

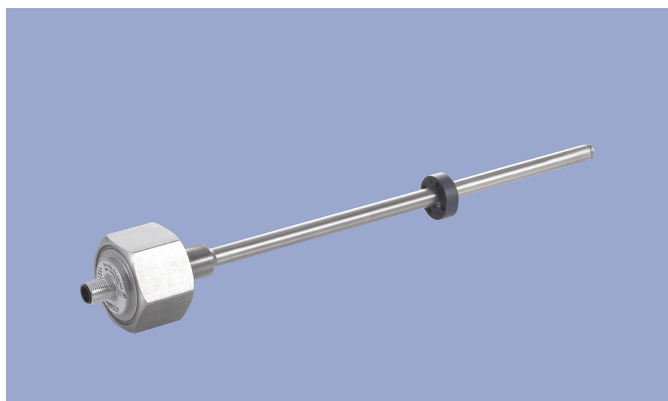
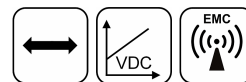
**NOVOSTRICTIVE
Transducer
Touchless**

TM1

Screw flange

Voltage

Mobile Applications



Special Features

- For integration in pneumatic and hydraulic cylinders
- Touchless magnetostrictive measurement technology
- Operating pressure up to 350 bar, peaks up to 450 bar
- 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 %
- Wide range of supply voltage
- Optimized for use in mobile applications with highest EMC requirements such as ISO pulses and high interferences to ISO 11452, exceeds E1 requirements
- Other configurations see separate data sheets

Applications

Hydraulic or pneumatic cylinders in

- Agricultural and forestry machinery
- Construction machines
- Vehicles with loading and unloading devices
- Vehicles with extension arms

The absolute position transducer can be used directly in-cylinder and thus enables a compact and cost-effective position measurement. The sensor consists of a stainless steel flange welded to a pressure tight rod and can therefore be used in harsh environments.

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 Flange cover: AISiMgBi Rod: SS 1.4571 / AISI 316Ti Sealing: O-ring NBR 90 SH A |
| Mounting | Screwed into cylinder via bushing M18x1.5 for screw plug hole per ISO 6149 |
| Electrical connection | Connector M12x1, A-coded / Cable 3x 0.5 mm ² (AWG 20), PUR, unshielded |

Mechanical Data

| | |
|------------|-----------------------|
| Dimensions | See dimension drawing |
|------------|-----------------------|

Ordering Specifications

Ordering Specifications

Preferred types printed in bold

Supply voltage U_b

8: $U_b = 12/24$ VDC, 24 VDC

Output signal

1: 0.1 ... 10 VDC

4: 0.5 ... 4.5 VDC

5: 0.25 ... 4.75 VDC

Output characteristic

1: Rising output characteristic, seen from flange

2: Falling output characteristic, seen from flange

Electrical connection

104: Connector M12x1, 4-pin

251: Cable, 3-pole, unshielded, A = 1 m

253: Cable, 3-pole, unshielded, A = 3 m

255: Cable, 3-pole, unshielded, A = 5 m

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

Series

Mechanical version

306: Screw flange M18x1.5

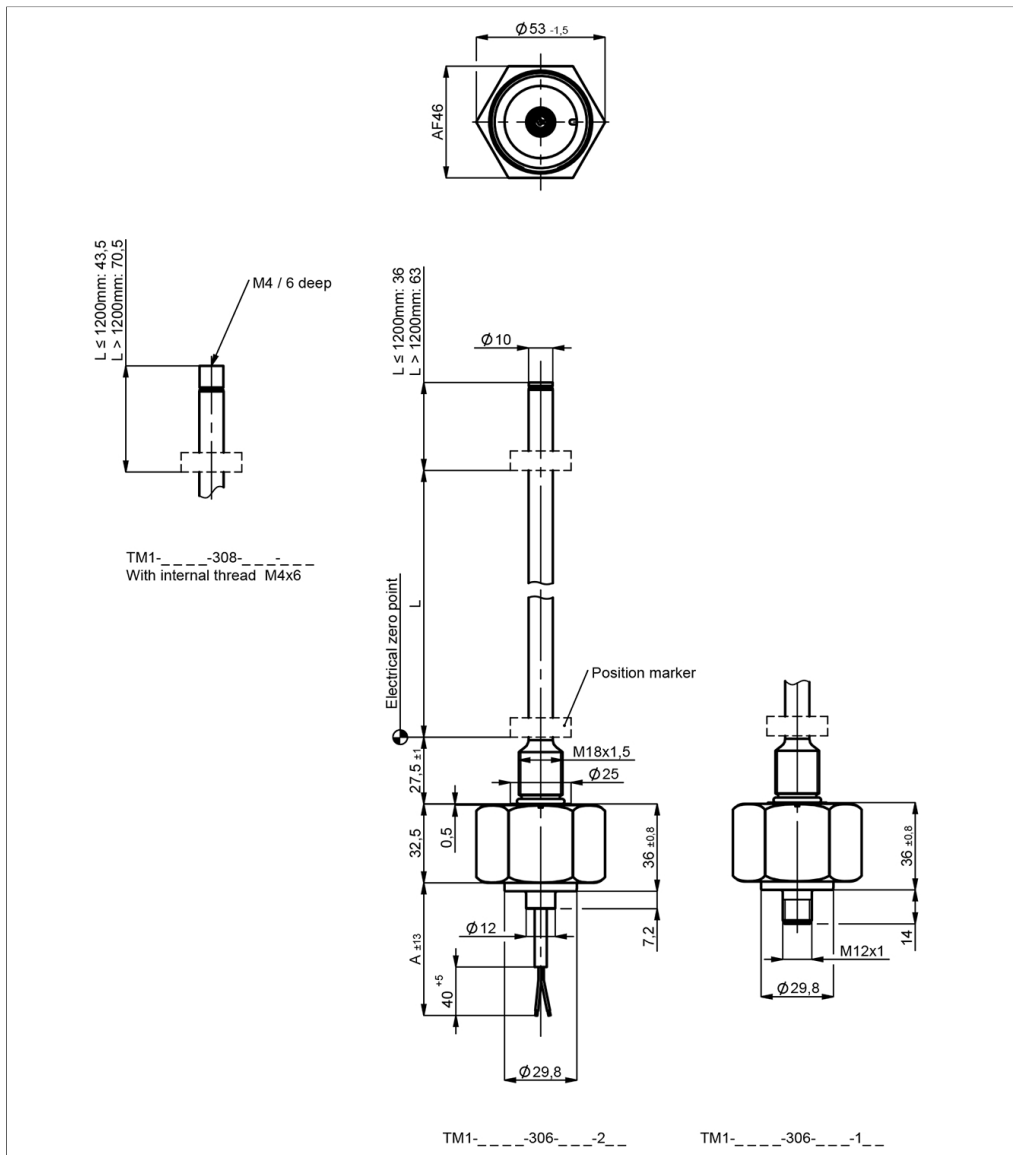
308: Screw flange M18x1.5 with internal thread M4x6 at rod end, additional length 7.5 mm

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/

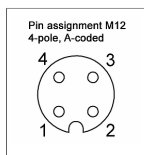
Technical Data

| Type | TM1-____-306-84 -____ TM1-____-306-85 -____ | TM1-____-306-81 -____ |
|--|--|------------------------|
| Output signal | 0.25 ... 4.75 V 0.5 ... 4.5 V | 0.1 ... 10 V |
| Load | ≥ 10 kΩ | |
| Sampling rate / Update rate | 0.5 kHz | |
| Electrical measuring range (dim. L) | 0 ... 50 mm up to 0 ... 2000 mm | |
| Absolute linearity | ≤ ±0.04 %FS (min. 300 μm) | |
| Tolerance of electr. zero point | ±1 mm | |
| Resolution | ≤ 0.1 mm | |
| Repeatability | ≤ ±0.1 mm | |
| Hysteresis | ≤ ±0.1 mm | |
| Temperature error | typ. 50 ppm/K (min. 0.01 mm/K) | |
| Supply voltage Ub | 12/24 VDC (8 ... 32 VDC) | 24 VDC (16 ... 34 VDC) |
| Supply voltage ripple | ≤ 10% Ub | |
| Power drain w/o load | < 1 W | |
| Overvoltage protection | 36 VDC (permanent) | |
| Polarity protection | yes (-36 VDC) | |
| Short circuit protection | yes (output vs GND and supply voltage up to 36 VDC) | |
| Insulation resistance (500 VDC) | ≥ 10 MΩ | |
| 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 | |
| Operating temperature | -40 ... +105°C | |
| 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) | 346 years | 346 years |
| EMC Compatibility | | |
| ISO 10605 ESD (Handling/Component) | 8 kV / 15 kV | |
| ISO 11452-2 Radiated HF-fields | 100 V/m | |
| ISO 11452-4 BCI (Bulk current injection) | 200 mA | |
| CISPR 25 Radiated emission | Level 4 | |
| ISO 7637-2 Transient Emissions | Level 1/2 | |
| ISO 7637-2 Pulses on supply lines | (1, 2a, 2b, 3a, 3b) Level 4 | |
| ISO 7637-3 Pulses on output lines | (3a, 3b) Fast Level 2 | |
| ISO 16750 Pulses on supply lines | Starting profile Level 4 @12 V / Level 3 @24 V, Load dump A +200 V | |
| EN 13309 Construction machinery | | |
| ISO 14982 Agricult./forestry machines | | |
| Emission/Immunity | Exceeds E1 requirements | |
| | 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

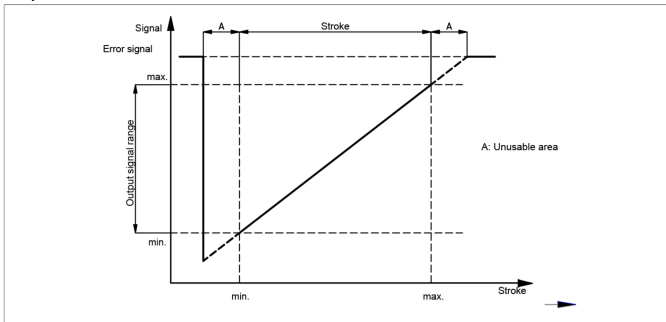
Connection Assignment

| Signal | Connector code 1__ | Cable code 2__ |
|-------------------|-----------------------|-------------------|
| Supply voltage Ub | Pin 1 | BN |
| GND | Pin 3 | WH |
| Signal output | Pin 2 | GN |
| Do not connect | Pin 4 | - |

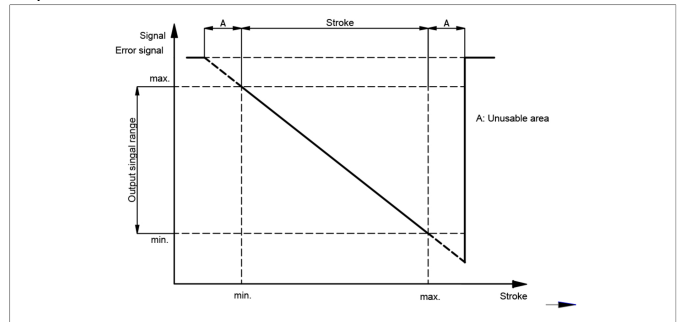


Technical Data
Output
Characteristics

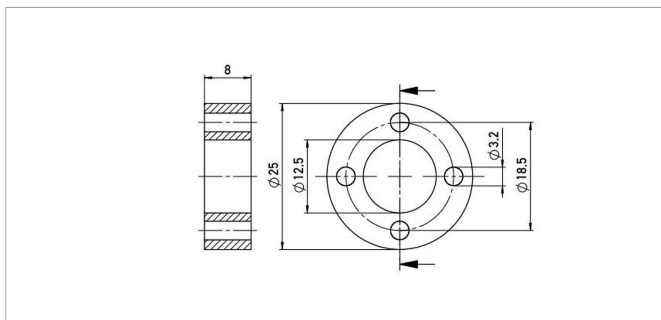
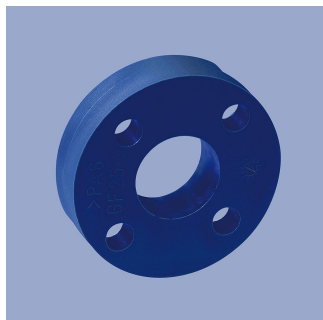
Output characteristic



Output characteristic



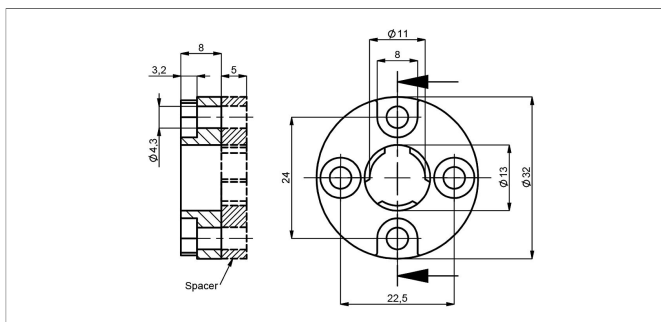
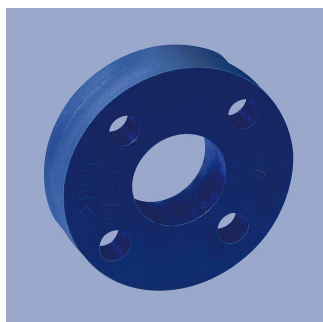
Position Markers



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 max. 100 Ncm
 of mounting

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

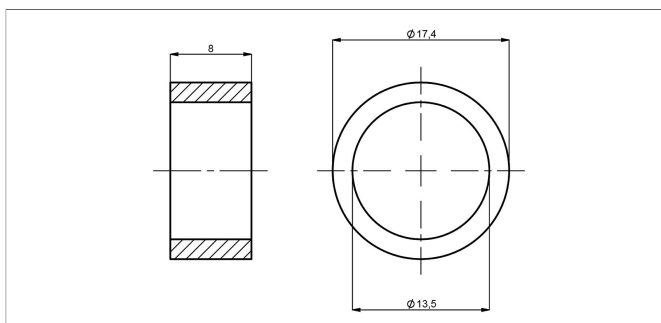
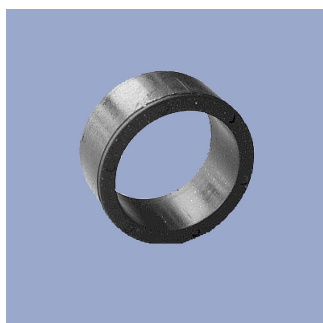


Z-TH1-P19

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

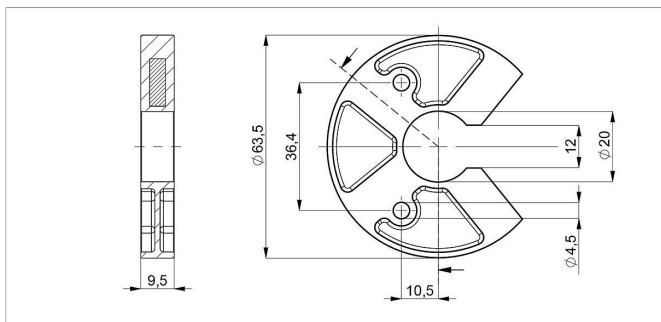
| P/N | Spacer | Pack. unit [pcs] |
|-----------|--------|------------------|
| 400005698 | - | 1 |
| 400107117 | incl. | 1 |



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

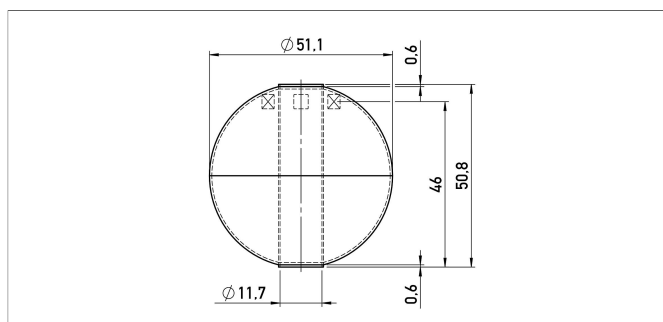
U-shaped position marker for fixation with M4 screws

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 max. 100 Ncm
 of mounting

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

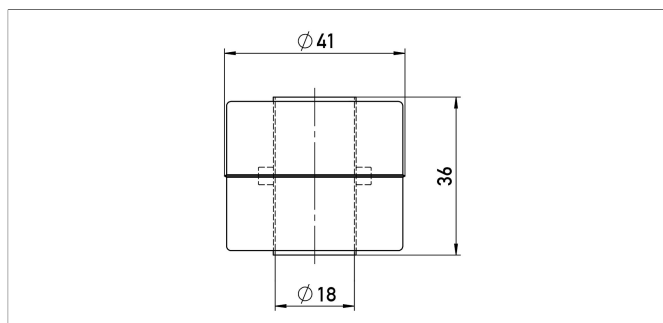
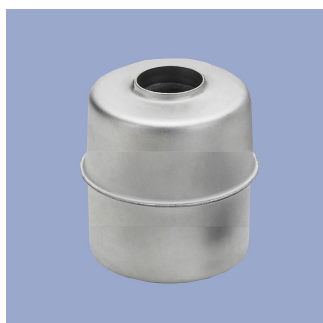
Position Markers



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

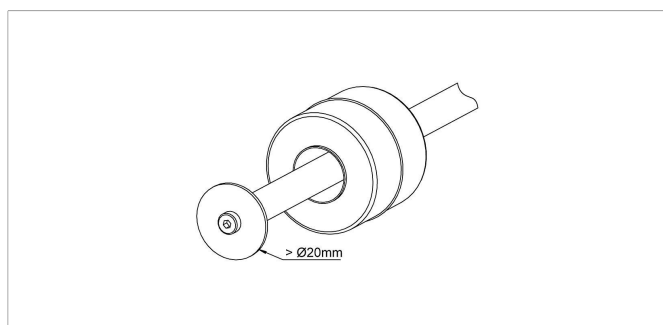
| P/N | Pack. unit [pcs] |
|-----------|------------------|
| 400105703 | 1 |



Z-TH1-P21

Cylinder floating position marker
Material SS 1.4404 / AISI 316L
Weight approx. 20 g
Operating temp. -40 ... +100°C
Compression strength ≤ 8 bar
Density 740 kg/m³
Immersion depth in water approx. 26.6 mm

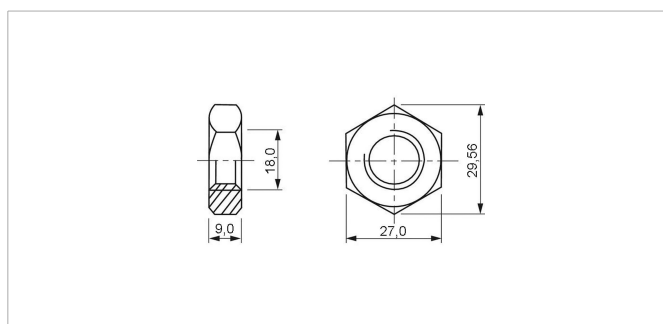
| P/N | Pack. unit [pcs] |
|-----------|------------------|
| 400056044 | 1 |



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).

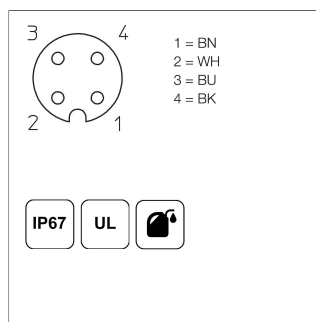
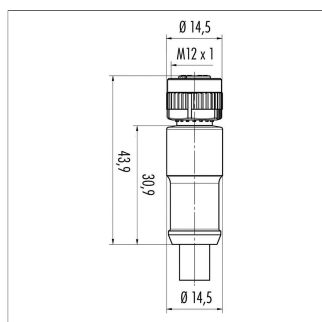


Z-TH1-M01

Lock nut ISO 8675, M18x1.5-A2

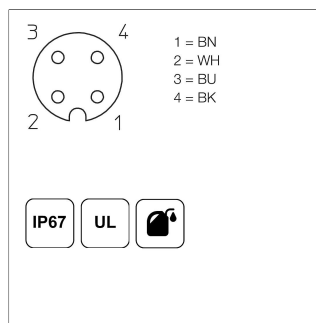
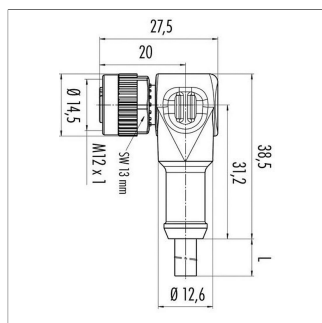
| P/N | Pack. unit [pcs] |
|-----------|------------------|
| 400056090 | 1 |

Connector System M12



EEM-33-35/36/37
M12x1 Mating female connector, 4-pin, straight, A-coded, with molded cable, not shielded, IP67, open ended
Plug housing PA
Cable sheath PUR, Ø = max. 6 mm, -40 ... +85°C (fixed)
Lead wires PP, 0.34 mm²

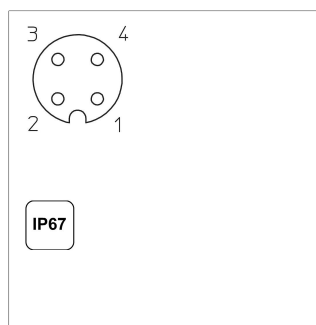
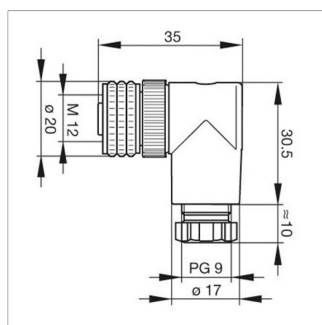
| P/N | Type | Length |
|-----------|-----------|--------|
| 400056135 | EEM-33-35 | 2 m |
| 400056136 | EEM-33-36 | 5 m |
| 400056137 | EEM-33-37 | 10 m |



EEM-33-38/39/40
M12x1 Mating female connector, 4-pin, angled, A-coded, with molded cable, not shielded, IP67, open ended

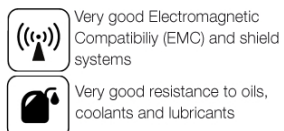
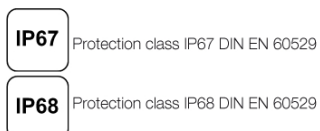
Plug housing PA
Cable sheath PUR, Ø = max. 6 mm, -40 ... +85°C (fixed)
Lead wires PP, 0.34 mm²

| P/N | Type | Length |
|-----------|-----------|--------|
| 400056138 | EEM-33-38 | 2 m |
| 400056139 | EEM-33-39 | 5 m |
| 400056140 | EEM-33-40 | 10 m |



EEM-33-89
M12x1 Mating female connector, 4-pin, angled, A-coded, with coupling nut, screw termination, IP67, not shieldable
Operating temp. -25 ... +90°C
Plug housing PBT
For wire gauge 6 ... 8 mm, max. 0.75 mm²

| P/N | Type |
|-----------|-----------|
| 400005634 | EEM-33-89 |



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