



## BTL7-abcde-Mnnnn-fh-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  $\mu$ m  
2 = 5  $\mu$ m  
3 = 10  $\mu$ m  
4 = 20  $\mu$ m  
5 = 40  $\mu$ m  
6 = 100  $\mu$ m  
7 = 2  $\mu$ m  
8 = 50  $\mu$ m  
9 = 0.5  $\mu$ m

#### e Interface characteristic 3

D = Synchronous / configurable

#### Mnnnn Nominal length (4-position)

M0500 = metric in mm  
(M0025...M7620: with 10.2 mm rod diameter)

#### f Form factor

TB = Mounting threads M18x1.5, for O-Ring

#### h Redundancy

2 = 2 times redundant  
3 = 3 times redundant

#### l Connection type

S = Connector  
KA = Cable (PUR)  
FA = Cable (PTFE)

#### m Connection type characteristic 1

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

for cable (length in meters):  
02, 05, 10,  
15, 20 (only when h = 2 and Mnnnn < 2541 mm)

## Basic features

|                                   |                                                                 |
|-----------------------------------|-----------------------------------------------------------------|
| Approval/Conformity               | I = S, KA: CE + UKCA + cULus + WEEE<br>I = FA: CE + UKCA + WEEE |
| Magnets, number (factory setting) | 1                                                               |
| Magnets, number max.              | nnnn < 90: 1<br>nnnn > 89: 2                                    |

## Display/Operation

|             |                                                                                                               |
|-------------|---------------------------------------------------------------------------------------------------------------|
| Error value | d = 1: all bits = 0<br>d = 7: all bits = 0<br>d = 9: all bits = 0<br>otherwise: only bits 2 <sup>21</sup> = 1 |
|-------------|---------------------------------------------------------------------------------------------------------------|

## 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  | 150 mA per unit         |
| Inrush current                       | ≤ 500 mA/10 ms per unit |
| Operating voltage Ub                 | 10...30 VDC             |
| Output signal adjustable             | with software tool      |
| Overvoltage protection               | Ub up to 36 V           |
| Switch-on delay max.                 | 600 ms                  |
| Voltage-proof up to (GND to housing) | 500 V AC                |

## Environmental conditions

|                                     |                                                       |
|-------------------------------------|-------------------------------------------------------|
| Ambient temperature                 | -40...85 °C                                           |
| Cable temperature, fixed routing    | I = KA: -40 °C ... 90 °C<br>I = FA: -40 °C ... 200 °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     | 100 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                                                  |
| Relative humidity                   | ≤ 90 %, non-condensing                                |
| Storage temperature                 | -40...100 °C                                          |
| Temperature coefficient typ.        | ≤ 30 ppm/K                                            |

## Functional safety

|      |                            |
|------|----------------------------|
| MTTF | h = 2: 69 a<br>h = 3: 39 a |
|------|----------------------------|

## Interface

|           |     |
|-----------|-----|
| Interface | SSI |
|-----------|-----|

## Material

|                                      |                             |
|--------------------------------------|-----------------------------|
| Cable flame-resistant                | I = KA, FA: IEC 60332-1     |
| Cable jacket, material               | I = KA: PUR<br>I = FA: PTFE |
| Cover material                       | Aluminium, Anodized         |
| Housing material                     | Aluminium, Anodized         |
| Housing material, surface protection | Anodized                    |
| Material flange                      | 1.4404 stainless steel      |
| Protection tube material             | 1.4571 stainless steel      |

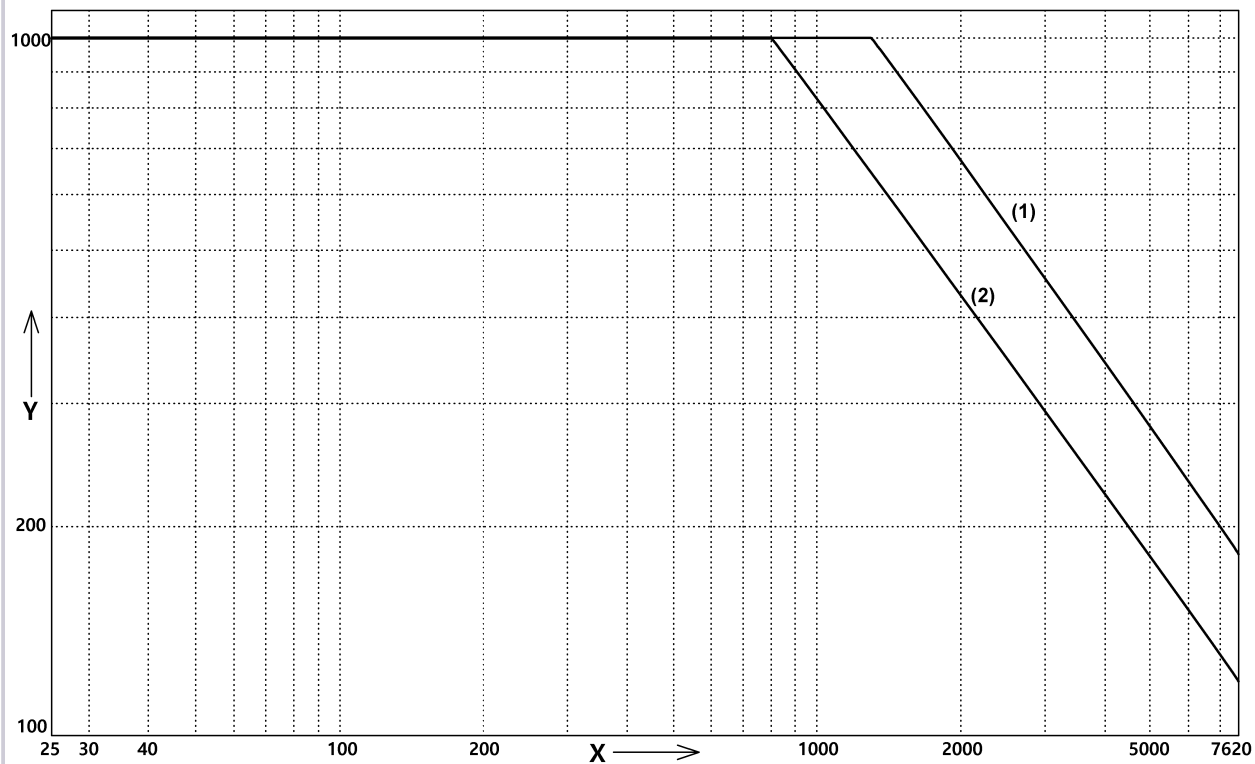
## Mechanical data

|                                          |                                                   |
|------------------------------------------|---------------------------------------------------|
| Installation length from contact surface | nnnn + 90 mm                                      |
| Pressure rating max.                     | nnnn = 25...2000: 600 bar<br>nnnn > 2000: 300 bar |
| Pressure rating, note                    | when installed in hydraulic cylinder              |
| Speed detectable max.                    | 10 m/s                                            |
| Tightening torque max.                   | 100 Nm                                            |

## Range/Distance

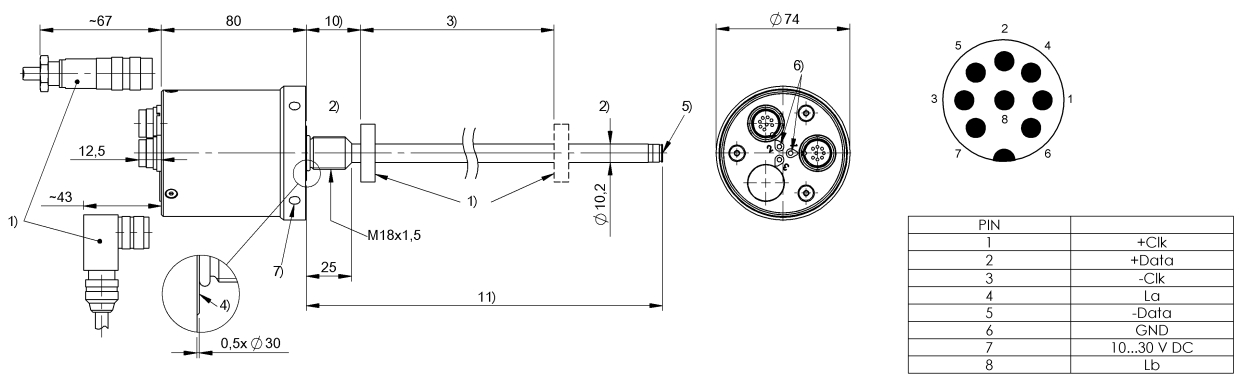
|                         |                                                                                 |
|-------------------------|---------------------------------------------------------------------------------|
| Linearity deviation     | d = 1, 2, 3, 7, 9:<br>nnnn = 25...2000: ± 60 µm<br>nnnn = 2001...5500: ± 200 µm |
|                         | d = 4, 5:<br>nnnn = 25...2000: ± 4 LSB<br>nnnn = 2001...5500: ± 200 µm          |
|                         | d = 6, 8:<br>nnnn = 25...5500: ± 4 LSB                                          |
|                         | nnnn > 5500: ± 0.04% FS                                                         |
| Measuring length        | 25...7620 mm                                                                    |
| Null point              | 30 mm                                                                           |
| Repeat accuracy         | ≤ ± 5 µm                                                                        |
| Sampling frequency max. | See illustration for measuring frequency                                        |

Characteristic Diagram



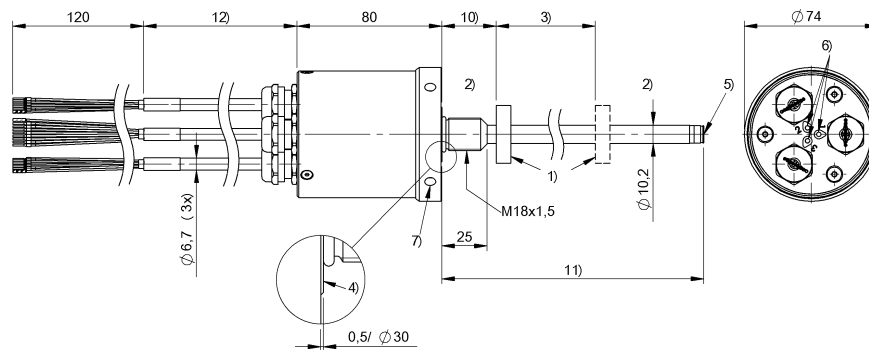
fA,min: 62,5 Hz  
1) 1 magnet  
2) 2 magnets  
x: Nominal length [mm]  
y: fA,max Hz

BTL7-S5xxD-Mxxxx-TB2-S32



- 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
- 7) Ø6.1 for hook wrench Ø74
- 10) Null point
- 11) Installation length

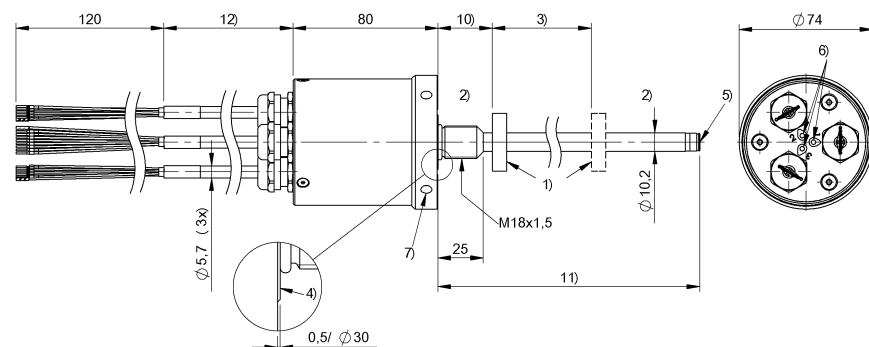
## BTL7-S5xxD-Mxxxx-TB3-KAxx



| PIN |              |
|-----|--------------|
| YE  | +Clk         |
| GY  | +Data        |
| PK  | -Clk         |
| RD  | La           |
| GN  | -Data        |
| BU  | GND          |
| BN  | 10...30 V DC |
| WH  | 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
- 7)  $\varnothing 6.1$  for hook wrench  $\varnothing 74$
- 10) Null point
- 11) Installation length
- 12) Cable length

## BTL7-S5xxD-Mxxxx-TB3-FAxx



| PIN |              |
|-----|--------------|
| YE  | +Clk         |
| GY  | +Data        |
| PK  | -Clk         |
| RD  | La           |
| GN  | -Data        |
| BU  | GND          |
| BN  | 10...30 V DC |
| WH  | 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
- 7)  $\varnothing 6.1$  for hook wrench  $\varnothing 74$
- 10) Null point
- 11) Installation length
- 12) Cable length