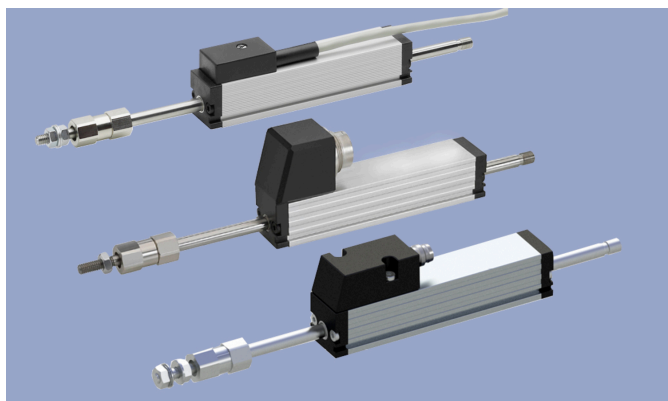
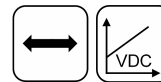


**Short Stroke
Transducer
Potentiometric**

T/TS



Special Features

- Extremely compact design 18 x 18 mm
- Long life up to 100 million movements
- Outstanding linearity up to $\pm 0.05\%$
- Repeatability to ± 0.002 mm
- Actuating shaft with double-sided support
- Insensitive to shock and vibration
- Optionally cable or plug connection
- Special ball-coupling eliminates lateral forces
- High operational speeds - up to 10 m/s
- Spring-loaded series TR/TRS with internal return spring, 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 transducer with proven conductive-plastic technology.

The model with push rod and ball coupling enables a backlash- and lateral force-free operation even with parallel and angular displacement of transducer and measuring direction. Characteristic for the robust design is the double-sided support of the actuating rod.

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 1.4305 / AISI 303
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
Ball coupling	Hardened ball with spring pressure on carbide plate (included in delivery)
Resistance element	Conductive plastic
Wiper	Precious metal multi-finger wiper, elastomer damped
Electrical connection	Cable 3x 0.14 mm ² (AWG 26), PVC, shielded, L = 2 m / Connector M8x1, 3-pin / Connector M16x0.75 (IEC 130-9), 5-pin

Mechanical Data

Type	T/TS-0025...	T/TS-0050...	T/TS-0075...	T/TS-0100...	T/TS-0150...
Dimensions	See dimension drawing				
Length of housing (dimension A +1 mm)	63 mm	88 mm	113 mm	138 mm	188 mm
Mechanical travel (dim. B ± 1.5 mm)	30 mm	55 mm	80 mm	105 mm	155 mm
Weight (cable/connector version)	140/86 g	160/107 g	170/132 g	190/150 g	220/190 g
Weight actuating rod with wiper a. coupling	35 g	43 g	52 g	58 g	74 g
Operating force, horizontal	≤ 0.3 N				
Max. displacement of ball coupling	± 1 mm parallel offset, $\pm 2,5^\circ$ angular offset				

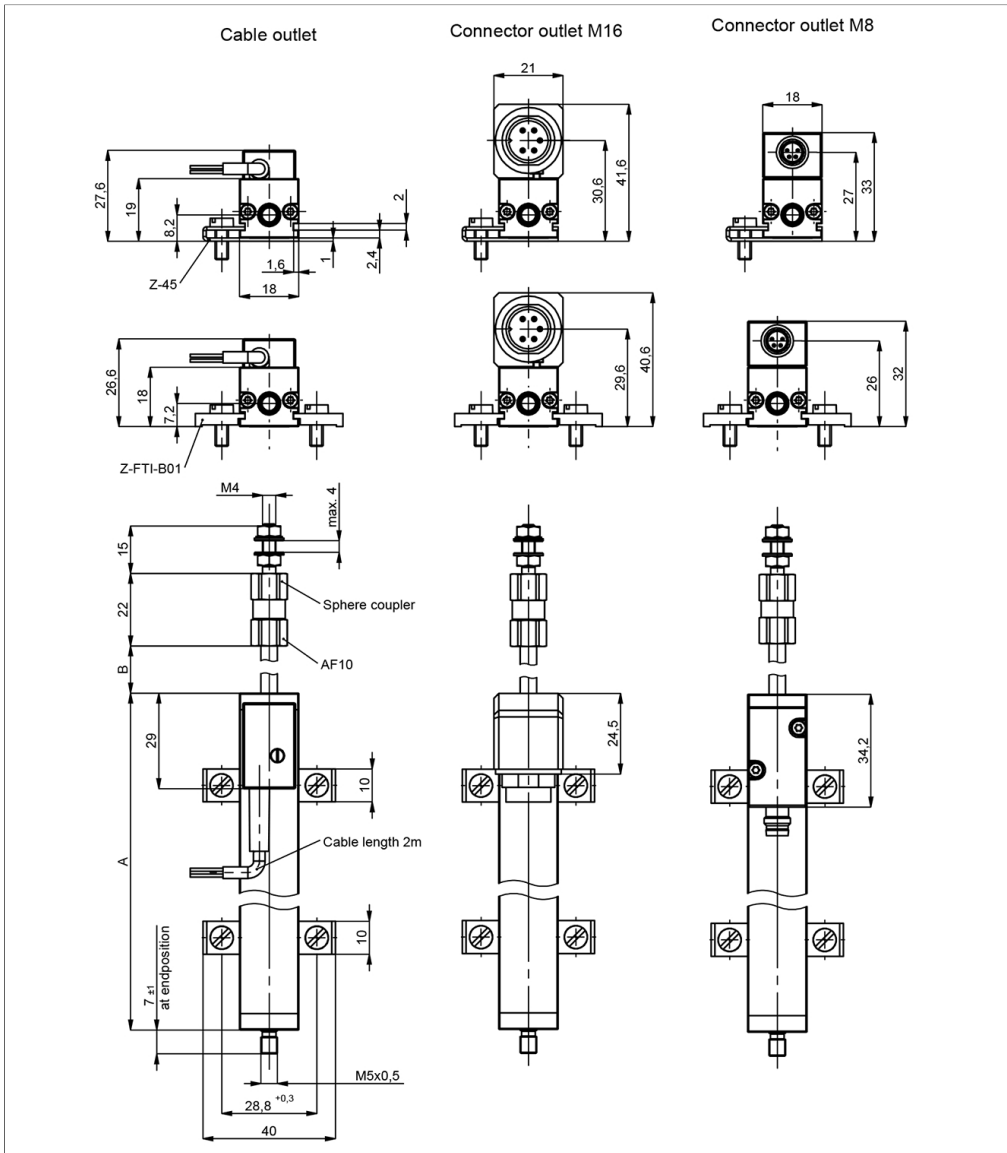
Ordering Specifications

P/N	Type	Defined electr. measuring range	Independent linearity	
			Electrical connection	
400023202	T-0025	0 ... 25 mm	Cable	≤ ±0.2 %FS Preferred type
400023203	T-0050	0 ... 50 mm	Cable	≤ ±0.15 %FS Preferred type
400023204	T-0075	0 ... 75 mm	Cable	≤ ±0.1 %FS Preferred type
400023205	T-0100	0 ... 100 mm	Cable	≤ ±0.075 %FS Preferred type
400023206	T-0150	0 ... 150 mm	Cable	≤ ±0.075 %FS Preferred type
400107032	TS-0025-101	0 ... 25 mm	Connector M8	≤ ±0.2 %FS Preferred type
400107035	TS-0050-101	0 ... 50 mm	Connector M8	≤ ±0.15 %FS Preferred type
400107038	TS-0075-101	0 ... 75 mm	Connector M8	≤ ±0.1 %FS Preferred type
400107040	TS-0100-101	0 ... 100 mm	Connector M8	≤ ±0.075 %FS Preferred type
400107042	TS-0150-101	0 ... 150 mm	Connector M8	≤ ±0.075 %FS Preferred type
400023232	TS-0025	0 ... 25 mm	Connector M16	≤ ±0.2 %FS Preferred type
400023233	TS-0050	0 ... 50 mm	Connector M16	≤ ±0.15 %FS Preferred type
400023234	TS-0075	0 ... 75 mm	Connector M16	≤ ±0.1 %FS Preferred type
400023235	TS-0100	0 ... 100 mm	Connector M16	≤ ±0.075 %FS Preferred type
400023236	TS-0150	0 ... 150 mm	Connector M16	≤ ±0.075 %FS Preferred type
400023207	T-0025-1	0 ... 25 mm	Cable	≤ ±0.1 %FS
400023208	T-0050-1	0 ... 50 mm	Cable	≤ ±0.1 %FS
400023209	T-0050-05	0 ... 50 mm	Cable	≤ ±0.05 %FS
400023213	T-0075-05	0 ... 75 mm	Cable	≤ ±0.05 %FS
400023214	T-0100-05	0 ... 100 mm	Cable	≤ ±0.05 %FS
400023215	T-0150-05	0 ... 150 mm	Cable	≤ ±0.05 %FS
400107033	TS-0025-1-101	0 ... 25 mm	Connector M8	≤ ±0.1 %FS
400107037	TS-0050-1-101	0 ... 50 mm	Connector M8	≤ ±0.1 %FS
400107036	TS-0050-05-101	0 ... 50 mm	Connector M8	≤ ±0.05 %FS
400107039	TS-0075-05-101	0 ... 75 mm	Connector M8	≤ ±0.05 %FS
400107041	TS-0100-05-101	0 ... 100 mm	Connector M8	≤ ±0.05 %FS
400107043	TS-0150-05-101	0 ... 150 mm	Connector M8	≤ ±0.05 %FS
400023237	TS-0025-1	0 ... 25 mm	Connector M16	≤ ±0.1 %FS
400023238	TS-0050-1	0 ... 50 mm	Connector M16	≤ ±0.1 %FS
400023239	TS-0050-05	0 ... 50 mm	Connector M16	≤ ±0.05 %FS
400023243	TS-0075-05	0 ... 75 mm	Connector M16	≤ ±0.05 %FS
400023244	TS-0100-05	0 ... 100 mm	Connector M16	≤ ±0.05 %FS
400023245	TS-0150-05	0 ... 150 mm	Connector M16	≤ ±0.05 %FS

Accessories included in delivery

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

Drawing



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

Technical Data

Type	T/TS-0025...	T/TS-0050...	T/TS-0075...	T/TS-0100...	T/TS-0150...
Electrical measuring range	0 ... 27 mm	0 ... 52 mm	0 ... 77 mm	0 ... 102 mm	0 ... 152 mm
Defined electr. measuring range	0 ... 25 mm	0 ... 50 mm	0 ... 75 mm	0 ... 100 mm	0 ... 150 mm
Output	Voltage divider				
Resistance value	1 k Ω	5 k Ω	5 k Ω	5 k Ω	5 k Ω
Resistance tolerance	$\pm 20\%$				
Independent linearity	$\leq \pm 0.2\%$ 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	$\leq \pm 0.075\%$ FS Pref.version $\leq \pm 0.05\%$ FS
Repeatability	$\leq \pm 0.002$ mm				
Recommended operating wiper current	≤ 1 μ A				
Max. wiper current in case of malfunction	10 mA				
Max. supply voltage U_b	42 VDC				
Effective temp. coefficient of the output-to-applied voltage ratio	typ. 5 ppm/K				
Insulation resistance (500 VDC)	≥ 10 M Ω				
Dielectric strength (500 VAC, 50 Hz)	≤ 100 μ A				
Environmental Data					
Max. operational speed	10 m/s				
Vibration IEC 60068-2-6	20 g, 5 ... 2000 Hz, $A_{max} = 0.75$ 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				

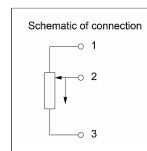
Important:

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 ($I_e \leq 1$ μ A).

Connection Assignment

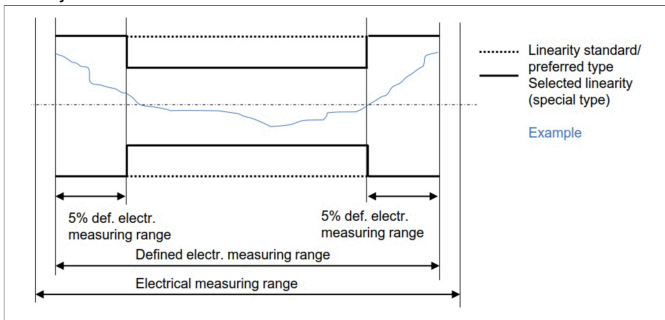
Signal	Cable	Connector M8	Connector M16
Connection 1	BN	Pin 3	Pin 1
Connection 2 Signal output	RD	Pin 4	Pin 2
Connection 3	OG	Pin 1	Pin 3
Do not connect	-	-	Pin 4
Do not connect	-	-	Pin 5

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

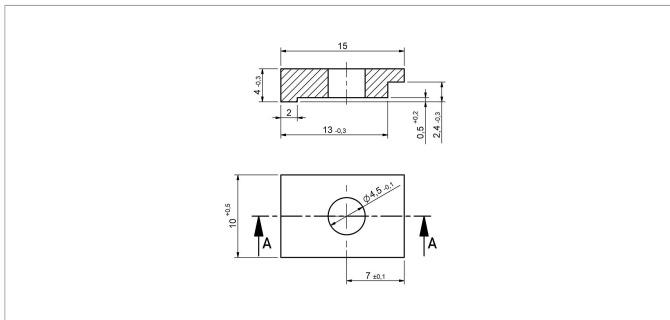
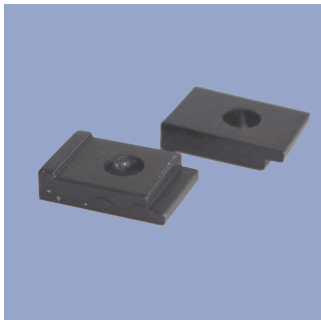


Technical Data

Linearity



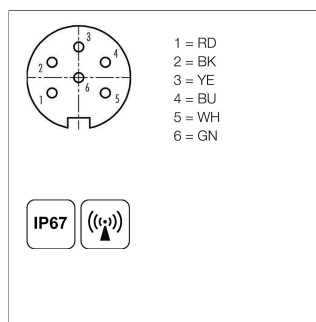
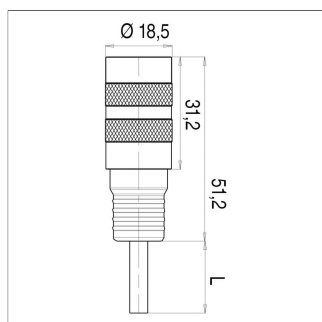
Sensor Mounting



Z-FTI-B01
4 single clamps for lower total height, with screw
M4x10 - 4,8 tinned

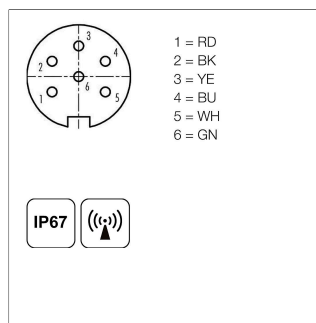
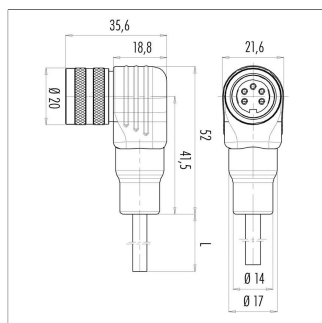
Material	Aluminium, anodized
P/N	Type
400059010	Z-FTI-B01

Connector System M16



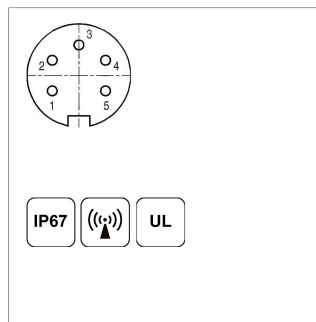
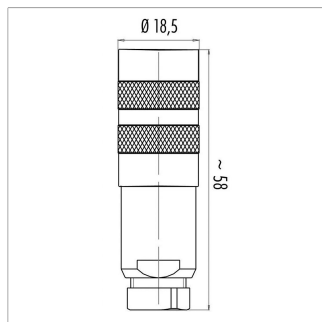
EEM-33-26
M16x0.75 Mating female connector, 6-pin, straight, with molded cable, shielded, IP67, open ended
Use in combination with 5-pin M16 connectors possible, than pin 6/GN is open.
Plug housing PUR
Cable sheath PUR, Ø = max. 6 mm, -5 ... +70°C (moved) -20 ... +70°C (fixed)
Lead wires PVC, 6x0.25 mm²

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



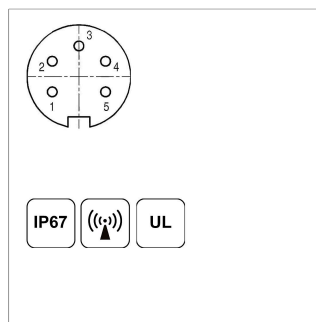
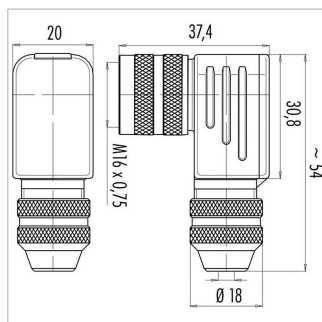
EEM-33-27
M16x0.75 Mating female connector, 6-pin, angled, with molded cable, shielded, IP67, open ended
Use in combination with 5-pin M16 connectors possible, than pin 6/GN is open.
Plug housing PUR
Cable sheath PUR, Ø = max. 6 mm, -5 ... +70°C (moved) -20 ... +70°C (fixed)
Lead wires PVC, 6x0.25 mm²

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 mm²

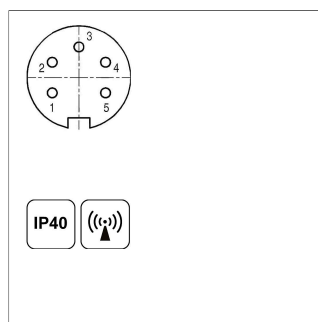
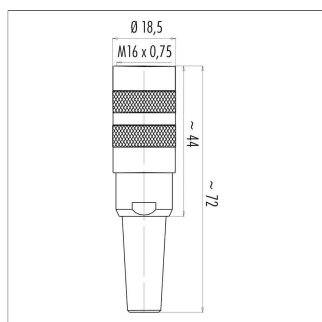
P/N	Type
400005614	EEM-33-76



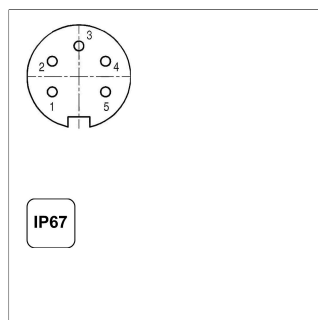
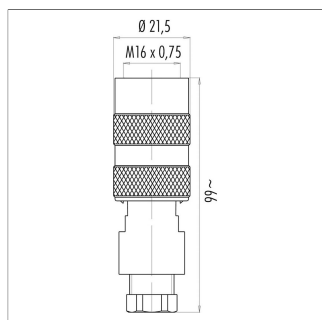
EEM-33-77
M16x0.75 Mating female connector, 5-pin, angled, with coupling nut, solder terminal, shielded, IP67
Plug housing CuZn nickel plated, -40 ... +95°C
For wire gauge 4 ... 6 mm, PG7 max. 0.75 mm²

P/N	Type
400005615	EEM-33-77

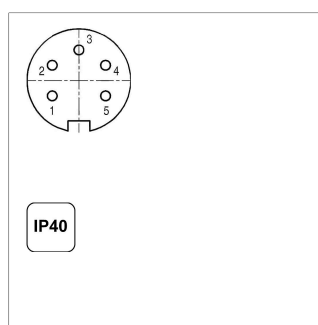
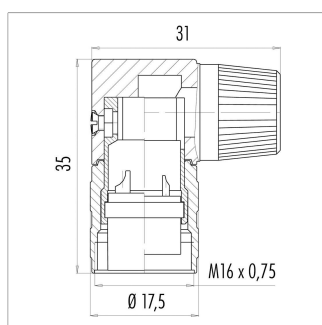
Connector System M16



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 mm²
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 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

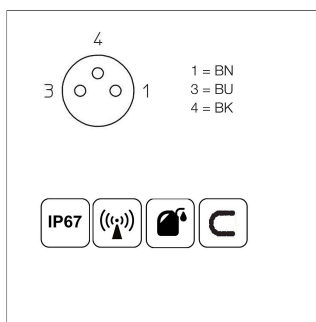
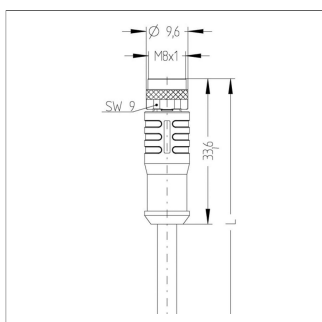
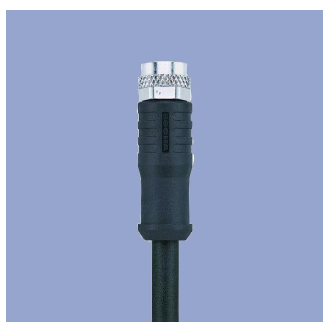
IP67 Protection class IP67 DIN EN 60529
IP68 Protection class IP68 DIN EN 60529

Very good Electromagnetic 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

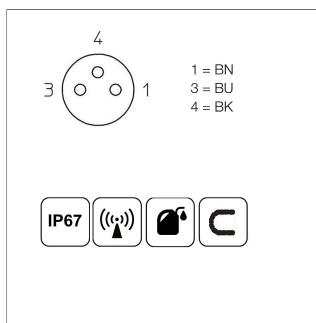
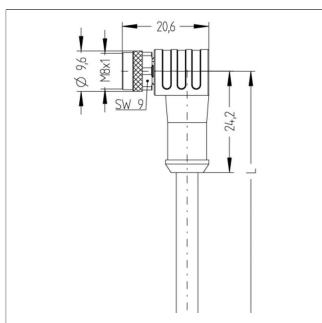
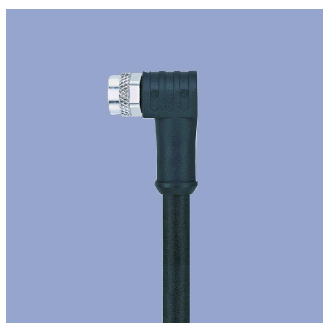


EEM-33-56/58/60
M8x1 Mating female connector, 3-pin, straight, with molded cable, shielded, IP67, open ended

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

Lead wires PP, 3x 0.34 mm²

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

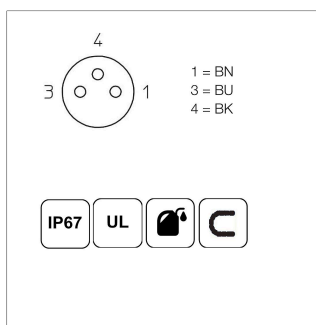
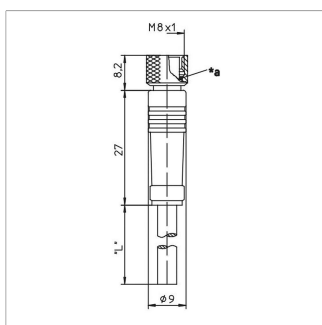


EEM-33-57/59/61
M8x1 Mating female connector, 3-pin, angled, with molded cable, shielded, IP67, open ended

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

Lead wires PP, 3x 0.34 mm²

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

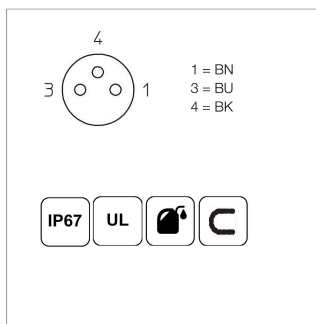
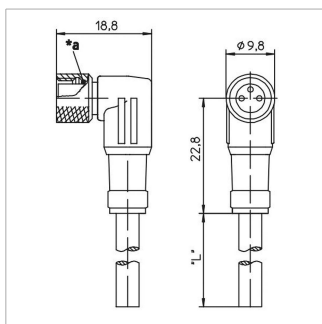


EEM-33-64/66/68
M8x1 Mating female connector, 3-pin, straight, with molded cable, not shielded, IP67, open ended

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

Lead wires PP, 0.34 mm²

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 ... +90°C

Lead wires PP, 0.34 mm²

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

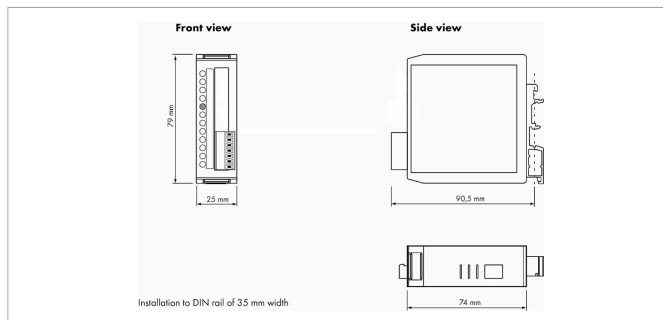
Very good resistance to oils, coolants and lubricants

C Suited for applications in dragchains

UL UL - approved

CAN-Bus

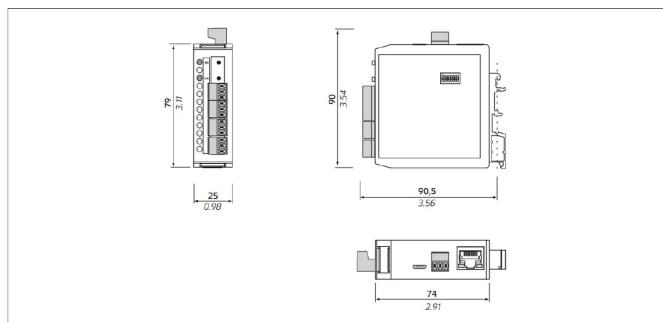
Signal Processing



MUP-080

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

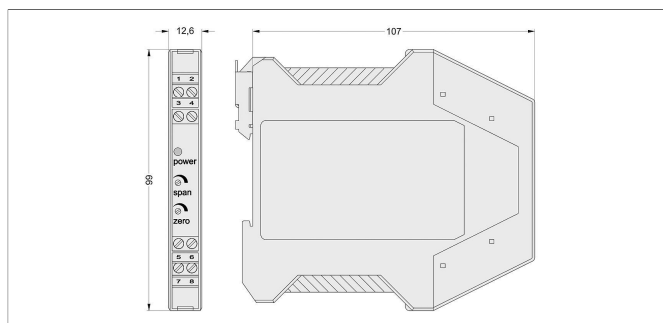
P/N	Type	Output
400054220	MUP-080-111	0 ... 10 V
400054221	MUP-080-113	4 ... 20 mA



MUP-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.

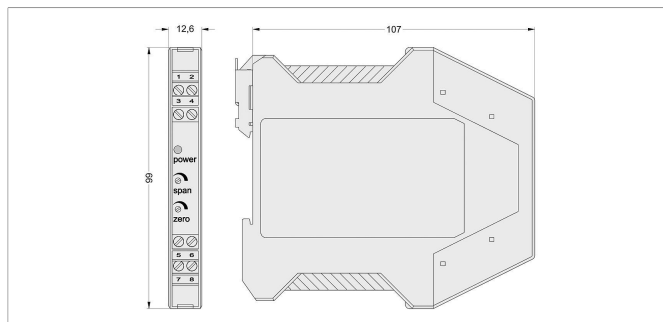
P/N	Type	Output
400108799	MUP-410-11	4 ... 20 mA, 0 ... 10 V, 0 ... 2/5 V, ± 10 V, 0 ... 5/20 mA



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

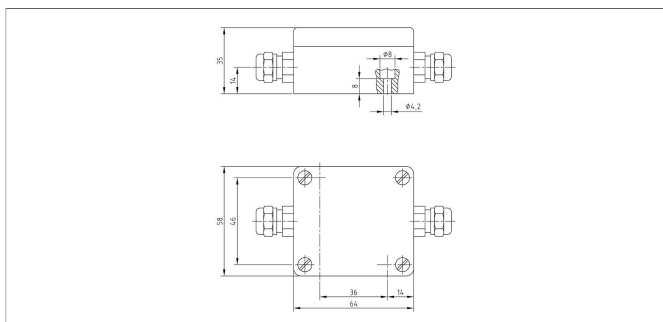
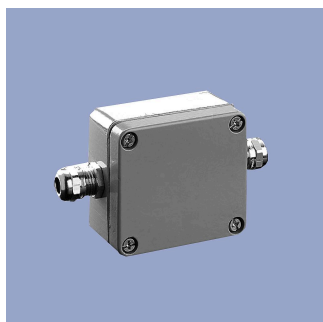


MUP-160

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

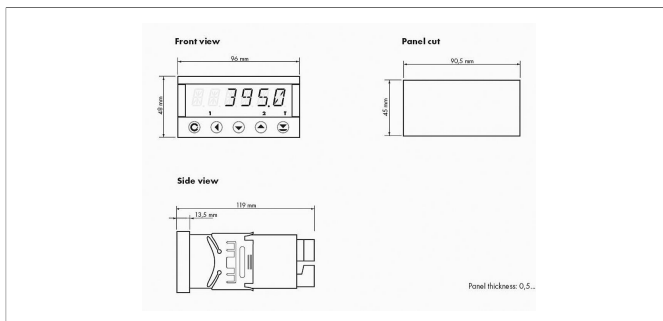
Signal Processing



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 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

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