Special features
- Non-contacting magnetostrictive measurement technology
- Touchless position detection
- Wear-free, unlimited mechanical life
- Resolution up to 1 μm, independently of length
- Low temperature coefficient <15 ppm/K
- Insensitive to shock and vibration
- Protection class IP67 / IP68
- Position-Teach-In
- Optionally galvanic isolated
- Interfaces: Analog, SSI, Impulse, Incremental, CANopen, IO-Link

Applications
- Manufacturing Engineering
  - Plastic injection molding
  - Textile
  - Packaging
  - Sheet metal working
  - Woodwork
- Automation Technology

Transducer in profile design with magnetostrictive technology for highly accurate and reproducible position measurement for lengths up to 4250 mm. Mechanically decoupled and therefore wear-free when the floating position marker is used. Depending on the interface, up to three positions and speed can be measured.
<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Data</td>
<td>3</td>
</tr>
<tr>
<td>Analog Versions</td>
<td>4</td>
</tr>
<tr>
<td>Technical Data</td>
<td>5</td>
</tr>
<tr>
<td>Ordering Specifications</td>
<td></td>
</tr>
<tr>
<td>Digitale Versions</td>
<td>6</td>
</tr>
<tr>
<td>SSI</td>
<td></td>
</tr>
<tr>
<td>Impulse</td>
<td>7</td>
</tr>
<tr>
<td>Incremental</td>
<td>8</td>
</tr>
<tr>
<td>Ordering Specifications</td>
<td>9</td>
</tr>
<tr>
<td>Fieldbus, IO-Link Versions</td>
<td>10</td>
</tr>
<tr>
<td>CANopen</td>
<td></td>
</tr>
<tr>
<td>IO-Link</td>
<td>11</td>
</tr>
<tr>
<td>Ordering Specifications</td>
<td>12</td>
</tr>
<tr>
<td>Accessories</td>
<td></td>
</tr>
<tr>
<td>Position Marker</td>
<td>13</td>
</tr>
<tr>
<td>M12 Connector System</td>
<td>14</td>
</tr>
<tr>
<td>M16 Connector System</td>
<td>17</td>
</tr>
</tbody>
</table>
**Mechanical Data**

**Dimensions**
- Length of housing (dimension A): \( 146 \) mm
- Electrical measuring range (dimension B):
  - 0.050 up to 0.500 mm in 0.025 mm steps,
  - 0.500 up to 1.000 mm in 0.050 mm steps,
  - 1.000 up to 2.000 mm in 0.100 mm steps,
  - 2.000 up to 4.250 mm in 0.250 mm steps
  - Other lengths on request

**Max. operational speed**
- With valid output signal: \( 10 \) ms\(^{-1}\)

**Max. operational acceleration**
- With valid output signal: \( 200 \) ms\(^{-2}\)

**Shock (IEC 60068-2-27)**
- 100 (11 ms) (single hit) g

**Vibration (IEC 60068-2-6)**
- 20 (5...2000 Hz, \( A_{max} = 0.75 \) mm) g

**Protection class (DIN EN 60529)**
- IP67 with fastened connector
- IP68 with cable connection

**Mechanical Data**

**Materials**
- Housing: Anodized aluminum, AlMgSi0.5 F22, 3.3206.71
- End flanges: Aluminum G AlSi12Cu1 (FE)

**Mounting**
- Adjustable clamps (included in delivery)

**Position marker**
- Floating position marker, plastic
- Guided position marker, plastic, with ball coupling

**Electrical connections**
- Connector M12x1, 4-pin / 5-pin / 8-pin, shielded
- Connector M16x0.75 (IEC 130-9), 6-pin / 8-pin, shielded
- PUR-cable, 8 x 0.25 mm\(^2\), shielded: 1 m, 3 m or 5 m length

**Electronic**
- SMD with ASIC, integrated
- Connector casing (shield) is connected to the sensor housing.
- Housing is capacitively decoupled to the electronics

**Life**
- Mechanically unlimited (with floating position marker)

**Operating temperature range**
- \(-40 \ldots +85^\circ\text{C}\)

**Storage temperature range**
- \(-40 \ldots +105^\circ\text{C}\)

**Operating humidity range**
- \(0 \ldots 95\%\) R.H.

**Description**

- Housing: Anodized aluminum, AlMgSi0.5 F22, 3.3206.71
- End flanges: Aluminum G AlSi12Cu1 (FE)

**Mounting**
- Adjustable clamps (included in delivery)

**Position marker**
- Floating position marker, plastic
- Guided position marker, plastic, with ball coupling

**Electrical connections**
- Connector M12x1, 4-pin / 5-pin / 8-pin, shielded
- Connector M16x0.75 (IEC 130-9), 6-pin / 8-pin, shielded
- PUR-cable, 8 x 0.25 mm\(^2\), shielded: 1 m, 3 m or 5 m length

**Electronic**
- SMD with ASIC, integrated
- Connector casing (shield) is connected to the sensor housing.
- Housing is capacitively decoupled to the electronics

**Life**
- Mechanically unlimited (with floating position marker)

**Operating temperature range**
- \(-40 \ldots +85^\circ\text{C}\)

**Storage temperature range**
- \(-40 \ldots +105^\circ\text{C}\)

**Operating humidity range**
- \(0 \ldots 95\%\) R.H.

**Materials**
- Housing: Anodized aluminum, AlMgSi0.5 F22, 3.3206.71
- End flanges: Aluminum G AlSi12Cu1 (FE)

**Mounting**
- Adjustable clamps (included in delivery)

**Position marker**
- Floating position marker, plastic
- Guided position marker, plastic, with ball coupling

**Electrical connections**
- Connector M12x1, 4-pin / 5-pin / 8-pin, shielded
- Connector M16x0.75 (IEC 130-9), 6-pin / 8-pin, shielded
- PUR-cable, 8 x 0.25 mm\(^2\), shielded: 1 m, 3 m or 5 m length

**Electronic**
- SMD with ASIC, integrated
- Connector casing (shield) is connected to the sensor housing.
- Housing is capacitively decoupled to the electronics

**Life**
- Mechanically unlimited (with floating position marker)

**Operating temperature range**
- \(-40 \ldots +85^\circ\text{C}\)

**Storage temperature range**
- \(-40 \ldots +105^\circ\text{C}\)

**Operating humidity range**
- \(0 \ldots 95\%\) R.H.

**Mechanical Data**

**Dimensions**
- Length of housing (dimension A): \( 146 \) mm

**Electrical measuring range**
- (dimension B):
  - 0.050 up to 0.500 mm in 0.025 mm steps,
  - 0.500 up to 1.000 mm in 0.050 mm steps,
  - 1.000 up to 2.000 mm in 0.100 mm steps,
  - 2.000 up to 4.250 mm in 0.250 mm steps
  - Other lengths on request

**CAD data see**
- www.novotechnik.de/en/download/cad-data/
## Technical Data

### Analog Versions

<table>
<thead>
<tr>
<th>Type designations</th>
<th>TP1-____-101 - 41 - --</th>
<th>TP1-____-101 - 42 - --</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>0.1 ... 10 V (load ≥ 6 kΩ)</td>
<td>0.1 ... 20 mA (burden ≥ 500 Ω)</td>
</tr>
<tr>
<td></td>
<td>-10 ... 10 V (load ≥ 5 kΩ)</td>
<td>4 ... 20 mA (burden ≥ 500 Ω)</td>
</tr>
<tr>
<td>Number of channels</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling rate / Update rate</td>
<td>&lt; 750 mm: 2 kHz, 750 ... &lt; 2000 mm: 1 kHz, &gt; 2000 mm: 0.5 kHz</td>
<td>Extrapolated to 16 kHz</td>
</tr>
<tr>
<td>Resolution</td>
<td>16</td>
<td>bit</td>
</tr>
<tr>
<td>Absolute linearity</td>
<td>± 0.02 (min. ± 50 µm)</td>
<td>% FS</td>
</tr>
<tr>
<td>Tolerance of electr. zero point</td>
<td>± 0.5 (min. 2 x reproducibility)</td>
<td>mm</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>± 0.03</td>
<td>% FS</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>± 0.01</td>
<td>% FS</td>
</tr>
<tr>
<td>Temperature error</td>
<td>± 0.01 (min. 0.01 mm/K)</td>
<td>ppm/K</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 (19 ... 36)</td>
<td>VDC</td>
</tr>
<tr>
<td>Supply voltage with galvanic isolation</td>
<td>24 (18 ... 36)</td>
<td>VDC</td>
</tr>
<tr>
<td>Supply voltage ripple</td>
<td>± 0.1</td>
<td>% Ub</td>
</tr>
<tr>
<td>Current consumption</td>
<td>1 A</td>
<td>mA</td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td>40 (temporary / 1 min.)</td>
<td>VDC</td>
</tr>
<tr>
<td>Polarity protection</td>
<td>Yes, up to supply voltage max</td>
<td>VDC</td>
</tr>
<tr>
<td>Short circuit protection</td>
<td>Yes (outputs vs GND and supply voltage max)</td>
<td></td>
</tr>
<tr>
<td>Insulation resistance (500 VDC)</td>
<td>≥ 10 Ω</td>
<td>MΩ</td>
</tr>
<tr>
<td><strong>Environmental Data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTTF (DIN EN ISO 13849-1 parts count method, w/o load, wc)</td>
<td>23</td>
<td>Years</td>
</tr>
<tr>
<td>Functional safety</td>
<td>If you need assistance in using our products in safety-related systems, please contact us</td>
<td></td>
</tr>
</tbody>
</table>

### EMC compatibility

EN 61000-4-2 Electrostatic discharges (ESD) 4 kV, 8 kV
EN 61000-4-3 Electromagnetic fields 10 V/m
EN 61000-4-4 Electrical fast transients (burst) 2 kV
EN 61000-4-6 Conducted disturbances, induced by RF-fields 10 V eff.
EN 55011 Radiated disturbances class B

---

### Pin assignment

<table>
<thead>
<tr>
<th>Connector code 101, 102</th>
<th>Cable code 20_</th>
<th>Connector with cable (Accessories)</th>
<th>Analog voltage</th>
<th>Analog current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>YE</td>
<td>WH</td>
<td>do not connect</td>
<td>0(4)...20 mA</td>
</tr>
<tr>
<td>Pin 2</td>
<td>GY</td>
<td>BN</td>
<td>Signal GND</td>
<td>Signal GND</td>
</tr>
<tr>
<td>Pin 3</td>
<td>PK</td>
<td>GIN</td>
<td>+10...0 (-10) V</td>
<td>do not connect</td>
</tr>
<tr>
<td>Pin 4</td>
<td>RD</td>
<td>YE</td>
<td>DIAG **</td>
<td>DIAG **</td>
</tr>
<tr>
<td>Pin 5</td>
<td>GN</td>
<td>GY</td>
<td>0 (-10)...+10 V</td>
<td>do not connect</td>
</tr>
<tr>
<td>Pin 6</td>
<td>BU</td>
<td>PK</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>Pin 7</td>
<td>SN</td>
<td>BU</td>
<td>Supply voltage</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>Pin 8</td>
<td>WH</td>
<td>RD</td>
<td>PROG ***</td>
<td>PROG ***</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pin assignment</th>
<th>Connector code 103</th>
<th>Connector with cable (Accessories)</th>
<th>Analog voltage</th>
<th>Analog current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>YE</td>
<td>WH</td>
<td>0 (-10)...+10 V</td>
<td>0(4)...20 mA</td>
</tr>
<tr>
<td>Pin 2</td>
<td>GY</td>
<td>BN</td>
<td>Signal GND</td>
<td>Signal GND</td>
</tr>
<tr>
<td>Pin 3</td>
<td>PK</td>
<td>BU</td>
<td>+10...0 (-10) V</td>
<td>do not connect</td>
</tr>
<tr>
<td>Pin 4</td>
<td>RD</td>
<td>YE</td>
<td>DIAG **</td>
<td>DIAG **</td>
</tr>
<tr>
<td>Pin 5</td>
<td>GN</td>
<td>GY</td>
<td>Supply voltage</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>Pin 6</td>
<td>SN</td>
<td>BU</td>
<td>GND</td>
<td></td>
</tr>
</tbody>
</table>

**(*) connect only for Teach-in-function (see manual).**
Ordering specifications

Analog Versions

- Voltage
- Current

### Electrical interface

**4: Analog interface**

#### Output signal analog interfaces 41.

1. **Voltage output**
2. **Current output**

#### Analog interface voltage output 41.

- 1: 0 ... 10 V and 10 ... 0 V *
- 4: 0 ... 10 V and 10 ... 0 V galvanic isolated
- 6: -10 ... +10 V and +10 ... -10 V galvanic isolated

#### Analog interface current output 42.

- 1: 0 ... 20 mA *
- 2: 20 ... 0 mA *
- 3: 4 ... 20 mA *
- 4: 20 ... 4 mA *

*) With Teach-In-function

### Mechanical version

101: Profile design

### Electrical connection

- 101: Connector M16x0.75 (IEC 130-9), 8-pin
- 102: Connector M12x1, 8-pin
- 103: Connector M16x0.75 (IEC 130-9), 6-pin
- 201: Cable, 8-pole, shielded, 1 m
- 203: Cable, 8-pole, shielded, 3 m
- 205: Cable, 8-pole, shielded, 5 m

#### Series

**T** P 1 - **0 8 0 0** - 1 0 1 - **4 1 1** - **1 0 2**

### Important:

Avoid equalizing currents in the cable shield caused by potential differences.

Twisted pair cable (STP) is recommended.

---

**Ordering Specifications**

**Preferred types printed in bold**

---

**Electrical measuring range**

- Standard lengths 0050 up to 4250 mm
- 0050 up to 0500 mm in 25 mm-steps, 0500 up to 1000 mm in 50 mm-steps, 1000 up to 2000 mm in 100 mm-steps, 2000 up to 4250 mm in 250 mm-steps.
- Other lengths on request.
Type designations

TP1 - _ _ _ _ - 101 - 2_ _ - _ _ _
Synchronous-serial interface (SSI)

Electrical Data

Electrical measuring range (dimension B) 0050 up to 4250 mm

Protocol SSI 24 und 25 bit (26 bit on request)

Inputs RS422

Monoplop time (tm) 30 µs

Encoding Gray, Binary

Sampling rate / Update rate < 750 mm: 2 kHz, 750 ... < 2000 mm: 1 kHz, > 2000 mm: 0.5 kHz
Extrapolated to 16 kHz

Resolution (LSB) 1, 5 or 10 (Other resolutions on request) µm

Absolute linearity *

<table>
<thead>
<tr>
<th>Range</th>
<th>Linearity</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 250 mm</td>
<td>±25 µm</td>
</tr>
<tr>
<td>&lt; 750 mm</td>
<td>±30 µm</td>
</tr>
<tr>
<td>&lt; 1000 mm</td>
<td>±50 µm</td>
</tr>
<tr>
<td>&lt; 2500 mm</td>
<td>±80 µm</td>
</tr>
<tr>
<td>up to 4250 mm</td>
<td>±120 µm</td>
</tr>
</tbody>
</table>

Tolerance of electrical zero point ± 5 mm

Reproducibility (rounded to LSB) ± 6 µm

Hysteresis (rounded to LSB) ± 4 µm

Temperature error ± 15 min. 0.01 mm/K ppm/K

Supply voltage 24 (13 ... 34) V DC

Supply voltage ripple ± 10 % Ud

Overvoltage protection 40 (permanent) V DC

Current consumption ≤ 100 mA

Polarity protection Yes, up to supply voltage max.

Short circuit protection Yes (outputs vs. GND and supply voltage up to 7 V)

Dynamic load at outputs > 120 O

Max. clock rate 2 MHz

Insulation resistance (500 VDC) ≥ 10 MΩ

Insulation resistance (500 VDC) ≥ 10 MΩ

ECC compatibility

EN 61000-4-2 Electrostatic discharges (ESD) 4 kV, 8 kV
EN 61000-4-3 Electromagnetic fields 10 V/m
EN 61000-4-4 Electrical fast transients (burst) 2 kV
EN 61000-4-6 Conducted disturbances, induced by RF-fields 10 V eff.
EN 55011 Radiated disturbances class B

Environmental Data

MTTF (DIN EN ISO 13849-1, parts count method, w/o load, wc) 27 Years

Functional Safety

If you need assistance in using our products in safety-related systems, please contact us.

Pin assignment

<table>
<thead>
<tr>
<th>Connector code 101, 102</th>
<th>Cable code 20 _</th>
<th>Connector with cable (Accessories)</th>
<th>SSI Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>YE</td>
<td>WH</td>
<td>Clk +</td>
</tr>
<tr>
<td>Pin 2</td>
<td>GY</td>
<td>BN</td>
<td>Data +</td>
</tr>
<tr>
<td>Pin 3</td>
<td>PK</td>
<td>GN</td>
<td>Clk</td>
</tr>
<tr>
<td>Pin 4</td>
<td>RD</td>
<td>YE</td>
<td>do not connect</td>
</tr>
<tr>
<td>Pin 5</td>
<td>GN</td>
<td>GY</td>
<td>Data</td>
</tr>
<tr>
<td>Pin 6</td>
<td>BU</td>
<td>PK</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 7</td>
<td>BN</td>
<td>BU</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>Pin 8</td>
<td>WH</td>
<td>RD</td>
<td>do not connect</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connector code 103</th>
<th>Connector with cable (Accessories)</th>
<th>Connector code 108</th>
<th>SSI Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>WH</td>
<td>Pin 1</td>
<td>Data -</td>
</tr>
<tr>
<td>Pin 2</td>
<td>BN</td>
<td>Pin 2</td>
<td>Data +</td>
</tr>
<tr>
<td>Pin 3</td>
<td>BU, Clk</td>
<td>Pin 3</td>
<td>Clk</td>
</tr>
<tr>
<td>Pin 4</td>
<td>BK</td>
<td>Pin 4</td>
<td>Clk -</td>
</tr>
<tr>
<td>Pin 5</td>
<td>GY</td>
<td>Pin 5</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>Pin 6</td>
<td>GN, Clk</td>
<td>Pin 6</td>
<td>GND</td>
</tr>
</tbody>
</table>

*) Measured with resolution 1 µm.
At resolution > 1 µm the permissible linearity error is increased by the resolution.
Type designations
TP1- _ _ _ _ - 101 - 11 _ - _ _ _
Start-Stop-Impulse-Interface

Electrical Data

Electrical measuring range (dimension B)
0050 up to 4250 mm

Number of position markers
1 up to 3

Protocol
Impulse

Inputs
RS422

Sampling rate / Update rate
< 500 mm: 1 kHz, 500 ... < 2000 mm: 0.5 kHz, > 2000 mm: 0.25 kHz

Resolution
Depending on interpretation, normalized to 2800 ms⁻¹

Absolute linearity
≤ 1000 mm ≤ ±50 μm
≤ 2500 mm ≤ ±10 μm
up to 4250 mm ≤ ±120 μm

Tolerance of electric zero point
≤ 0.5 mm

Reproducibility
≤ 6 μm

Hysteresis
≤ 4 μm

Temperature error
≤ 15 μm (0,01 mm/K)

Supply voltage
24 (13 ... 34) VDC

Supply voltage ripple
≤ 10 % Ub

Overvoltage protection
40 (permanent) VDC

Current consumption
≤ 100 mA

Polarity protection
Yes, up to supply voltage max.

Short circuit protection
Yes (outputs vs. GND and supply voltage up to 7 V)

Insulation resistance (500 VDC)
≥ 10 MΩ

MTTF (DIN EN ISO 13849-1, parts count method, w/o load, wc)
27 Years

EMC compatibility
EN 61000-4-2 Electrostatic discharges (ESD) 4 kV, 8 kV
EN 61000-4-3 Electromagnetic fields 10 V/m
EN 61000-4-4 Electrical fast transients (burst) 2 kV
EN 61000-4-6 Conducted disturbances, induced by RF-fields 10 V eff.
EN 55011 Radiated disturbances class B

Environmental Data

Functional safety
If you need assistance in using our products in safety-related systems, please contact us

Connector code 101, 102
Cable code 20 _
Connector with cable (Accessories)
Start/Stop-Impulse-Interface
Pin 1 YE WH INIT +
Pin 2 GY BN Start/Stop +
Pin 3 PK GN INIT -
Pin 4 RD YE do not connect
Pin 5 GN GY Start/Stop -
Pin 6 BU PK GND
Pin 7 BN BU Supply voltage
Pin 8 WH RD do not connect

Connector code 103
Connector with cable (Accessories)
Start/Stop-Impulse-Interface
Pin 1 WH Start/Stop -
Pin 2 BN Start/Stop +
Pin 3 BU INIT +
Pin 4 BK INIT -
Pin 5 GY Supply voltage
Pin 6 GN GND

Control unit
RS422

Sensor
CLK  + INIT
+ Data - Start/Stop
- Data + Start/Stop

Pin assignment

Pin assignment
### Type designations

TP1- _ _ _ _ - 101 - 8 _ _ - _ _ _

**Incremental-Interface**

### Electrical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical measuring range (dimension B)</td>
<td>0050 up to 4250 mm</td>
</tr>
<tr>
<td>Outputs</td>
<td>A+ / A- / B+ / B- / Z+ / Z-</td>
</tr>
<tr>
<td>Leveling</td>
<td>RS422 differential</td>
</tr>
<tr>
<td>Incremental-Interface</td>
<td></td>
</tr>
<tr>
<td>Sampling rate / Update rate</td>
<td>&lt; 750 mm: 2 kHz, 750 mm up to 2000 mm: 1 kHz, &gt; 2000 mm: 0.5 kHz Extrapolated to 16 kHz</td>
</tr>
<tr>
<td>Resolution (with 4-fold interpretation)</td>
<td>1 or 5 µm</td>
</tr>
<tr>
<td>Max. pulse frequency at power-on (initialising)</td>
<td>156 high speed mode</td>
</tr>
<tr>
<td></td>
<td>78 low speed mode</td>
</tr>
<tr>
<td>Frequency A/B-signal</td>
<td>Variable, depending on operational speed, max. 148 kHz</td>
</tr>
<tr>
<td>Missing increments when exceeding the max. operational speed</td>
<td>none</td>
</tr>
<tr>
<td>Length Z-pulse</td>
<td>Distance between 2 edges A / B</td>
</tr>
<tr>
<td>Absolute linearity</td>
<td>&lt; 250 mm: ±25 µm</td>
</tr>
<tr>
<td></td>
<td>&lt; 750 mm: ±30 µm</td>
</tr>
<tr>
<td></td>
<td>&lt; 1000 mm: ±50 µm</td>
</tr>
<tr>
<td></td>
<td>&lt; 2500 mm: ±80 µm</td>
</tr>
<tr>
<td></td>
<td>up to 4250 mm: ±120 µm</td>
</tr>
<tr>
<td>Tolerance of electric zero point</td>
<td>±0,4 mm</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>± 6 µm</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>± 4 µm</td>
</tr>
<tr>
<td>Temperature error</td>
<td>± 15 (min. 0,01 mm/K) ppm/K</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 (13 ... 34) V DC</td>
</tr>
<tr>
<td>Supply voltage ripple</td>
<td>≤ 10 % Ub</td>
</tr>
<tr>
<td>Current consumption</td>
<td>≤ 100 mA</td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td>40 (permanent) V DC</td>
</tr>
<tr>
<td>Polarity protection</td>
<td>Yes, up to supply voltage max.</td>
</tr>
<tr>
<td>Short circuit protection</td>
<td>Yes (outputs vs. GND and supply voltage up to 7 V)</td>
</tr>
<tr>
<td>Choke load at outputs</td>
<td>≤ 120 Ω</td>
</tr>
<tr>
<td>Insulation resistance (500 VDC)</td>
<td>≥ 10 MΩ</td>
</tr>
</tbody>
</table>

### Environmental Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. operating speed **</td>
<td>Resolution 1 µm</td>
</tr>
<tr>
<td>High speed mode</td>
<td>0.45 ms</td>
</tr>
<tr>
<td></td>
<td>Resolution 5 µm</td>
</tr>
<tr>
<td>Low speed mode</td>
<td>0.22 ms</td>
</tr>
<tr>
<td></td>
<td>1.1 ms</td>
</tr>
<tr>
<td>MTTF (DIN EN ISO 13849-1, parts count method, w/o load, wc)</td>
<td>27 Years</td>
</tr>
</tbody>
</table>

### Functional safety

If you need assistance in using our products in safety-related systems, please contact us.

### EMC compatibility

- EN 61000-4-2 Electrostatic discharges (ESD) 4 kV, 8 kV
- EN 61000-4-3 Electromagnetic fields 10 V/m
- EN 61000-4-4 Electrical fast transients (burst) 2 kV
- EN 61000-4-6 Conducted disturbances, induced by RF-fields 10 V eff.
- EN 55011 Radiated disturbances class B

### Pin assignment

<table>
<thead>
<tr>
<th>Connector code 102</th>
<th>Cable code 20 _</th>
<th>Connector with cable (Accessories)</th>
<th>Incremental Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1 YE WH</td>
<td></td>
<td>A+</td>
<td></td>
</tr>
<tr>
<td>Pin 2 GY BN</td>
<td></td>
<td>B+</td>
<td></td>
</tr>
<tr>
<td>Pin 3</td>
<td>B-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin 4</td>
<td></td>
<td>YE Z-</td>
<td></td>
</tr>
<tr>
<td>Pin 5</td>
<td>RD GY</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>Pin 6 BU PK</td>
<td></td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>Pin 7</td>
<td></td>
<td>B-</td>
<td></td>
</tr>
<tr>
<td>Pin 8</td>
<td>PK RD</td>
<td>A-</td>
<td></td>
</tr>
</tbody>
</table>
### Ordering Specifications

#### Digital Versions

**- SSI**

- Start-Stop-Impulse
- Incremental

#### Mechanical version

101: Profile design

### Electrical Interface

1: Impulse-Interface
2: SSI-Interface
8: Incremental-Interface (A / B / Z)

<table>
<thead>
<tr>
<th>Output signal Impulse-Interface 1 _ _</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Impulse-Interface Start-Stop Signal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output signal SSI-Interface 2 _ _</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: SSI 24 bit</td>
</tr>
<tr>
<td>2: SSI 25 bit</td>
</tr>
<tr>
<td>7: SSI 26 bit (25 = alarm, 26 = parity even) on request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output signal Incremental-Interface 8 _ _</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Resolution 5 μm, high speed mode, power-on burst</td>
</tr>
<tr>
<td>6: Resolution 1 μm, high speed mode, power-on burst</td>
</tr>
<tr>
<td>7: Resolution 5 μm, low speed mode, power-on burst</td>
</tr>
<tr>
<td>9: Resolution 1 μm, low speed mode, power-on burst</td>
</tr>
</tbody>
</table>

### Impulse-Interface Start-Stop Signal 11 _ _

1: For 1 position marker
2: For 2 position markers
3: For 3 position markers

### Synchronous-Serial Interface 2 _ _

1: Binary code; resolution 5 μm
2: Gray code; resolution 5 μm
4: Binary code; resolution 1 μm
5: Gray code; resolution 1 μm
7: Binary code; resolution 10 μm
8: Gray code; resolution 10 μm

### Incremental-Interface 8 _ _

1: RS422 differential (A / B / Z)

#### Electrical connection

- 101: Connector M16x0.75 (IEC 130-9), 8-pin *
- 102: Connector M12x1, 8-pin
- 103: Connector M16x0.75 (IEC 130-9), 6-pin *
- 108: Connector M16x0.75 (IEC 130-9), 7-pin (only SSI interface)
- 201: Cable, 8-pole, shielded, 1 m
- 203: Cable, 8-pole, shielded, 3 m
- 205: Cable, 8-pole, shielded, 5 m

*) not for incremental interface

#### Electrical measuring range

Standard lengths 0050 up to 4250 mm
- 0050 up to 0500 mm in 25 mm-steps, 0500 up to 1000 mm in 50 mm-steps, 1000 up to 2000 mm in 100 mm-steps, 2000 up to 4250 mm in 250 mm-steps.
- Other lengths on request

---

**Important:** Avoid equalizing currents in the cable shield caused by potential differences. Twisted pair cable (STP) is recommended.
Type designations

<table>
<thead>
<tr>
<th>Type designations</th>
<th>TP1 - - - - -101- 6 - - -</th>
</tr>
</thead>
</table>

CANopen-Interface

Electrical Data

Measured variables

<table>
<thead>
<tr>
<th>Electrical measuring range (dimension B)</th>
<th>0050 up to 4250 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range speed</td>
<td>0 ... 10 m/s</td>
</tr>
</tbody>
</table>

Number of position markers

| Number of position markers | 1 / 2 |

Output signal / 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

| 20 ... 1000 kBaud |

Resolution

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>5</th>
<th>μm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>0.1</td>
<td>0.5</td>
<td>mms⁻¹</td>
</tr>
</tbody>
</table>

Update rate

| 1 kHz |

(Internal sampling rate < 750 mm: 2 kHz, 750 ... < 2000 mm: 1 kHz, > 2000 mm: 0.5 kHz)

Absolute linearity *

<table>
<thead>
<tr>
<th>&lt; 250 mm</th>
<th>±25 μm</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 750 mm</td>
<td>±38 μm</td>
</tr>
<tr>
<td>&lt; 1000 mm</td>
<td>±50 μm</td>
</tr>
<tr>
<td>&lt; 2500 mm</td>
<td>±80 μm</td>
</tr>
<tr>
<td>up to 4250 mm</td>
<td>±120 μm</td>
</tr>
</tbody>
</table>

Tolerance of electr. zero point

| 0.5 | mm |

Reproducibility (rounded to resolution)

| 6 | μm |

Hysteresis (rounded to resolution)

| 4 | μm |

Temperature error

| 24 (13 ... 34) K | ppm/K |

Supply voltage

| VDC |

Supply voltage ripple

| ≤ 10 % | Ub |

Current consumption

| 100 mA |

Overvoltage protection

| 40 (permanent) | VDC |

Polarity protection

| Yes, up to supply voltage max. |

Short circuit protection

| Yes (outputs vs. GND and supply voltage max.) |

Insulation resistance (ISO 1000 VDC)

| 10 MΩ |

Bus termination internal

| No |

Environmental Data

| MTTF (DIN EN ISO 13849-1 parts count method, w/o load, wc) | 25 Years |

Functional safety

If you need assistance in using our products in safety-related systems, please contact us

EMC compatibility

<table>
<thead>
<tr>
<th>EN 61000-4-2 Electrostatic discharges (ESD) 4 kV, 8 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-4-3 Electromagnetic fields 10 V/m</td>
</tr>
<tr>
<td>EN 61000-4-4 Electrical fast transients (burst) 1 kV</td>
</tr>
<tr>
<td>EN 61000-4-6 Conducted disturbances, induced by RF-fields 10 V eff.</td>
</tr>
<tr>
<td>EN 55016-2-3 Noise radiation class B</td>
</tr>
</tbody>
</table>

Pin assignment

<table>
<thead>
<tr>
<th>Connector code 106</th>
<th>Connector code 105</th>
<th>CANopen interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>Pin 3</td>
<td>CAN_SHLD ***</td>
</tr>
<tr>
<td>Pin 2</td>
<td>Pin 5</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>Pin 3</td>
<td>Pin 6</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 4</td>
<td>Pin 2</td>
<td>CAN_H</td>
</tr>
<tr>
<td>Pin 5</td>
<td>Pin 1</td>
<td>CAN_L</td>
</tr>
<tr>
<td>Pin 4</td>
<td>Pin 1</td>
<td>n/a</td>
</tr>
</tbody>
</table>

*) Measured with resolution 1 µm. At resolution > 1 µm the permissible linearity error is increased by the resolution.

**) CAN_SHLD: CAN-shield, internally connected to housing
Type designations
TP1 - _ _ _ _-101- A _ _ - _ _ _
IO-Link

Electrical Data
Measured variables
Position, speed and temperature

Electrical measuring range (dimension B)
0050 up to 4250 mm

Number of position markers
1 up to 3

Output signal / protocol
IO-Link Spec V1.1 to IEC 61131-9, Smart Sensor Profil (V1.0 compatible)

Programmable parameters
Zero point offset, resolution, averaging

Configurability
Number of position markers and measured variables (position, speed). All product versions listed in the ordering specifications (e.g. 1 x position) are also configurable by the customer (e.g. into 2 x position and 2 x speed).

Transfer rate
COM 3 (230.4 kB)

Frame type
2.2

Minimum cycle time
1 ms

Update rate
1 kHz
(Internal sampling rate < 750 mm: 2 kHz, 750 ... < 2000 mm: 1 kHz, > 2000 mm: 0.5 kHz)

Resolution
Position
1 µm
5 µm

Speed
0.1 m/s
0.5 m/s

Reproducibility (rounded to resolution)
6 µm

Hysteresis (rounded to resolution)
4 µm

Absolute linearity *
< 250 mm ± 25 µm
< 750 mm ± 30 µm
< 1000 mm ± 50 µm
< 2500 mm ± 80 µm
up to 4250 mm ± 120 µm

Zero point tolerance
0.5 mm

Temperature error
< 15 (min. 0.01 mm/K) ± ppm/K

Supply voltage
24 (18 ... 30) VDC

Supply voltage ripple
max. 10 % Ub

Current consumption (w/o load)
< 100 mA

Reverse voltage
yes, up to supply voltage max.

Short circuit protection
yes (C/Q vs. GND and supply voltage)

Overvoltage protection
36 (permanent) VDC

Insulation resistance (500 VDC)
> 10 MΩ

Environmental Data
MTTF (DIN EN ISO 13849-1 parts count method, w/o load, wc)
> 28.6 Years

Functional safety
If you need assistance in using our products in safety-related systems, please contact us

EMC compatibility
EN 61000-4-2 Electrostatic discharges (ESD) 4 kV, 8 kV
EN 61000-4-3 Electromagnetic fields 10 V/m
EN 61000-4-4 Electrical fast transients (burst) 1 kV
EN 61000-4-6 Conducted disturbances, induced by RF-fields 10 V eff.
EN 55016-2-3 Noise radiation class B

* Measured with resolution 1 µm. At resolution > 1 µm the permissible linearity error is increased by the resolution.

** Alternatively on GND
## Ordering specifications

**Preferred types printed in bold**

### Electrical Interfaces

#### CANopen-Interface
- 1: Resolution 5 μm, 1 x position and speed, 1 position marker fix
- 2: Resolution 5 μm, 2 x position and speed, 1 position markers fix
- 3: Resolution 5 μm, 1 x position and speed, 1 position marker fix
- 4: Resolution 5 μm, 2 x position and speed, 2 position markers fix
- 5: Resolution 5 μm, 2 x position and speed, 2 position markers fix
- 6: Resolution 1 μm, 2 x position and speed, 2 position markers fix

#### IO-Link
- 11: Resolution 5 μm, 1 x position, 1 position marker fix
- 12: Resolution 5 μm, 1 x position and speed, 1 position marker fix
- 13: Resolution 5 μm, 2 x position, 2 position markers fix
- 14: Resolution 5 μm, 2 x position and speed, 2 position markers fix
- 15: Resolution 1 μm, 3 x position, 3 position markers fix

### Electrical Connection CANopen
- Baudrate CANopen 6
  - 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
  - 6: Baud rate 50 kBaud
  - 7: Baud rate 20 kBaud

### Interface parameters for IO-Link
- 11: Resolution 5 μm, 1 x position, 1 position marker fix
- 12: Resolution 5 μm, 1 x position and speed, 1 position marker fix
- 13: Resolution 5 μm, 2 x position, 2 position markers fix
- 14: Resolution 5 μm, 2 x position and speed, 2 position markers fix
- 15: Resolution 5 μm, 2 x position, 2 position markers fix
- 31: Resolution 1 μm, 1 x position, 1 position marker fix
- 32: Resolution 1 μm, 1 x position and speed, 1 position marker fix
- 33: Resolution 1 μm, 2 x position, 2 position markers fix
- 34: Resolution 1 μm, 2 x position and speed, 2 position markers fix
- 35: Resolution 1 μm, 3 x position, 3 position markers fix

### Electrical measuring range

- Standard lengths 0050 up to 4250 mm
- 0050 up to 0500 mm in 25 mm-steps, 0500 up to 1000 mm in 50 mm-steps, 1000 up to 2000 mm in 100 mm-steps, 2000 up to 4250 mm in 250 mm-steps.
- Other lengths on request

### Important:
Avoid equalizing currents in the cable shield caused by potential differences.

Only CANopen: Twisted pair cable (STP) is recommended.
Position Marker

Ordering example:

Floating position marker
- Material: PA6 GF25
- Working distance: 0.5 ... 3 mm
- Weight: approx. 10 g
- P/N: 005693, Z-TP1-P06

Floating position marker for large distances
- Material: PA6 GB30
- Working distance: 3 ... 12 mm
- Weight: approx. 40 g
- P/N: 005694, Z-TP1-P07

Guided position marker
- Material: POM
- Weight: approx. 30 g
- P/N: 005695, Z-TP1-P08

Actuating rod for guided position marker
- Material: Aluminum
- Weight: approx. 150 g
- P/N: Z-TP1-P08

Standard-nominal lengths (mm):
- 0075, 0100, 0125, 0150,
- 0200, 0250, 0300, 0350,
- 0400, 0450, 0500, 0600,
- 0800, 1000, 1500, 2000

Environmental conditions, length of actuating rod, acceleration etc. have a direct influence on life time and accuracy of the whole system; it must be qualified by the user in the real application.
M12x1 Mating female connector, 8-pin, straight, A-coded, with molded cable, shielded, IP67, open ended

Connector housing: Plastic PA
Cable sheath: PUR; Ø = max. 8 mm
-25 °C...+80 °C (moved)
-50 °C...+80 °C (fixed)
Wires: PP; 0.25 mm²
Length | Type | P/N
---|---|---
2 m | EEM 33-88 | 005629
5 m | EEM 33-90 | 005635
10 m | EEM 33-92 | 005637

M12x1 Mating female connector, 8-pin, angled, A-coded, with molded cable, shielded, IP67, open ended

Connector housing: Plastic PA
Cable sheath: PUR; Ø = max. 8 mm
-25 °C...+80 °C (moved)
-50 °C...+80 °C (fixed)
Wires: PP; 0.25 mm²
Length | Type | P/N
---|---|---
2 m | EEM 33-87 | 005630
5 m | EEM 33-91 | 005636
10 m | EEM 33-93 | 005638

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

M12x1 Mating female connector, 5-pin, straight, A-coded, with molded cable, IP68, shielded, 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
**Connector System**

**M12**

**Terminating resistor M12x1**, 5-pin, A-coded, IP67, 120 Ω resistance, CAN-bus

- **Connector housing**: PUR
- **Temperature range**: -25 °C...+85 °C
- **Type**: EEM 33-45, P/N 056147

**Pin assignment**

1 = n. c.  
2 = n. c.  
3 = n. c.  
4 = Resistance 120 Ω  
5 =

---

**T-connector M12x1**, 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**

1 = n. c.  
2 = n. c.  
3 = n. c.  
4 =  
5 =

---

**M12x1** Mating female connector, 5-pin, straight, A-coded, with coupling nut, screw termination, IP67, shieldable, CAN-bus

- **Connector housing**: Metal
- **Temperature range**: -40 °C...+85 °C
- **For wire gauge**: 6...8 mm, max. 0.75 mm²
- **Type**: EEM 33-73, P/N 005645

**Pin assignment**

1 = n. c.  
2 =  
3 =  
4 =  
5 =

---

**M12x1** Mating female connector, 5-pin, angled, A-coded, with coupling nut, screw termination, IP67, shieldable, CAN-bus

- **Connector housing**: Metal
- **Temperature range**: -40 °C...+85 °C
- **For wire gauge**: 6...8 mm, max. 0.75 mm²
- **Type**: EEM 33-75, P/N 005646

It is possible to turn and fix the contact carrier in 90° positions.
Connector System M12

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

<table>
<thead>
<tr>
<th>Connector housing</th>
<th>Plastic PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable sheath</td>
<td>PUR; Ø = max. 6 mm, -40 °C...+85 °C (fixed)</td>
</tr>
<tr>
<td>Wires</td>
<td>PP; 0.34 mm²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length</th>
<th>Type</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m</td>
<td>EEM 33-35</td>
<td>056135</td>
</tr>
<tr>
<td>5 m</td>
<td>EEM 33-36</td>
<td>056136</td>
</tr>
<tr>
<td>10 m</td>
<td>EEM 33-37</td>
<td>056137</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Connector housing</th>
<th>Plastic PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable sheath</td>
<td>PUR; Ø = max. 6 mm, -40 °C...+85 °C (fixed)</td>
</tr>
<tr>
<td>Wires</td>
<td>PP; 0.34 mm²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length</th>
<th>Type</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m</td>
<td>EEM 33-38</td>
<td>056138</td>
</tr>
<tr>
<td>5 m</td>
<td>EEM 33-39</td>
<td>056139</td>
</tr>
<tr>
<td>10 m</td>
<td>EEM 33-40</td>
<td>056140</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Connector housing</th>
<th>Plastic PBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>For wire gauge</td>
<td>6...8 mm, max. 0.75 mm²</td>
</tr>
</tbody>
</table>

Type EEM 33-89, P/N 005634
M16x0.75 Mating female connector, 6-pin, straight, with coupling nut, solder terminal, IP67, shielded

Connector housing: CuZn (Brass, nickel plated)

−40 °C... +95 °C

For wire gauge 6...8 mm², PG 9 max. 0.75 mm²

Type EEM 33-28, P/N 005649

This coupling can be used in combination with 5-pin M16 connectors. Than „pin 6/green“ is open.

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

M16x0.75 Mating female connector, 6-pin, angled, with coupling nut, solder terminal, IP67, shielded

Connector housing: CuZn (Brass, nickel plated)

−40 °C... +95 °C

For wire gauge 6...8 mm², PG 9 max. 0.75 mm²

Type EEM 33-29, P/N 005650

This coupling can be used in combination with 5-pin M16 connectors. Than „pin 6/green“ is open.

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

M16x0.75 Mating female connector, 6-pin, straight, with molded cable, 2 m length, shielded, IP67, open ended

Connector housing: PUR

Cable sheath: PUR, Ø max. 6 mm, −5...+70 °C (moved) −20...+70 °C (fixed)

Wires: PVC, 6 x 0.25 mm²

Type EEM 33-30, P/N 0056126

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

M16x0.75 Mating female connector, 6-pin, angled, with molded cable, 2 m length, shielded, IP67, open ended

Connector housing: PUR

Cable sheath: PUR, Ø max. 6 mm, −5...+70 °C (moved) −20...+70 °C (fixed)

Wires: PVC, 6 x 0.25 mm²

Type EEM 33-31, P/N 0056127

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

M16x0.75 Mating female connector, 6-pin, straight, with molded cable, 2 m length, shielded, IP68, shielded

Connector housing: PUR

Cable sheath: PUR; Ø max. 6 mm, −5...+70 °C (moved) −20...+70 °C (fixed)

Wires: PVC, 6 x 0.25 mm²

Type EEM 33-32, P/N 005639

This coupling can be used in combination with 5-pin M16 connectors. Than „pin 6/green“ is open.

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

M16x0.75 Mating female connector, 6-pin, angled, with molded cable, 2 m length, shielded, IP68, shielded

Connector housing: PUR

Cable sheath: PUR; Ø max. 6 mm, −5...+70 °C (moved) −20...+70 °C (fixed)

Wires: PVC, 6 x 0.25 mm²

Type EEM 33-33, P/N 005648

This coupling can be used in combination with 5-pin M16 connectors. Than „pin 6/green“ is open.

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green

Pin assignment:

1 = red
2 = black
3 = yellow
4 = blue
5 = white
6 = green
**Note:** The protection class is valid only in locked position with its plugs.

The application of these products in harsh environments must be checked in particular cases.

### M16x0.75 Mating female connector, 8-pin, straight, with coupling nut, solder terminal, IP68, shielded

<table>
<thead>
<tr>
<th>Connector housing</th>
<th>CuZn (Brass, nickel plated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For wire gauge</td>
<td>6...8 mm, max. 0.75 mm²</td>
</tr>
<tr>
<td>Type</td>
<td>EEM 33-84, P/N 005628</td>
</tr>
</tbody>
</table>

- **Very good Electromagnetic Compatibility (EMC) and shield systems**
- **Very good resistance to oils, coolants and lubricants**
- **UL - approved**
- **SUITED FOR APPLICATIONS IN DRAGCHAINS**

### M16x0.75 Mating female connector, 8-pin, angled, with coupling nut, solder terminal, IP67, shielded

<table>
<thead>
<tr>
<th>Connector housing</th>
<th>CuZn (Brass, nickel plated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For wire gauge</td>
<td>4...8 mm, max. 0.75 mm²</td>
</tr>
<tr>
<td>Type</td>
<td>EEM 33-85, P/N 005628</td>
</tr>
</tbody>
</table>

- **Canbus**

The specifications contained in our datasheets are intended solely for informational purposes. The documented specification values are based on ideal operational and environmental conditions and can vary significantly depending on the actual customer application. Using our products at or close to one or more of the specified performance ranges can lead to limitations regarding other performance parameters. It is therefore necessary that the end user verifies relevant performance parameters in the intended application. We reserve the right to change product specifications without notice.