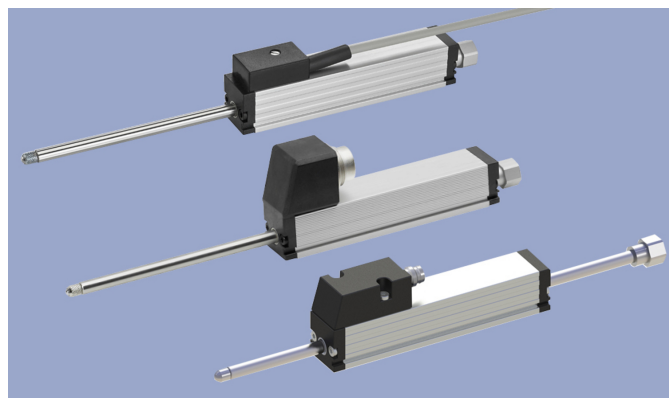
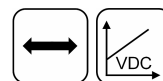




**Short Stroke  
Transducer  
Potentiometric  
TR/TRS  
Spring-loaded**



**Special Features**

- Extremely compact design 18 x 18 mm
- With internal return spring
- Long life up to 100 million movements
- Outstanding linearity up to  $\pm 0.05\%$
- Repeatability to  $\pm 0.002$  mm
- Actuating shaft with double-sided support
- Compatible to standard probe tips
- Insensitive to shock and vibration
- Optionally cable or plug connection
- Series T/TS with positive coupling, series TE1 with integrated signal processing for normalized outputs (current or voltage) or inductive series LS1 in same design see separate data sheets

**Applications**

- Measuring/control technology
- Manufacturing Engineering (woodwork machines, riveting machines, packaging machines, welding machines)
- Assembly/test devices
- Medical appliances
- Building automation

Compact spring-loaded transducer with proven conductive-plastic technology.

Characteristic for the robust design is the double-sided support of the actuating rod. This bearing allows high lateral forces on the tip of the rod which may occur during scanning of cams or wedge plates.

Signal conditioners or high impedance voltage inputs are used for electrical connection of these potentiometers.

**Description**

Material	Housing: aluminium AlMgSi, anodized Actuating rod: stainless steel AISI 303, 1.4305, with anti-twist safeguard, internal thread M2.5x6
Mounting	Adjustable clamps 2x Z-45 and 4x cylinder screws M4x10 DIN EN ISO 1207 (included in delivery)
Fastening torque of mounting	max. 140 Ncm
Bearing	Double-sided DU glide bearings
Probe tip	Stainless steel with external thread M2.5 and pressed-in hardened metal ball (included in delivery)
Resistance element	Conductive plastic
Wiper	Precious metal multi-finger wiper, elastomer damped
Electrical connection	Cable 3x 0.14 mm <sup>2</sup> (AWG 26), PVC, shielded, L = 2 m / Connector M8x1, 3-pin / Connector M16x0.75 (IEC 130-9), 5-pin

**Mechanical Data**

Type	TR/TRS-0010...	TR/TRS-0025...	TR/TRS-0050...	TR/TRS-0075...	TR/TRS-0100...
Dimensions	See dimension drawing				
Length of housing (dimension A +1 mm)	48 mm	63 mm	94.4 mm	134.4 mm	166 mm
Mechanical travel (dim. B $\pm 1.5$ mm)	15 mm	30 mm	55 mm	80 mm	105 mm
Flange nut SW-10 (dimension C)	7 mm	12 mm	12 mm	12 mm	12 mm
Excess length of push rod in end position (dimension D)	6 mm	32 mm	32 mm	32 mm	32 mm
Weight (cable/connector version)	80/- g	120/74 g	150/100 g	180/128 g	200/150 g
Weight actuating rod with wiper	18 g	25 g	36 g	48 g	57 g
Operating force, horizontal (extended/retracted)	$\leq 3.5 / 5$ N	$\leq 2.5 / 5$ N	$\leq 2.5 / 5$ N	$\leq 2.5 / 5$ N	$\leq 2.5 / 5$ N
Operating force to end stop	max 5 N				
Max. operating frequency*	20 Hz	18 Hz	14 Hz	11 Hz	10 Hz

\*) Data refer to critical application "probe tip upwards"

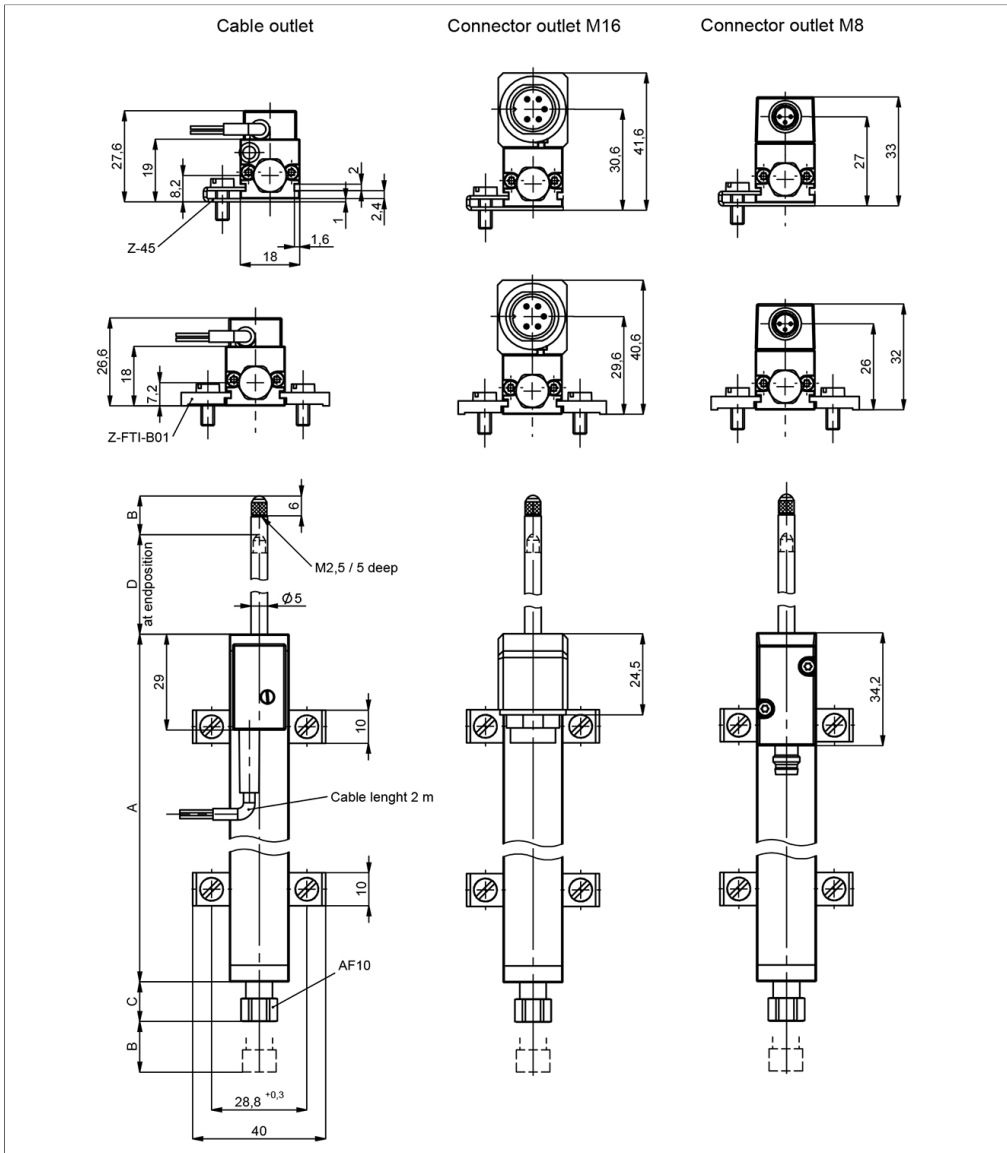
## Ordering Specifications

P/N	Type	Defined electr. measuring range	Electrical connection	Independent linearity	
400023260	TR-0010	0 ... 10 mm	Cable	≤ ±0.25 %FS	Preferred type
400023261	TR-0025	0 ... 25 mm	Cable	≤ ±0.2 %FS	Preferred type
400023262	TR-0050	0 ... 50 mm	Cable	≤ ±0.15 %FS	Preferred type
400023263	TR-0075	0 ... 75 mm	Cable	≤ ±0.1 %FS	Preferred type
400023264	TR-0100	0 ... 100 mm	Cable	≤ ±0.075 %FS	Preferred type
400107044	TRS-0010-101	0 ... 10 mm	Connector M8	≤ ±0.25 %FS	Preferred type
400107045	TRS-0025-101	0 ... 25 mm	Connector M8	≤ ±0.2 %FS	Preferred type
400107047	TRS-0050-101	0 ... 50 mm	Connector M8	≤ ±0.15 %FS	Preferred type
400107051	TRS-0075-101	0 ... 75 mm	Connector M8	≤ ±0.1 %FS	Preferred type
400107053	TRS-0100-101	0 ... 100 mm	Connector M8	≤ ±0.075 %FS	Preferred type
400023271	TRS-0025	0 ... 25 mm	Connector M16	≤ ±0.2 %FS	Preferred type
400023272	TRS-0050	0 ... 50 mm	Connector M16	≤ ±0.15 %FS	Preferred type
400023273	TRS-0075	0 ... 75 mm	Connector M16	≤ ±0.1 %FS	Preferred type
400023274	TRS-0100	0 ... 100 mm	Connector M16	≤ ±0.075 %FS	Preferred type
400023265	TR-0025-.1	0 ... 25 mm	Cable	≤ ±0.1 %FS	
400023266	TR-0050-1	0 ... 50 mm	Cable	≤ ±0.1 %FS	
400023267	TR-0050-05	0 ... 50 mm	Cable	≤ ±0.05 %FS	
400023268	TR-0075-05	0 ... 75 mm	Cable	≤ ±0.05 %FS	
400023269	TR-0100-05	0 ... 100 mm	Cable	≤ ±0.05 %FS	
400107046	TRS-0025-1-101	0 ... 25 mm	Connector M8	≤ ±0.1 %FS	
400107050	TRS-0050-1-101	0 ... 50 mm	Connector M8	≤ ±0.1 %FS	
400107049	TRS-0050-05-101	0 ... 50 mm	Connector M8	≤ ±0.05 %FS	
400107052	TRS-0075-05-101	0 ... 75 mm	Connector M8	≤ ±0.05 %FS	
400107054	TRS-0100-05-101	0 ... 100 mm	Connector M8	≤ ±0.05 %FS	
400023275	TRS-0025-1	0 ... 25 mm	Connector M16	≤ ±0.1 %FS	
400023276	TRS-0050-1	0 ... 50 mm	Connector M16	≤ ±0.1 %FS	
400023277	TRS-0050-05	0 ... 50 mm	Connector M16	≤ ±0.05 %FS	
400023278	TRS-0075-05	0 ... 75 mm	Connector M16	≤ ±0.05 %FS	
400023279	TRS-0100-05	0 ... 100 mm	Connector M16	≤ ±0.05 %FS	

### Accessories included in delivery

- Adjustable clamps 2x Z-45 and 4x cylinder screws M4x10 DIN EN ISO 1207
- Probe tip

**Drawing**



CAD data see  
[www.novotechnik.de/en/download/cad-data/](http://www.novotechnik.de/en/download/cad-data/)

## Technical Data

Type	TR/TRS-0010...	TR/TRS-0025...	TR/TRS-0050...	TR/TRS-0075...	TR/TRS-0100...
Electrical measuring range	0 ... 12 mm	0 ... 27 mm	0 ... 52 mm	0 ... 77 mm	0 ... 102 mm
Defined electr. measuring range	0 ... 10 mm	0 ... 25 mm	0 ... 50 mm	0 ... 75 mm	0 ... 100 mm
Output	Voltage divider				
Resistance value	1 k $\Omega$	1 k $\Omega$	5 k $\Omega$	5 k $\Omega$	5 k $\Omega$
Resistance tolerance	$\pm 20\%$				
Independent linearity	$\leq \pm 0.25\%$ FS Pref.version	$\leq \pm 0.2\%$ FS Pref.version $\leq \pm 0.1\%$ FS	$\leq \pm 0.15\%$ FS Pref. version $\leq \pm 0.1\%$ FS $\leq \pm 0.05\%$ FS	$\leq \pm 0.1\%$ FS Pref.version $\leq \pm 0.05\%$ FS	$\leq \pm 0.075\%$ FS Pref.version $\leq \pm 0.05\%$ FS
Repeatability	$\leq \pm 0.002$ mm				
Recommended operating wiper current	$\leq 1\ \mu\text{A}$				
Max. wiper current in case of malfunction	10 mA				
Max. supply voltage $U_b$	24 VDC	42 VDC	42 VDC	42 VDC	42 VDC
Effective temp. coefficient of the output-to-applied voltage ratio	typ. 5 ppm/K				
Insulation resistance (500 VDC)	$\geq 10\ \text{M}\Omega$				
Dielectric strength (500 VAC, 50 Hz)	$\leq 100\ \mu\text{A}$				
<b>Environmental Data</b>					
Vibration IEC 60068-2-6	20 g, 5 ... 2000 Hz, $A_{\text{max}} = 0.75$ mm				
Shock IEC 60068-2-27	50 g, 11 ms				
Protection class DIN EN 60529	IP40				
Operating temperature	-30 ... +100°C, -30 ... +85°C (connector M8)				
Operating humidity	0 ... 95 % R.H. (no condensation)				
Life	> 100 Mio. movements				
Functional safety	If you need assistance in using our products in safety-related systems, please contact us				
Traceability	Serial number on type labeling: production batch of the sensor assembly and relevant sensor components				

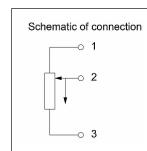
### Important:

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 ( $I_e \leq 1\ \mu\text{A}$ ).

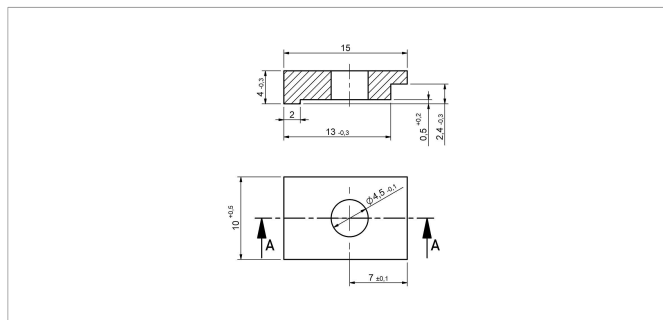
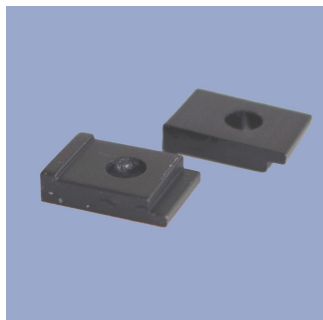
### Connection Assignment

Signal	Cable	Connector M8	Connector M16
Connection 1	BN	Pin 3	Pin 1
Connection 2 Signal output	RD	Pin 4	Pin 2
Connection 3	OG	Pin 1	Pin 3
Do not connect	-	-	Pin 4
Do not connect	-	-	Pin 5

Direction of output characteristic while extending the rod:  
increasing: supply voltage  $U_b$  at connection 3  
falling: supply voltage  $U_b$  at connection 1



## Sensor Mounting

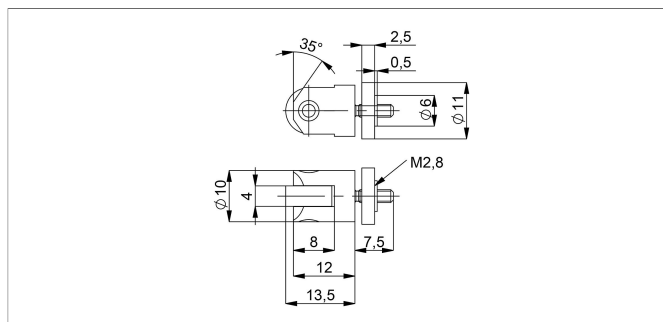


### Z-FTI-B01

4 single clamps for lower total height, with screw M4x10 - 4,8 tinned

Material Aluminium, anodized

P/N	Type
400059010	Z-FTI-B01



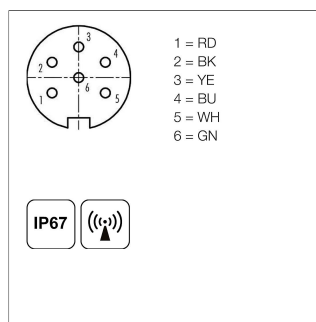
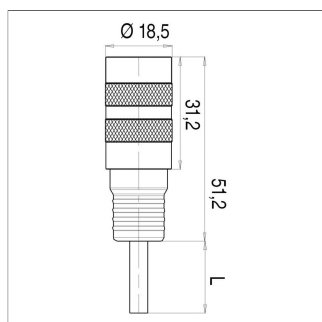
### Z-R50

Roller head for mounting via external thread M2.5 at push rod. Locked with knurled screw.

Material Hardened steel

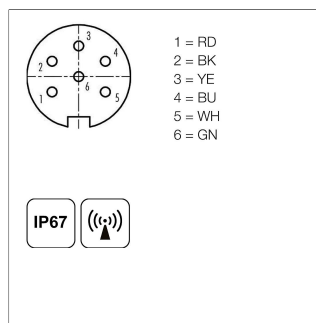
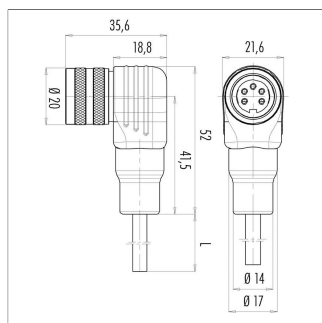
P/N	Type
400005678	Z-R50

## Connector System M16



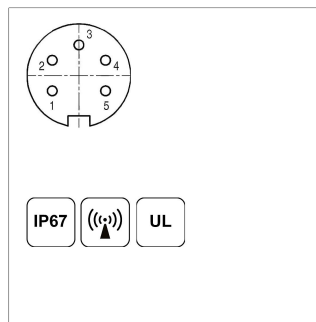
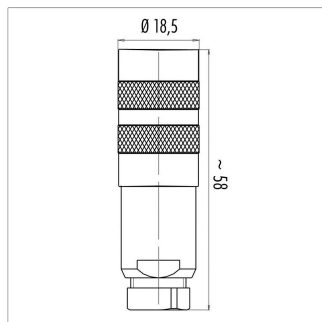
**EEM-33-26**  
M16x0.75 Mating female connector, 6-pin, straight, with molded cable, shielded, IP67, open ended  
Use in combination with 5-pin M16 connectors possible, than pin 6/GN is open.  
Plug housing PUR  
Cable sheath PUR, Ø = max. 6 mm, -5 ... +70°C (moved) -20 ... +70°C (fixed)  
Lead wires PVC, 6x0.25 mm<sup>2</sup>

P/N	Type	Length
400056126	EEM-33-26	2 m



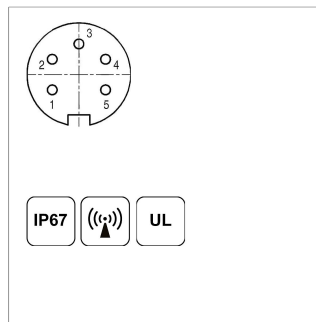
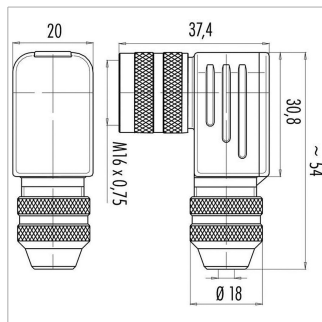
**EEM-33-27**  
M16x0.75 Mating female connector, 6-pin, angled, with molded cable, shielded, IP67, open ended  
Use in combination with 5-pin M16 connectors possible, than pin 6/GN is open.  
Plug housing PUR  
Cable sheath PUR, Ø = max. 6 mm, -5 ... +70°C (moved) -20 ... +70°C (fixed)  
Lead wires PVC, 6x0.25 mm<sup>2</sup>

P/N	Type	Length
400056127	EEM-33-27	2 m



**EEM-33-76**  
M16x0.75 Mating female connector, 5-pin, straight, with coupling nut, solder terminal, shielded, IP67  
Plug housing CuZn nickel plated, -40 ... +95°C  
For wire gauge 4 ... 6 mm, PG7 max. 0.75 mm<sup>2</sup>

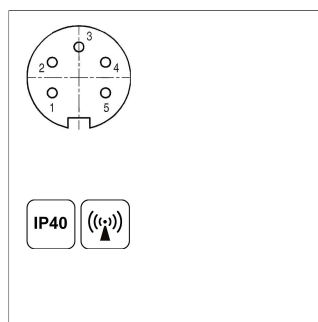
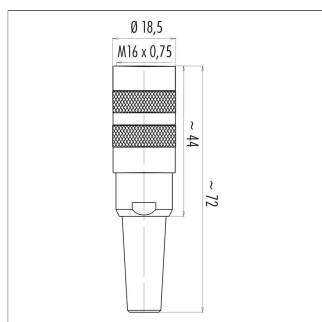
P/N	Type
400005614	EEM-33-76



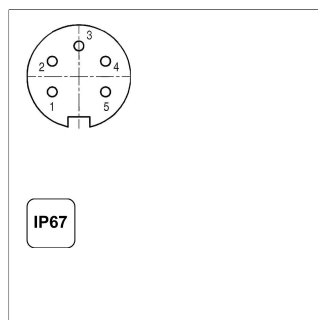
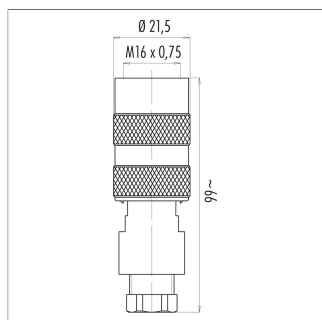
**EEM-33-77**  
M16x0.75 Mating female connector, 5-pin, angled, with coupling nut, solder terminal, shielded, IP67  
Plug housing CuZn nickel plated, -40 ... +95°C  
For wire gauge 4 ... 6 mm, PG7 max. 0.75 mm<sup>2</sup>

P/N	Type
400005615	EEM-33-77

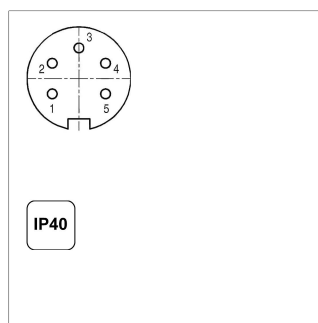
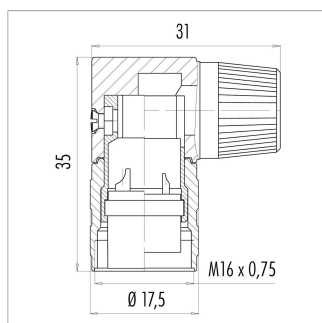
## Connector System M16



**EEM-33-71**  
M16x0.75 Mating female connector, 5-pin, straight, with coupling nut, solder terminal, shielded, IP40  
Plug housing CuZn nickel plated, -40 ... +85°C  
For wire gauge 4 ... 6 mm, max. 0.75 mm<sup>2</sup>  
**P/N** **Type**  
400005612 EEM-33-71



**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 mm<sup>2</sup>  
**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 mm<sup>2</sup>  
**P/N** **Type**  
400005613 EEM-33-72

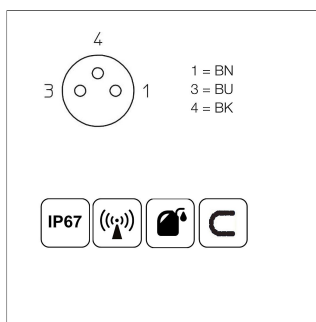
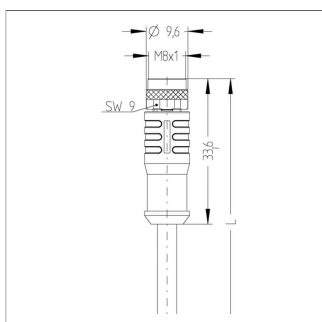
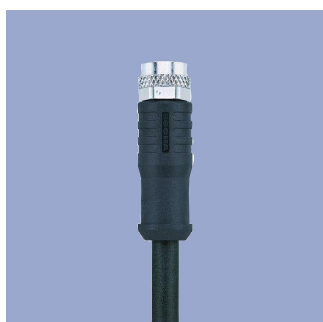
**IP67** Protection class IP67 DIN EN 60529  
**IP68** Protection class IP68 DIN EN 60529

Very good Electromagnetic Compatibility (EMC) and shield systems  
 Very good resistance to oils, coolants and lubricants

**C** Suited for applications in dragchains  
**UL** UL - approved

CAN-Bus

## Connector System M8

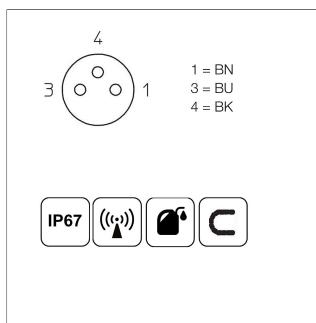
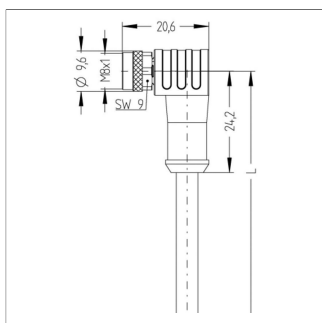
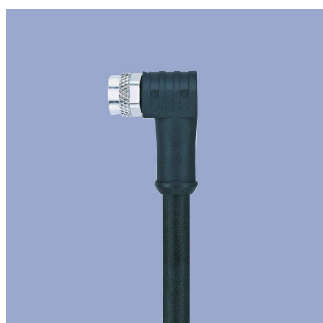


**EEM-33-56/58/60**  
M8x1 Mating female connector, 3-pin, straight, with molded cable, shielded, IP67, open ended

Plug housing TPU  
Cable sheath PUR,  $\varnothing = \text{max. } 6 \text{ mm}$ ,  $-40 \dots +90^\circ\text{C}$

Lead wires PP,  $3 \times 0.34 \text{ mm}^2$

P/N	Type	Length
400005602	EEM-33-56	2 m
400005604	EEM-33-58	5 m
400005606	EEM-33-60	10 m

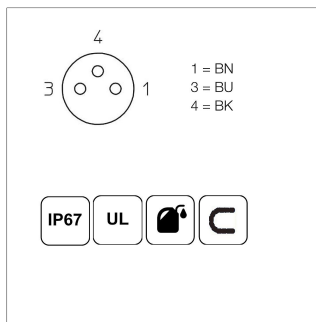
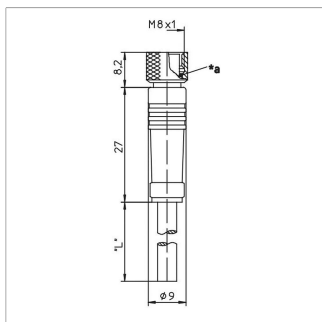


**EEM-33-57/59/61**  
M8x1 Mating female connector, 3-pin, angled, with molded cable, shielded, IP67, open ended

Plug housing TPU  
Cable sheath PUR,  $\varnothing = \text{max. } 6 \text{ mm}$ ,  $-40 \dots +90^\circ\text{C}$

Lead wires PP,  $3 \times 0.34 \text{ mm}^2$

P/N	Type	Length
400005603	EEM-33-57	2 m
400005605	EEM-33-59	5 m
400005607	EEM-33-61	10 m

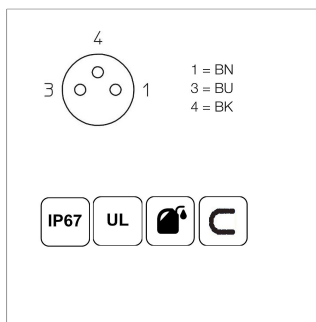
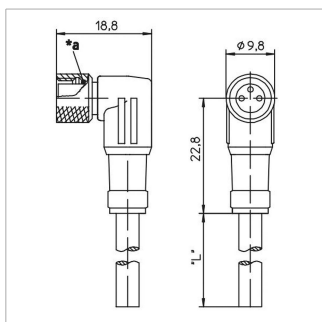


**EEM-33-64/66/68**  
M8x1 Mating female connector, 3-pin, straight, with molded cable, not shielded, IP67, open ended

Plug housing PA  
Cable sheath PUR,  $\varnothing = \text{max. } 6 \text{ mm}$ ,  $-40 \dots +90^\circ\text{C}$

Lead wires PP,  $0.34 \text{ mm}^2$

P/N	Type	Length
400005617	EEM-33-64	2 m
400005619	EEM-33-66	5 m
400005643	EEM-33-68	10 m



**EEM-33-65/67/69**  
M8x1 Mating female connector, 3-pin, angled, with molded cable, not shielded, IP67, open ended

Plug housing PA  
Cable sheath PUR,  $\varnothing = \text{max. } 6 \text{ mm}$ ,  $-40 \dots +90^\circ\text{C}$

Lead wires PP,  $0.34 \text{ mm}^2$

P/N	Type	Length
400005618	EEM-33-65	2 m
400005620	EEM-33-67	5 m
400005644	EEM-33-69	10 m

**IP67** Protection class IP67 DIN EN 60529

**IP68** Protection class IP68 DIN EN 60529

Very good Electromagnetic Compatibility (EMC) and shield systems

Very good resistance to oils, coolants and lubricants

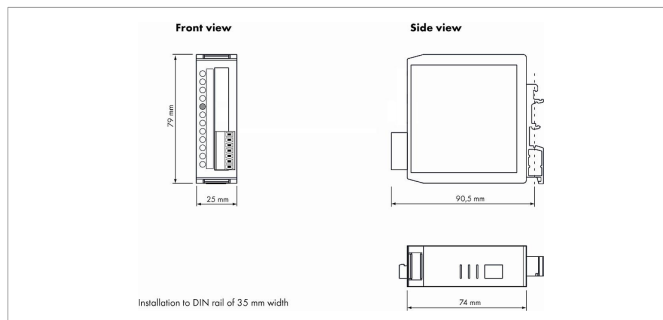
**C** Suited for applications in dragchains

**UL** UL - approved

CAN-Bus



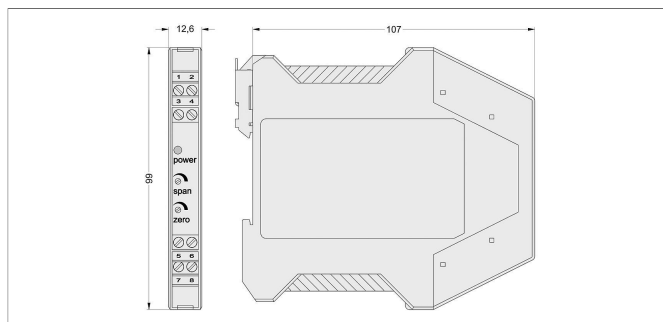
## Signal Processing



### MUP-080

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

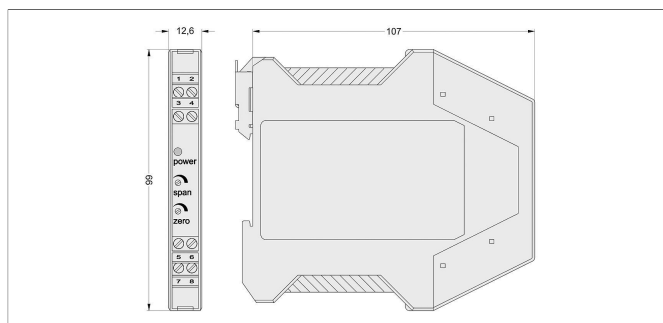
P/N	Type	Output
400054220	MUP-080-111	0 ... 10 V
400054221	MUP-080-113	4 ... 20 mA



### MUP-110

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

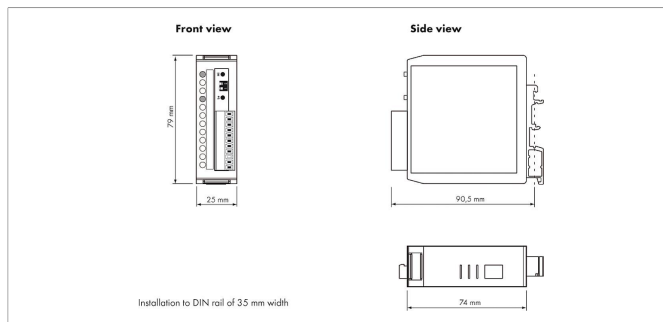
P/N	Type	Output
400054010	MUP-110-0	0 ... 20 mA
400054011	MUP-110-1	0 ... 10 V
400054014	MUP-110-4	4 ... 20 mA



### 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

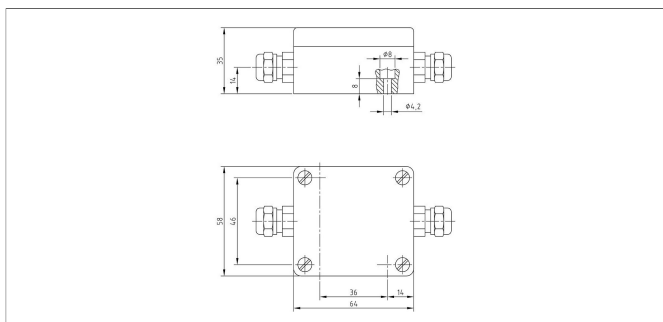
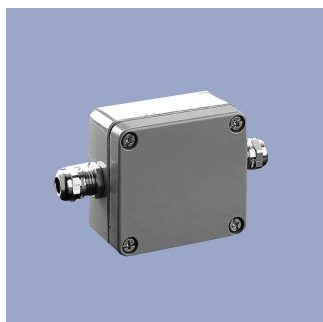


### MUP-400

Signal conditioner with simple teach-in function to adapt start and end point. Switchable current or voltage output. Available with or without galvanic isolation. Detailed data see separate data sheet.

P/N	Type	Isolation
400054201	MUP-400-01	w/o
400054202	MUP-400-11	with

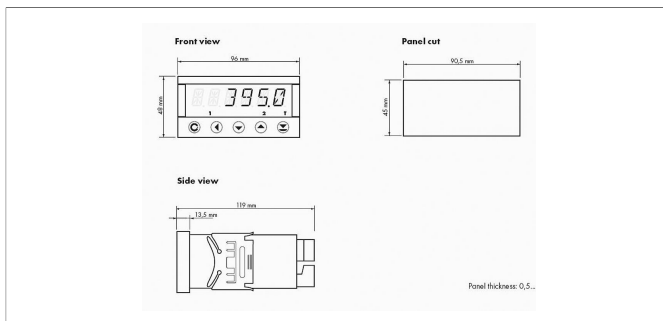
## Signal Processing



### 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 connection 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