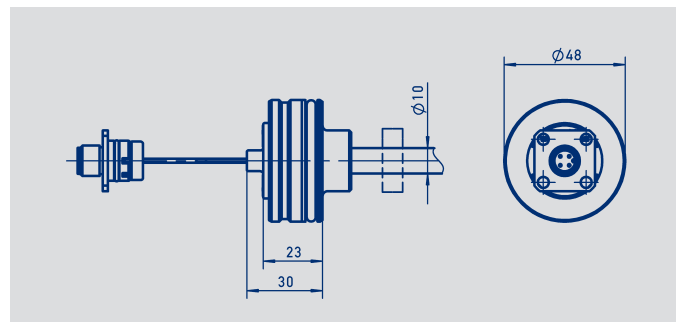
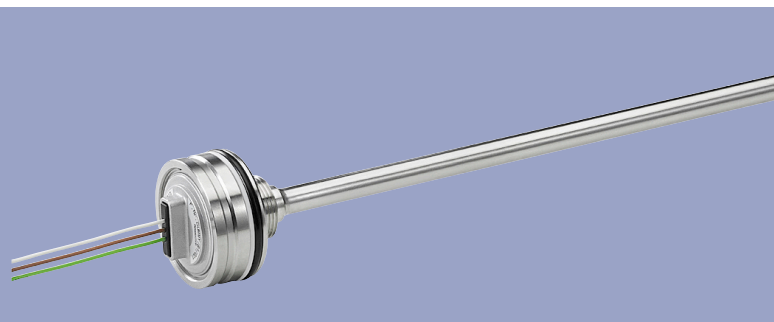
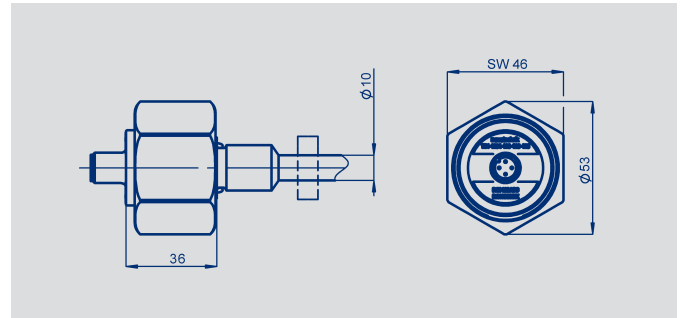
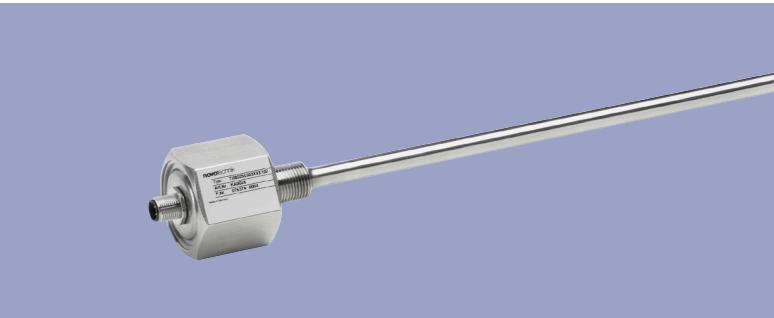


Product discontinued!
Replaced by series TM1.

Transducer
up to 2500 mm
touchless
absolute

Series TIM



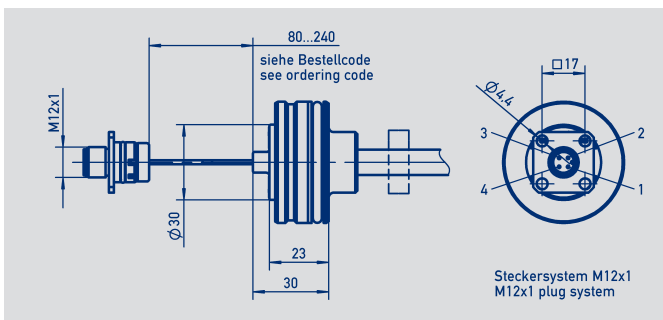
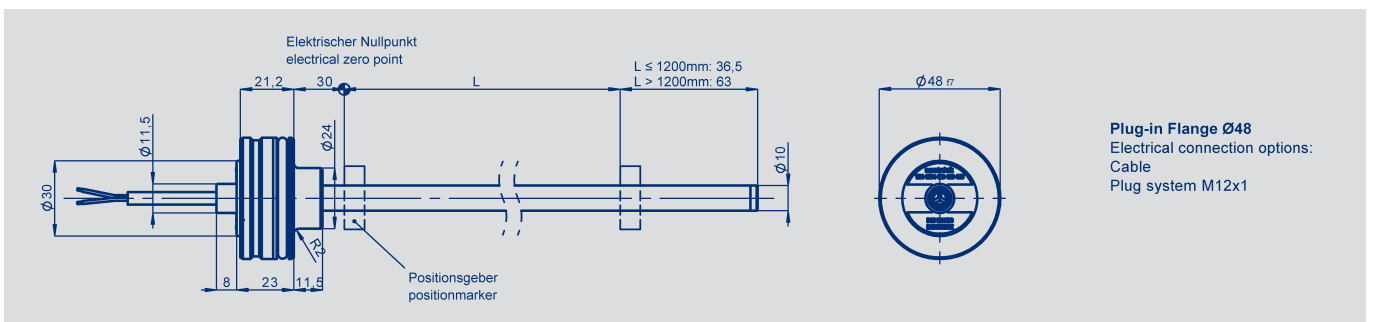
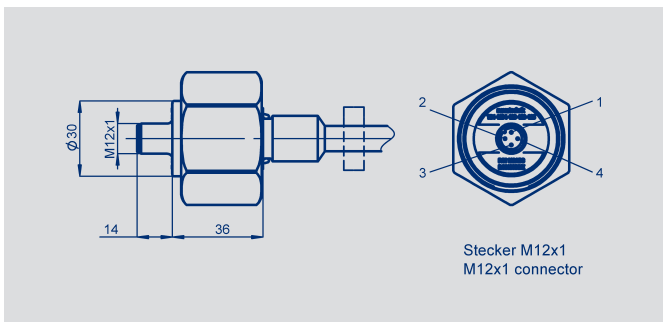
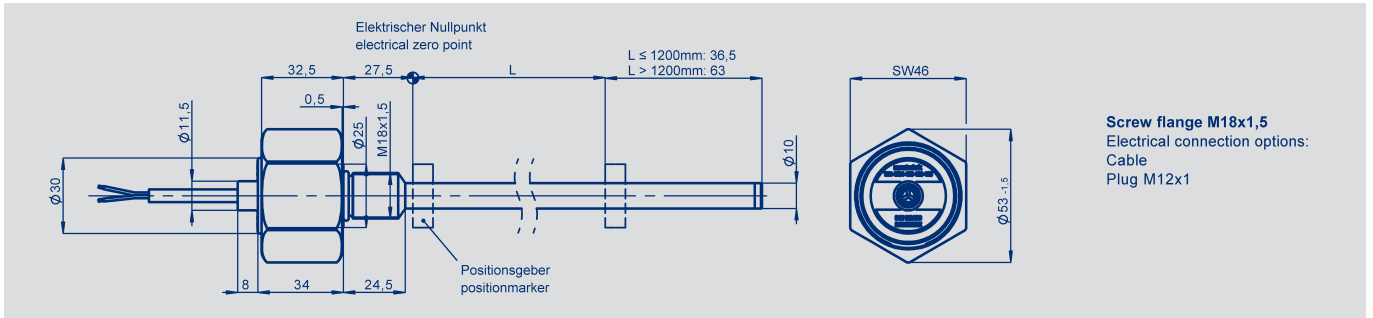
Special features

- Rod style transducer
- For integration in pneumatic and hydraulic cylinders
- Operating pressure up to 350 bar, peaks up to 450 bar
- Touchless magnetostrictive measurement technology
- Ring-shaped position marker does not contact sensor
- Unlimited mechanical life
- No velocity limit for position marker
- Absolute output
- Outstanding accuracy performance up to 0.04 %
- Analog (current, voltage) and fieldbus interfaces
- Wide range of supply voltage
- EMC for mobile applications
- Immunity against HF fields up to 200 V/m
- Screw flange M18x1.5 or plug-in flange Ø 48 mm
- Optionally plug, cable or lead wire connection
- Simple integration in cylinders with M12 plug-system

Applications

- Hydraulic or pneumatic cylinders in
- Agricultural and forestry machinery
 - Construction machines
 - Vehicles with loading and unloading devices
 - Vehicles with extension arms

Mechanical Data



Technical Data Analog Versions

| Type designations | TIM - - - - - 3 - - - - 841 - - - - TIM - - - - - 3 - - - - 851 - - - - Analog voltage | TIM - - - - - 3 - - - - 911 - - - - Analog voltage | TIM - - - - - 3 - - - - 821 - - - - Analog current | |
|---|---|---|---|--|
| Mechanical Data | | | | |
| Dimensions | see drawing | | | |
| Electrical Data | | | | |
| Electrical measuring range (dimension L) | 0050 up to 2500 0050 up to 1000 in 50 mm steps, 1000 up to 2000 in 100 mm steps, 2000 up to 2500 in 250 mm steps. Other lengths in 10 mm steps on request. | | | mm |
| Absolute linearity | 50 ... 250 mm: $\leq \pm 0.1$ 260 ... 2000 mm: $\leq \pm 0.04$ 2010 ... 2500 mm: $\leq \pm 0.8$ | | | mm % FS mm |
| Tolerance of electrical zero point | ≤ 1 | | | mm |
| Output signal | 0.5 ... 4.5 VDC 0.25 ... 4.75 VDC (load $\geq 10\text{ k}\Omega$) | 0.1 ... 10.0 VDC (load $\geq 10\text{ k}\Omega$) | 4.0 ... 20.0 mA (burden $\leq 500\ \Omega$ at 24 VDC) (burden $\leq 250\ \Omega$ at 12 VDC) | |
| Update rate | > 500 | | | Hz |
| Resolution | typ. 0.1 | | | \pm mm |
| Repeatability | 0.1 | | | \pm mm |
| Hysteresis | 0.1 | | | \pm mm |
| Supply voltage | 8 ... 32 | 16 ... 34 | 8 ... 32 | VDC |
| Supply voltage ripple | < 1 | | | % ss |
| Power consumption without load | < 1 | | | W |
| Temperature coefficient | typ. 50 | | | ppm/K |
| Overvoltage protection | 36 (GND - supply) | | | VDC |
| Polarity protection | -36 | | | VDC |
| Insulation resistance (500 VDC) | ≥ 10 (GND vs. housing, for 60 s) | | | M Ω |
| Cross-section cable | AWG 20, 0.5 | | | mm ² |
| Environmental Data | | | | |
| Operating temperature range | -40 ... +105 with cable connection and M12 plug system -40 ... +85 with M12 connector | | - | $^{\circ}\text{C}$ $^{\circ}\text{C}$ |
| Operating humidity range | 0...90 (no condensation) | | | % R.H. |
| Shock per DIN IEC68T2-27 | 100 (11 ms) (single hit) | | | g |
| Vibration per DIN IEC68T2-6 | 20 (r.m.s) (10...2000 Hz) | | | g |
| Protection class per DIN EN 60529 | IP67 (M12x1 plug system IP69K, plugged) | | | |
| Pressure rating | | | | |
| Working pressure | ≤ 350 | | | bar |
| Pressure peaks | ≤ 450 | | | bar |
| Burst pressure | ≤ 600 | | | bar |
| Operating speed of position marker | mechanically unlimited | | | |
| Functional safety | When using our products in safety-related systems please contact us | | | |
| EMC compatibility* | ISO 14982 Agricultural and forestry machines EN 13309 Construction machines ISO 10605 Packaging and Handling + Component Test (ESD) ISO 11452-2 Radiated EM HF-Fields, Absorberhall 200 V/m ISO 11452-4 BCI (Bulk Current Injection) 200 mA CISPR25 Radiated Emission ISO 7637-1/2 Transient Impulses | | | |

*) The EMC measurements are performed in a reference cylinder. The values can deviate when using different cylinders.

Ordering Specifications
Analog Versions

Ordering specifications

Operating voltage

8: 12/24 V mobile electronic (8 ... 32 V)
9: 24 V mobile electronic (16 ... 34 V)

Output signal at supply = 12/24 V

2: 4 ... 20 mA
4: 0.5 ... 4.5 V
5: 0.25 ... 4.75 V

Output signal at supply = 24 V

1: 0.1 V ... 10 V

Output characteristics

1: Positive gradient, seen from flange

Electrical connection

104: 4-pin round connector M12x1 **
251: 3-pin cable, 1.0 m, unshielded
253: 3-pin cable, 3.0 m, unshielded
255: 3-pin cable, 5.0 m, unshielded
260: 3-pin cable, 10 m, unshielded
438: Plug system M12x1, 4-pin, with wires 80 mm *
442: Plug system M12x1, 4-pin, with wires 120 mm *
446: Plug system M12x1, 4-pin, with wires 160 mm *
450: Plug system M12x1, 4-pin, with wires 200 mm *
454: Plug system M12x1, 4-pin, with wires 240 mm *

* only plug-in flange

** only screw flange

T I M - 0 5 0 0 - 3 0 5 - 8 5 1 - 2 5 1

Series

Electrical measuring range

Multiple standard lengths from 0050 up to 2500 mm

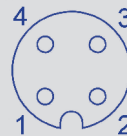
Mechanical version

305: Plug-in flange Ø 48 mm
306: Screw flange M18x1.5

Pin assignment

| Output connector | Output cable | Signal |
|------------------|--------------|----------------|
| Code 104, 4 __ | Code 2 __ | |
| PIN 1 | BN brown | Supply |
| PIN 2 | GN green | Output signal |
| PIN 3 | WH white | GND |
| PIN 4 | - | do not connect |

Pin assignment, A-coded



Technical Data



| | | |
|---|---|------------------|
| Type designations | TIM - - - - - 3 _ - -64 _ - - - - Digital CANopen | |
| Mechanical Data | | |
| Dimensions | see drawing | |
| Electrical Data | | |
| Measurement | Position and speed | |
| Electrical measuring range (dimension L) | 0050 up to 2500 0050 up to 1000 in 50 mm steps, 1000 up to 2000 in 100 mm steps, 2000 up to 2500 in 250 mm steps. Other lengths in 10 mm steps on request. | mm |
| Measuring range speed | 0 ... 1000 | mm/s |
| Output signal / protocol | CANopen protocol to CiA DS-301 V4.02, Encoder profile DS-406 V3.2, LSS services to CiA DS-305 | |
| Prgrammable parameter | Node ID, baud rate | |
| Node ID | 0 ... 127 (default 127) | |
| Baud rate | 10 ... 1000 see ordering code | kBaud |
| Resolution position | 0.1 | |
| Resolution speed | 1 | |
| Update rate | 1 | |
| Absolute linearity | 50 ... 250 mm: $\leq \pm 0.1$ 260 ... 2000 mm: $\leq \pm 0.04$ 2010 ... 2500 mm: $\leq \pm 0.8$ | mm % FS mm |
| Tolerance of electrical zero point | 0.2 | |
| Repeatability | 0.1 | |
| Hysteresis | 0.1 | |
| Supply voltage | 12/24 (8 ... 32) | |
| Supply voltage ripple | < 1 | |
| Power consumption without load | < 1.5 | |
| Temperature coefficient | typ. 50 | |
| Overvoltage protection | 36 (GND - supply) | |
| Polarity protection | -36 | |
| Insulation resistance (500 VDC) | ≥ 10 (GND vs. housing, for 60 s) | |
| Bus termination internal | without | |
| Environmental Data | | |
| Operating temperature range | -40 ... +105 with cable connection and M12 plug system -40 ... +85 with M12 connector | °C °C |
| Operating humidity range | 0...90 (no condensation) | |
| Shock per DIN IEC68T2-27 | 100 (11 ms) (single hit) | |
| Vibration per DIN IEC68T2-6 | 20 (r.m.s) (10...2000 Hz) | |
| Protection class per DIN EN 60529 | IP67 (M12x1 plug system IP69K, plugged) | |
| Pressure rating | | |
| Working pressure | ≤ 350 | bar |
| Pressure peaks | ≤ 450 | bar |
| Burst pressure | ≤ 600 | bar |
| Operating speed of position marker | mechanically unlimited | |
| Functional safety | When using our products in safety-related systems please contact us | |
| EMC compatibility* | ISO 14982 Agricultural and forestry machines EN 13309 Construction machines ISO 10605 Packaging and Handling + Component Test (ESD) ISO 11452-2 Radiated EM HF-Fields, Absorberhall 200 V/m ISO 11452-4 BCI (Bulk Current Injection) 200 mA CISPR25 Radiated Emission ISO 7637-1/2 Transient Impulses | |

*) The EMC measurements are performed in a reference cylinder. The values can deviate when using different cylinders.

Ordering specifications

Interface

6: CANopen interface to CiA DS-406, supply = 12/24 V (8...32 V)

Interface parameter

1: 1 x position and 1 x speed (1 position marker)

Baud rate

- 1: baud rate 1000 kBaud
- 2: baud rate 800 kBaud
- 3: baud rate 500 kBaud
- 4: baud rate 250 kBaud
- 5: baud rate 125 kBaud
- 7: baud rate 50 kBaud
- 8: baud rate 20 kBaud
- 9: baud rate 10 kBaud

Electrical connection

- 106: 5-pin round connector M12x1 **
- 468: Connector system M12x1, 5-pin, with wires 80 mm *
- 472: Connector system M12x1, 5-pin, with wires 120 mm *
- 476: Connector system M12x1, 5-pin, with wires 160 mm *
- 480: Connector system M12x1, 5-pin, with wires 200 mm *
- 484: Connector system M12x1, 5-pin, with wires 240 mm *

* only plug-in flange
** only screw flange

T I M - 0 5 0 0 - 3 0 5 - 6 1 4 - 4 6 8

Series

Electrical measuring range

Standard lengths
from 0050 up to 2500 mm

Mechanical version

305: Plug-in flange Ø 48 mm
306: Screw flange M18x1.5

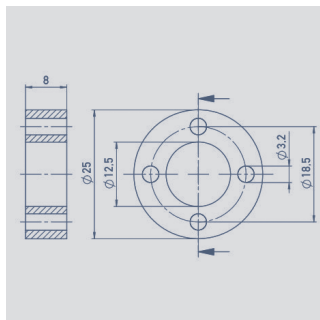
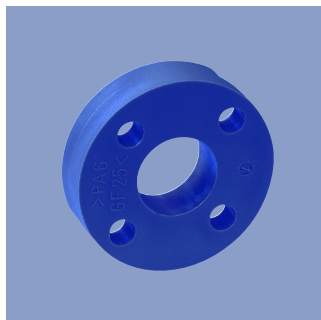
Pin assignment

| Output connector | Signal |
|------------------|----------------|
| Code 106, 4 _ _ | |
| Pin 1 | do not connect |
| Pin 2 | Supply |
| Pin 3 | GND |
| Pin 4 | CAN_H |
| Pin 5 | CAN_L |

Pin assignment, A-coded



Accessories
Position marker

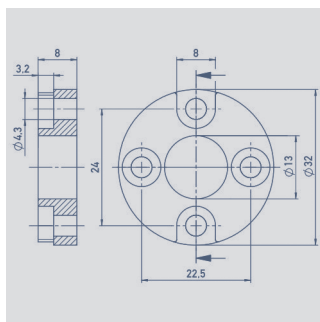
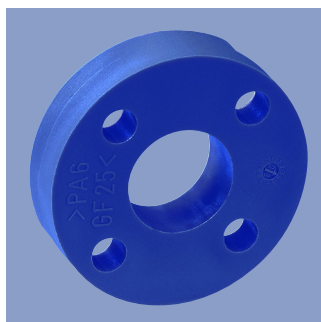


Ring Position Marker Z-TH1-P18

P/N 005697

Series TH1 / TIM

| | |
|---|----------------------|
| Material | PA6-GF25 |
| Weight approx. | 12 g |
| Operating temperature | -40 ... +100° C |
| Surface pressure max. | 40 N/mm ² |
| Fastening torque of mounting screws, max. | 1 Nm |

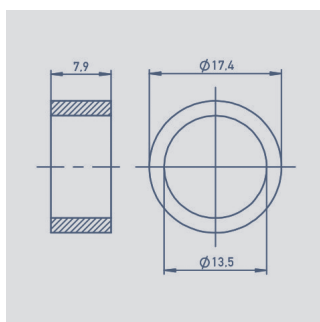
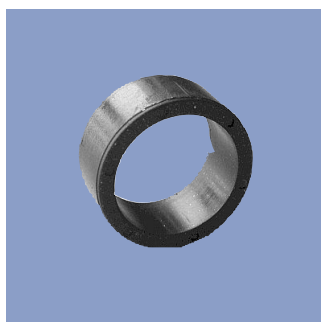


Ring Position Marker Z-TH1-P19

P/N 005698

Series TH1 / TIM

| | |
|---|----------------------|
| Material | PA6-GF25 |
| Weight approx. | 14 g |
| Operating temperature | -40 ... +100°C |
| Surface pressure max. | 40 N/mm ² |
| Fastening torque of mounting screws, max. | 1 Nm |

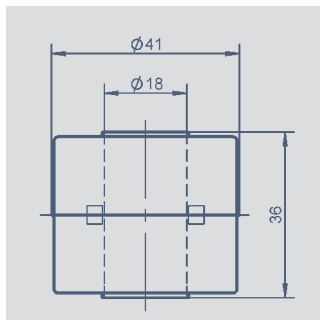
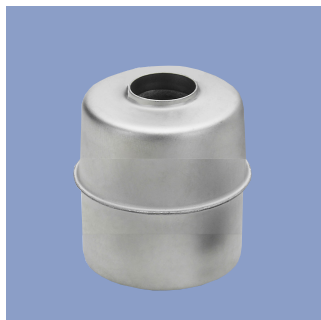


Ring Position Marker Z-TIM-P20

P/N 005699

Series TH1 / TIM

| | |
|--|----------------------|
| Material | PA-Neonbond Compound |
| Weight approx. | 5 g |
| Operating temperature | -40 ... +100°C |
| Surface pressure max. | 10 N/mm ² |
| Mounting via lock washer and lock ring | |



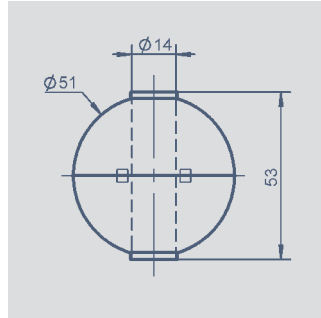
Cylinder - Floating Position Marker Z-TH1-P21

P/N 056044

Series TH1 / TIM

| | |
|----------------------------|-----------------------|
| Material | 1.4404 |
| Weight approx. | 20 g |
| Operating temperature | -40 ... +100°C |
| Compression strength, min. | < 8 bar |
| Density | 740 kg/m ³ |
| Immersion depth in water | 26,6 mm |

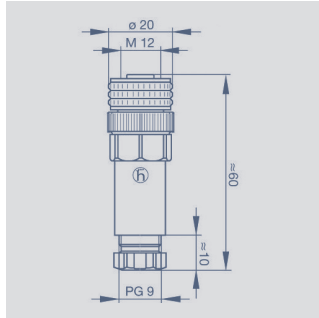
Accessories
Position marker



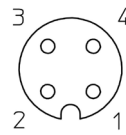
Bowl - Floating Position Marker Z-TH1-P22
P/N 056045
Series TH1 / TIM

| | |
|----------------------------|-----------------------|
| Material | 1.4571 |
| Weight approx. | 42 g |
| Operating temperature | -40 ... +100°C |
| Compression strength, min. | < 60 bar |
| Density | 720 kg/m ³ |
| Immersion depth in water | 36,7 mm |

Accessories
Connector System M12



Pin assignment

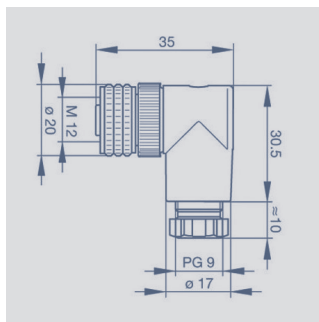


M12x1 Mating female connector, 4-pin, straight, A-coded, with coupling nut, screw termination, IP67, not shielded

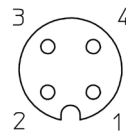
Connector housing Plastic PBT
-25 °C...+90 °C

For wire gauge 6...8 mm, max. 0.75 mm²

Type EEM 33-88, P/N 005633



Pin assignment

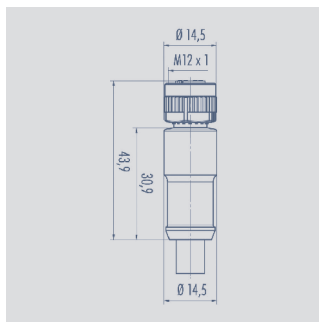


M12x1 Mating female connector, 4-pin, angled, A-coded, with coupling nut, screw termination, IP67, not shielded

Connector housing Plastic PBT
-25 °C...+90 °C

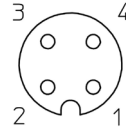
For wire gauge 6...8 mm, max. 0.75 mm²

Type EEM 33-89, P/N 005634



Pin assignment

- 1 = brown
- 2 = white
- 3 = blue
- 4 = black



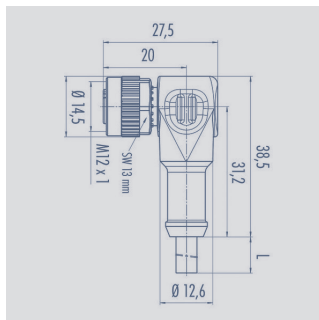
M12x1 Mating female connector, 4-pin, straight, A-coded, with molded cable, not shielded, IP67, open ended

Connector housing Plastic PA

Cable sheath PUR; Ø = max. 6 mm, -40 °C...+85 °C (fixed)

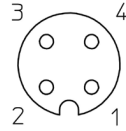
Wires PP, 0.34 mm²

| Length | Type | P/N |
|--------|-----------|--------|
| 2 m | EEM 33-35 | 056135 |
| 5 m | EEM 33-36 | 056136 |
| 10 m | EEM 33-37 | 056137 |



Pin assignment

- 1 = brown
- 2 = white
- 3 = blue
- 4 = black



M12x1 Mating female connector, 4-pin, angled, A-coded, with molded cable, not shielded, IP67, open ended

Connector housing Plastic PA

Cable sheath PUR; Ø = max. 6 mm, -40 °C...+85 °C (fixed)

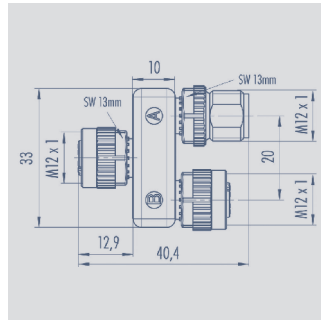
Wires PP, 0.34 mm²

| Length | Type | P/N |
|--------|-----------|--------|
| 2 m | EEM 33-38 | 056138 |
| 5 m | EEM 33-39 | 056139 |
| 10 m | EEM 33-40 | 056140 |

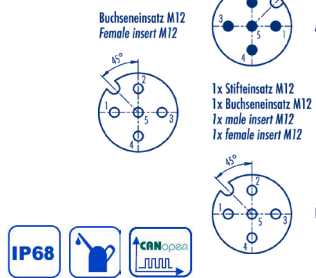
Novotechnik
Messwertaufnehmer OHG
Postfach 4220
73745 Ostfildern (Ruit)
Horbstraße 12
73760 Ostfildern (Ruit)
Telefon +49 711 4489-0
Telefax +49 711 4489-118
info@novotechnik.de
www.novotechnik.de



© 05/2015
Subject to change.
Printed in Germany.



Pin assignment

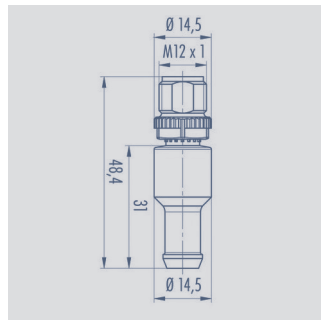


M12x1 splitter / T-connector, 5-pin, A-coded, IP68, 1:1 connection, female - male - female, CAN-Bus

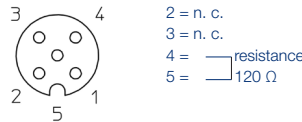
Connector housing PUR

Temperature range -25 °C... +85 °C

Type EEM 33-45, P/N 056145



Pin assignment

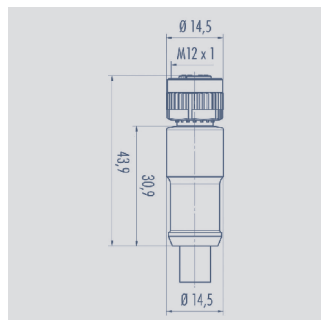


M12x1 terminating resistor, 5-pin, A-coded, IP67, 120 Ω resistance, CAN-Bus

Connector housing PUR

Temperature range -25 °C... +85 °C

Type EEM 33-47, P/N 056147



Pin assignment

- 1 = shield
- 2 = red (0,34 mm²)
- 3 = black (0,34 mm²)
- 4 = white (0,25 mm²)
- 5 = blue (0,25 mm²)

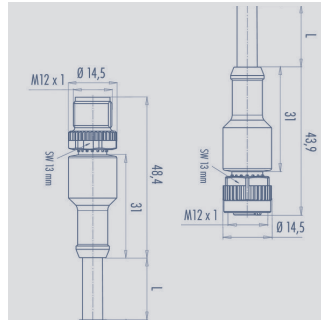
M12x1 Mating female connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded, open ended, CAN-Bus

Connector housing PUR

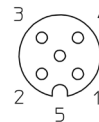
Cable sheath PUR Ø = max. 7.2 mm, -25 °C...+85 °C (moved)

Wires PP 2x 0.25 mm² + 2 x 0.34 mm²

| Length | Type | P/N |
|--------|-----------|--------|
| 2 m | EEM 33-41 | 056141 |
| 5 m | EEM 33-42 | 056142 |
| 10 m | EEM 33-43 | 056143 |



Pin assignment



M12x1 Mating female connector, 5-pin, straight, A-coded, with molded cable, IP68, CAN-Bus

Connector housing PUR

Cable sheath PUR; Ø 7.2 mm -25 °C... +85 °C (fixed)

| Length | Type | P/N |
|--------|-----------|--------|
| 5 m | EEM 33-44 | 056144 |

