Distance sensor SOIA

Characteristics

At a glance

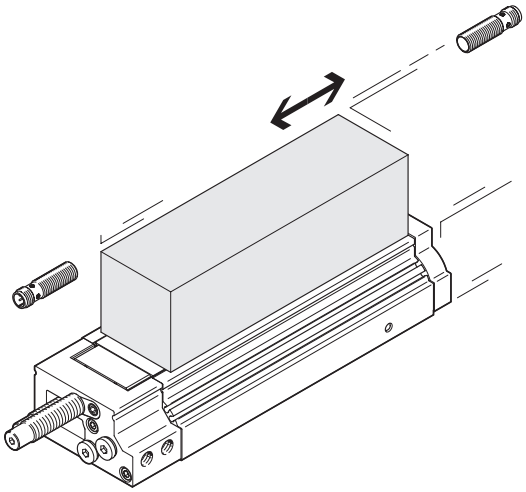
Product characteristics:

- Distance, speed and acceleration sensor
- IO-Link® 1.1 Smart sensor profile
- Sizes:M8, M12, M18, M30, Q40
- Flush and non-flush types
- Plug and cable types
- Distance measuring range up to 30 mm
- Velocity measuring range 0.001 ... 3.00 m/s
- Acceleration measuring range 0.1 ... 3250 m/s²

Advantages:

- Unique sensor for monitoring pneumatic, hydraulic and elastic cushioning (impact energy)
- Replacement for standard inductive proximity switches in SIO mode
- Enables predictive maintenance
- Preventing expensive production downtime
- Savings thanks to avoiding oversized actuators
- Cost effective

Application example



Type code

001	Series	
SOIA	Distance sensor	

002	Design	
M8P	Round, M8x1	
M12P	Round, M12x1	
M18P	Round, M18x1	
M30P	Round, M30x1.5	
Q40	Cube 40 mm	

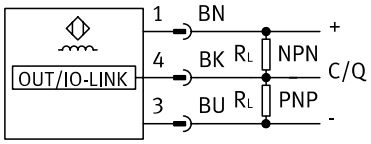
003	Mounting type	
B	Flush	
NB	Not flush	

004	Switching input/output	
PNLK	PNP or NPN or IO-Link®	

005	Electrical connection	
LE	Open end	
M8	Plug M8, A-coded	
M12	Plug M12, A-coded	

Datasheet

General technical data



Size	M8	M12	M18	M30	Q40
Measuring principle	Inductive				
Measurement method	Distance sensor				
Measured variable	Position, Path/displacement				
UKCA marking (see declaration of conformity)	To UK instructions for EMC, To UK RoHS instructions				
Conforms to standard	EN 60947-5-2				
Approval	c UL us listed (OL)				
CE mark (see declaration of conformity) [1]	To EU EMC Directive, In accordance with EU RoHS Directive				
LABS (PWIS) conformity	VDMA24364-B2-L				
Note on materials	RoHS-compliant				

1) For information about the area of use, see the declaration of conformity at: www.festo.com/catalogue/soia → Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or industrial environments as well as small businesses, further measures for reducing the emitted interference may be necessary.

Input signal, measuring element

Size	M8		M12	
Mounting type	Flush	Not flush	Flush	Not flush
Reference material	8 mm x 8 mm x 1 mm Structural steel, 1.0037, S235JR	12 mm x 12 mm x 1 mm Structural steel, 1.0037, S235JR		24 mm x 24 mm x 1 mm Structural steel, 1.0037, S235JR
Displacement measuring range	0 ... 2 mm	0 ... 4 mm		0 ... 7 mm
Measurement range speed	1 ... 800 mm/s	1 ... 1,100 mm/s	1 ... 1,400 mm/s	1 ... 2,100 mm/s
Displacement resolution	0.01 mm			
Repetition accuracy	±0.02 mm	±0.04 mm		±0.07 mm
Linearity error in ± %FS	3%			
Temperature drift	±10%			
Repetition accuracy speed	+/- 5% FS			
Accuracy speed	+/- 20% FS			
Acceleration value range	-3,270 ... 3,270 m/s²			

Input signal, measuring element, basic type

Size	M18		M30	
Mounting type	Flush	Not flush	Flush	Not flush
Reference material	24 mm x 24 mm x 1 mm Structural steel, 1.0037, S235JR	36 mm x 36 mm x 1 mm Structural steel, 1.0037, S235JR	30 mm x 30 mm x 1 mm Structural steel, 1.0037, S235JR	60 mm x 60 mm x 1 mm Structural steel, 1.0037, S235JR
Displacement measuring range	0 ... 8 mm	0 ... 12 mm	0 ... 10 mm	0 ... 20 mm
Measurement range speed	1 ... 2,700 mm/s	1 ... 3,000 mm/s	1 ... 2,400 mm/s	1 ... 3,000 mm/s
Displacement resolution	0.01 mm			
Repetition accuracy	±0.08 mm	±0.12 mm	±0.1 mm	±0.2 mm
Linearity error in ± %FS	3%			
Temperature drift	±10%			
Repetition accuracy speed	+/- 5% FS			
Accuracy speed	+/- 20% FS			
Acceleration value range	-3,270 ... 3,270 m/s²			

Datasheet

Input signal, measuring element, basic type	
Size	Q40
Mounting type	Not flush
Reference material	90 mm x 90 mm x 1 mm Structural steel, 1.0037, S235JR
Displacement measuring range	0 ... 30 mm
Measurement range speed	1 ... 3,000 mm/s
Displacement resolution	0.01 mm
Repetition accuracy	±0.3 mm
Linearity error in ± %FS	3%
Temperature drift	±10%
Repetition accuracy speed	+/- 5% FS
Accuracy speed	+/- 20% FS
Acceleration value range	-3,270 ... 3,270 m/s²

Switching output, M8, M12				
Size	M8		M12	
Mounting type	Flush	Not flush	Flush	Not flush
Switching output	PNP/NPN, switchable, Push-pull			
Switching element function	Switchable			
Rated operating distance	0 ... 2 mm	0 ... 4 mm		0 ... 7 mm
Note on rated operating distance	SSC1.SP1: 1.7 mm SSC2.SP1: 1.0 mm Factory setting	SSC1.SP1: 3.4 mm SSC2.SP1: 2.0 mm Factory setting		SSC1.SP1: 5.95 mm SSC2.SP1: 3.5 mm Factory setting
Hysteresis	1 ... 20 %FS			
Note on hysteresis	Factory setting: 5% FS			
Max. switching frequency	750 Hz	1,400 Hz	1,200 Hz	1,400 Hz

Switching output, M18, M30, Q40				
Size	M18		M30	
Mounting type	Flush	Not flush	Flush	Not flush
Switching output	PNP/NPN, switchable, Push-pull			
Switching element function	Switchable			
Rated operating distance	0 ... 8 mm	0 ... 12 mm	0 ... 10 mm	0 ... 20 mm
Note on rated operating distance	SSC1.SP1: 6.8 mm SSC2.SP1: 4.0 mm Factory setting	SSC1.SP1: 10.2 mm SSC2.SP1: 6.0 mm Factory setting	SSC1.SP1: 8.5 mm SSC2.SP1: 5.0 mm Factory setting	SSC1.SP1: 17.0 mm SSC2.SP1: 10.0 mm Factory setting
Hysteresis	1 ... 20 %FS			
Note on hysteresis	Factory setting: 5% FS			
Max. switching frequency	1,200 Hz	1,100 Hz	1,300 Hz	400 Hz

Switching output, basic type	
Size	Q40
Mounting type	Not flush
Switching output	PNP/NPN, switchable, Push-pull
Switching element function	Switchable
Rated operating distance	0 ... 30 mm
Note on rated operating distance	SSC1.SP1: 20.5 mm SSC2.SP1: 15.0 mm Factory setting
Hysteresis	1 ... 20 %FS
Note on hysteresis	Factory setting: 5% FS
Max. switching frequency	250 Hz

Datasheet

Electronics					
Size	M8	M12	M18	M30	Q40
Operational voltage range DC	10 ... 30 V				
Note on operational voltage range DC	18 - 30 V in IO-Link mode				
Residual ripple	20%				
Max. output current	100 mA				
Min. load current	0 mA				
No-load supply current	17 mA				22 mA
Off-state current	0.03 mA				
Reverse polarity protection	yes				
Short circuit current rating	Pulsed				
Overload protection	Available				
Inductive protective circuit	Integrated				
Voltage drop	≤1 V				
Immunity to surge	0.5 kV				
Insulation voltage	30 V				
Switching status indication	Yellow LED				
Ready status indication	–				Green LED

IO-Link®	
Protocol	IO-Link®
IO-Link, revision ID	V1.1
IO-Link, device profile	Function Object detection Function Product URI Function Teach two values Identification and diagnostics Smart sensor - SSP 4.1.1
IO-Link, transmission rate	COM2
IO-Link, SIO-Mode support	Yes
IO-Link, port type	Class A
IO-Link, process data length input	32 bit
IO-Link, Process data content IN	Distance measurement 16 bit MDC Distance monitoring 2 bit SSC Maintenance warning 1 bit DSC Motion diagnostic 2 bit DSC
Reverse polarity protection	yes
IO-Link, minimum cycle time	3.2 ms
IO-Link, Data storage required	308 Byte

Electromechanics with plug					
Size	M8	M12	M18	M30	Q40
Electrical connection 1, connection type	Plugs				
Electrical connection 1, connector system	M8x1, A-coded, to EN 61076-2-104	M12x1, A-coded to EN 61076-2-101			
Electrical connection 1, number of connections/cores	3				4
Electrical connection 1, type of mounting	Snap-locking, Screw-type lock, Not rotatable	Screw-type lock, Not rotatable			

Datasheet

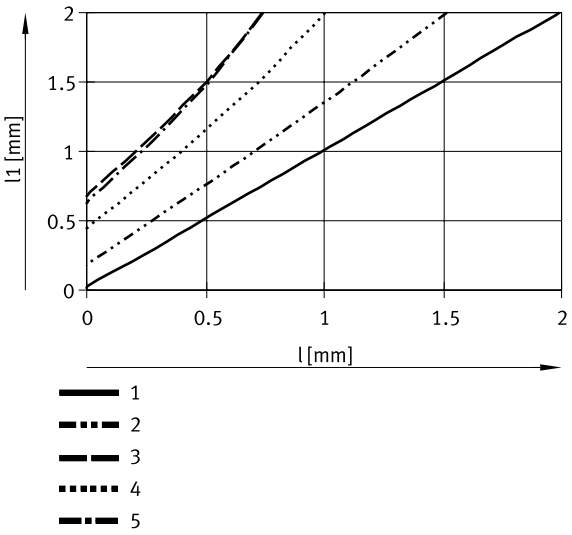
Electromechanics, cable open end				
Size	M8	M12	M18	M30
Electrical connection 1, connection type	Cable			
Electrical connection 1, number of connections/cores	3			
Cable length	2.5 m			
Material cable sheath	PUR			
Cable sheath colour	Grey			
Cable diameter	2.9 mm	3.8 mm		
Nominal cross section conductor	0.14 mm²	0.25 mm²		

Mechanics, M8, M12					
Size	M8	M12	M18	M30	Q40
Tightening torque	0 ... 3 Nm	0 ... 10 Nm	0 ... 30 Nm		
Material housing	Brass PBT				PA
Housing colour	Blue, grey				Blue, Black
Material locknut	Brass				–

Immission, emission, basic type					
Size	M8	M12	M18	M30	Q40
Ambient temperature	-25 ... 70°C				
Storage temperature	-40 ... 85°C				
Degree of protection	IP65, IP67				
Housing pressure resistance	1 bar				–
Immunity to magnetic fields	< 50 µT				
Corrosion resistance class CRC [1]	3 - high corrosion stress				1 - Low corrosion stress

1) More information: www.festo.com/x/topic/crc

SOIA-M8PB-PNLK

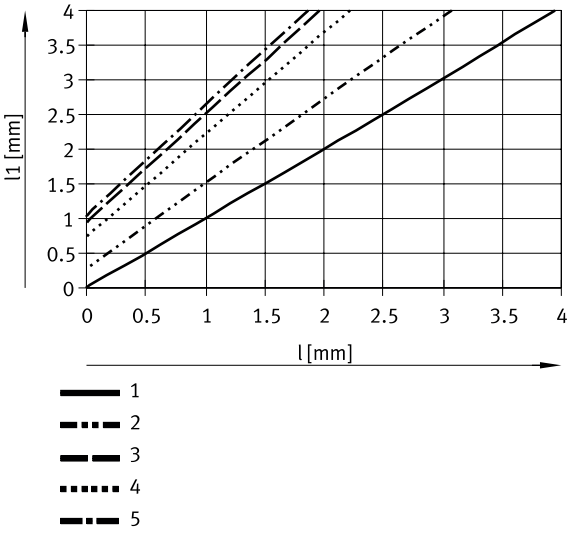


1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

Datasheet

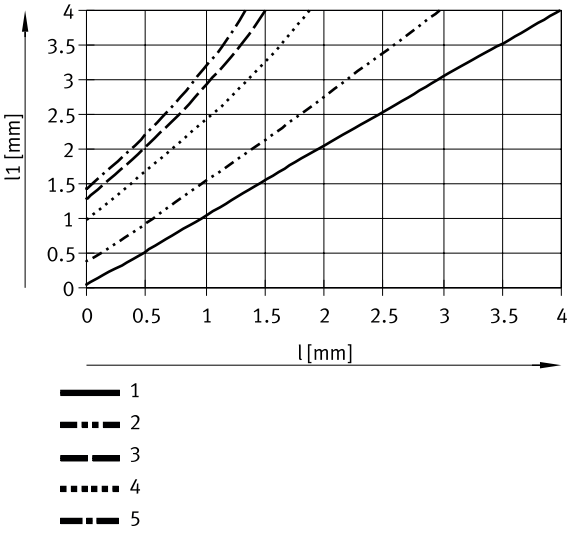
SOIA-M8PNB-PNLK



1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

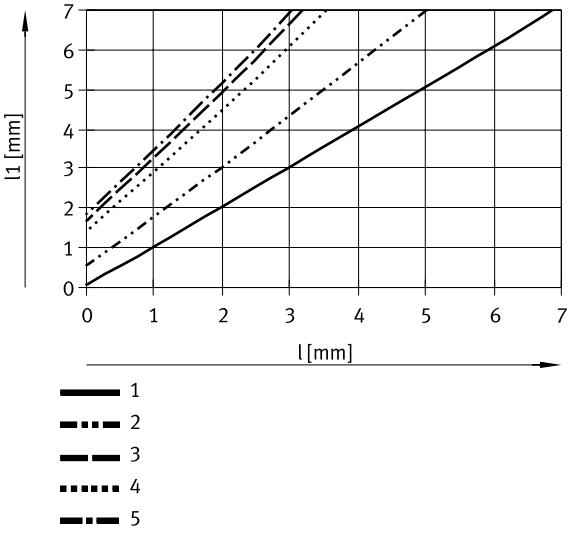
SOIA-M12PB-PNLK



1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

SOIA-M12PNB-PNLK

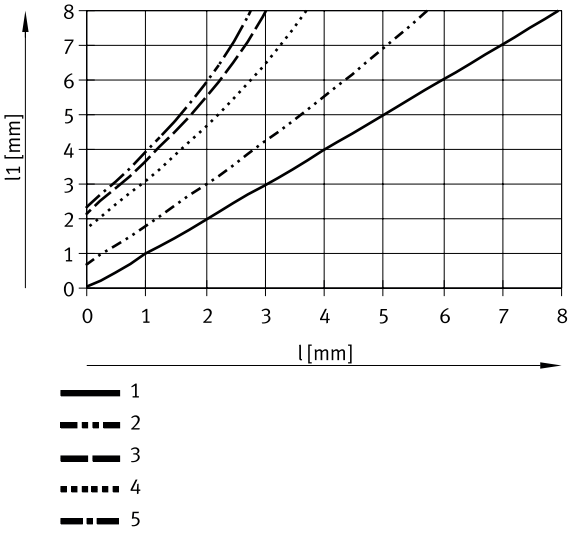


1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

Datasheet

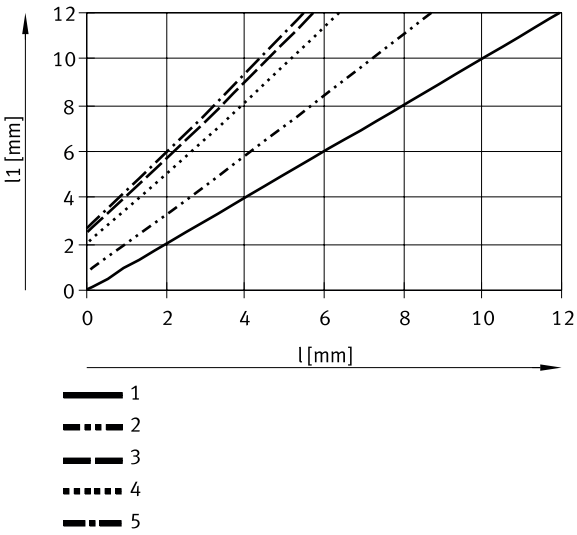
SOIA-M18PB-PNLK



1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

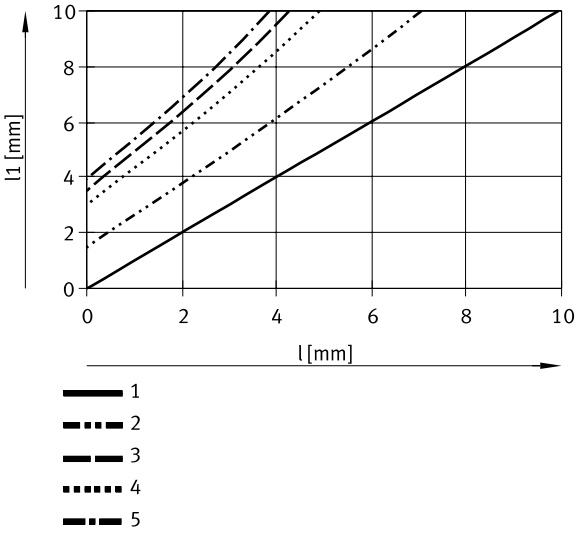
SOIA-M18PNB-PNLK



1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

SOIA-M30PB-PNLK

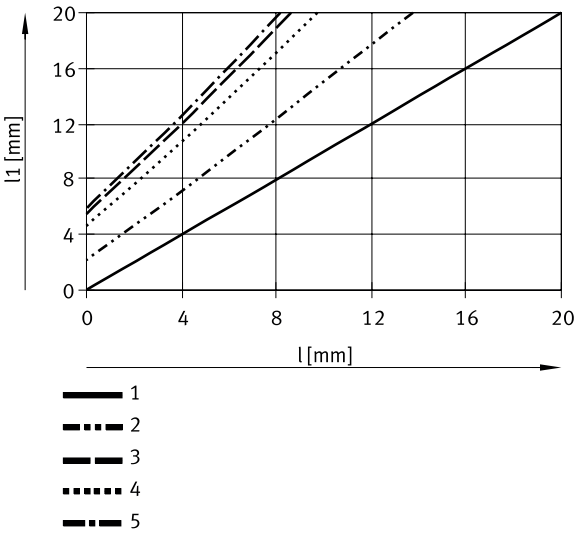


1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

Datasheet

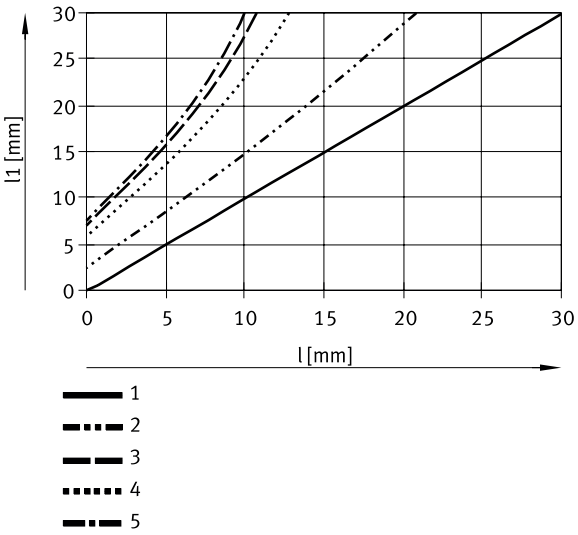
SOIA-M30PNB-PNLK



1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

SOIA-Q40NB-PNLK

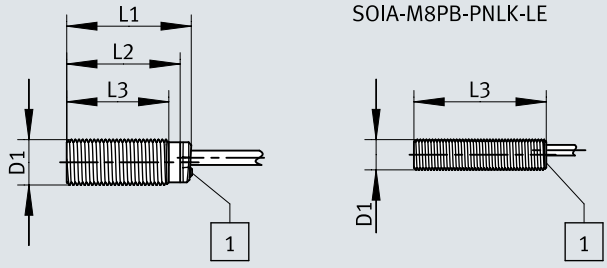


1 Steel
2 Stainless steel
3 Aluminium
4 Brass
5 Copper

l = Distance
l1 = Measured value

Dimensions

Dimensions – SOIA-M...PB-PNLK-LE Download CAD data www.festo.com

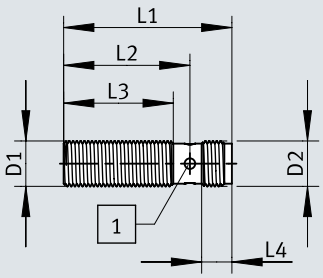


[1] LED

	D1	L1	L2	L3
SOIA-M8PB-PNLK-LE	M8x1	–	–	35
SOIA-M12PB-PNLK-LE	M12x1	33,2	30	27
SOIA-M18PB-PNLK-LE	M18x1	35,9	30	27
SOIA-M30PB-PNLK-LE	M30x1,5	40,3	31,2	28,2

Dimensions

Dimensions – SOIA-M...PB-PNLK-M... Download CAD data www.festo.com

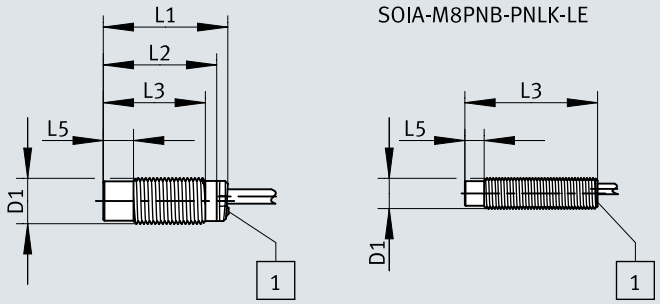


[1] LED

	D1	D2	L1	L2	L3	L4
SOIA-M8PB-PNLK-M8	M8x1	M8x1	45	35,7	30	6
SOIA-M12PB-PNLK-M12	M12x1	M12x1	44,5	33	28,5	8
SOIA-M18PB-PNLK-M12	M18x1	M12x1	46	35,5	27	8
SOIA-M30PB-PNLK-M12	M30x1,5	M12x1	47,2	36,7	28,2	8

Dimensions

Dimensions – SOIA-M...PNB-PNLK-LE Download CAD data www.festo.com

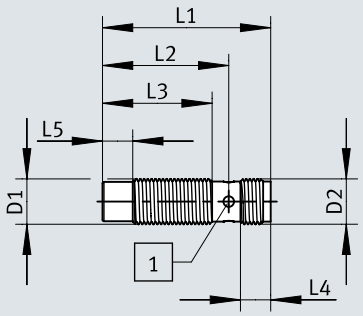


[1] LED

	D1	L1	L2	L3	L5
SOIA-M8PNB-PNLK-LE	M8x1	–	–	35	5
SOIA-M12PNB-PNLK-LE	M12x1	33,2	30	27	8
SOIA-M18PNB-PNLK-LE	M18x1	35,9	30	27	10
SOIA-M30PNB-PNLK-LE	M30x1,5	44,1	35	32	18

Dimensions

Dimensions – SOIA-M...PNB-PNLK-M... Download CAD data www.festo.com

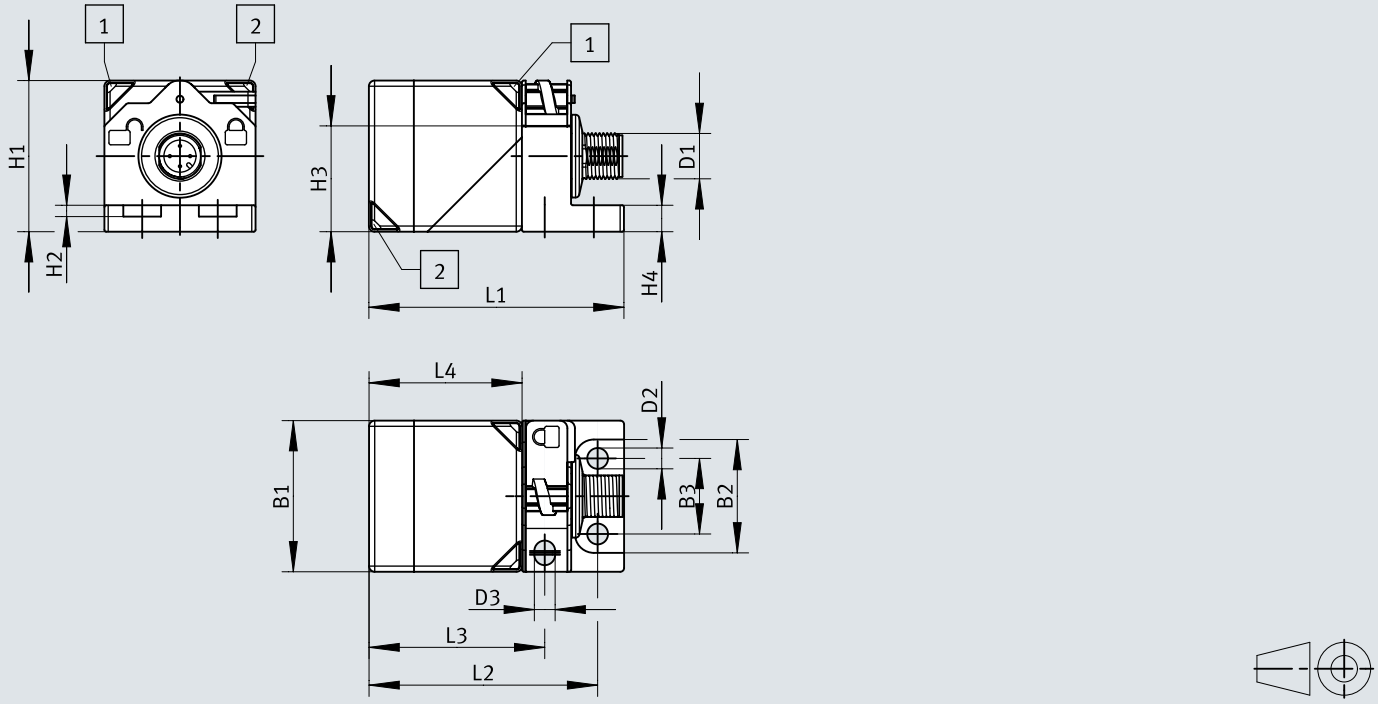


[1] LED

	D1	D2	L1	L2	L3	L4	L5
SOIA-M8PNB-PNLK-M8	M8x1	M8x1	45	35,8	30	6	5
SOIA-M12PNB-PNLK-M12	M12x1	M12x1	44,5	33	28,5	8	8
SOIA-M18PNB-PNLK-M12	M18x1	M12x1	46	35,5	27	8	10
SOIA-M30PNB-PNLK-M12	M30x1,5	M12x1	51	40,5	32	8	18

Dimensions

Dimensions – SOIA-Q40NB-PNLK-M12 Download CAD data www.festo.com



[1] Yellow LED
[2] Green LED

	B1	B2	B3	D1	D2 ø	D3	H1	H2	H3	H4	L1	L2	L3	L4
SOIA-Q40NB-PNLK-M12	40	30	20	M12x1	5,5	5,5	40	4	28	7	67	60	46	40

Ordering data

Ordering data M8

	Rated operating distance	Mounting type [1]	Electrical connection 1, connection type	Product weight	Part no.	Type
	0 ... 2 mm	Flush	Cable	39 g	**8161194**	**SOIA-M8PB-PNLK-LE**
			Plugs	13 g	**8161195**	**SOIA-M8PB-PNLK-M8**
	0 ... 4 mm	Not flush	Cable	38 g	**8161196**	**SOIA-M8PNB-PNLK-LE**
			Plugs	13 g	**8161197**	**SOIA-M8PNB-PNLK-M8**

1) (Sample picture)

Ordering data M12

	Rated operating distance	Mounting type [1]	Electrical connection 1, connection type	Product weight	Part no.	Type
	0 ... 4 mm	Flush	Cable	67 g	**8161198**	**SOIA-M12PB-PNLK-LE**
			Plugs	21 g	**8161199**	**SOIA-M12PB-PNLK-M12**
	0 ... 7 mm	Not flush	Cable	66 g	**8161200**	**SOIA-M12PNB-PNLK-LE**
			Plugs	20 g	**8161201**	**SOIA-M12PNB-PNLK-M12**

1) (Sample picture)

Ordering data M18

	Rated operating distance	Mounting type [1]	Electrical connection 1, connection type	Product weight	Part no.	Type
	0 ... 8 mm	Flush	Cable	87 g	**8161202**	**SOIA-M18PB-PNLK-LE**
			Plugs	45 g	**8161203**	**SOIA-M18PB-PNLK-M12**
	0 ... 12 mm	Not flush	Cable	83 g	**8161204**	**SOIA-M18PNB-PNLK-LE**
			Plugs	42 g	**8161205**	**SOIA-M18PNB-PNLK-M12**

1) (Sample picture)

Ordering data M30

	Rated operating distance	Mounting type [1]	Electrical connection 1, connection type	Product weight	Part no.	Type
	0 ... 10 mm	Flush	Cable	145 g	**8161206**	**SOIA-M30PB-PNLK-LE**
			Plugs	116 g	**8161207**	**SOIA-M30PB-PNLK-M12**
	0 ... 20 mm	Not flush	Cable	134 g	**8161208**	**SOIA-M30PNB-PNLK-LE**
			Plugs	104 g	**8161209**	**SOIA-M30PNB-PNLK-M12**

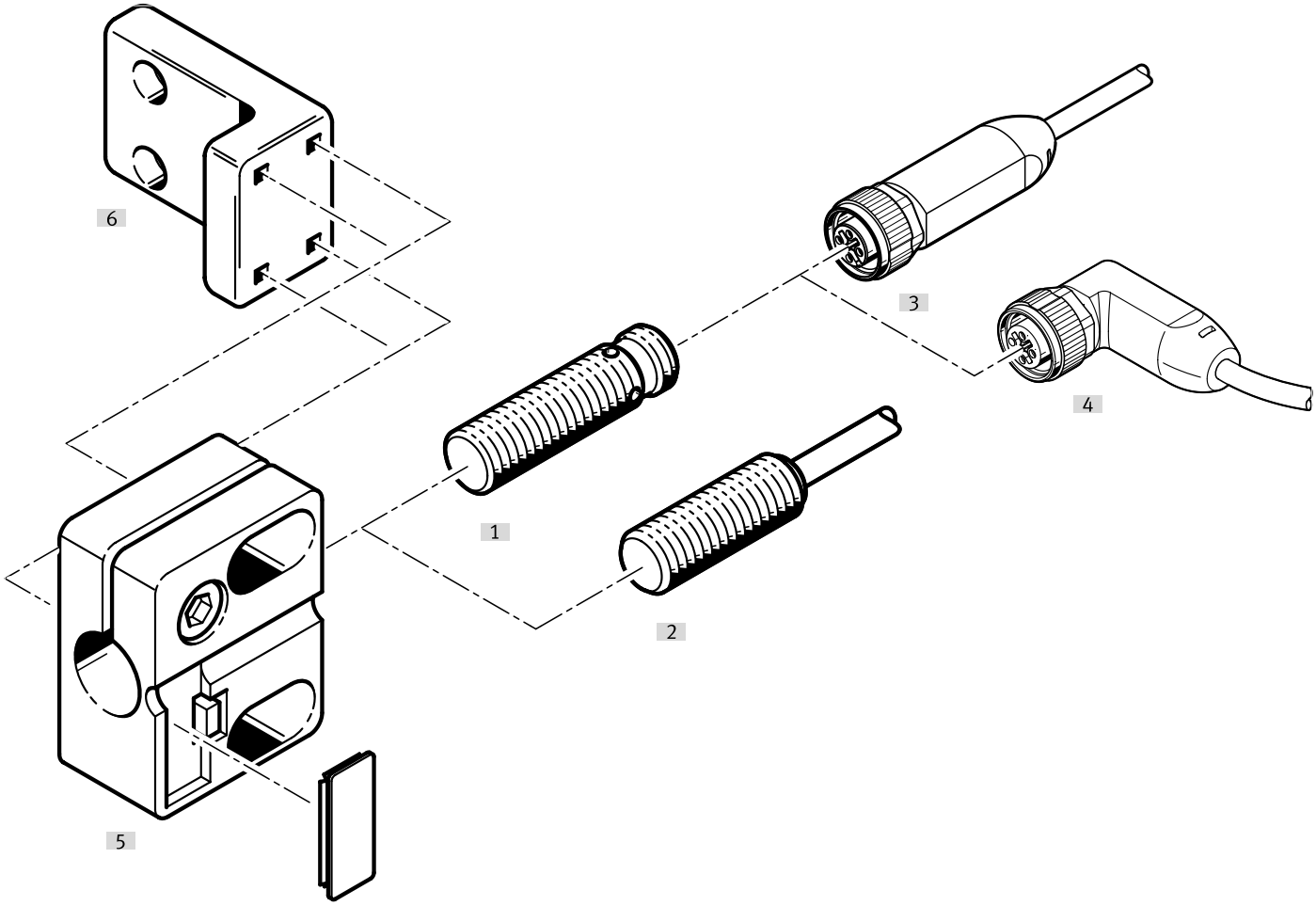
1) (Sample picture)

Ordering data Q40

	Rated operating distance	Mounting type	Electrical connection 1, connection type	Product weight	Part no.	Type
	0 ... 30 mm	Not flush	Plugs	145 g	**8161210**	**SOIA-Q40NB-PNLK-M12**

Peripherals

Peripherals overview



Accessories			→ Link
	Type/order code	Description	
[1]	Proximity switch SIEN-M5B-PS-S-L	Proximity switch, inductive with plug	soia
[2]	Proximity switch SIEN-M5B-PS-K-L	Proximity switch, inductive with cable	soia
[3]	Connecting cables NEBA-M12G5-...	Straight socket	18
[4]	Connecting cables NEBA-M12W5-...	Angled socket	18
[5]	Sensor bracket SIEZ-B-12	For flush mounting	18
[6]	Sensor bracket SIEZ-UH	Without stop	19

Accessories

Connecting cables M8 socket, 3-pin, without switching status indication

Electrical connection 1, cable outlet	Electrical connection 2, connector system	Electrical connection 2, cable outlet	Cable length	Product weight	Part no.	Type
Straight	M12x1, A-coded to EN 61076-2-101	Straight	0.5 m	23 g	8078278	NEBA-M8G3-U-0.5-N-M12G3
			1 m	33 g	8078279	NEBA-M8G3-U-1-N-M12G3
			2.5 m	60 g	8078280	NEBA-M8G3-U-2.5-N-M12G3
			5 m	107 g	8078281	NEBA-M8G3-U-5-N-M12G3
	M8x1, A-coded to EN 61076-2-104		0.5 m	17 g	★ 8078282	NEBA-M8G3-U-0.5-N-M8G3
			1 m	26 g	★ 8078283	NEBA-M8G3-U-1-N-M8G3
			1.5 m	35 g	8078284	NEBA-M8G3-U-1.5-N-M8G3
			2 m	44 g	8078285	NEBA-M8G3-U-2-N-M8G3
			2.5 m	54 g	★ 8078286	NEBA-M8G3-U-2.5-N-M8G3
			5 m	100 g	★ 8078287	NEBA-M8G3-U-5-N-M8G3
			10 m	192 g	★ 8078288	NEBA-M8G3-U-10-N-M8G3
	Open end		1 m	22 g	8078222	NEBA-M8G3-U-1-N-LE3
			2.5 m	50 g	★ 8078223	NEBA-M8G3-U-2.5-N-LE3
			5 m	96 g	★ 8078224	NEBA-M8G3-U-5-N-LE3
			10 m	188 g	★ 8078225	NEBA-M8G3-U-10-N-LE3
			20 m	373 g	★ 8078226	NEBA-M8G3-U-20-N-LE3
Angled			2.5 m	50 g	★ 8078230	NEBA-M8W3-U-2.5-N-LE3
			5 m	96 g	★ 8078231	NEBA-M8W3-U-5-N-LE3
			10 m	189 g	★ 8078232	NEBA-M8W3-U-10-N-LE3

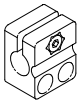
Connecting cables, M8 socket, 3-pin, snap-locking

Electrical connection 1, cable outlet	Electrical connection 2, connector system	Cable length	Product weight	Part no.	Type
Straight	Open end	2.5 m	49 g	8078264	NEBA-M8CG3-U-2.5-N-LE3
		5 m	95 g	8078265	NEBA-M8CG3-U-5-N-LE3
Angled		2.5 m	49 g	8078266	NEBA-M8CW3-U-2.5-N-LE3
		5 m	95 g	8078267	NEBA-M8CW3-U-5-N-LE3

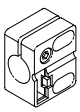
Connecting cables M12 socket, 5-pin, without switching status indication

Electrical connection 1, cable outlet	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Product weight	Part no.	Type
Straight	M12x1, A-coded to EN 61076-2-101	5	0.5 m	34 g	8078274	NEBA-M12G5-U-0.5-N-M12G5
			1 m	47 g	8078275	NEBA-M12G5-U-1-N-M12G5
			2.5 m	87 g	8078276	NEBA-M12G5-U-2.5-N-M12G5
			5 m	153 g	★ 8078277	NEBA-M12G5-U-5-N-M12G5
	Open end	3	2.5 m	55 g	8078236	NEBA-M12G5-U-2.5-N-LE3
			5 m	102 g	8078237	NEBA-M12G5-U-5-N-LE3
			10 m	194 g	8078238	NEBA-M12G5-U-10-N-LE3
Angled			2.5 m	56 g	8078245	NEBA-M12W5-U-2.5-N-LE3
			5 m	103 g	8078246	NEBA-M12W5-U-5-N-LE3
			10 m	195 g	8078247	NEBA-M12W5-U-10-N-LE3

Sensor bracket with stop, for flush sensors

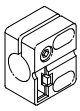
	Size	Type of mounting	Product weight	Part no.	Type
	M8	With through-hole	3.5 g	538346	SIEZ-B-8
	M12		20 g	538348	SIEZ-B-12
	M18		21 g	538350	SIEZ-B-18
	M30		36 g	538352	SIEZ-B-30

Sensor bracket without stop, for non-flush sensors

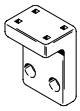
	Size	Type of mounting	Product weight	Part no.	Type
	M8	With through-hole	3.5 g	538345	SIEZ-NB-8

Accessories

Sensor bracket without stop, for non-flush sensors

	Size	Type of mounting	Product weight	Part no.	Type
	M12	With through-hole	20 g	**538347**	**SIEZ-NB-12**
	M18		21 g	**538349**	**SIEZ-NB-18**
	M30		36 g	**538351**	**SIEZ-NB-30**

Sensor bracket without stop

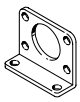
	Type of mounting	Product weight	Part no.	Type
	With through-hole	25 g	**538354**	**SIEZ-UH**

Foot mounting

	Size [1]	Product weight	Part no.	Type
	8/10	22 g	**5123**	**HBN-8/10X1**

1) Suitable for SIEN-M12.

Flange mounting

	Size [1]	Product weight	Part no.	Type
	32	103 g	**195855**	**FBN-32**

1) Suitable for SIEN-M30.

Mounting flange YSRF-S-...-C

	Size	Material housing	Product weight	Part no.	Type
	8	Steel, Galvanised	12 g	**34579**	**YSRF-S-8-C**
	12		130 g	**34580**	**YSRF-S-12-C**
	16		180 g	**34581**	**YSRF-S-16-C**
	20		250 g	**34582**	**YSRF-S-20-C**

Stop

	Size	Part no.	Type
	M8	**11542**	**SDA-8X1-B**
	M12	**11541**	**SDA-12X1-B**