ifm electronic

7415 x

Made in Germany

2010

fluid sensors and diagnostic systems

position sensors and object recognition

bus, identification and control systems

ifm electronic – close to you!

- **Self-clamping fixture for easy adjustment and quick mounting.**
- **Convenient: can be easily inserted into the slot from the top.**
- **Suitable for almost all C and T slots.**
- **Unit versions available with connection cable and M8 / M12 cable plug.**
- **Wide selection of adapter accessories.**

Cylinder sensors

Cylinder sensors are used for position detection of pistons in pneumatic cylinders. They are directly mounted onto the cylinder. The ring magnet attached to the piston is sensed through the housing wall of non-magnetisable material (e.g. aluminium, brass or stainless steel). ifm electronic offers a standard solution for different cylinder types and manufacturers.

Operating principle

ifm's cylinder sensors use state-of-the-art GMR and AMR technology: A GMR element is made up of extremely thin magnetic layers, each separated by a non-magnetic layer. Without external field they align in an antiparallel manner which results in a defined electrical resistance. If these layers are exposed to a magnetic field, the magnetic layers align in a parallel manner. This results in a large change in resistance that is converted into a switching signal by the internal electronics.

An AMR element consists of thin ferromagnetic layers. Electrical resistance is highest without external magnetic fields. The effect of a magnetic field reduces resistance. This change is converted into a switching signal by the internal electronics. Advantage: this method enables exact measurement of even very small changes of the magnetic field where space is extremely limited. This results in a smaller hysteresis and a short travel distance. So, the sensors can be used wherever exact positioning is required (e.g. short-stroke cylinder).

Response sensitivity

The response sensitivity applies equally to either magnetic polarity and without external field influence. The magnetic flux density in most pneumatic cylinders is between 5 and 25 millitesla (mT). ifm electronic's cylinder sensors are factory set so that they detect these magnetic fields safely.

Travel distance

The travel distance describes the section which is covered by the magnet in the sensing zone. It depends on the strength of the magnet. The short response times of the sensors allow very high travel speeds.

Position sensing: Cylinder sensors monitor the position of the piston in a pneumatic cylinder.

T-slot sensors for industrial applications

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable with connector 0.3 m · Output function ⎍⎓ · DC PNP · Wiring diagram no. 1									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	1	**MK5101**
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	2	**MK5102**
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	3	**MK5107**
Cable with connector 1 m · Output function ⎍⎓ · DC PNP · Wiring diagram no. 1									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	2	**MK5122**
Cable 2 m · Output function ⎍⎓ · DC PNP · Wiring diagram no. 2									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	4	**MK5100**
Cable with connector 2 m · Output function ⎍⎓ · DC PNP · Wiring diagram no. 1									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	1	**MK5133**
Cable 2 m · Output function ⎍⎓ · DC NPN · Wiring diagram no. 3									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	4	**MK5114**
Cable 2 m · Output function ⎍⎓ · DC PNP/NPN · Wiring diagram no. 4									
	25 x 5 x 6.5	PA (polyamide)	10...30	4000	IP67	100	-25...85	4	**MK5103**
Cable 6 m · Output function ⎍⎓ · DC PNP · Wiring diagram no. 2									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	200	-25...85	4	**MK5117**
Cable 10 m · Output function ⎍⎓ · DC PNP · Wiring diagram no. 2									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	4	**MK5124**
Cable with connector 0.3 m · Output function ⎍⎓ · DC NPN · Wiring diagram no. 5									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	3	**MK5113**
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	1	**MK5112**

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable with connector 0.3 m · Output function ⎍ · DC PNP/NPN · Wiring diagram no. 6									
	25 x 5 x 6.5	PA (polyamide)	10...30	4000	IP67	100	-25...85	1	**MK5104**
	25 x 5 x 6.5	PA (polyamide)	10...30	4000	IP67	100	-25...85	2	**MK5105**
	25 x 5 x 6.5	PA (polyamide)	10...30	4000	IP67	100	-25...85	3	**MK5109**

T-slot reed sensors for industrial applications

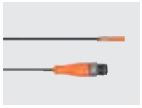
Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ · AC/DC PNP/NPN · Wiring diagram no. 7									
	30.5 x 5 x 6.5	PA (polyamide)	5...120	1000	IP67	100	-25...70	5	**MR0100***
Cable with connector 0.3 m · Output function ⎍ · AC/DC PNP/NPN · Wiring diagram no. 8									
	30.5 x 5 x 6.5	PA (polyamide)	5...60	1000	IP67	100	-25...70	6	**MR0101***
	30.5 x 5 x 6.5	PA (polyamide)	5...60	–	IP67	100	-25...70	7	**MR0107***
Cable 6 m · Output function ⎍ · AC/DC PNP/NPN · Wiring diagram no. 7									
	30.5 x 5 x 6.5	PA (polyamide)	5...120	1000	IP67	100	-25...70	5	**MR0117***

*** Note for AC and AC/DC units**

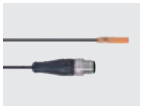
Miniature fuse to IEC60127-2 sheet 1, ≤ 0,175 A (fast acting). Recommendation: check the unit for reliable function after a short circuit.

T-slot sensors for hygienic and wet ares

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 2									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 4000	IP67 / IP69K	100	-25...85	4	**MK5110**
Cable 6 m · Output function ⎍ · DC PNP · Wiring diagram no. 2									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 4000	IP67 / IP69K	100	-25...85	4	**MK5128**

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 4000	IP67 / IP69K	100	-25...85	8	**MK5111**
Cable with connector 0.3 m · Output function ⎍ · DC NPN · Wiring diagram no. 5									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67 / IP69K	100	-25...85	8	**MK5120**

Sensors for short-stroke cylinders

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 2									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67	100	-25...85	9	**MK5140**
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 9									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67	100	-25...85	9	**MK5156**
Cable with connector 0.3 m · Output function ⎍ · DC NPN · Wiring diagram no. 5									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67	100	-25...85	10	**MK5137**
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67	100	-25...85	10	**MK5138**
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 10									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67	100	-25...85	10	**MK5155**
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67	100	-25...85	11	**MK5159**
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67	100	-25...85	12	**MK5139**

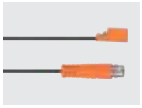
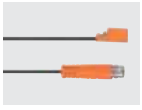
Sensors for short-stroke cylinders for hygienic and wet areas

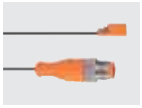
Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎓ · DC PNP · Wiring diagram no. 2									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67 / IP69K	100	-25...85	9	**MK5158**
Cable with connector 0.3 m · Output function ⎓ · DC PNP · Wiring diagram no. 1									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 3000	IP67 / IP69K	100	-25...85	13	**MK5157**

T-slot sensors with ATEX approval

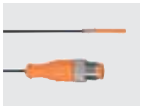
Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎓ · DC PNP · Wiring diagram no. 2									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-20...60	4	**MK500A**
Cable with connector 0.3 m · Output function ⎓ · DC PNP · Wiring diagram no. 1									
	25 x 5 x 6.5	PA (polyamide)	10...30	> 10000	IP67	100	-20...60	8	**MK501A**

Non flush C-slot sensors for industrial applications

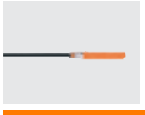
Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎓ · DC PNP · Wiring diagram no. 2									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	14	**MK5300**
Cable 2 m · Output function ⎓ · DC NPN · Wiring diagram no. 3									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	14	**MK5306**
Cable with connector 0.3 m · Output function ⎓ · DC PNP · Wiring diagram no. 1									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	15	**MK5301**
Cable with connector 0.3 m · Output function ⎓ · DC NPN · Wiring diagram no. 5									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	15	**MK5307**
Cable with connector 0.3 m · Output function ⎓ · DC PNP · Wiring diagram no. 1									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	16	**MK5302**

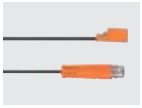
Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable with connector 0.5 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	16	**MK5305**
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	17	**MK5304**

Flush C-slot sensors for industrial applications

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 2									
	25.8 x 2.8 x 5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	18	**MK5312**
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	25.8 x 2.8 x 5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	19	**MK5310**
	25.8 x 2.8 x 5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	20	**MK5311**
Cable with connector 0.5 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	25.8 x 2.8 x 5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	20	**MK5315**
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	25.8 x 2.8 x 5	PA (polyamide)	10...30	> 10000	IP67	100	-25...85	21	**MK5314**

C-slot sensors for industrial applications with AMR cell

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 2									
	25.8 x 2.8 x 5	PA (polyamide)	10...30	> 5000	IP67	100	-25...85	18	**MK5325**
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	25.8 x 2.8 x 5	PA (polyamide)	10...30	> 5000	IP67	100	-25...85	19	**MK5326**
	26.1 x 2.8 x 5.5	PA (polyamide)	10...30	> 5000	IP67	100	-25...85	22	**MK5328**

Type	Dimensions [mm]	Material	U_b [V]	f [Hz]	Protection	I_{load} [mA]	T_a [°C]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 2									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 5000	IP67	100	-25...85	23	**MK5329**
Cable with connector 0.3 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 5000	IP67	100	-25...85	24	**MK5330**
	17.5 x 2.8 x 7.7	PA (polyamide)	10...30	> 5000	IP67	100	-25...85	25	**MK5331**

Accessories

Type	Description	Order no.
	Fixing strap for clean-line cylinders · Piston diameter · Ø 8...12 mm · for type MKT · Housing materials: stainless steel	**E11816**
	Fixing strap for clean-line cylinders · Piston diameter · Ø 16...20 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	**E11817**
	Fixing strap for clean-line cylinders · Piston diameter · Ø 25...32 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	**E11818**
	Fixing strap for clean-line cylinders · Piston diameter · Ø 40 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	**E11819**
	Fixing strap for clean-line cylinders · Piston diameter · Ø 50 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	**E11820**
	Fixing strap for clean-line cylinders · Piston diameter · Ø 63 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	**E11821**
	Fixing strap for clean-line cylinders · Piston diameter · Ø 80 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	**E11822**
	Fixing strap for clean-line cylinders · Piston diameter · Ø 100 mm · for type MKT · Housing materials: adapter: PA / Fixing strap: stainless steel	**E11823**
	Adapter for clean-line cylinders · for types MKT (T-slot cylinder sensors) · for types MKT · Housing materials: PA · Pack quantity: 10	**E11846**
	Adapter for clean-line cylinders · for types MKT (T-slot cylinder sensors) · Housing materials: stainless steel	**E11877**

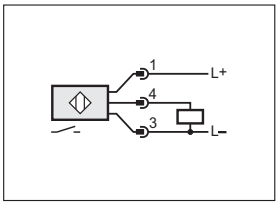
Type	Description	Order no.
	Fixing strap for clean-line cylinders · Ø 10...16 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	**E11975**
	Fixing strap for clean-line cylinders · Ø 20...25 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	**E11976**
	Fixing strap for clean-line cylinders · Ø 32 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	**E11977**
	Fixing strap for clean-line cylinders · Ø 40 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	**E11978**
	Fixing strap for clean-line cylinders · Ø 50 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	**E11979**
	Fixing strap for clean-line cylinders · Ø 63 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	**E11980**
	Fixing strap for clean-line cylinders · Ø 80 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	**E11981**
	Fixing strap for clean-line cylinders · Ø 100 mm · for type MKT · Housing materials: adapter: stainless steel / Fixing strap: stainless steel	**E11982**
	Adapter for tie rod / integrated profile cylinders · for types MKT (T-slot cylinder sensors) · Clamping range 5...11 mm · Housing materials: aluminium / screw: stainless steel	**E11797**
	Adapter for tie rod / integrated profile cylinders · for types MKT (T-slot cylinder sensors) · Clamping range 9...15 mm · Housing materials: aluminium / screw: stainless steel	**E11799**
	Adapter for tie rod / integrated profile cylinders · for types MKT (T-slot cylinder sensors) · Clamping range 14...20 mm · Housing materials: aluminium / screw: stainless steel	**E11801**
	Adapter for tie rod cylinders (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · Clamping range 3...5 mm · Housing materials: aluminium / screw: stainless steel	**E11913**
	Adapter for tie rod cylinders (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · Clamping range 5...7 mm · Housing materials: aluminium / screw: stainless steel	**E11912**
	Adapter for Bosch Rexroth cylinders ICL series and Festo cylinders type CDN · for types MKT (T-slot cylinder sensors) · Housing materials: adapter: aluminium anodised / screw: stainless steel	**E12164**

Type	Description	Order no.
	Adapter for trapezoidal slot cylinders · for types MKT (T-slot cylinder sensors) · Housing materials: aluminium alloy / set screw: stainless steel	E11796
	Adapter for trapezoidal slot cylinders · for types MKT (T-slot cylinder sensors) · Housing materials: aluminium alloy / set screw: stainless steel	E11957
	Adapter for Bosch-Rexroth cylinders PRA / PRB series (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · Housing materials: aluminium / screw: stainless steel	E11892
	Adapter for Bosch-Rexroth cylinders 2700 series (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · Housing materials: aluminium / screw: stainless steel	E11893
	Adapter for Bosch-Rexroth cylinders 523 series (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · L-slot · Housing materials: aluminium / screw: stainless steel	E11894
	Adapter for SMC cylinders ECDQ2 series (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · T-slot rail, flat · Housing materials: aluminium / screw: stainless steel	E11890
	Adapter for SMC cylinders CDQ2 series (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · T-slot rail, high · Housing materials: aluminium / screw: stainless steel	E11891
	Adapter for SMC cylinder CP95 · for types MKT (T-slot cylinder sensors) · Housing materials: stainless steel	E11872
	Adapter for Festo cylinders type DZH (or cylinders of the same dimensions) · for types MKT (T-slot cylinder sensors) · Housing materials: aluminium / screw: stainless steel	E11895
	T-slot adapter for C-slot sensor · for types MKC (C-slot cylinder sensor) for installation in T-slot cylinders · for types MKC · (height 5 mm) · Housing materials: diecast zinc / fixing element: stainless steel	E11928
	T-slot adapter for C-slot sensor · for types MKC (C-slot cylinder sensor) for installation in T-slot cylinders · for types MKC · (height 7.7 mm) · Housing materials: diecast zinc / fixing element: stainless steel	E11914
	T-slot cylinder memorisation block · for types MKT (T-slot cylinder sensors) · Housing materials: PA / stainless steel	E11798
	C-slot cylinder memorisation block · for types MKC (C-slot cylinder sensors) · Housing materials: PA / stainless steel	E12004
	Adapter for trapezoidal slot cylinders · for types MKT (T-slot cylinder sensors) · for types MKT · Housing materials: aluminium alloy / set screw: stainless steel	E11988

Type	Description	Order no.
	Clip · for types MKT (T-slot cylinder sensors) · Piston diameter 16 mm · Housing materials: POM / fixture: aluminium / screw: stainless steel	**E11958**
	Clip · for types MKT (T-slot cylinder sensors) · Piston diameter 20 mm · Housing materials: POM / fixture: aluminium / screw: stainless steel	**E11959**
	Clip · for types MKT (T-slot cylinder sensors) · Piston diameter 25 mm · Housing materials: POM / fixture: aluminium / screw: stainless steel	**E11960**
	Clip · for types MKT (T-slot cylinder sensors) · Piston diameter 12 mm · Housing materials: POM / fixture: aluminium / screw: stainless steel	**E11961**
	Clip · for types MKT (T-slot cylinder sensors) · Piston diameter 16 mm · Housing materials: POM / fixture: aluminium / screw: stainless steel	**E11958**
	Clip · for types MKT (T-slot cylinder sensors) · Piston diameter 20 mm · Housing materials: POM / fixture: aluminium / screw: stainless steel	**E11959**
	Clip · for types MKT (T-slot cylinder sensors) · Clamping range 44-45 mm · Piston diameter 40 mm · Housing materials: POM / fixture: aluminium / screw: stainless steel	**E12015**
	Clip · for types MKT (T-slot cylinder sensors) · Clamping range 35-36 mm · Piston diameter 32 mm · Housing materials: POM / fixture: aluminium / screw: stainless steel	**E12017**

Wiring diagrams

1



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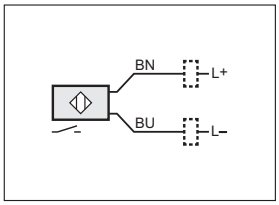
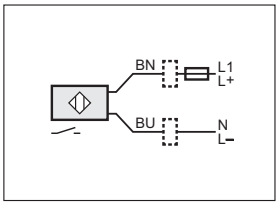


7



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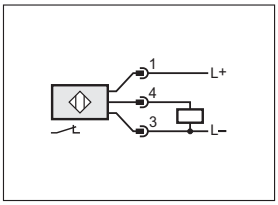

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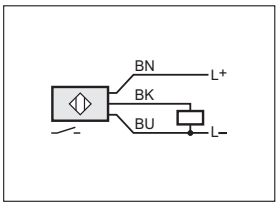

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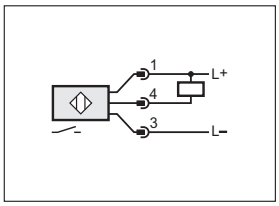

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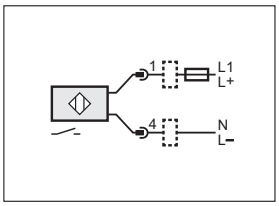

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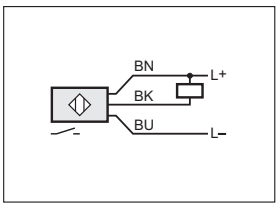

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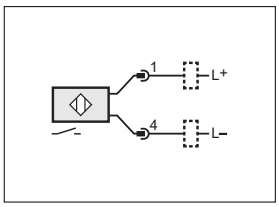

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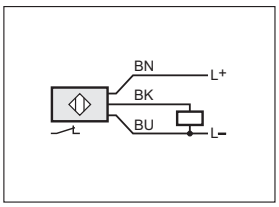
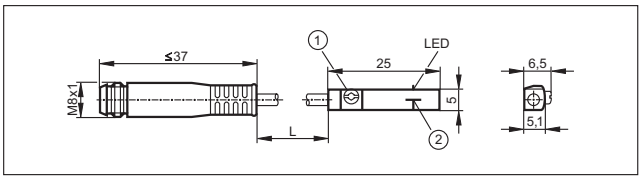


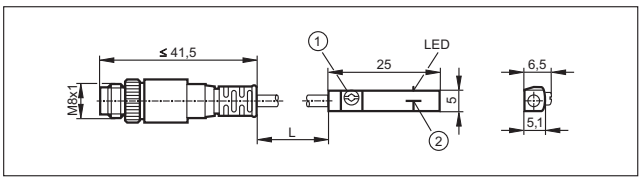
Scale drawings

1



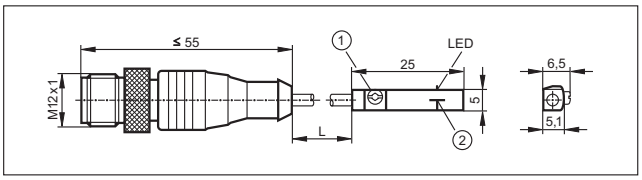
1: Fastening clamp, 2: sensing face

2



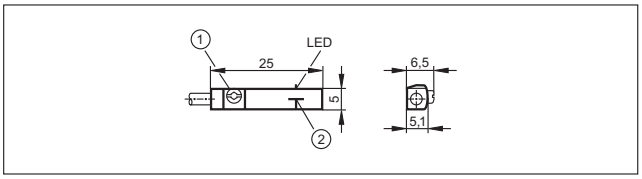
1: Fastening clamp, 2: sensing face

3



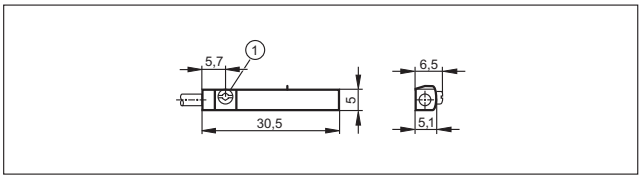
1: Fastening clamp, 2: sensing face

4



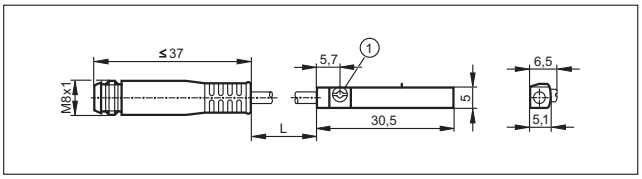
1: Fastening clamp, 2: sensing face

5



1: Fastening clamp

6



1: Fastening clamp

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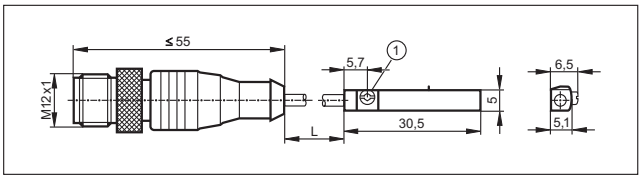
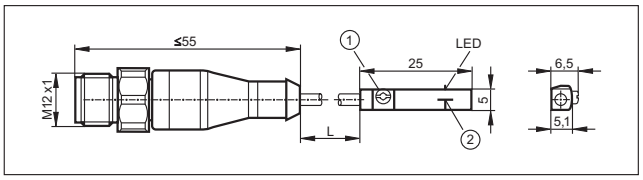


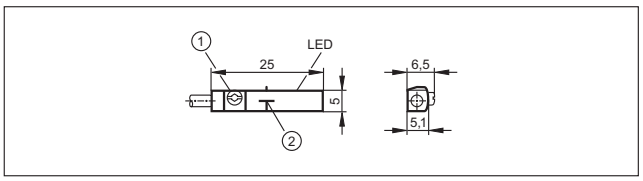
1: Fastening clamp

8



1: Fastening clamp, 2: sensing face

9



1: Fastening clamp, 2: sensing face

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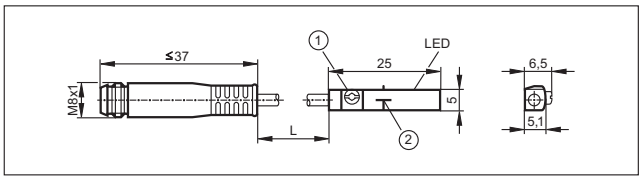
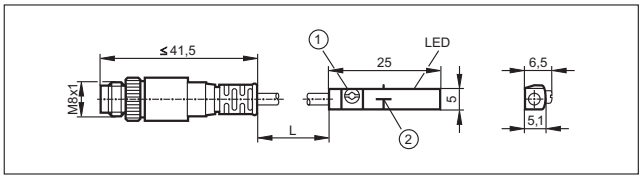


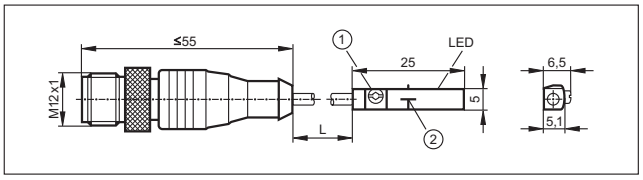
1: Fastening clamp, 2: sensing face

11



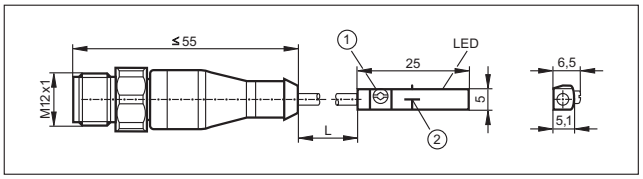
1: Fastening clamp, 2: sensing face

12



1: Fastening clamp, 2: sensing face

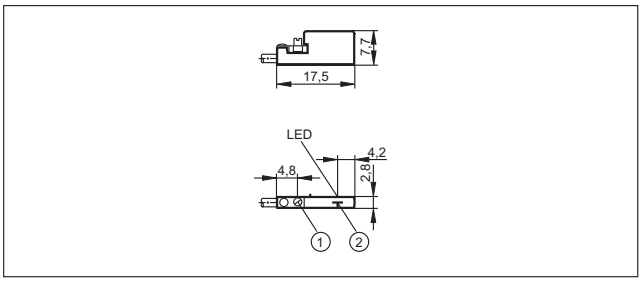
13



1: Fastening clamp, 2: sensing face

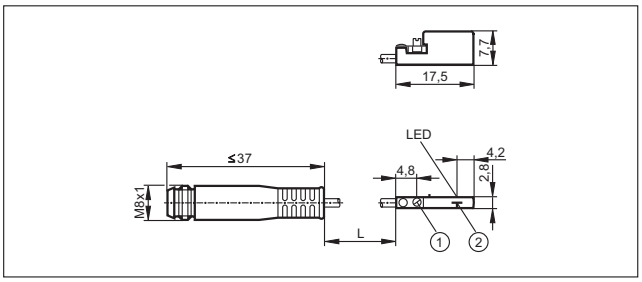
Scale drawings

14



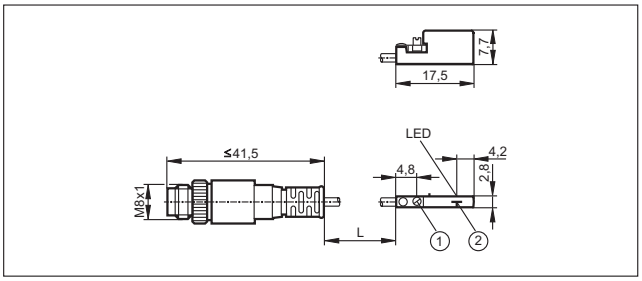
1: Fastening clamp, 2: sensing face

15



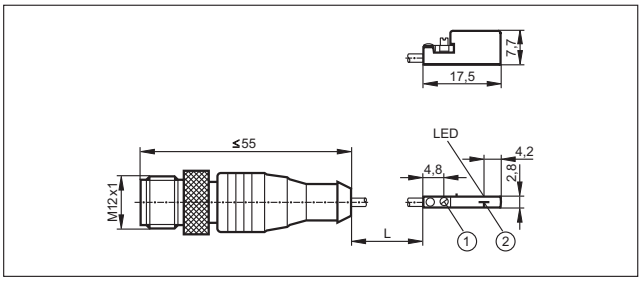
1: Fastening clamp, 2: sensing face

16



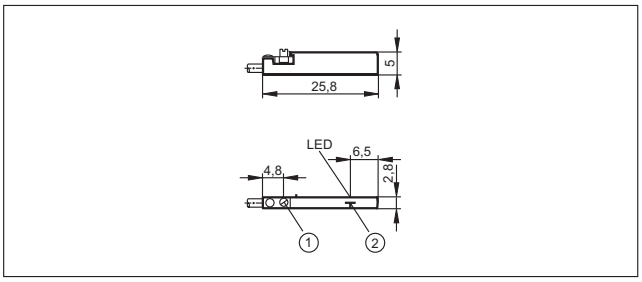
1: Fastening clamp, 2: sensing face

17



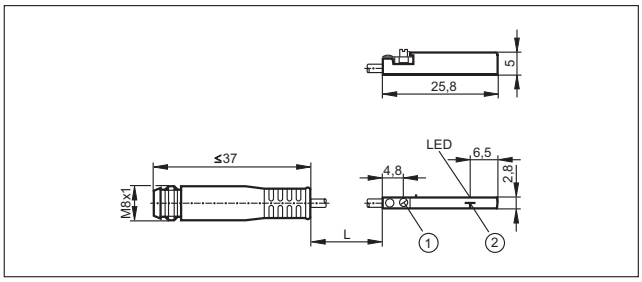
1: Fastening clamp, 2: sensing face

18



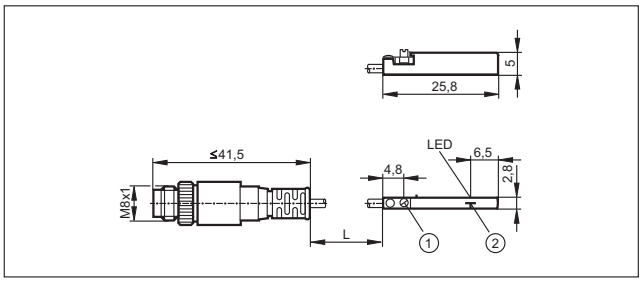
1: Fastening clamp, 2: sensing face

19



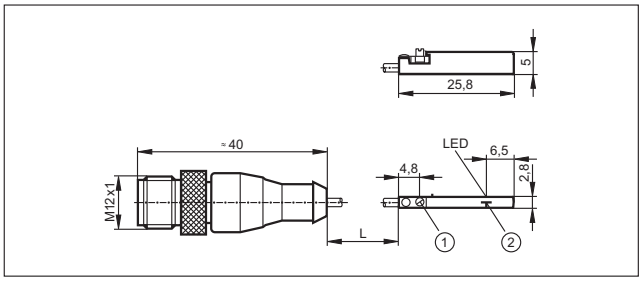
1: Fastening clamp, 2: sensing face

20



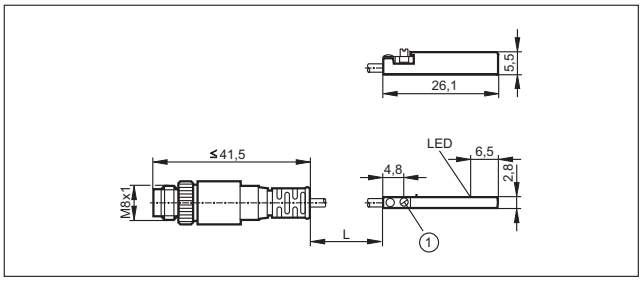
1: Fastening clamp, 2: sensing face

21



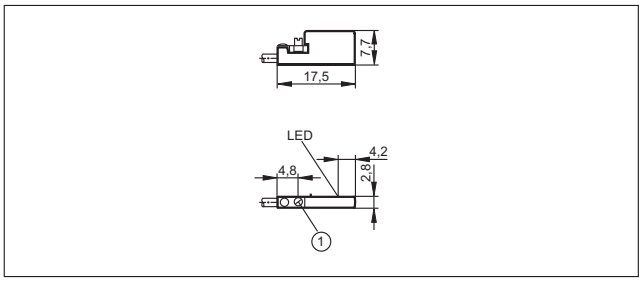
1: Fastening clamp, 2: sensing face

22



1: Fastening clamp

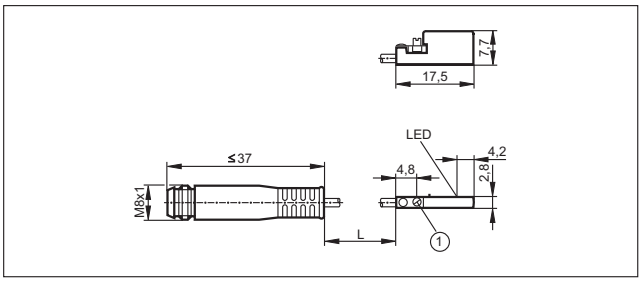
23



1: Fastening clamp

Scale drawings

24



1: Fastening clamp

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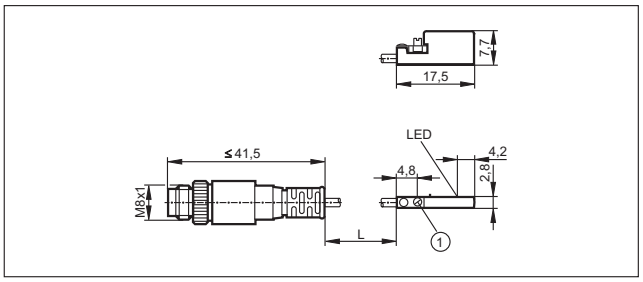

1: Fastening clamp

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