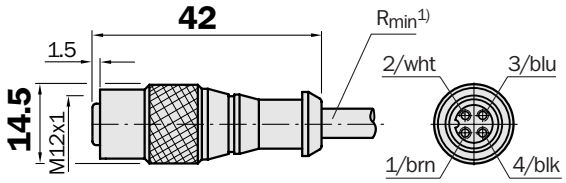


1) Minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

SENSICK screw-in system M 12, 4-pin, enclosure rating IP 67

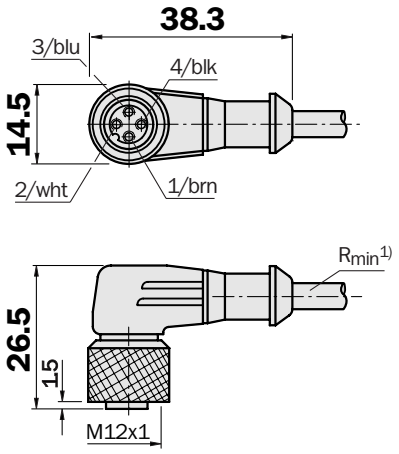
Female connector M 12, 4-pin, straight
Cable diameter 5 mm, 4 x 0.25 mm², sheath PVC

Type	Part no.	Contacts	Cable length
DOL-1204-G02M	6 009 382	4	2 m
DOL-1204-G05M	6 009 866	4	5 m
DOL-1204-G10M	6 010 543	4	10 m
DOL-1204-G15M	6 010 753	4	15 m



Female connector M 12, 4-pin, right angle
Cable diameter 5 mm, 4 x 0.25 mm², sheath PVC

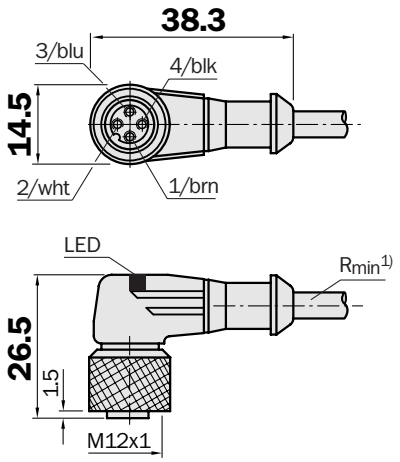
Type	Part no.	Contacts	Cable length
DOL-1204-W02M	6 009 383	4	2 m
DOL-1204-W05M	6 009 867	4	5 m
DOL-1204-W10M	6 010 541	4	10 m



Dimensional drawings and order information

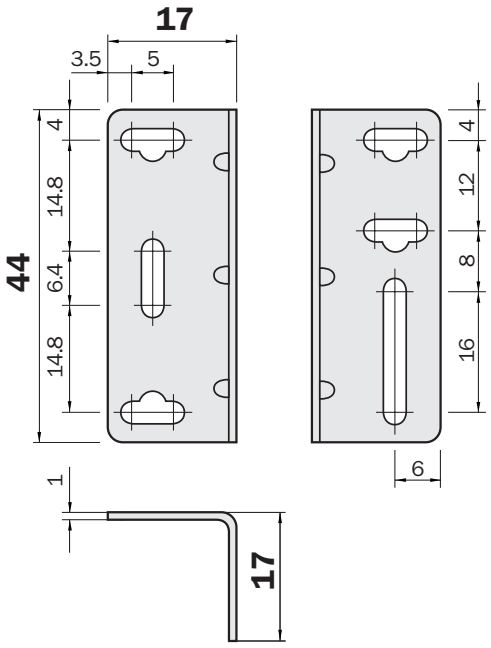
SENSICK screw-in system M 12, 4-pin, enclosure rating IP 67

Female connector M 12, 4-pin, right angle			
Cable diameter 5 mm, 4 x 0.34 mm², sheat PUR/PVC			
With built-in LED-operation and function indicators, PNP complementary [2]			
Type	**Part no.**	**Contacts**	**Cable length**
DOL-1204-W05ME	6 020 398	4	5 m



1) Minimum bend radius in dynamic use
R_{min} = 20 x cable diameter
2) Note: Not suitable for sender in through-beam photoelectric switches

Mounting bracket	
Type	**Part no.**
BEF-WN-W9-2	2 022 855



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