

Magnetostrictive Sensors
BTL C1 - Profil PF - Analog

BALLUFF



BTL abcdef-nnnn-ghijklmo-pqrstu

BTL

Magnetostrictive linear position sensor

a Mounting

P = Profile

b Housing geometry

F = Profile 35x20.8 mm, alu, axial

c Detailed design 1

0 = no fixing clamp
1 = fixing clamp profile 1

d Detailed design 2

4 = zero point= 67 mm

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 zero point
C = 0..20 mA increasing from zero point
E = 4..20 mA increasing from zero point
1 = 10..0 V decreasing from zero point
3 = 20..0 mA decreasing from zero point
5 = 20..4 mA decreasing from zero point

l Characteristic Interface 2

0 = none
A = 0..10 V increasing from zero point
C = 0..20 mA increasing from zero point
E = 4..20 mA increasing from zero point
1 = 10..0 V decreasing from zero point
3 = 20..0 mA decreasing from zero point
5 = 20..4 mA decreasing from 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*
A = Signal 1= Position (+ IO-Link)
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
A = Faster sampling rate

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

00 = no connector
32 = connector, M16, 8-pin
15 = connector, M12, 8-pin
35 = connector, M16, 6-pin

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 I = A, 1 AND o = 0: 80 mA k = A, 1 AND I = A, 1 AND o = A: 90 mA k = E, 5 AND I = E, 5 AND o = 0: 110 mA k = E, 5 AND I = E, 5 AND o = A: 120 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. | 500 ms |
| Voltage-proof up to (GND to housing) | 500 V DC |

Environmental conditions

| | |
|-------------------------------------|---|
| Ambient temperature | -25...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 with connector |
| Relative humidity | ≤ 90 %, non-condensing |
| Storage temperature | -25...100 °C |
| Temperature coefficient typ. | ≤ 30 ppm/K at 50% of nominal stroke 500mm |

Functional safety

| | |
|------|--|
| MTTF | k = A, 1: 143 a k = C, E, 3, 5: 130 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 | Zinc, Die casting |
| Housing material | Aluminium, Anodized |
| Housing material, surface protection | Anodized |

Mechanical data

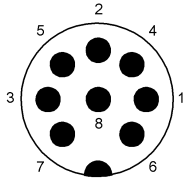
| | |
|-----------------------|---------------|
| Overall Length | nnnn + 137 mm |
| Speed detectable max. | 10 m/s |

Range/Distance

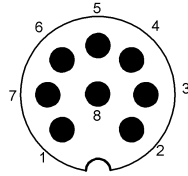
| | |
|-------------------------|--|
| Linearity deviation | nnnn = 0050...0500: ± 60 µm nnnn ≥ 0500: ± 0.012% FS |
| Measuring length | 25...4000 mm |
| Null point | 67 mm |
| Repeat accuracy | nnnn ≤ 0500: ≤ ± 10 µm nnnn > 0500: ≤ ± 0.002% FS |
| Resolution, position | k = A, 1: 183 µV at least 4 µm k = C, E, 3, 5: 351 nA at least 4 µm |
| Sampling frequency max. | o = A AND n = 25...240: 4000 Hz o = A AND n = 241...590: 2000 Hz o = A AND n = 591...1270: 1000 Hz o = 0 AND n = 25...1270: 1000 Hz o = 0, A AND n = 1271...2650: 500 Hz o = 0, A AND n = 2651...4000: 250 Hz |

Connector Diagramm

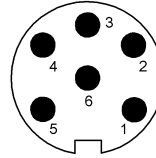
stu = S32: M16 connector, 8 pole



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 |

M12 connector, 8 pole / 1 output

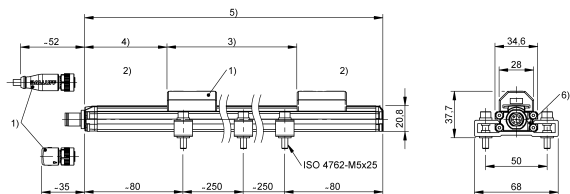
| Pin | Signal |
|-----|--------------------------|
| 1 | NC |
| 2 | 0 V (Output 1) |
| 3 | NC |
| 4 | C/Q (communication line) |
| 5 | Output 1 |
| 6 | GND |
| 7 | +UB |
| 8 | NC |

Cable outlet axial

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

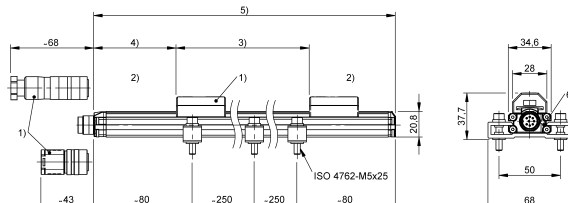
Product View

ab = PF: Profil 35x20,8 mm + stu = S15



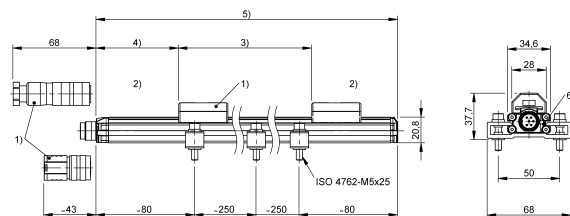
- 1) not included in scope of delivery
- 2) Non-usable area
- 3) Nominal length = Measuring length
- 4) Null point
- 5) Overall length
- 6) LED function indicator

ab = PF: Profil 35x20,8 mm + stu = S32



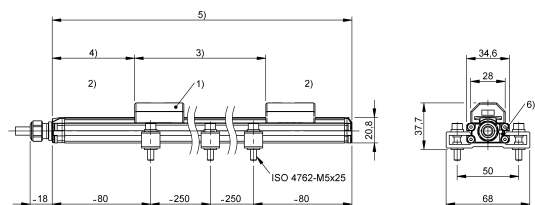
- 1) not included in scope of delivery
- 2) Non-usable area
- 3) Nominal length = Measuring length
- 4) Null point
- 5) Overall length
- 6) LED function indicator

ab = PF: Profil 35x20,8 mm + stu = S35



- 1) not included in scope of delivery
- 2) Non-usable area
- 3) Nominal length = Measuring length
- 4) Null point
- 5) Overall length
- 6) LED function indicator

ab = PF: Profil 35x20,8 mm + p = C: cable PUR



- 1) not included in scope of delivery
- 2) Non-usable area
- 3) Nominal length = Measuring length
- 4) Null point
- 5) Overall length
- 6) LED function indicator