novotechnik
Siedle Group

# Rotary Sensor Potentiometric

# IP-6000 Industrial


**Special Features**
- Excellent linearity ± 0.075%
- Long life - up to 100 Mio. movements
- Very good repeatability 0.007°
- Mechanical continuous rotation
- Protection class IP65

This "industrial-grade“ potentiometer has been specially designed for severe working conditions often encountered in industrial applications.
The housing is water-protected and of sturdy construction. The shaft bearing and the connector both meet IP65 rating. Because of its reliability, long life, good linearity, high resolution, high operational speed and corrosion resistance, this sensor design opens applications previously closed to conventional potentiometers.

If the operating voltage is applied via connection 5, a protective resistance prevents a short circuit between the wiper and the supply voltage, as it may happen during wiring.

Special versions with different electrical angles and shaft dimensions are available.

| **Description** | |
|---|---|
| Material | Housing: aluminium, anodized<br>Shaft: SS |
| Mounting | With 3 mounting clamps Z3-31 (included in delivery) |
| Bearing | Stainless steel ball bearings |
| Resistance element | Conductive plastic |
| Wiper | Precious metal multi-finger wiper |
| Electrical connection | Connector M16x0.75 (IEC 130-9), 5-pin |

| **Mechanical Data** | |
|---|---|
| Dimensions | See dimension drawing |
| Mechanical travel | Continuous |
| Permitted shaft load<br>static or dynamic | 45 N (axial / radial) |
| Torque | ≤ 1.5 Ncm |
| Weight | 180 g |

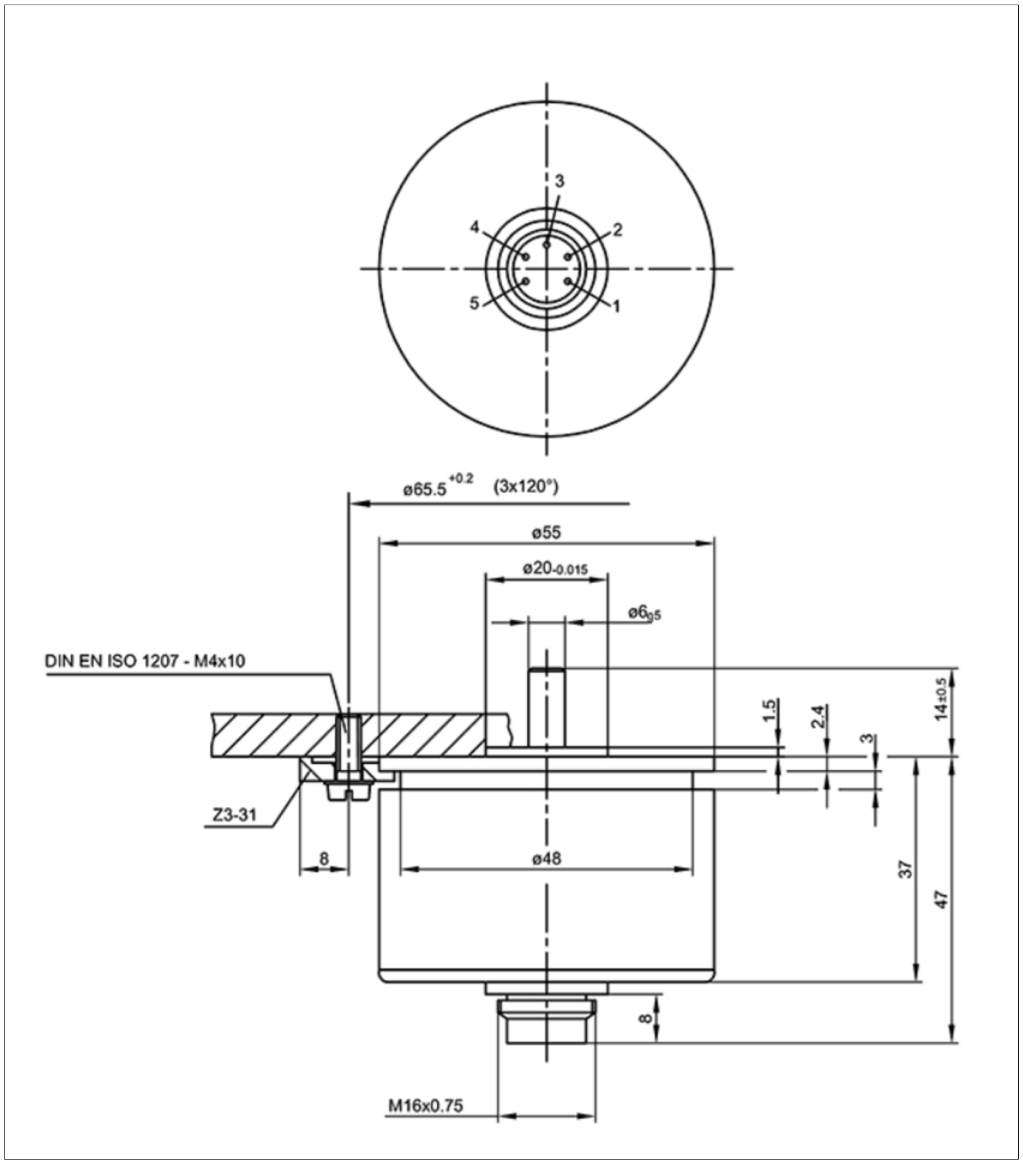
# Ordering Specifications

| P/N | Type | |
|---|---|---|
| 400010001 | IP-6501-A502 | Measuring Range 355° |
| 400010004 | IP-6501-G252 | Measuring Range 90° |

## Accessories included in delivery

3x fixing clamp Z3-31

## Drawing




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

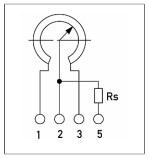
# Technical Data

| Type | IP-6501-A502 | IP-6501-G252 |
|---|---|---|
| Electrical measuring range | 355° ±2° | 90° ±2° |
| Resistance value | 5 kΩ | 2.5 kΩ |
| Resistance tolerance | ± 20 % | |
| Independent linearity | ≤ ±0.075 %FS | ≤ ±0.3 %FS |
| Repeatability | ≤ ±0.007° | |
| Recommended operating wiper current | ≤ 1 µA | |
| Max. wiper current in case of malfunction | 10 mA | |
| Max. permissible supply voltage Ub | 42 VDC | |
| Protective resistance Rs | 5.6 kΩ between connection 2 and 5 | |
| Effective temp. coefficient of the output-to-applied voltage ratio | typ. 5 ppm/K | |
| Insulation resistance (500 VDC) | ≥ 10 MΩ | |
| Dielectric strength (500 VAC, 50 Hz) | ≤ 100 µA | |
| **Environmental Data** | | |
| Max. operational speed | 2000 rpm | |
| Vibration IEC 60068-2-6 | 5 g, 5 ... 2000 Hz, Amax = 0.75 mm | |
| Shock IEC 60068-2-27 | 50 g, 11 ms | |
| Protection class DIN EN 60529 | IP65 (with fastened connector EEM-33-70) | |
| Operating temperature | -40 ... +100°C | |
| Life | typ. > 100 Mio. movements | |

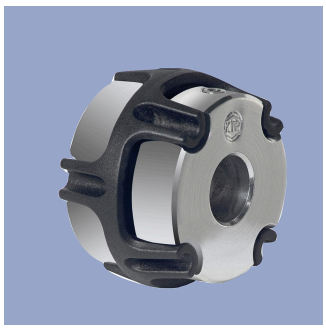
**Important:**
All values specified in this data sheet for linearity, lifetime and temperature coefficient are only valid for a sensor used as a voltage divider with virtually no load applied to the wiper (Ie ≤ 1 µA).

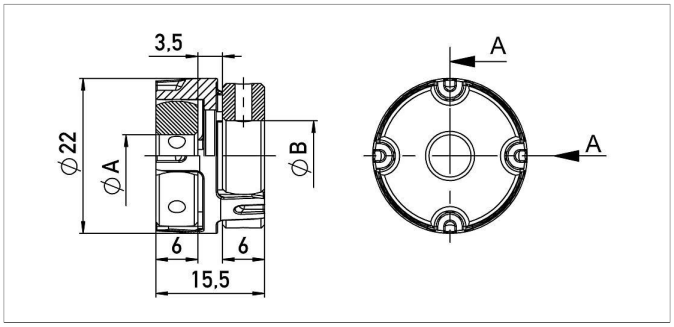
**Connection Assignment**

| | |
|---|---|
| Connection 1 | Pin 1 |
| Conn. 2 Signal Output (not protected) | Pin 2 |
| Connection 3 | Pin 3 |
| Conn. 5 Signal Output (protected) | Pin 5 |
| Do not connect | Pin 4 |



# Sensor Mounting

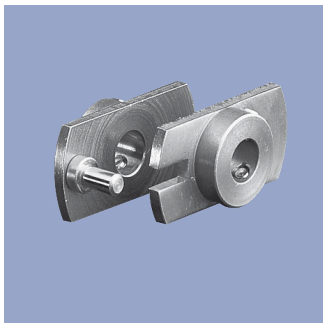


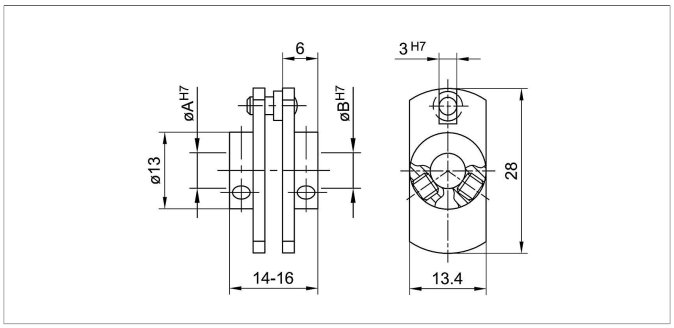



**Z-106-G-_**
Backlash-free, double cardanic shaft coupling for Ø6 mm to Ø6 mm, Ø6.35 mm or Ø10 mm, mounting via 2 threaded pins with internal hexagon

| | |
|---|---|
| Material | Aluminium, PEEK |
| Operating temp. | -40 ... +160°C |
| Transferable torque | ≤ 1 Nm |
| Displacement | rad. ≤ 0.1 mm, angl. ≤ 0.45° |

| P/N | Type | ØA / ØB [mm] |
|---|---|---|
| 400103910 | Z-106-G-6 | 6 / 6 |
| 400103912 | Z-106-G-6,35 | 6 / 6.35 |
| 400103913 | Z-106-G-10 | 6 / 10 |

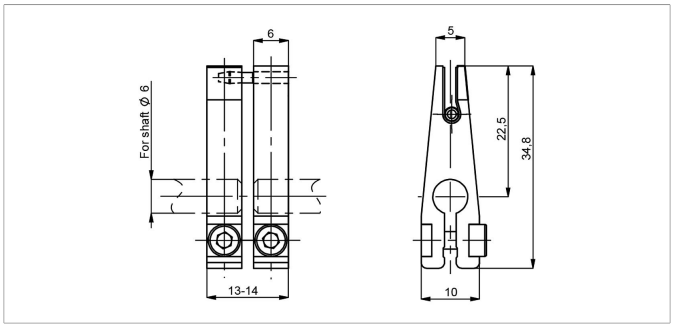





**Z-104-G-6**
Fork coupling with low backlash for Ø6 mm. Mounting with 2 cylinder head screws M3 with internal hexagon.
Angle screwdriver DIN 911 AF 1.5 included in delivery.

| | |
|---|---|
| Material | SS, ground driving pin |
| Displacement | ≤ 1 mm |

| P/N | Type | ØA / ØB [mm] |
|---|---|---|
| 400005690 | Z-104-G-6 | 6 / 6 |

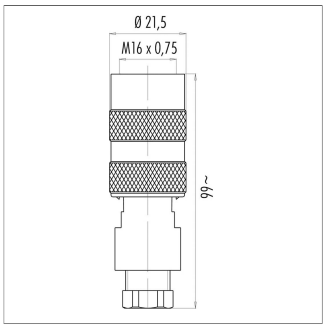


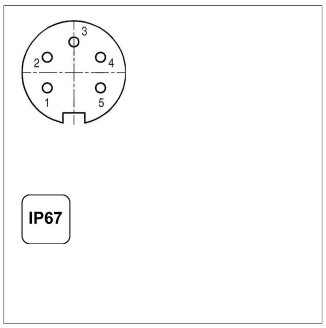

**Z-105-G-6**
Backlash-free fork coupling for Ø6 mm. Mounting with 1 cylinder head screw M3 with internal hexagon.
Angle screwdriver DIN 911 AF 2.5 included in delivery.

| | |
|---|---|
| Material | Aluminium, anodized (black)<br>Driving pin and spring hardened |
| Transferable torque | ≤ 5 Ncm |
| Displacement | ≤ 1 mm |

| P/N | Type |
|---|---|
| 400005691 | Z-105-G-6 |

# Connector System M16



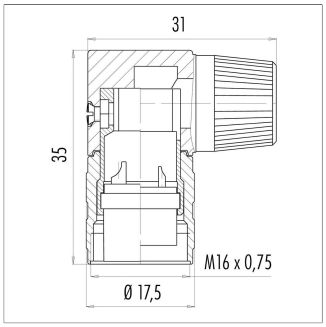



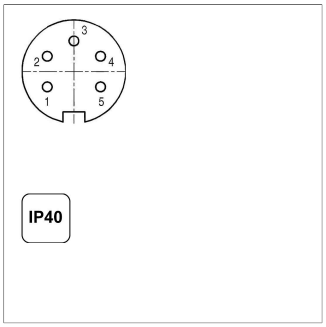

**EEM-33-70**

M16x0.75 Mating female connector, 5-pin, straight, with coupling nut, solder terminal, unshielded, IP67

| | |
|---|---|
| Plug housing | PA, -40 ... +95°C |
| For wire gauge | 4 ... 6 mm, max. 0.75 mm² |

| P/N | Type |
|---|---|
| 400005611 | EEM-33-70 |




**EEM-33-72**

M16x0.75 Mating female connector, 5-pin, angled, with coupling nut, solder terminal, unshielded, IP40

| | |
|---|---|
| Plug housing | PA, -40 ... +85°C |
| For wire gauge | 6 ... 8 mm, max. 0.75 mm² |

| P/N | Type |
|---|---|
| 400005613 | EEM-33-72 |

IP67 Protection class IP67 DIN EN 60529

IP68 Protection class IP68 DIN EN 60529

Very good Electromagnetic Compatibiliy (EMC) and shield systems

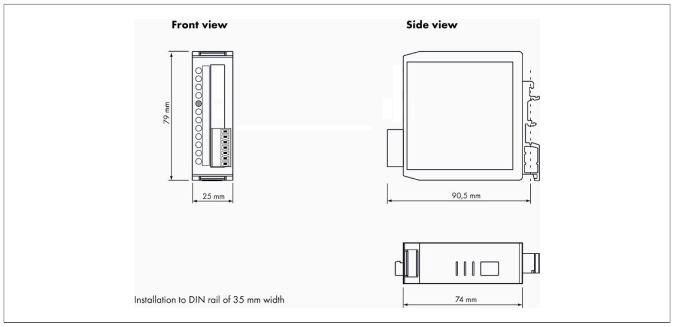
Very good resistance to oils, coolants and lubricants

Suited for applications in dragchains

UL - approved

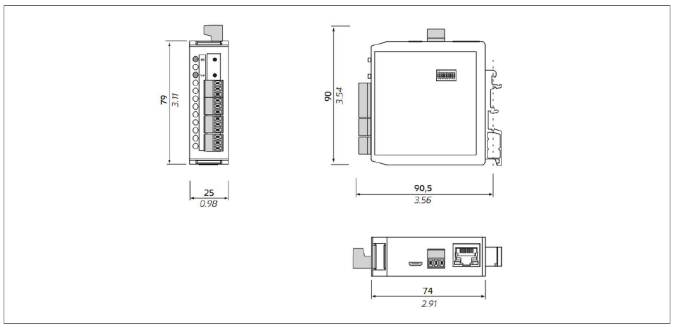
CAN-Bus

# Signal Processing



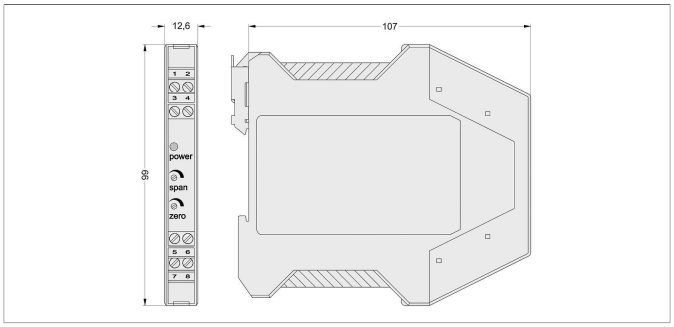

**MUP-080**
Cost-efficient signal conditioner with fixed output range, voltage or current output. Not adjustable.
Detailed data see separate data sheet.

| P/N | Type | Output |
|---|---|---|
| 400054220 | MUP-080-111 | 0 ... 10 V |
| 400054221 | MUP-080-113 | 4 ... 20 mA |



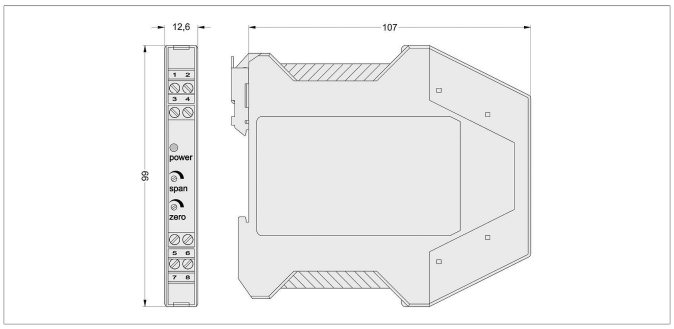

**MUP-410**
Signal conditioner with simple teach-in function to adapt start and end point. Switchable current or voltage outputs. With galvanic isolation.
Detailed data see separate data sheet.

| P/N | Type | Output |
|---|---|---|
| 400108799 | MUP-410-11 | 4 ... 20 mA,<br>0 ... 10 V,<br>0 ... 2/5 V,<br>± 10 V,<br>0 ... 5/20 mA |




**MUP-110**
Signal conditioner in compact size with voltage or current output, adjustable zero and span.
Detailed data see separate data sheet.

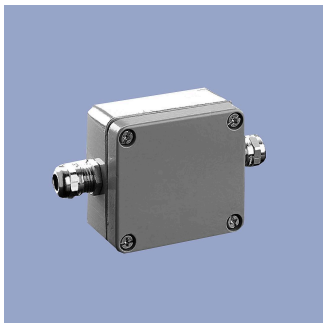
| P/N | Type | Output |
|---|---|---|
| 400054010 | MUP-110-0 | 0 ... 20 mA |
| 400054011 | MUP-110-1 | 0 ... 10 V |
| 400054014 | MUP-110-4 | 4 ... 20 mA |

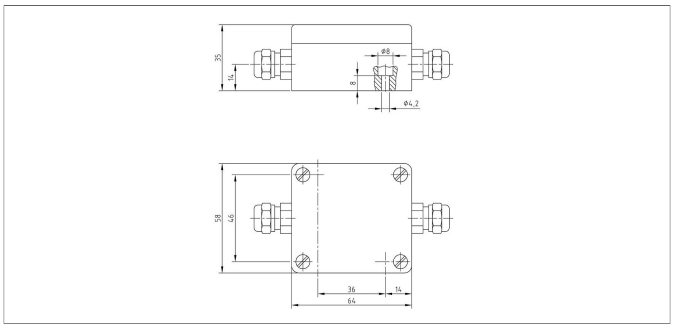



**MUP-160**
Signal conditioner in compact size with voltage or current output, adjustable zero and span. With galvanic isolation.
Detailed data see separate data sheet.

| P/N | Type | Output |
|---|---|---|
| 400054060 | MUP-160-0 | 0 ... 20 mA |
| 400054061 | MUP-160-1 | 0 ... 10 V |
| 400054064 | MUP-160-4 | 4 ... 20 mA |

# Signal Processing

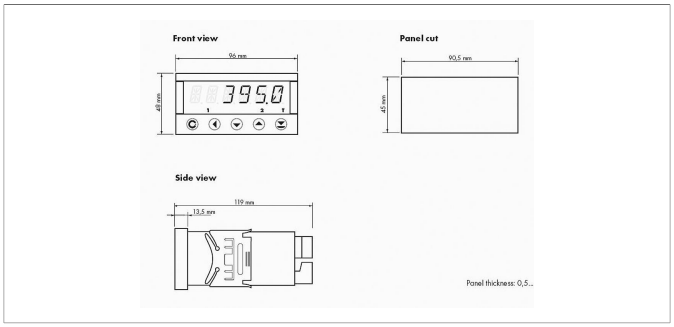




**MUK-350**

Signal conditioner inside robust housing, even for outside use. Zero point and span adjustable. Detailed data see separate data sheet.

| P/N | Type | Output |
|---|---|---|
| 400054171 | MUK-350-0 | 0 ... 20 mA |
| 400054172 | MUK-350-1 | 0 ... 10 V |
| 400054173 | MUK-350-4 | 4 ... 20 mA |
| 400054174 | MUK-350-6 | ± 10 V |




**MAP-4000**

Multifunctional measuring device with digital display for direct connnection of potentiometric and normalized signals.

- Supply voltage 10...30 VDC, 80...250 VDC or AC
- High accuracy up to 0.1%
- Adjustable supply voltage for sensors 5...24 V
- Temperature coefficient 100 ppm/K
- Optional RS 232, RS 485, analog output, limited switch
- Complete data see separate data sheet

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