Magnetostrictive Sensors

BTL C1 - Rod BN/ZN - Analog

BTL abcdef-nnnn-ghijklmo-pqrstu

BTL
Magnetostrictive linear position sensor

a Mounting
B = Metric fastening thread M18x1.5
Z = Inch threads 3/4"-16UNF

b Housing geometry
N = Width across flats 41; length 34 mm; axial connection

c Detailed design 1
C = Rod diameter 10.2mm; Stainless steel 1.4404

d Detailed design 2
A = Screw plug; zero point 30 mm; with O-ring
E = Screw plug; zero point 50.8 mm; with O-ring

ef Special design feature
00 = none

nnnn Measuring range
0500 = Specification in mm
(0025 ... 4000)

g Performance class
C = Platform C, Level 2

h Version Performance class
1

i Supply voltage
5 = 10 ... 30 V

j Interface group
A = Analog

k Characteristic Interface 1
A = 0 ... 10 V increasing from mechanical zero point
1 = 10 ... 0 V decreasing from mechanical zero point
E = 4 ... 20 mA increasing from mechanical zero point
5 = 20 ... 4 mA decreasing from mechanical zero point

l Characteristic Interface 2
0 = no second output signal
A = 0 ... 10 V increasing from mechanical zero point
1 = 10 ... 0 V decreasing from mechanical zero point
E = 4 ... 20 mA increasing from mechanical zero point
5 = 20 ... 4 mA decreasing from mechanical zero point

m Configuration Signals
1 = Signal 1 = Position, 1 Magnet fix
2 = Signal 1&2 = Position, 1 Magnet fix
4 = Signal 1&2 = Position, FMM*
B = Signal 1&2 = Position, FMM* (+ IO-Link)
C = Signal 1&2 = Position, 1 Magnet fix (+ IO-Link)
* = Flexible Magnet Mode

o Optional configuration
0 = none

p Cable/leads
0 = no cable/leads
C = Cable PUR

qr Cable length
00 = no cable/leads
A2 = 2 m
A5 = 5 m
B0 = 10 m
B5 = 15 m
C0 = 20 m

s Connector type
0 = no connector
S = single connector

tu Connector model
15 = connector, M12, 8-pin
32 = connector, M16, 8-pin
35 = connector, M16, 6-pin

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Basic features

Approval/Conformity	CE UKCA cULus WEEE
Magnets, number (factory setting)	1
Magnets, number max.	2 minimum separation between magnets 65 mm.

Electrical connection

Polarity reversal protected	Ub up to 30 V DC
Short-circuit protection	Signal output against GND and against 30 V DC

Electrical data

Current consumption max. at 24 V DC	k = A, 1 AND l = A, 1 AND m = 2, 4: 70 mA k = A, 1 AND l = A, 1 AND m = B, C: 80 mA k = E, 5 AND l = E, 5 AND m = B, C: 110 mA
Inrush current	≤ 3 A/0.5 ms
Operating voltage Ub	10...30 VDC
Output signal adjustable	m = 1, 2, 4: - m = B, C: with Softwaretool
Overvoltage protection	Ub up to 36 V DC
Switch-on delay max.	300 ms
Voltage-proof up to (GND to housing)	500 V DC

Environmental conditions

Ambient temperature	-40...85 °C
Cable temperature, fixed routing	-40 °C...90 °C
Cable temperature, flexible routing	-5 °C...90 °C
EN 55016-2-3, Radiation	For industrial and residential use
EN 60068-2-27, Continuous shock	50 g, 2 ms
EN 60068-2-27, Shock	100 g, 6 ms
EN 60068-2-6, Vibration	12 g, 10...2000 Hz
EN 61000-4-2, ESD	Severity Level 3
EN 61000-4-3, RFI	Severity Level 3
EN 61000-4-4, Burst	Severity Level 3
EN 61000-4-5, Surge	Severity Level 2
EN 61000-4-6, High-frequency fields	Severity Level 3
EN 61000-4-8 Magnetic fields	Severity Level 4
IP rating	IP67, IP69K with connector
Relative humidity	≤ 90 %, non-condensing
Storage temperature	-40...100 °C
Temperature coefficient typ.	≤ 30 ppm/K at 50% of nominal stroke 500mm

Functional safety

MTTF	k = A, 1 UND m = 1, 2, 4: 168 a k = A, 1 UND m = B, C: 128 a k = E, 5 UND m = 1, 2, 4: 136 a k = E, 5 UND m = B, C: 101 a

Interface

Interface	k = A, 1: Analog, voltage k = E, 5: Analog, current

Material

Cable flame-resistant	IEC 60332-1
Cable jacket, material	PUR
Cover material	1.4404 stainless steel
Material flange	Stainless steel (AISI 316 / V4A)
Protection tube material	Stainless steel (AISI 316 / V4A)

Mechanical data

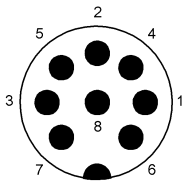
Installation length from contact surface	d = A: n + 90 mm d = E: n + 111 mm
Pressure rating max.	450 bar
Pressure rating, note	when installed in hydraulic cylinder maximum pressure: 750 bar (10 x 1 min)
Speed detectable max.	10 m/s
Tightening torque max.	75 Nm

Range/Distance

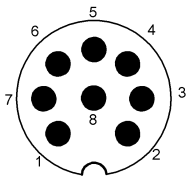
Linearity deviation	nnnn = 0050...0500: ± 60 µm nnnn ≥ 0500: ± 0.012% FS
Measuring length	25...4000 mm
Null point	d = A: 30 mm d = E: 50.8 mm
Repeat accuracy	nnnn ≤ 0500: ≤ ± 10 µm nnnn > 0500: ≤ ± 0.002% FS
Resolution, position	k = A, 1: 183 µV at least 4 µm k = E, 5: 351 nA at least 4 µm
Sampling frequency max.	nnnn = 25...1270: 1000 Hz nnnn = 1271...2650: 500 Hz nnnn = 2651...4000: 250 Hz

Connector Diagramm

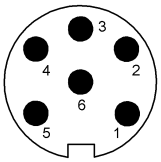
stu = S32: M16 connector, 8 pole



stu = S15: M12 connector, 8 pole



stu = S35: M16 connector, 6 pole



Wiring diagramm

M16 connector, 8 pole / voltage

Pin	Signal
1	NC
2	0 V
3	Output 2
4	C/Q (communication line)
5	Output 1
6	GND
7	+UB
8	NC

M16 connector, 8 pin / current

Pin	Signal
1	Output 1
2	0 V
3	Output 2
4	C/Q (communication line)
5	NC
6	GND
7	+UB
8	NC

M16 connector, 6 pole / voltage

Pin	Signal
1	Output 1
2	0 V (Output 1)
3	Output 2
4	0 V (Output 2)
5	+UB
6	GND

M16 connector, 6 pole / current

Pin	Signal
1	Output 1
2	0 V
3	NC
4	NC
5	+UB
6	GND

M12 connector, 8 poles

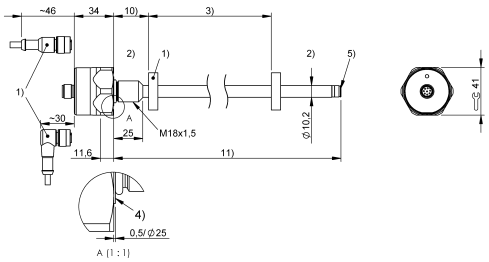
Pin	Signal
1	0 V (Output 2)
2	0 V (Output 1)
3	Output 2
4	C/Q (communication line)
5	Output 1
6	GND
7	+UB
8	NC

Cable outlet axial

Colour	Signal
GY	0 V
PK	Output 2
GN	Output 1
BU	GND
BN	+UB
WH	C/Q (communication line)

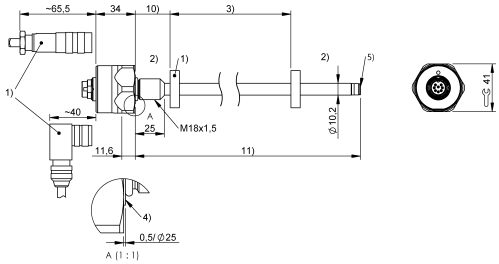
Product View

a = B: mounting M18 thread + stu = S15: M12x1 connector 8 pole



1) not included in scope of delivery
2) Non-usable area
3) Nominal length = Measuring length
4) Mounting surface
5) Internal threads M4x4/6 deep
10) Null point
11) Installation length

a = B: mounting M18 thread + stu = S32: M16x1 connector 8-pole



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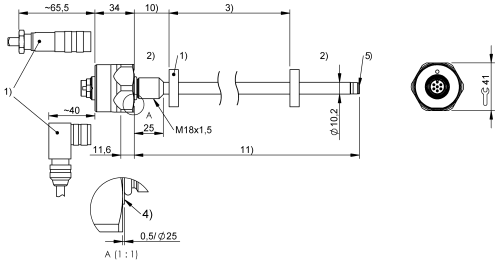

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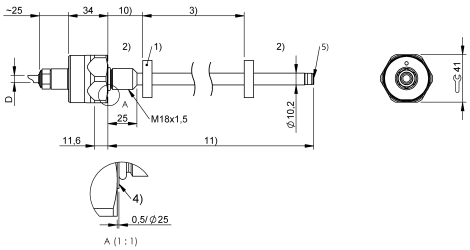

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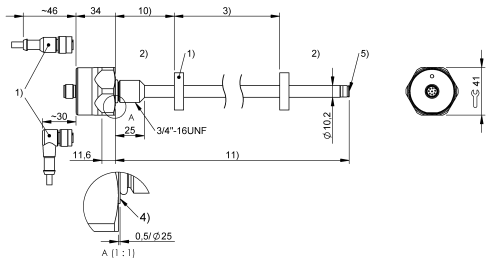
a = Z: mounting 3/4 inch thread + stu = S15: M12x1 connector 8-pin



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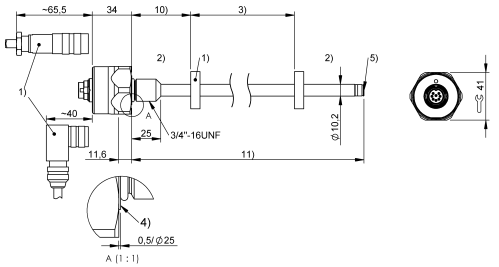

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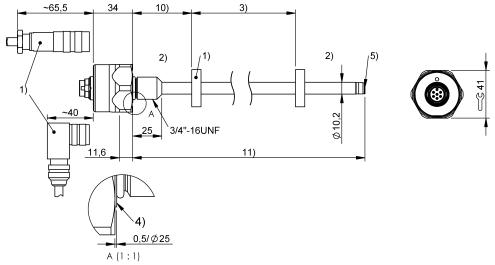

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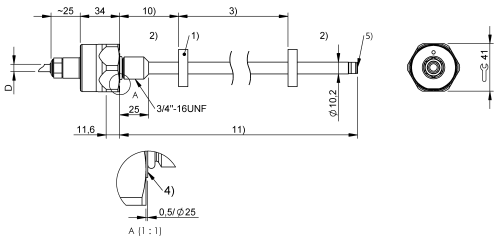

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