



BTL7-abcde-Mnnnn-fg-i-lm

BTL7

Magnetostrictive linear position sensor Generation 7

a interface

S = SSI

b Operating voltage

5 = 10 ... 30 V

c Interface characteristic 1

0 = 24 bits, binary, rising
1 = 24 bits, gray, rising
2 = 24 bits, binary, falling
3 = 24 bits, gray, falling
6 = 25 bits, binary, rising
7 = 25 bits, gray, rising
8 = 25 bits, binary, falling
9 = 25 bits, gray, falling
A = 26 bits, binary, rising
B = 26 bits, gray, rising
C = 26 bits, binary, falling
D = 26 bits, gray, falling

d Interface characteristic 2

1 = 1 µm
2 = 5 µm
3 = 10 µm
4 = 20 µm
5 = 40 µm
6 = 100 µm
7 = 2 µm
8 = 50 µm

e Interface characteristic 3

B = Synchronous mode
- = Asynchronous mode

Mnnnn Nominal length (4-position)

M0500 = metric in mm
(M0025...M1016: for rod diameter 8 mm)
(M0025...M5500: for rod diameter 10.2 mm)

f Style

A = Mounting threads M18x1.5, for flat seal
B = Mounting threads M18x1.5, for O-Ring

g Form factor characteristic

8 = Rod diameter 8 mm
- = Rod diameter 10.2 mm

i Variant

NEX = Ignition class "nA" and "tb"

l Connection type

S = Connector
KA = Cable (PUR)

m Connection type characteristic 1

for connector:
32 = M16x0.75 connector with 8 pins

for cable (length in meters):
02, 05, 10, 15, 20, 50, 100

Magnetostrictive Sensors

BTL7 -B-NEX- Series - SSI

BALLUFF

Display/Operation

Error value	cd = 10: all bits = 0 d = 1: all bits = 0 d = 7: all bits = 0 otherwise: only bits 2 ²¹ = 1
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Electrical connection

Polarity reversal protected	Ub up to 36 V
Short-circuit protection	to GND and to 36 V DC

Electrical data

Current consumption max. at 24 V DC	120 mA
Inrush current	nnnn < 1525: ≤ 500 mA/10 ms nnnn 1525...3000: ≤ 500 mA/25 ms nnnn 3001...5500: ≤ 500 mA/10 ms
Operating voltage Ub	10...30 VDC
Output signal adjustable	cd ≠ 10: no cd = 10: with software tool
Overvoltage protection	Ub up to 36 V
Switch-on delay max.	nnnn < 1525: 100 ms nnnn 1525...3000: 500 ms nnnn 3001...5500: 100 ms
Voltage-proof up to (GND to housing)	500 V DC

Environmental conditions

Ambient temperature	-40...60 °C
Cable temperature, fixed routing	I = KA: -40 °C ... 90 °C
Cable temperature, flexible routing	I = KA: -5 °C ... 90 °C
EN 55016-2-3, Radiation	For industrial and residential use
EN 60068-2-27, Continuous shock	150 g, 2 ms
EN 60068-2-27, Shock	150 g, 6 ms
EN 60068-2-6, Vibration	20 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	I = S: IP67 with connector I = KA: IP68
Relative humidity	≤ 90 %, non-condensing
Storage temperature	-40...70 °C
Surface temperature max.	135 °C
Temperature coefficient typ.	≤ 15 ppm/K at 50% of nominal stroke 500mm

Functional safety

MTTF (40 °C)	102 a
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General data

Approval/Conformity	CE CSA IECEX EAC WEEE
Ex marking	ATEX: II 3 G Ex nA IIC T4 Gc II 2 D Ex tb IIIC T135°C Db IP6x -40°C ≤ Ta ≤ +60°C EAC: 2Ex nA IIC T4 Gc X Ex tb IIIC T135 °C Db X -40 °C ≤ Ta ≤ +60 °C IECEX: Ex nA IIC T4 Gc Ex tb IIIC T135°C Db IP6x -40°C ≤ Ta ≤ +60°C NEC: NI: Class I, Division 2, Groups ABCD Class II, Division 2, Groups EFG T4 CAN: Class I, Zone 2, Ex nA IIC T4 Ex tb IIIC T135°C USA: Class I, Zone 2, AEx nA IIC Gc T4 AEx tb IIIC Db T135°C -40°C ≤ Ta ≤ +60°C
Magnets, number (factory setting)	1
Magnets, number max.	cd ≠ 10: 1 cd = 10: 2

Material

Cable flame-resistant	I = KA: IEC 60332-1
Cable jacket, material	I = KA: PUR
Cover material	Aluminum, Die-cast, nickel plated
Housing material	Aluminum
Housing material, surface protection	Anodized
Material flange	Stainless steel (1.3960)
Protection tube material	Stainless steel (1.4571)

Mechanical data

Installation length from contact surface	nnnn + 90 mm
Pressure rating max.	g ≠ 8: 600 bar g = 8: 250 bar
Pressure rating, note	when installed in hydraulic cylinder
Speed detectable max.	10 m/s
Tightening torque max.	100 Nm

Output/Interface

Interface	SSI
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Magnetostrictive Sensors
BTL7 -B-NEX- Series - SSI

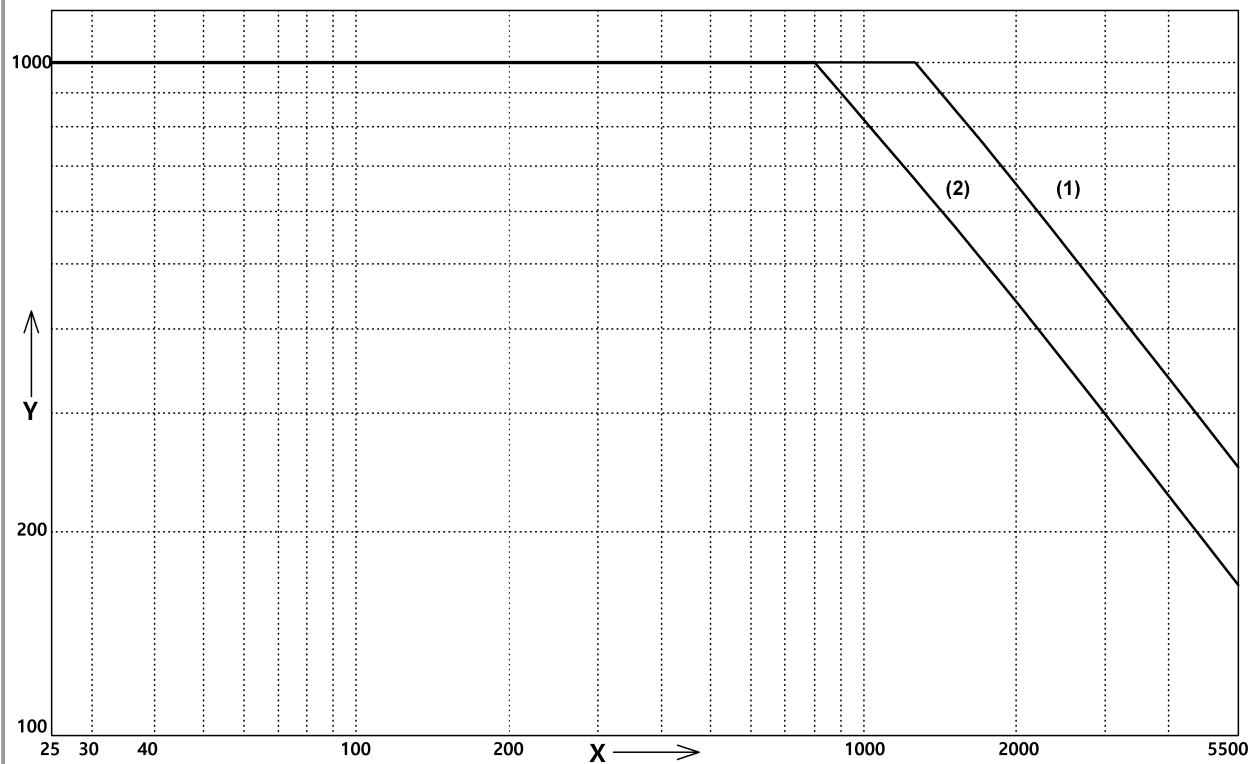


Range/Distance

Linearity deviation	d = 1, 2, 3, 7: $\pm 30\mu\text{m}$ d = 4, 5, 6, 8: $\pm 2\text{ LSB}$
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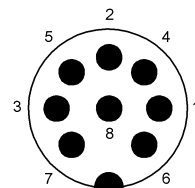
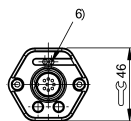
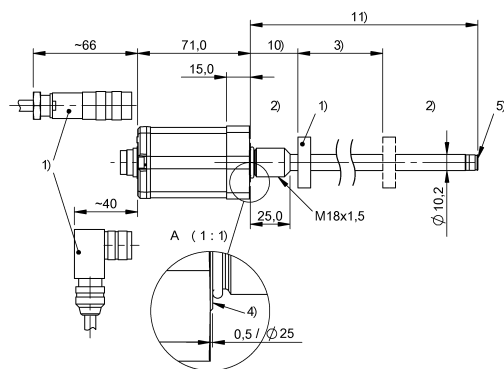
Measuring length	25...5500 mm
Repeat accuracy	$\leq \pm 5\ \mu\text{m}$
Sampling frequency max.	See illustration for measuring frequency

Characteristic Diagram



fA,min: 62,5 Hz
1) 1 magnet
2) 2...16 magnets
x: Nominal length [mm]
y: fA,max Hz

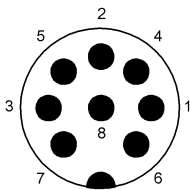
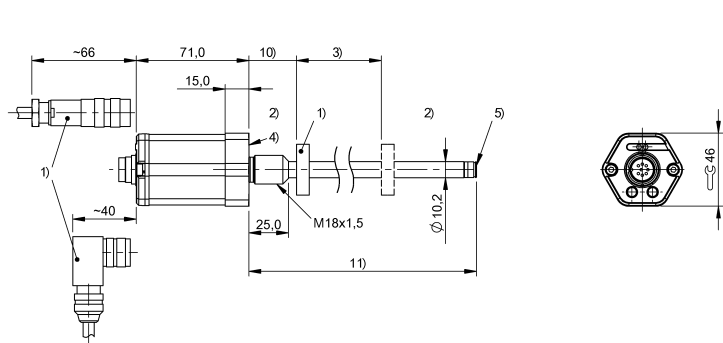
BTL7-S510x-Mxxxx-B-NEX-S32



PIN	
1	+Clk
2	+Data
3	-Clk
4	La
5	-Data
6	GND
7	10...30 V DC
8	Lb

- 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
- 6) LED function indicator
- 10) Null point
- 11) Installation length

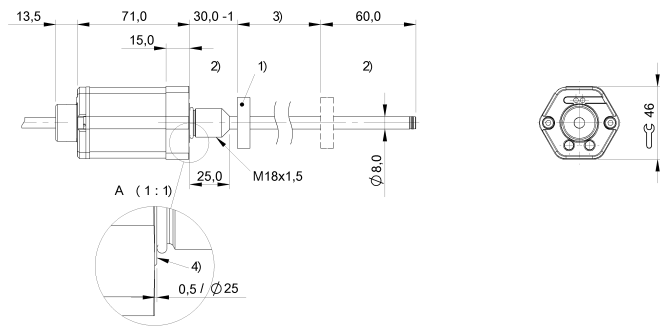
BTL7-S5xxx-Mxxxx-A-NEX-S32



PIN	
1	+Clk
2	+Data
3	-Clk
4	NC
5	-Data
6	GND
7	10...30 V DC
8	NC

- 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

BTL7-S5xxx-Mxxxx-B8-NEX-KAxx



PIN	
YE	+Clk
GY	+Data
PK	-Clk
RD	NC
GN	-Data
BU	GND
BN	10...30 V DC
WH	NC

- 1) not included in scope of delivery
- 2) Non-usable area
- 3) Nominal length = Measuring length
- 4) Mounting surface