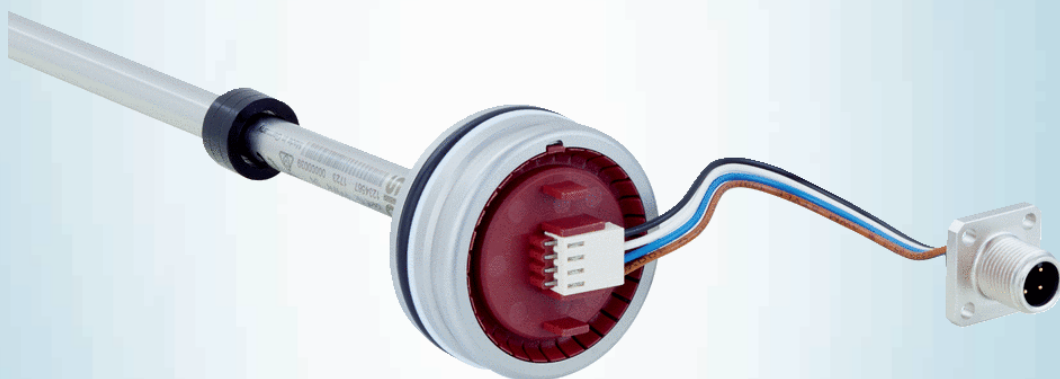




MAX48N-12V30AA0160

MAX®

LINEAR ENCODERS

SICK
Sensor Intelligence.



Illustration may differ

Ordering information

Type	Part no.
MAX48N-12V30AA0160	1221681

Accessories not included with delivery, please order separately.

Other models and accessories → www.sick.com/MAX



Detailed technical data

Features

Items supplied	Accessories not included with delivery, please order separately.
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Performance

Measured values	Positioning
Measuring range	
Position (F.S.)	0 mm ... 160 mm ¹⁾
Unusable range	
Null zone	30 mm
Damping zone	30 mm
Switch-on time	< 250 ms
Measuring frequency (internal)	2 ms
Transmission rate (cycle time)	Constant analog output signal
Setpoint tolerance	
Zero point and F.S.	≤ ± 1 mm
Resolution	Typ. 0.1 mm (noise-free)
Hysteresis	± 0,1 mm
Repeatability	Typically ± 0.2 mm
Linearity (in the operational status)	Typ. ± 0.25 mm (measuring range 50 to 500 mm) Typ. ± 0.04% F.S. (measuring range from 500 to 2,500 mm)
Temperature drift	
Self-heating of the electronics (warm-up phase)	Typ. ≤ ± 0.25 mm (2 min)
Operational status (hydraulic oil at operating temperature)	Typ. ≤ ± 0.005% x F.S. x ΔT (ΔT 40 °C) ²⁾

¹⁾ F.S. = Full Scale (Measuring range).

²⁾ 40 °C increase in oil temperature during operation.

Interfaces

Communication interface	Analog
Communication Interface detail	Voltage
Voltage output	0.5 V DC ... 9.5 V DC

Electrical data

Connection type	Male connector, M12 type S (20x20 mm), 4-pin
PIN assignment	1=V DC; 2=n.c.; 3=GND; 4=SIG
Supply voltage	8 ... 36 V DC
Residual ripple	< 1% S-S
Power consumption	≤ 0.75 W
Current consumption	≤ 30 mA
Load resistance	
Voltage signal	RL ≥ 10 kΩ
Switch-on current	Typ. 5.0 A / 50 μs
Over voltage protection	≤ 36 V at all poles during power-up (60 s) ≤ 48 V To GND during power-up (60 s)
Reverse polarity protection	≤ 36 V (at all poles) (ISO 16750-2)
Insulation resistance	Riso ≥ 10 MΩ, 60 s (ISO 16750-2)
Dielectric strength	500 V DC, 0 V against housing (ISO 16750-2)

Mechanical data

Dimensions	
Construction size	48 mm (48f7 mm (for installation in a 48H8 bore hole))
Ø pressure pipe	10 mm
Ø support ring	42.6 mm x 48 mm x 1.4 mm
M12 flange	Construction DM 20x20 mm - hole pattern 14 mm (EN 61076-2-101)
Length of stranded cable	60 mm
Material	
Electronics enclosure	Stainless steel 1.4305, AISI 303
Pressure pipe	Stainless steel 1.4404, AISI 316L
O-ring	NBR 70
Support ring	PTFE
M12 plug insert	Glass fiber reinforced polyamide, nickel-/gold-plated brass contacts
M12 flange	Nickel-plated brass with O-ring (NBR)
Stranded cable sheath	PVC

Ambient data

EMC	EU Directive 2014/30 / EU CE marking EU Directive 2009/64/EU Agricultural machinery
Generic standards	According to EN 61000-6-2 and EN 61000-6-3
Agricultural and forestry machinery Construction machinery	ISO 14982 EN13309/ ISO 13766
Transient pulses	ISO 7637-2
ESD (air and contact discharge)	EN 61000-4-2 ISO/TR 10605
Enclosure rating	

¹⁾ Taking into account self-heating, generated through constant electrical operation with supply voltage.

²⁾ Caused by the permitted temperature range of the O-ring seal, the hydraulic oil and the temperature-dependent signal quality of the position magnet.

³⁾ Relative humidity 55 %.

⁴⁾ Caused by dry storage of the O-ring in uninstalled state (no coating with oil).

	M12 male connector	IP67 (EN 60529) IP67 (EN 60529) IP69k (ISO 20653)
Temperature		
	Operating temperature range (electronics)	-40 °C ... +105 °C ¹⁾
	Ambient temperature (fluid)	-30 °C ... +95 °C ²⁾
	Storage temperature range	-20 °C ... +65 °C ^{3) 4)}
Permissible relative humidity		90 % (Condensation not permitted)
Resistance to shocks		Fall test in acc. with IEC 60068-2-31 100 g, 11 ms (Single shock in acc. with IEC 60068-2-27) 50 g, 11 ms (Continuous shocks, 1,000 shocks per spatial axis in acc. with IEC 60068-2-27)
Resistance to vibration		
	Sine	20 g, 24 h / spatial axis, 55 ... 2.000 Hz (IEC 60068-2-6) 18 g (r.m.s), 36 h / spatial axis, 10 ... 2.000 Hz (IEC 60068-2-80) 20 g (r.m.s), 48 h / spatial axis, 10 ... 2.000 Hz (IEC 60068-2-64)
Nominal operating pressure (P_N)		400 bar
Max. overload pressure during operation (P_N x 1.2)		480 bar
Max. test pressure in cylinder (P_N x 1.5)		600 bar
Note		For details of applied tests and descriptive standards, please see document 8021473

¹⁾ Taking into account self-heating, generated through constant electrical operation with supply voltage.

²⁾ Caused by the permitted temperature range of the O-ring seal, the hydraulic oil and the temperature-dependent signal quality of the position magnet.

³⁾ Relative humidity 55 %.

⁴⁾ Caused by dry storage of the O-ring in uninstalled state (no coating with oil).

General notes

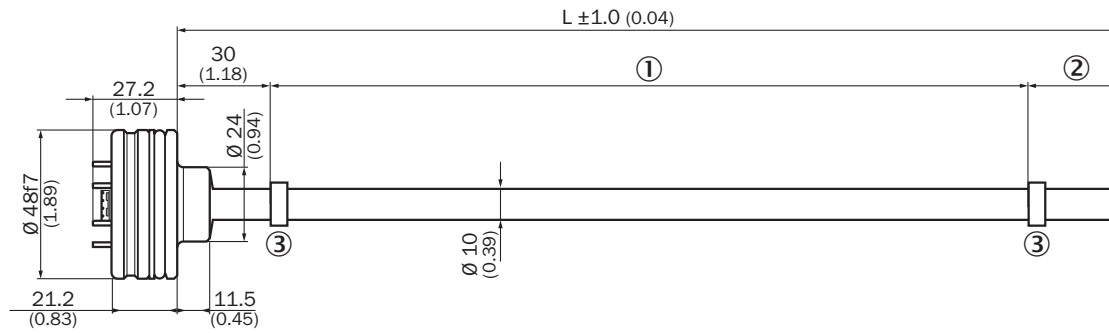
Note	Accessories not included with delivery, please order separately.
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Classifications

ECl@ss 5.0	27270705
ECl@ss 5.1.4	27270705
ECl@ss 6.0	27270705
ECl@ss 6.2	27270705
ECl@ss 7.0	27270705
ECl@ss 8.0	27270705
ECl@ss 8.1	27270705
ECl@ss 9.0	27270705
ECl@ss 10.0	27270703
ECl@ss 11.0	27270703
ETIM 5.0	EC002544
ETIM 6.0	EC002544
ETIM 7.0	EC002544
UNSPSC 16.0901	41111613

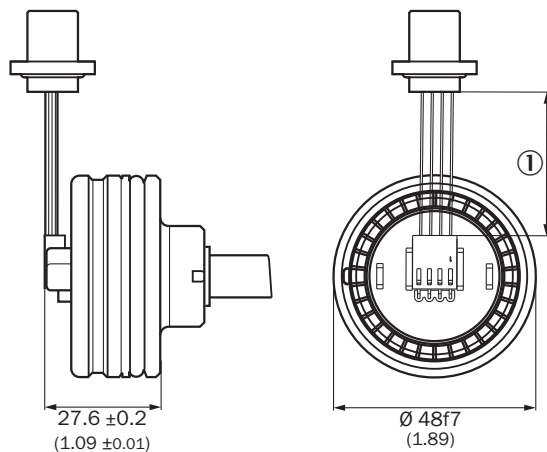
Dimensional drawing (Dimensions in mm (inch))

MAX48



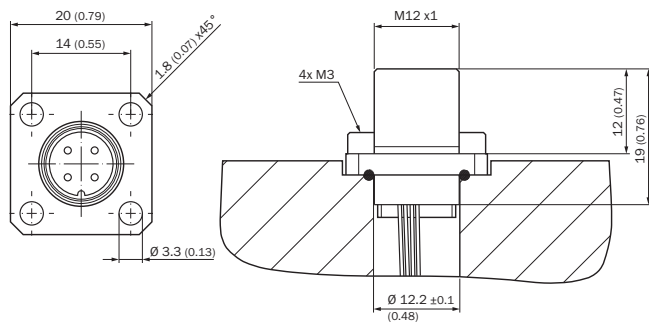
- ① Measuring range
- ② Damping zone
- ③ Position magnet

Male connector M12

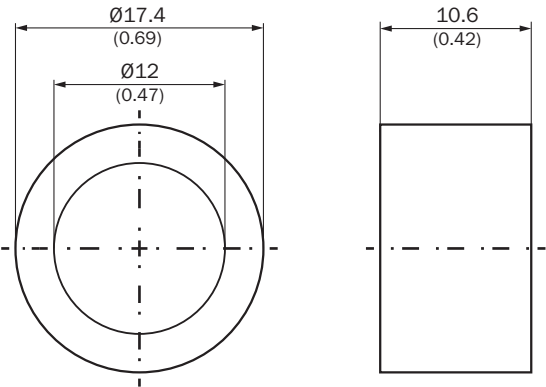


- ① Wire length (according to type code)

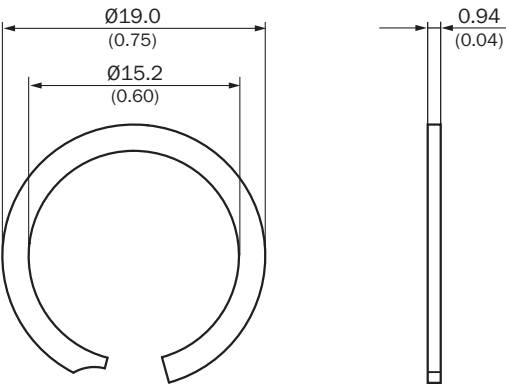
M12 connector type S/ flange - axial seal



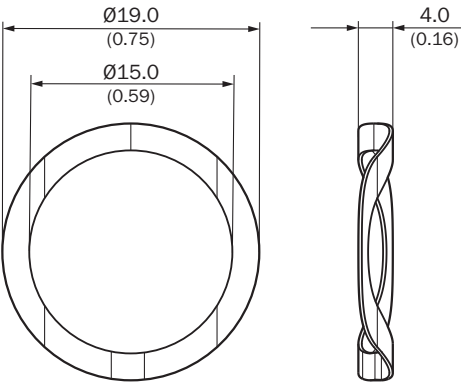
Position magnet



Circlip



Corrugated spring washer



Recommended accessories

Other models and accessories → www.sick.com/MAX

	Brief description	Type	Part no.
Flanges			
	1 piece, Flange for M12 male connector, type S square flange (20 mm x 20 mm) with axial seal, 1 piece, nickel-plated brass	BEF-FA-M12S-01	2117507
	5 pieces, Flange for M12 male connector, type S square flange (20 mm x 20 mm) with axial seal, 5 pieces, nickel-plated brass	BEF-FA-M12S-05	2117508
	10 pieces, Flange for M12 male connector, type S square flange (20 mm x 20 mm) with axial seal, 10 pieces, nickel-plated brass	BEF-FA-M12S-10	2117509
Other mounting accessories			
	1 piece, Circlip for installing the position magnets in the piston of the hydraulic cylinder, Stainless steel 1.4319	BEF-MK-SR-01	2116437
	5 pieces, Circlip for installing the position magnets in the piston of the hydraulic cylinder, Stainless steel 1.4319	BEF-MK-SR-05	2116438
	10 pieces, Circlip for installing the position magnets in the piston of the hydraulic cylinder, Stainless steel 1.4319	BEF-MK-SR-10	2116439
	50 pieces, Circlip for installing the position magnets in the piston of the hydraulic cylinder, Stainless steel 1.4319	BEF-MK-SR-50	2116440
	1 piece, Corrugated spring washer for installing the position magnets in the piston of the hydraulic cylinder, 17-7 PH Condition CH900 stainless steel	BEF-MK-WF-01	2116431
	5 pieces, Corrugated spring washer for installing the position magnets in the piston of the hydraulic cylinder, 17-7 PH Condition CH900 stainless steel	BEF-MK-WF-05	2116432
	10 pieces, Corrugated spring washer for installing the position magnets in the piston of the hydraulic cylinder, 17-7 PH Condition CH900 stainless steel	BEF-MK-WF-10	2116433
	50 pieces, Corrugated spring washer for installing the position magnets in the piston of the hydraulic cylinder, 17-7 PH Condition CH900 stainless steel	BEF-MK-WF-50	2116435
Magnets			
	Position magnet for magnetostrictive linear encoder, Ø 17.4 mm, max. axial surface pressure 40 N/mm², temperature range -30 °C ... +95 °C	MAG-O-174-01	2112714
		MAG-O-174-05	2112713
		MAG-O-174-10	2115045
		MAG-O-174-50	2112711

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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