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!

- **Capactive sensors for detection of non-metalic objects.**
- **Sensing range adjustable by means of a potentiometer.**
- **Plastic or metal housing for different applications.**
- **Housing styles from M12 cylindrical to 105 x 80 mm block.**
- **Assortment of tank and sight glass mounting acccessories.**

Capacitive sensors

Capacitive sensors are used for the non-contact detection of any objects. In contrast to inductive sensors, which only detect metallic objects, capacitive sensors can also detect non-metallic materials. Typical applications are in the wood, paper, glass, plastic, food and chemical industries. In a packaging system, capacitive sensors monitor that the contents of a cardboard box is complete, for example, or check the presence of non-metallic caps. Another application is to monitor the conveying of sheets of glass on a roller conveyor.

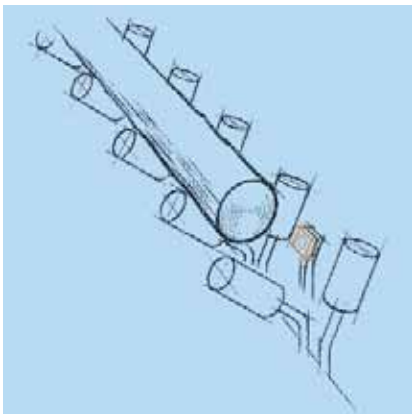
Operating principle

The capacitance between the active electrode of the sensor and the electrical earth potential is evaluated. An approaching object influences the electrical alternating field between these two "capacitor plates" and, consequently, the capacitance. This applies to metallic and non-metallic objects. By means of the potentiometer or the pushbutton the user can set the sensitivity.

Increased noise immunity

When detecting objects, very small changes in capacitance must be evaluated and converted into switching signals. This makes high requirements for the electronics. The sensors must be designed so that they are insensitive to fluctuations of the parasitic basic capacitances, as these can amount to a multiple of the change in capacitance to be measured. Moreover, the sensors must be insensitive to electromagnetic interference which typically occur in the application area.

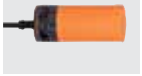
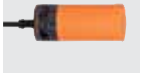
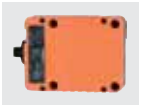
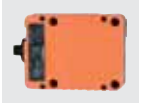
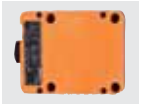
ifm electronic has developed future-oriented solutions to meet the high sensor requirements. A patented circuit concept efficiently prevents the mentioned problems and ensures reliable functioning for all relevant noise parameters.



Not only metal: Capacitive sensors detect almost all materials, here for example a log in a saw mill.

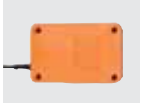
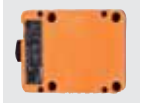
Sensors for industrial applications, DC

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	M18 / L = 84	8 nf	PBT	10...36	IP67	50	250	1	**KG5043**
Cable 2 m · Output function ⎍ / ⎍ · DC PNP/NPN · Wiring diagram no. 17									
	M18 / L = 84	8 nf	PBT	10...55	IP67	50	400	1	**KG5047**
M12 connector · Output function ⎍ · DC PNP · Wiring diagram no. 2									
	M12 / L = 60	4 f	high-grade st. steel	10...36	IP65	50	100	2	**KF5001**
	M12 / L = 61	8 nf	high-grade st. steel	10...36	IP65	50	100	3	**KF5002**
Terminals · Output function ⎍ · DC PNP · Wiring diagram no. 3									
	M18 / L = 110	8 nf	PBT	10...36	IP65	50	250	4	**KG5041**
M12 connector · Output function ⎍ · DC PNP · Wiring diagram no. 4									
	M18 / L = 93.8	8 nf	PBT	10...36	IP67	50	250	5	**KG5057**
Terminals · Output function ⎍ / ⎍ · DC PNP/NPN · Wiring diagram no. 18									
	M18 / L = 110	8 nf	PBT	10...55	IP65	50	400	4	**KG5040**
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	M30 / L = 81	15 nf	PBT	10...36	IP65	40	250	6	**KI5002**
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 5									
	M30 / L = 81	15 nf	PBT	10...36	IP65	40	250	6	**KI5001**
connector (DIN 43650) · Output function ⎍ / ⎍ · DC PNP · Wiring diagram no. 6									
	M30 / L = 92	15 nf	PBT	10...36	IP65	40	250	7	**KI5038**
M12 connector · Output function ⎍ / ⎍ · DC PNP · Wiring diagram no. 2									
	M30 / L = 90	8 f	high-grade st. steel	10...36	IP65 / IP67	10	100	8	**KI5085**
	M30 / L = 90	15 nf	high-grade st. steel	10...36	IP65 / IP67	10	100	9	**KI5087**

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Drawing no.	Order no.
M12 connector · Output function ⎍/⎍ · DC PNP/NPN · Wiring diagram no. 19									
	M30 / L = 90	8 f	high-grade st. steel	10...36	IP65 / IP67	10	100	8	**KI5084**
	M30 / L = 90	15 nf	high-grade st. steel	10...36	IP65 / IP67	10	100	9	**KI5086**
Terminals · Output function ⎍/⎍ · DC PNP · Wiring diagram no. 7									
	M30 / L = 125	15 nf	PBT	10...55	IP65	40	250	10	**KI5023**
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	Ø 34 / L = 81	20 nf	PBT	10...36	IP65	40	250	11	**KB5004**
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 5									
	Ø 34 / L = 81	20 nf	PBT	10...36	IP65	40	250	11	**KB5002**
M12 connector · Output function ⎍ · DC PNP · Wiring diagram no. 4									
	Ø 34 / L = 93	20 nf	PBT	10...36	IP65	40	250	12	**KB5062**
M12 connector · Output function ⎍ · DC PNP · Wiring diagram no. 8									
	Ø 34 / L = 93	20 nf	PBT	10...36	IP65	40	250	12	**KB5096**
Cable 2 m · Output function ⎍ · DC PNP · Wiring diagram no. 1									
	120 x 80 x 30	60 nf	modified PPO	10...36	IP65	10	250	13	**KD5022**
M12 connector · Output function ⎍/⎍ · DC PNP · Wiring diagram no. 20									
	105 x 80 x 40	60 nf	modified PPO	10...36	IP65	10	250	14	**KD5039**
M12 connector · Output function ⎍ · DC PNP · Wiring diagram no. 4									
	105 x 80 x 40	60 nf	modified PPO	10...36	IP65	10	250	14	**KD5044**
Terminals · Output function ⎍/⎍ · DC PNP · Wiring diagram no. 21									
	105 x 80 x 40	60 nf	modified PPO	10...36	IP65	10	250	15	**KD5018**

f = flush / nf = non flush

Sensors for industrial applications, AC and AC/DC

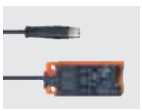
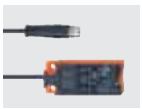
Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f AC / DC [Hz]	I_{load} AC / DC [mA]	Drawing no.	Order no.
Cable 2 m · Output function ⎓ · AC/DC · Wiring diagram no. 9									
	M18 / L = 84	8 nf	PBT	20...250	IP67	25 / 50	350 / 100	1	**KG0009***
Cable 2 m · Output function ⏚ · AC/DC · Wiring diagram no. 10									
	M18 / L = 84	8 nf	PBT	20...250	IP67	25 / 50	350 / 100	1	**KG0010***
Terminals · Output function ⎓ / ⏚ · AC/DC · Wiring diagram no. 11									
	M18 / L = 110	8 nf	PBT	20...250	IP65	25 / 50	350 / 100	4	**KG0008***
Cable 2 m · Output function ⎓ · AC/DC · Wiring diagram no. 9									
	M30 / L = 81	15 nf	PBT	20...250	IP65	25 / 40	250	6	**KI0016***
Cable 2 m · Output function ⏚ · AC/DC · Wiring diagram no. 10									
	M30 / L = 81	15 nf	PBT	20...250	IP65	25 / 40	250	6	**KI0020***
connector (DIN 43650) · Output function ⎓ / ⏚ · AC/DC · Wiring diagram no. 12									
	M30 / L = 92	15 nf	PBT	20...250	IP65	25 / 40	250	7	**KI0040***
Terminals · Output function ⎓ / ⏚ · AC/DC · Wiring diagram no. 13									
	M30 / L = 125	15 nf	PBT	20...250	IP65	25 / 40	250	10	**KI0024***
Cable 2 m · Output function ⎓ · AC/DC · Wiring diagram no. 9									
	Ø 34 / L = 81	20 nf	PBT	20...250	IP65	25 / 40	250	11	**KB0025***
Cable 2 m · Output function ⏚ · AC/DC · Wiring diagram no. 10									
	Ø 34 / L = 81	20 nf	PBT	20...250	IP65	25 / 40	250	11	**KB0029***
Cable 2 m · Output function ⎓ · AC/DC · Wiring diagram no. 9									
	120 x 80 x 30	60 nf	modified PPO	20...250	IP65	10	250	13	**KD0012***
Terminals · Output function ⎓ / ⏚ · AC/DC · Wiring diagram no. 22									
	105 x 80 x 40	60 nf	modified PPO	20...250	IP65	10	250	15	**KD0009***

f = flush / nf = non flush

*** Note for AC and AC/DC units** Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting). Recommendation: check the unit for reliable function after a short circuit.

www.ifm.com

Sensors for the detection of conductive media through a wall

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ / ⎍ · DC PNP/NPN · Wiring diagram no. 23									
	M18 / L = 77	8 nf	PP	10...36	IP65 / IP67	10	200	16	**KG5067**
Cable 2 m · Output function ⎍ / ⎍ · DC PNP · Wiring diagram no. 14									
	M18 / L = 77	8 nf	PP	10...36	IP65 / IP67	10	200	16	**KG5069**
Cable 2 m · Output function ⎍ / ⎍ · 1x open collector with automatic load detection (DC PNP or DC NPN) · Wiring diagram no. 23									
	20 x 14 x 48	12 nf	PBT	10...36	IP65 / IP67	10	100	17	**KQ6001**
Cable 2 m · Output function ⎍ / ⎍ · 1x open collector DC PNP · Wiring diagram no. 14									
	20 x 14 x 48	12 nf	PBT	10...36	IP65 / IP67	10	100	17	**KQ6002**
Cable with connector 0.04 m · Output function ⎍ / ⎍ · 1x open collector with automatic load detection (DC PNP or DC NPN) · Wiring diagram no. 19									
	20 x 14 x 48	12 nf	PBT	10...36	IP65 / IP67	10	100	17	**KQ6003**
Cable with connector 0.04 m · Output function ⎍ / ⎍ · 1x open collector DC PNP · Wiring diagram no. 2									
	20 x 14 x 48	12 nf	PBT	10...36	IP65 / IP67	10	100	17	**KQ6004**
Cable with connector 0.1 m · Output function ⎍ / ⎍ · 1x open collector DC PNP · Wiring diagram no. 2									
	20 x 14 x 48	12 nf	PBT	10...36	IP65 / IP67	10	100	17	**KQ6005**

f = flush / nf = non flush

Sensors for the detection of granulates

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Drawing no.	Order no.
M12 connector · Output function ⎍ / ⎍ · DC PNP/NPN · Wiring diagram no. 19									
	M18 / L = 87	12 nf	PBT	10...36	IP65 / IP67	10	200	18	**KG5065**
M12 connector · Output function ⎍ / ⎍ · DC PNP · Wiring diagram no. 2									
	M18 / L = 87	12 nf	PBT	10...36	IP65 / IP67	10	200	18	**KG5066**

Type	Dimensions [mm]	Sensing range [mm]	Material	U_b [V]	Protection	f [Hz]	I_{load} [mA]	Drawing no.	Order no.
M12 connector · Output function ⎍/⎍ · DC PNP · Wiring diagram no. 24									
	M30 / L = 116	nf	PPS	10...30	IP67	10	200	19	**KN5121**
M12 connector · Output function ⎍/⎍ · DC PNP/NPN · Wiring diagram no. 19									
	M30 / L = 90	20 nf	PBT	10...36	IP65 / IP67	10	200	20	**KI5082**
M12 connector · Output function ⎍/⎍ · DC PNP · Wiring diagram no. 2									
	M30 / L = 90	20 nf	PBT	10...36	IP65 / IP67	10	200	20	**KI5083**

f = flush / nf = non flush

Sensors with ATEX approval

Type	Dimensions [mm]	Sensing range [mm]	Material	$U_{nom.}$ at 1 KΩ [V]	U_b [V]	Internal capacit. [nF]	Internal inductance [µH]	f [Hz]	Drawing no.	Order no.
Cable 2 m · Output function ⎍ · Connection to certified intrinsically safe circuits with the max. values U = 15 V / I = 50 mA / P = 120 mW · Wiring diagram no. 15										
	M30 / L = 81	15 nf	PBT	8.2 DC	7.5...15	375	1	40	6	**KI5030**
Terminals · Output function ⎍/⎍ · DC PNP · Wiring diagram no. 7										
	M30 / L = 151	15 nf	PBT	10...30 DC	–	–	–	10	21	**KI5065**
Terminals · Output function ⎍/⎍ · AC/DC · Wiring diagram no. 13										
	M30 / L = 151	15 nf	PBT	20...250 AC/DC	–	–	–	25 / 50	21	**KI0042***
Cable 2 m · Output function ⎍ · Connection to certified intrinsically safe circuits with the max. values U = 15 V / I = 50 mA / P = 120 mW · Wiring diagram no. 16										
	M34 / L = 92	15 nf	brass	8.2 DC	7.5...15	375	1	40	22	**KX5001**
Terminals · Output function ⎍/⎍ · DC PNP · Wiring diagram no. 21										
	105 x 80 x 40	60 nf	modified PPO	10...36 DC	–	–	–	10	23	**KD500A**
Terminals · Output function ⎍/⎍ · AC/DC · Wiring diagram no. 22										
	105 x 80 x 40	60 nf	modified PPO	20...250 AC/DC	–	–	–	10	23	**KD000A***

f = flush / nf = non flush

*** Note for AC and AC/DC units** Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting). Recommendation: check the unit for reliable function after a short circuit.

Switching amplifiers with ATEX approval

Type	U_b [V]	Power / current consumption [VA] / [mA]	f [Hz]	T_a [°C]	Output	Protection	Drawing no.	Order no.
	115	1.0 /	10	-20...60	relay (1 changeover contact)	IP20	24	**N0030A**
	230	1.0 /	10	-20...60	relay (1 changeover contact)	IP20	24	**N0031A**
	115	1.3 /	10	-20...60	relay (1 changeover contact per channel)	IP20	24	**N0032A**
	230	1.3 /	10	-20...60	relay (1 changeover contact per channel)	IP20	24	**N0033A**
	24	/ < 23	10	-20...60	relay (1 changeover contact)	IP20	24	**N0530A**
	24	/ < 50	5000	-20...60	2 transistor outputs PNP (100 mA, short-circuit protection)	IP20	24	**N0531A**
	24	/ < 50	5000	-20...60	2 outputs (optocoupler, bipolar, 100 mA, short-circuit protection)	IP20	24	**N0532A**
	24	/ < 50	10	-20...60	relay (1 changeover contact per channel)	IP20	24	**N0533A**
	24	/ < 50	5000	-20...60	2 transistor outputs PNP (100 mA, short-circuit protection)	IP20	24	**N0534A**

Accessories

Type	Description	Order no.
	Mounting clamp · Ø 12 mm · Housing materials: PBT	**E10015**
	Mounting clamp · Ø 34 mm · Housing materials: PBT	**E10017**
	Mounting clamp · Ø 20 mm - Ø 18 mm · with reducing bush · for type M18 · Housing materials: PBT	**E10076**
	Mounting clamp · Ø 34 mm - Ø 30 mm · with reducing bush · for type M30 · Housing materials: PBT	**E10077**
	Mounting clamp · Ø 34 mm · Housing materials: PA	**E10193**
	Mounting adapter · G ¾ - M18 x 1 · for type M18 x 1 · Housing materials: PTFE	**E10698**
	Angle bracket · for type M12 · Housing materials: stainless steel	**E10735**

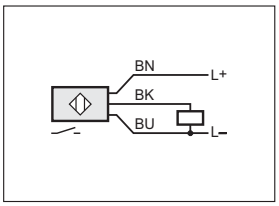
Type	Description	Order no.
	Angle bracket · for type M18 · Housing materials: stainless steel	**E10736**
	Angle bracket · for type M30 · Housing materials: stainless steel	**E10737**
	Mounting adapter · Ø 34 mm - G 1½ · Housing materials: POM	**E11027**
	Mounting adapter · Ø 34 mm - G 1¼ · Housing materials: PVDF	**E11028**
	Locknut · G 1¼ · for mounting adapter · Housing materials: PVDF	**E11030**
	Locknut · G 1½ · for mounting adapter · Housing materials: POM	**E11031**
	Locknut · G 1½ · for mounting adapter · Housing materials: PVDF	**E11032**
	Mounting adapter · M30 x 1.5 - G 1½ · Housing materials: POM / EPDM	**E11033**
	Mounting adapter · M30 x 1.5 - G 1½ · Housing materials: PVDF / EPDM	**E11034**
	Mounting adapter · M30 x 1.5 - G 1¼ · Housing materials: POM / EPDM	**E11035**
	Mounting adapter · M30 x 1.5 - G 1¼ · Housing materials: PVDF / EPDM	**E11036**
	Mounting set · M30 x 1.5 / G ¼...G 1 · for capacitive sensors on rising pipes G ¼" - 1" · Housing materials: POM	**E11037**
	Locknut · G 1¼ · for mounting adapter · Housing materials: POM	**E11055**
	Protective cover · G 1¼ · for mounting adapter · Housing materials: PES black transparent	**E11078**

Type	Description	Order no.
	Mounting set · straight · Clamp mounting · for type IA, IB, KA, KB · Housing materials: clamp: stainless steel / fixture: stainless steel 316Ti / 1.4571	**E11117**
	Mounting set · angled · Clamp mounting · for type IA, IB, KA, KB · Housing materials: clamp: stainless steel / fixture: stainless steel 316Ti / 1.4571	**E11118**
	Mounting set · angled · Clamp mounting · rod mounting Ø 14 mm · for type ICE, ID, KD · Housing materials: clamp: stainless steel / fixture: stainless steel 316Ti / 1.4571	**E11121**
	Mounting set · straight · Clamp mounting · rod mounting Ø 14 mm · for type ICE, ID, KD · Housing materials: clamp: stainless steel / fixture: stainless steel 316Ti / 1.4571	**E11122**
	Mounting set · Ø 18.5 mm · Clamp mounting · free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	**E20718**
	Mounting set · Ø 18.5 mm · Clamp mounting · free-standing M10 · for type OG, IG, KG · Housing materials: clamp: diecast zinc / fixture: steel	**E20719**
	Angle bracket · Clamp mounting · for type IW, KQ, OW · Housing materials: stainless steel 316Ti / 1.4571	**E20811**
	Mounting set · Ø 18.5 mm · Clamp mounting · aluminium profile · for type OG, IG, KG · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc / Cube: diecast zinc	**E20866**
	Mounting set · Ø 18.5 mm · Clamp mounting · aluminium profile · for type OG, IG, KG · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc / Cube: diecast zinc	**E20867**
	Mounting set · Ø 18.5 mm · Clamp mounting · free-standing M10 · for type OG, IG, KG · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: stainless steel	**E20869**
	Mounting set · Ø 18.5 mm · Clamp mounting · free-standing M10 · for type OG, IG, KG · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: stainless steel	**E20870**
	Mounting set · Ø 30.2 mm · Clamp mounting · free-standing M12 · for type OI, II, KI · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc	**E20873**
	Mounting set · Ø 30.2 mm · Clamp mounting · free-standing M12 · for type OI, II, KI · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: stainless steel	**E20874**
	Mounting set · Ø 30.2 mm · Clamp mounting · aluminium profile · for type OI, II, KI · Housing materials: fixture: stainless steel 316Ti / 1.4571 / clamp: diecast zinc / Cube: diecast zinc	**E20875**

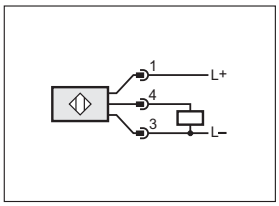
Type	Description	Order no.
	Mounting adapter · M18 x 1 - G ¾ · Housing materials: POM	**E43900**
	Mounting adapter · M18 x 1 - G ¾ · Housing materials: PVDF	**E43901**
	Locknut · G ¾ · for mounting adapter · Housing materials: POM	**E43902**
	Locknut · G ¾ · for mounting adapter · Housing materials: PVDF	**E43903**
	Mounting adapter · M18 x 1 - G 1 · Housing materials: POM	**E43904**
	Mounting adapter · M18 x 1 - G 1 · Housing materials: PVDF	**E43905**
	Locknut · G 1 · for mounting adapter · Housing materials: POM	**E43906**
	Locknut · G 1 · for mounting adapter · Housing materials: PVDF	**E43907**
	Fixing strap · Length: 760 mm · for capacitive level sensors · for type KNQ, KQ · Housing materials: PA · Pack quantity: 5	**E10880**
	Mounting adapter for free-standing mounting · for type KQ · Housing materials: adapter: PBT / inserts: brass / screw: steel galvanised · Pack quantity: 1	**E12153**
	Mounting adapter for free-standing mounting · for type KQ · Housing materials: adapter: PBT / inserts: brass / screw: steel galvanised · Pack quantity: 10	**E12154**
	Mounting adapter · Pipe and tube installation KQ5 / KQ6 with cable ties · Fixing of the types KQ5 and KQ6 to pipes and tubes · Housing materials: Mounting adapter: PA 12 black	**E12163**

Wiring diagrams

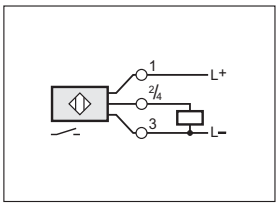
1



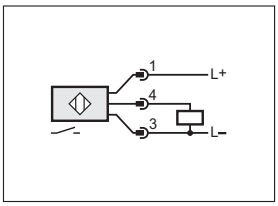
2



3

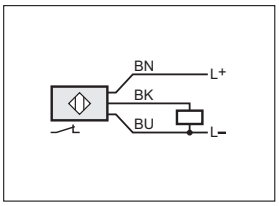


4

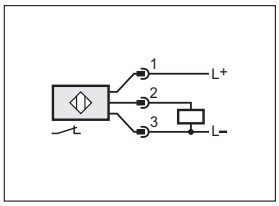


Wiring diagrams

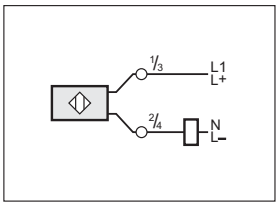
5



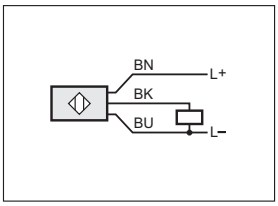
8



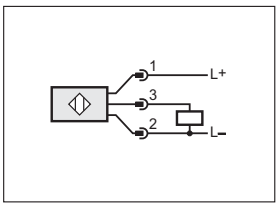
11



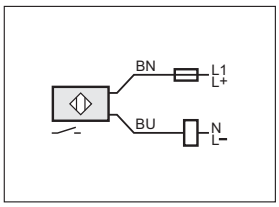
14



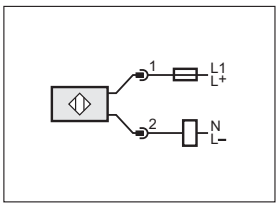
6



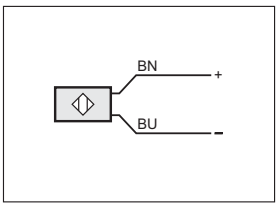
9



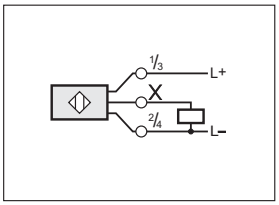
12



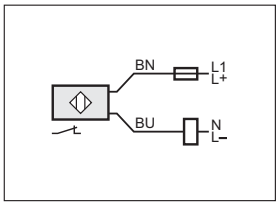
15



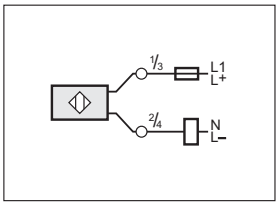
7



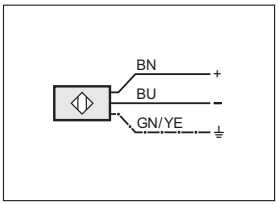
10



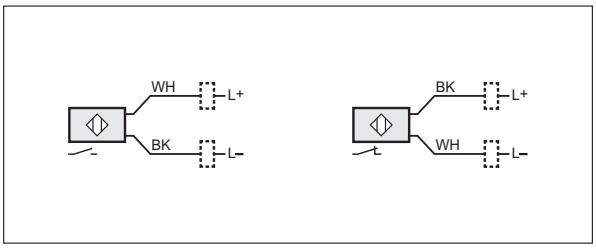
13



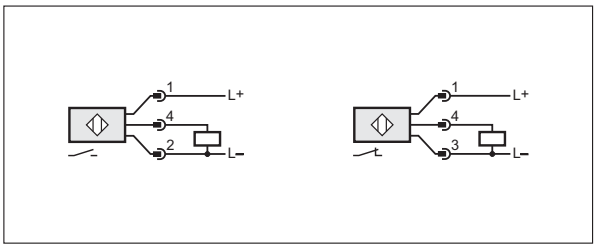
16



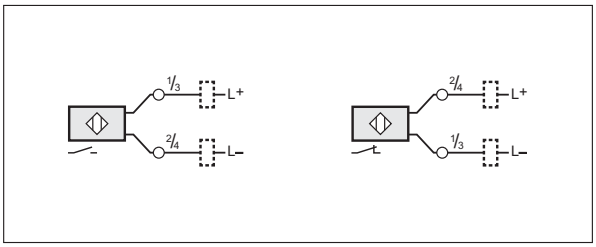
17



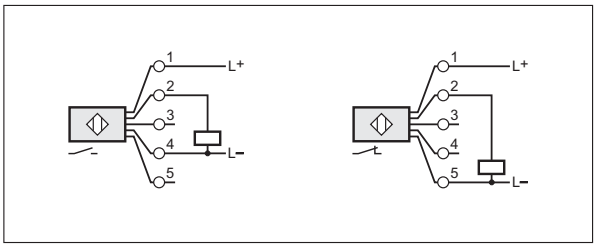
20



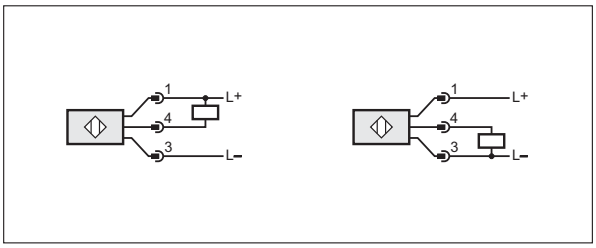
18



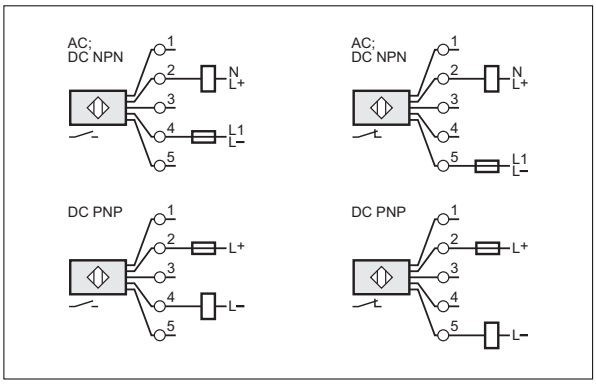
21



19

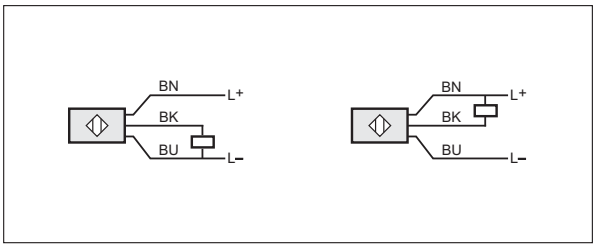


22

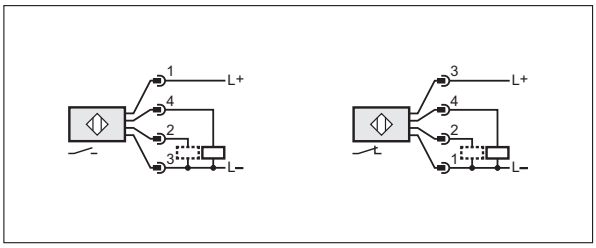


Wiring diagrams

23



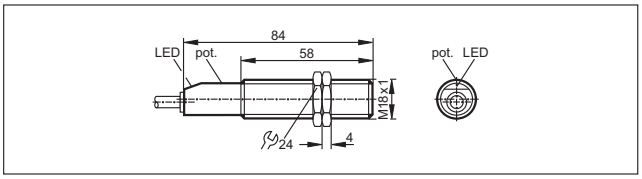
24



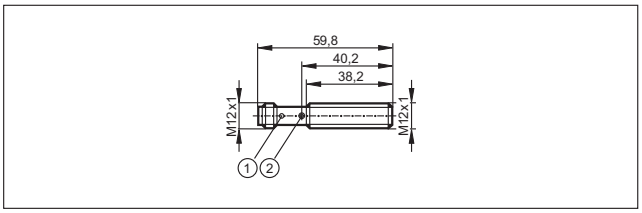
2: function check output / programming wire

Scale drawings

1

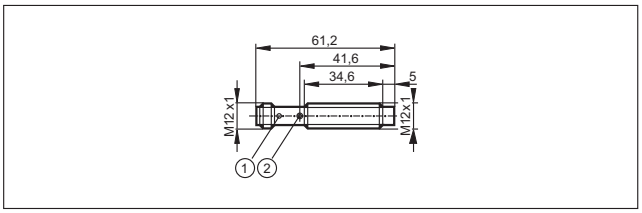


2



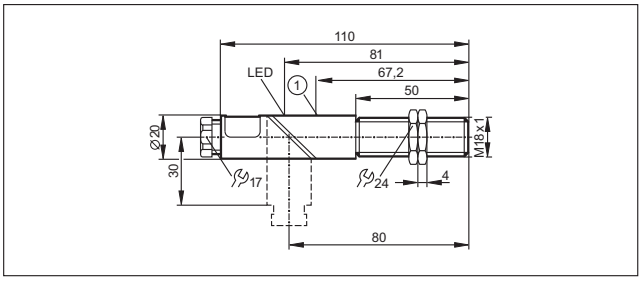
1: LED 4 x 90°, 2: with pot.

3



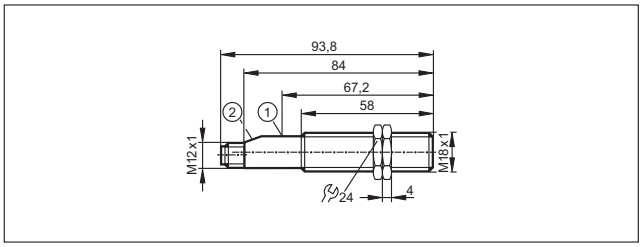
1: LED 4 x 90°, 2: with pot.

4



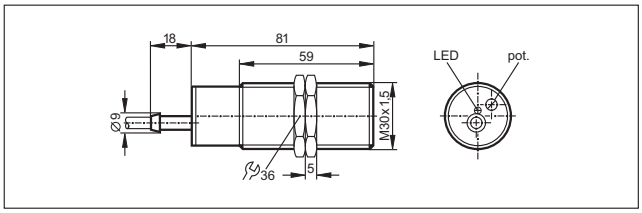
1: with pot.

5

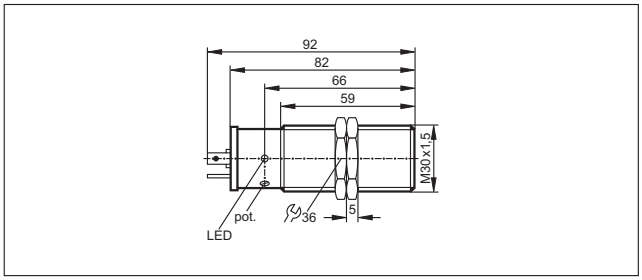


1: with pot., 2: LED

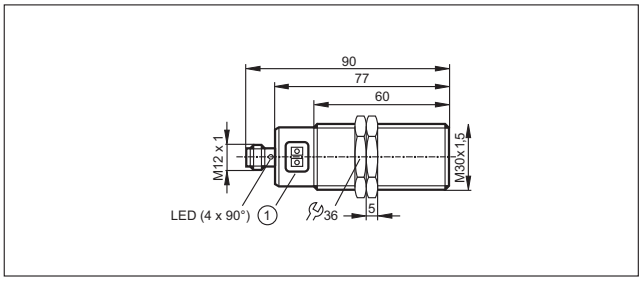
6



7



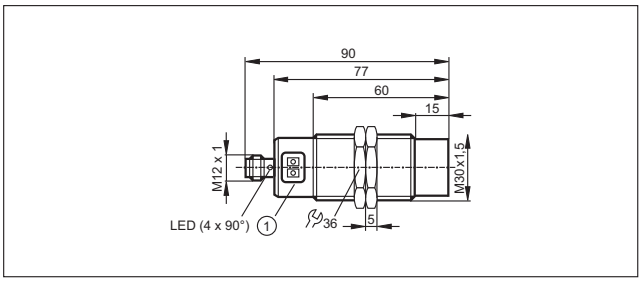
8



1: Programming buttons

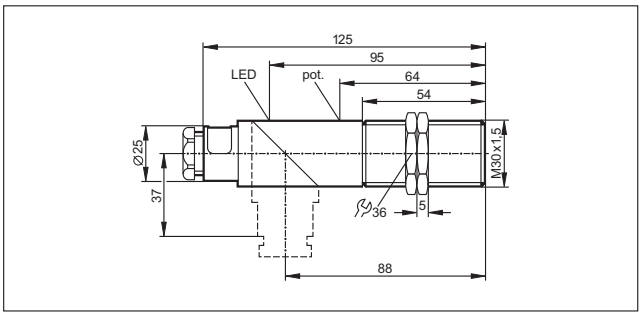
Scale drawings

9

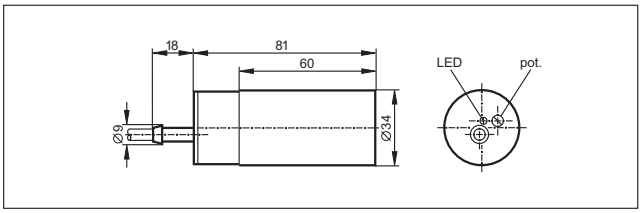


1: Programming buttons

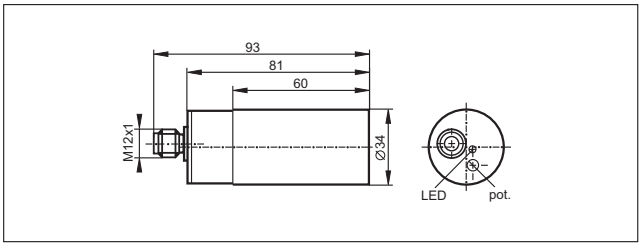
10



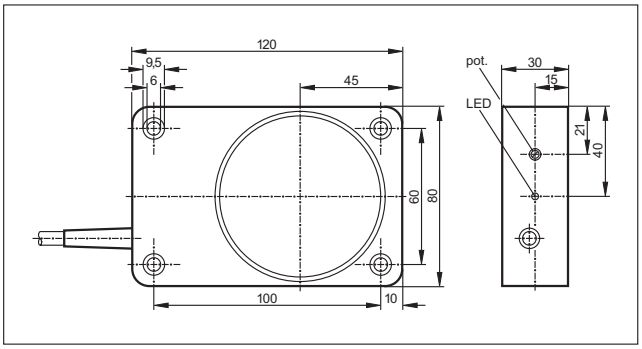
11



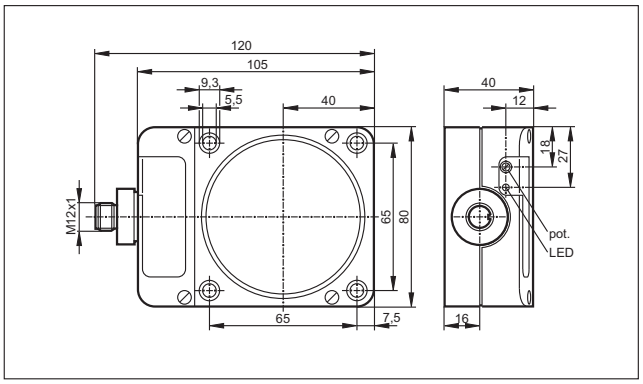
12



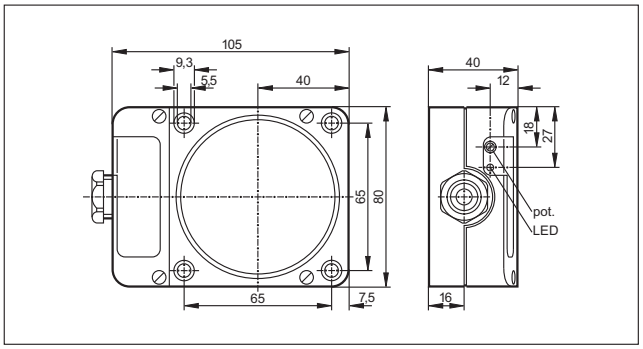
13



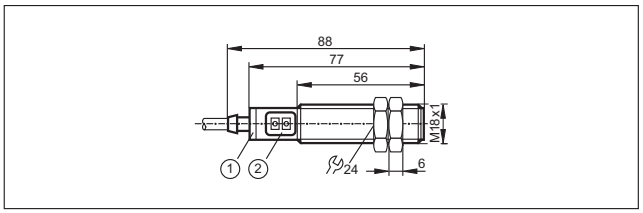
14



15

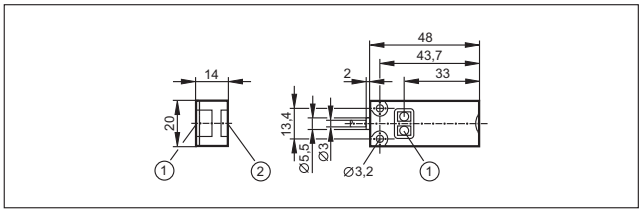


16



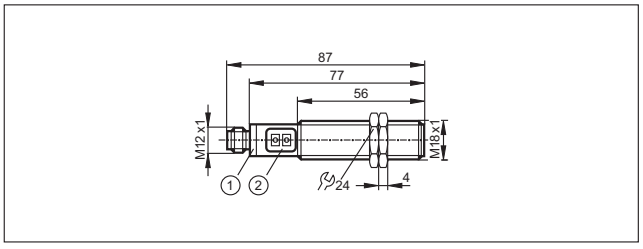
1: LED ring, 2: Programming buttons

17



1: Programming buttons, 2: sensing face

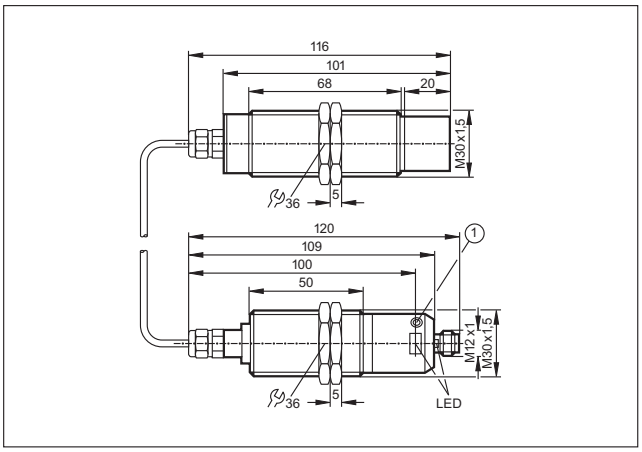
18



1: LED ring, 2: Programming buttons

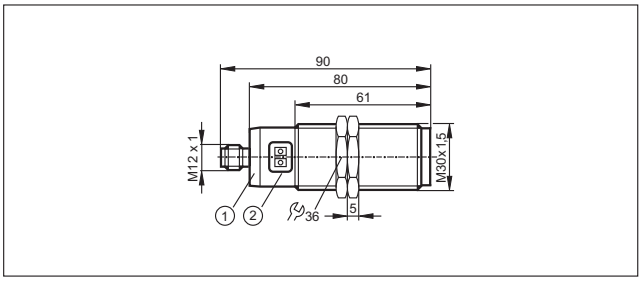
Scale drawings

19



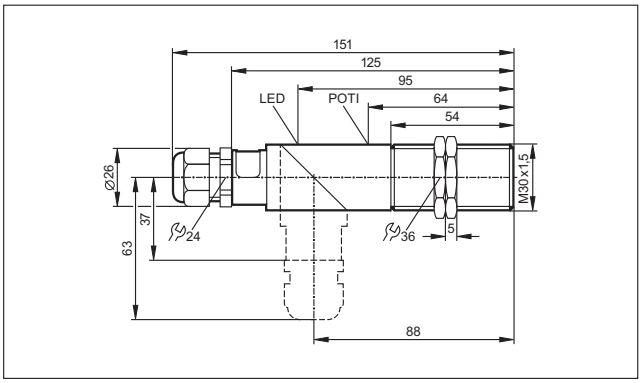
1: Programming button

20

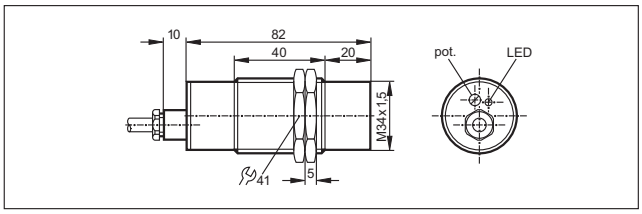


1: LED ring, 2: Programming buttons

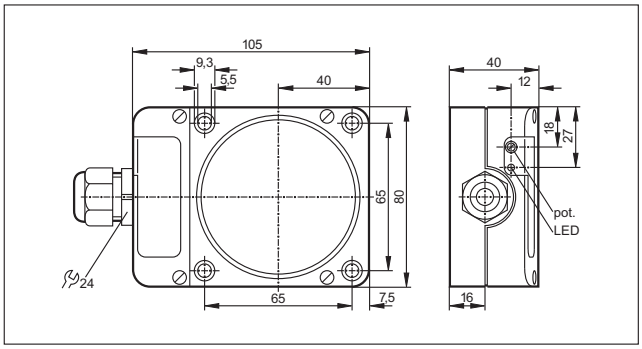
21



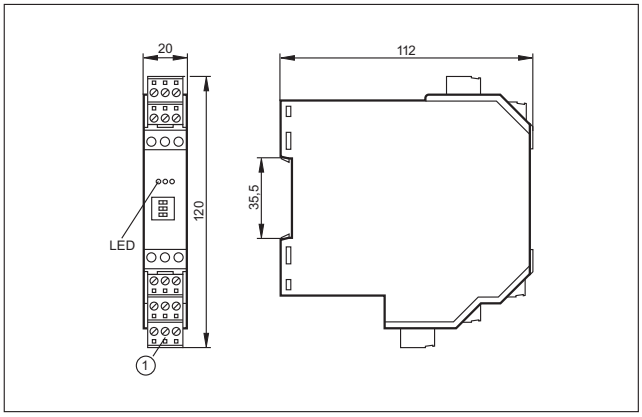
22



23



24



1: Combicon plug with screw terminals (optional)

www.ifm.com