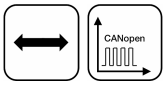
novotechnik
Siedle Group

# NOVOSTRICTIVE
# Transducer
# Touchless

## TM1
Plug-in Flange
CANopen
**Industrial**

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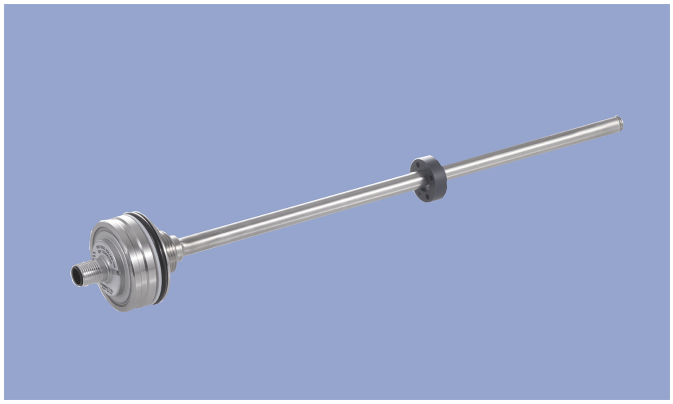


### Special Features
- Compact design for tight spaces
- Touchless magnetostrictive measurement technology
- Operating pressure up to 350 bar, peaks up to 450 bar
- Non-contacting position detection with ring-shaped position marker
- Unlimited mechanical life
- No velocity limit for position marker
- Absolute output
- Outstanding accuracy performance up to 0.04 %
- Wide range of supply voltage
- Optimized for use in industrial applications
- Other configurations see separate data sheets

### Applications
- Manufacturing Engineering
- Level measurement
- Actuators

The absolute linear transducer TM1 enables a compact and cost-effective position measurement. It consists of a stainless steel flange welded to a pressure-resistant rod and can therefore be used under harsh environmental conditions.
The magnetostrictive measuring technology offers excellent accuracy for measuring lengths up to 2000 mm.
The passive ring-shaped position marker allows a mechanically decoupled measurement.

| **Description** | |
|---|---|
| Material | Flange: SS 1.4307 / AISI 304L<br>Flange cover: AlSiMgBi<br>Rod: SS 1.4571 / AISI 316Ti<br>Sealing: O-ring FKM 80, Supporting ring: PTFE |
| Mounting | Plugged and secured in position with set screw M5 ISO 4026 |
| Electrical connection | Connector M12x1, A-coded / Connector system M12x1, A-coded with lead wires |

| **Mechanical Data** | |
|---|---|
| Dimensions | See dimension drawing |

# Ordering Specifications

## Ordering Specifications

Preferred types printed in bold

Interface
6: CANopen

Interface parameters
1: 1x position, 1x speed

Baud rate
1: 1000 kBaud
2: 800 kBaud
3: 500 kBaud
4: 250 kBaud
5: 125 kBaud
7: 50 kBaud

Electrical connection
106: Connector M12x1, 5-pin
468: Plug system M12x1, 5-pin, with lead wires 80 mm*
472: Plug system M12x1, 5-pin, with lead wires 120 mm*
476: Plug system M12x1, 5-pin, with lead wires 160 mm*
480: Plug system M12x1, 5-pin, with lead wires 200 mm*
484: Plug system M12x1, 5-pin, with lead wires 240 mm*
* Only for installation in a cylinder

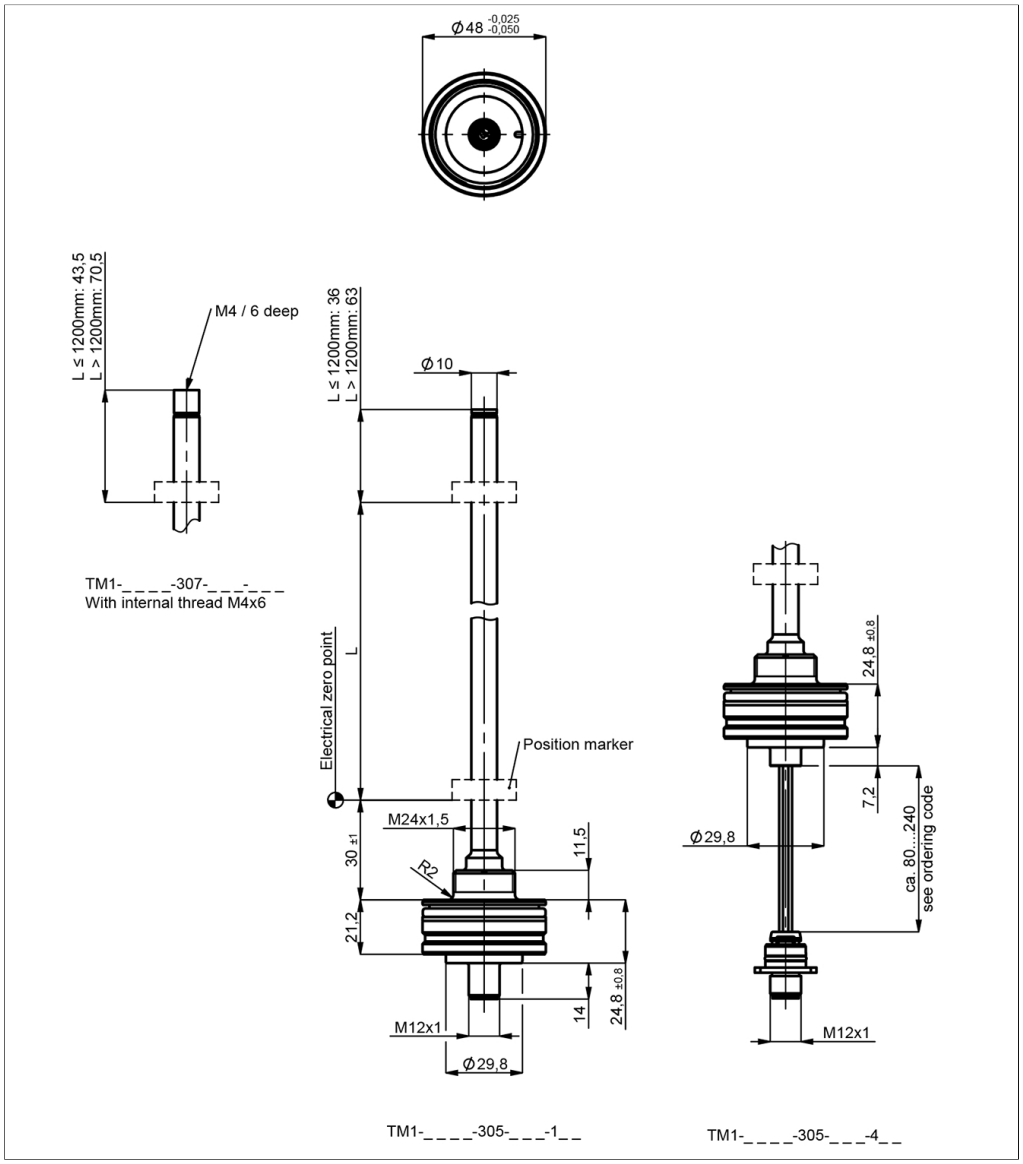
T M 1 – 0 5 0 0 – 3 0 5 – 6 1 4 – 1 0 6

Mechanical version
305: Plug-in flange Ø 48 mm
307: Plug-in flange Ø 48 mm with internal thread M4x6 at rod end, additional length 7.5 mm

Series

Electrical measuring range
Standard lengths 0050 up to 2000 mm in 25 mm-steps
Other lengths on request

# Drawing




CAD data see
www.novotechnik.de/en/download/cad-data/

# Technical Data

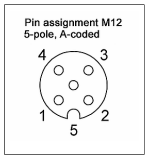
CANopen

| **Type** | **TM1-_ _ _ _-305-6_ _-_ _ _**<br>**CANopen** |
|---|---|
| Measured variables | Position, speed and temperature |
| Electrical measuring range (dim. L) | 0 ... 50 mm up to 0 ... 2000 mm |
| Measuring range speed | 25 ... 1000 mm/s |
| Protocol | CANopen protocol to CiA DS-301 V4.2.0, Device profile DS-406 V3.2 Encoder Class C2, LSS services to CiA DS-305 V1.1.2 |
| Programmable parameters | Position, speed, cams, working areas, temperature, node ID, baud rate |
| Node ID | 1 ... 127 (default 127) |
| Baud rate | 50 ... 1000 kBaud |
| Update rate (output) | 1 kHz (internal measuring rate 0.5 kHz) |
| Resolution | ≤ 0.1 mm |
| Resolution speed | 2 mm/s |
| Absolute linearity | ≤ ±0.04 %FS (min. 300 µm) |
| Tolerance of electr. zero point | ±1 mm |
| Repeatability | ≤ ±0.1 mm |
| Hysteresis | ≤ ±0.1 mm |
| Temperature error | ≤ ±15 ppm/K (min. 0.01 mm/K) |
| Supply voltage Ub | 12/24 VDC (8 ... 34 VDC) |
| Supply voltage ripple | ≤ 10% Ub |
| Power drain w/o load | < 1.5 W |
| Overvoltage protection | 40 VDC (6 s) |
| Polarity protection | yes (supply lines and outputs) |
| Short circuit protection | yes (all outputs vs. GND and supply voltage) |
| Insulation resistance (500 VDC) | ≥ 10 MΩ |
| Bus termination internal | w/o (internal load resistance 120 Ω on request) |
| **Environmental Data** | |
| Max. operational speed | Mechanically unlimited |
| Vibration IEC 60068-2-6 | 20 g, 10 ... 2000 Hz, Amax = 0.75 mm |
| Shock IEC 60068-2-27 | 100 g, 11 ms (single hit) |
| Protection class DIN EN 60529 | IP67 (Connector system M12, fastened, when correctly fitted in cylinder: IP69) |
| Operating temperature | -40 ... +105°C, -40 ... +85°C (connector system M12) |
| Operating humidity | 0 ... 95 % R.H. (no condensation) |
| Working pressure | ≤ 350 bar |
| Pressure peaks | ≤ 450 bar |
| Burst pressure | > 700 bar |
| Life | Mechanically unlimited |
| Functional safety | If you need assistance in using our products in safety-related systems, please contact us |
| MTTF (IEC 60050) | 391 years |
| Traceability | Serial number on type labeling: production batch of the sensor assembly and relevant sensor components |
| **EMC Compatibility** | |
| EN 61000-4-2 ESD (contact/air discharge) | 4 kV, 8 kV |
| EN 61000-4-3 Electromagnetic fields (RFI) | 10 V/m |
| EN 61000-4-4 Fast transients (burst) | 1 kV |
| EN 61000-4-6 Cond. disturbances (HF fields) | 10 V eff. |
| EN 55016-2-3 Radiated disturbances | Industrial and residential area |
| | Only for connector system M12: Data applies only inside a cylinder.<br>The EMC measurements are conducted in a reference cylinder. The EMC properties can deviate when using different cylinders. |

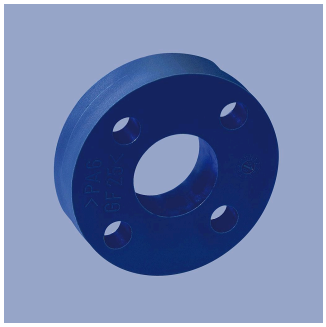
FS = Full scale: Signal span according to electrical measuring range

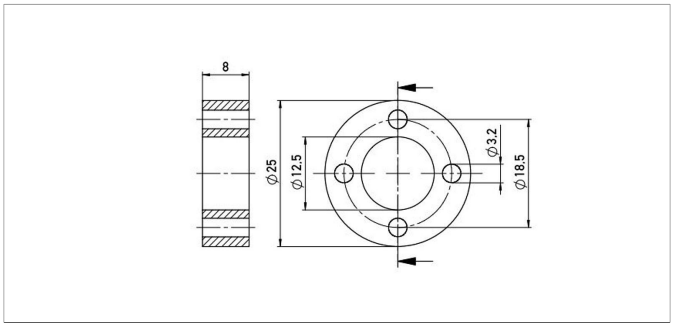
**Connection Assignment**

| Signal | Connector<br>code 106 | Plug system<br>code 4_ _ |
|---|---|---|
| Supply voltage Ub | Pin 2 | Pin 2 |
| GND | Pin 3 | Pin 3 |
| CAN_H | Pin 4 | Pin 4 |
| CAN_L | Pin 5 | Pin 5 |
| Do not connect | Pin 1 | Pin 1 |
| | Connect cable shielding to protection earth | |



# Position Markers



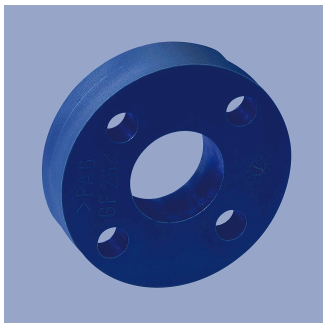


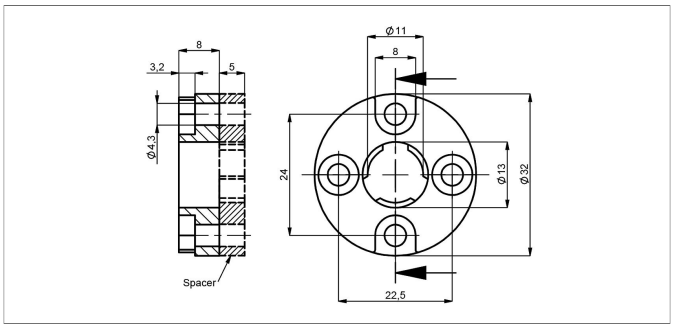

**Z-TH1-P18**

Ring position marker for fixation with screws M3

| | |
|---|---|
| Material | PA6-GF |
| Weight | approx. 12 g |
| Operating temp. | -40 ... +100°C |
| Surface pressure | max. 40 N/mm² |
| Fastening torque of mounting | max. 100 Ncm |

| P/N | Pack. unit [pcs] |
|---|---|
| 400005697 | 1 |





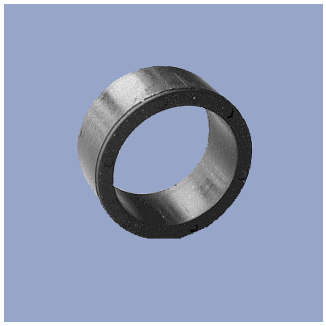

**Z-TH1-P19**

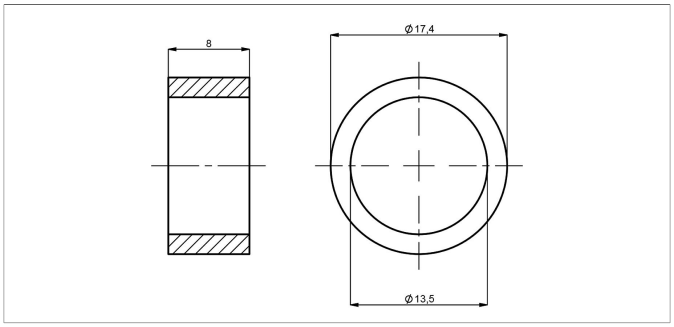
**Z-TH1-PD19 With spacer**

Ring position marker for fixation with screws M4, optionally with or without spacer

| | |
|---|---|
| Material | PA6-GF, Spacer: POM-GF |
| Weight | approx. 14 g |
| Operating temp. | -40 ... +100°C |
| Surface pressure | max. 40 N/mm² |
| Fastening torque | max. 100 Ncm |

| P/N | Spacer | Pack. unit [pcs] |
|---|---|---|
| 400005698 | - | 1 |
| 400107117 | incl. | 1 |



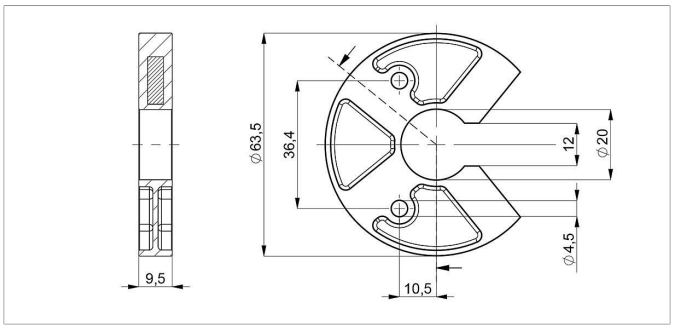



**Z-TH1-P30**

Ring position marker for mounting via lock washer and retaining ring

| | |
|---|---|
| Material | NdFeB bonded (EP) |
| Weight | approx. 5 g |
| Operating temp. | -40 ... +100°C |
| Surface pressure | max. 10 N/mm² |

| P/N | Pack. unit [pcs] |
|---|---|
| 400106139 | 1 |




**Z-TH1-P25**

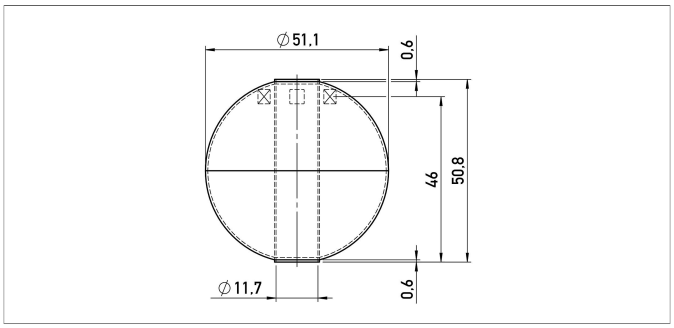
U-shaped position marker for fixation with M4 screws

Caution: for dimension of electrical zero point please follow the user manual!

| | |
|---|---|
| Material | PA6-GF |
| Operating temp. | -40 ... +105°C |
| Surface pressure | max. 40 N/mm² |
| Fastening torque of mounting | max. 100 Ncm |

| P/N | Pack. unit [pcs] |
|---|---|
| 400105076 | 1 |

# Position Markers

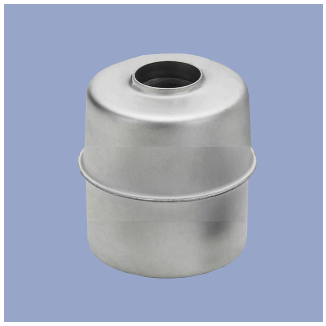


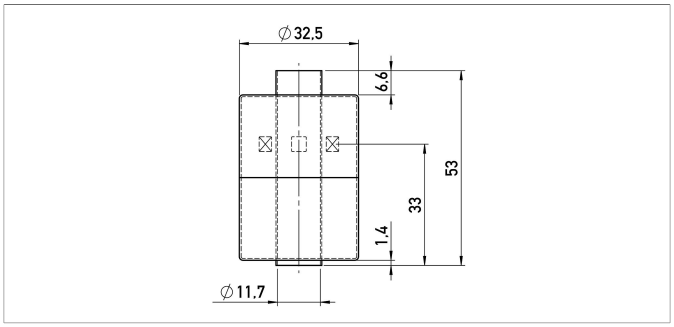

**Z-TH1-P32**

Ball-type floating position marker

| | |
|---|---|
| Material | SS 1.4571 / AISI 316Ti |
| Weight | approx. 42 g |
| Operating temp. | -40 ... +100°C |
| Compression strength | ≤ 40 bar |
| Density | 720 kg/m³ |
| Immersion depth in water | 36.7 mm |

| P/N | Pack. unit [pcs] |
|---|---|
| 400105703 | 1 |



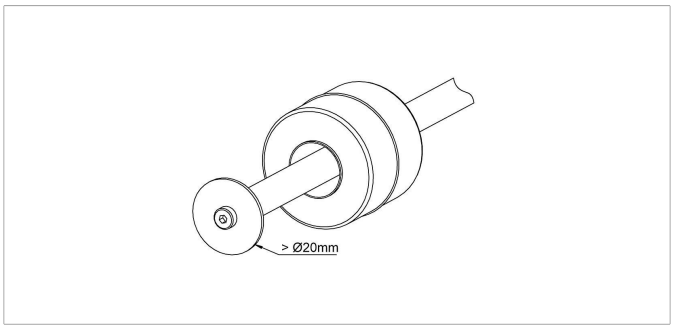



**Z-TH1-P31**

Cylinder floating position marker

| | |
|---|---|
| Material | SS 1.4404 / AISI 316L |
| Weight | approx. 20 g |
| Operating temp. | -40 ... +100°C |
| Compression strength | ≤ 24 bar |
| Density | 740 kg/m³ |
| Immersion depth in water | approx. 26.6 mm |

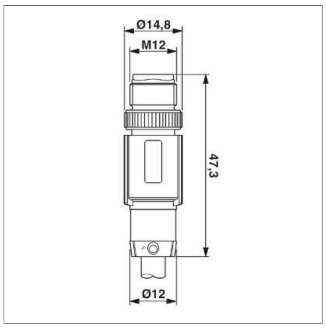
| P/N | Pack. unit [pcs] |
|---|---|
| 400105704 | 1 |

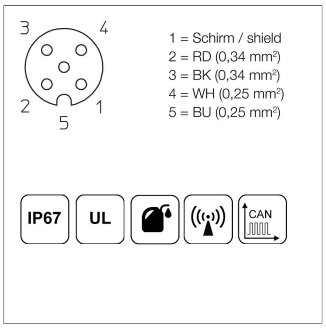



**Floating Position Marker - Installation Recommendation**

When using floating position markers, we recommend to secure the marker against loss with a washer at the rod end.
For this purpose, a sensor version with inner thread at the rod end is required (s. ordering code).

# Connector System M12

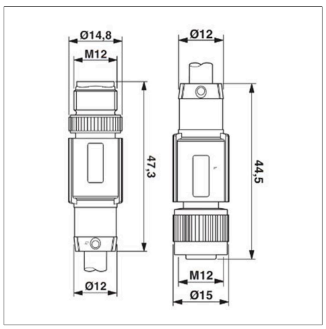


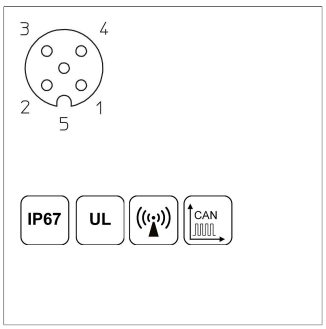




**EEM-33-49/50/51**
M12x1 Mating female connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded (shield on knurl), open ended

| | |
|---|---|
| Plug housing | TPU |
| Cable sheath | PUR, Ø = 6.7 mm, -25 ... +90°C (socket) -20 ... +80°C (cable) |
| Lead wires | PE, 2x0.25 mm²+2x0.34 mm² |

| P/N | Type | Length |
|---|---|---|
| 400106368 | EEM-33-49 | 2 m |
| 400106371 | EEM-33-50 | 5 m |
| 400106372 | EEM-33-51 | 10 m |

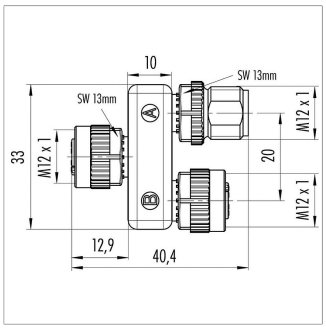


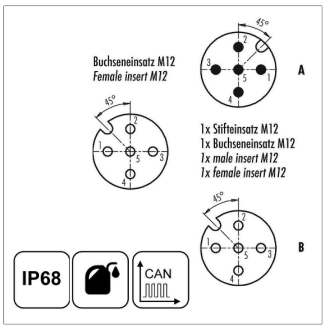




**EEM-33-52**
M12x1 Mating female/male connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded (shield on knurl), CAN-Bus

| | |
|---|---|
| Plug housing | PUR |
| Cable sheath | PUR, Ø = 6.7 mm, -25 ... +90°C (plug/socket) -20 ... +80°C (cable) |
| Lead wires | PE, 2x0.25 mm²+2x0.34 mm² |

| P/N | Type | Length |
|---|---|---|
| 400106373 | EEM-33-52 | 5 m |

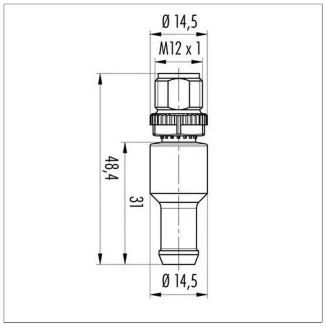


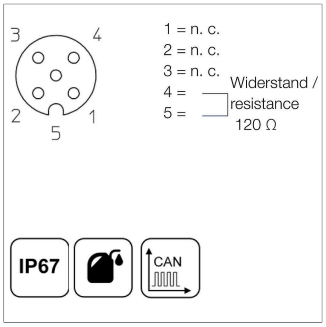




**EEM-33-45**
M12x1 splitter / T-connector, 5-pin, A-coded, IP68,1:1 connection, female - male - female, CAN-Bus

| | |
|---|---|
| Plug housing | PUR, -25 ... +85°C |

| P/N | Type |
|---|---|
| 400056145 | EEM-33-45 |




**EEM-33-47**
M12x1 terminating resistor, 5-pin, A-coded, IP67, 120 Ω resistance, CAN-Bus

| | |
|---|---|
| Plug housing | PUR, -25 ... +85°C |

| P/N | Type |
|---|---|
| 400056147 | EEM-33-47 |

**IP67** Protection class IP67 DIN EN 60529

**IP68** Protection class IP68 DIN EN 60529

Very good Electromagnetic Compatibiliy (EMC) and shield systems

Very good resistance to oils, coolants and lubricants

Suited for applications in dragchains

**UL** UL - approved

CAN CAN-Bus

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