Inductive proximity switches

IFL

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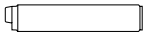
Safe solutions for your industry

Inductive proximity switches
Design and voltage variants

Overview

Design		Dimensions [mm]	Designation	DC 3-wire	DC 4-wire
Cylindrical design		**Ø 6.5**	IFL …-6.5-..	Page 18	
		**Ø 20**	IFL …-200-…		Page 16
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Thread design		**M 8**	IFL …-8-…	Page 19	
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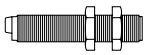
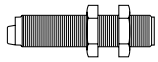
		**M18**	IFL …-18(0)-…	Page 24	Page 14
		**M 30**	IFL …-30(0)-…	Page 28	Page 15
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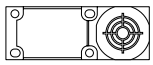
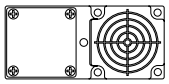
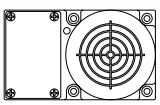
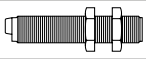
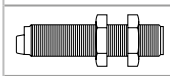
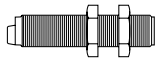
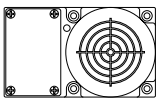
		**112x40x40**	IFL …- 333-…		Page 17
		**120x55x40**	IFL …-384-…		Page 17
		**135x80x40**	IFL …-385-…		Page 17
Sensors with increased temperature resistance		**M18**	IFL …-18L-…-2130	Page 26	
		**M 30**	IFL 15-30L-…-2130	Page 29	
		**M 30**	IFL …-30L-…-1766		Page 15
		**135x80x40**	IFL 50-385-…-2130		Page 17

Proximity switches, general information

The proximity switch is an electronic command device. Compared to the mechanical limit switch, it features non-contact switching upon approach as well as an electronic, i.e. non-contact, operation.

As there are no wearable mechanical parts such as actuating mechanisms and contacts, the service life of a proximity switch is virtually unlimited. Contact burning and contact contamination caused by ambient influences cannot occur.

Electronic proximity switches function without noise, bounce and reaction. They are insensitive to vibration and shock. There is no unreliable contact that can occur with mechanical switches, e.g. actuation too low, switching current too slow, etc. There is no contact bounce when switching direct current. Proximity switches should be preferred over mechanical limit switches:

- when contact difficulties due to environmental conditions, or an extremely low switching current is to be expected
- when no actuating forces are present
- when high switching frequencies are required
- when a long life expectancy is necessary
- when extreme vibrations are present
- when a control unit is switched
- when DC switching, contact bounce must be avoided
- Where the switch must switch without any retaining force (retaining force of mechanical limit switches, magnetic force of magnetic reed switches).

Proximity switches are not, however, entirely without problems. When selecting a proximity switch type and application, the following factors must be considered:

- it makes a difference, if AC or DC has to be switched
- a direct or indirect supply voltage is required
- the switching distance varies, when the actuating surface is made of different materials as well as with different kind of surfaces
- ambient temperatures have a slight influence on the switching distance
- embedding or non-embedding mounting must be considered
- a minimum mounting distance between two switches has to be observed
- especially with high actuating speeds, the length and the distance between the next actuating surface plays a role
- inductive proximity switches react only to metal surfaces

These factors will be discussed in further detail on the following pages.

Mounting

Fig. 1a: Mounting inductive cylindrical proximity switches

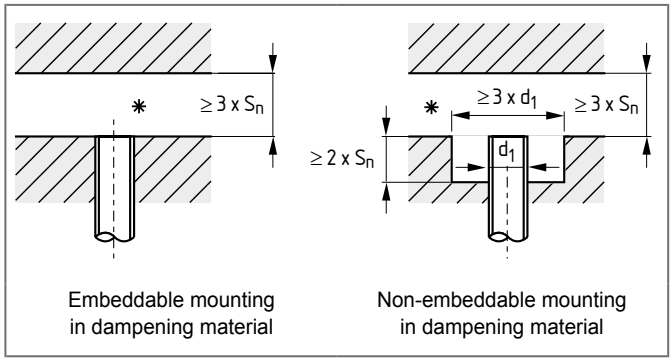
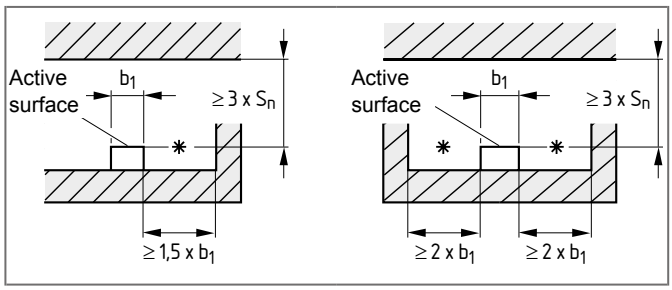
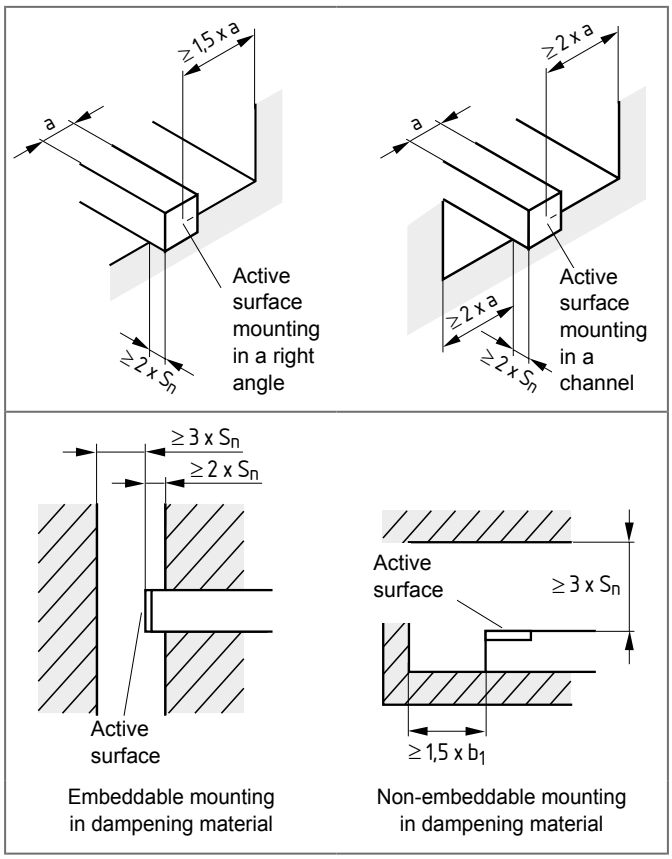


Fig. 1b: Non-embeddable mounting of rectangular inductive proximity switches



* Spacing or
non-dampening material

Fig. 1c: Mounting quadratic inductive proximity switches



Mounting (embeddable and non-embeddable)

The sensing field of the active surface is not only emitted in a vertical direction. It also spreads to the side where it can be influenced. This type of proximity switch is only suited for non-embeddable mounting. When mounting, care must be taken that no materials are in the vicinity which could influence the operation of the switch. The minimum mounting distances, stated in figures 1a-c and those in the specifications, have to be observed. With shorter mounting distances, the switching distance will also change causing unwanted dampening of the oscillator.

For embeddable-mounted proximity switches, a preventive measure has been implemented so that a side-ways spreading of the sensing field is avoided. The inductive proximity switches, for example, include a metal shielding ring around the coil Which prevents the switch from being influenced from the side. On the other hand, the switch is pre-dampened and has a shorter switching distance as with a non-embeddable mounted proximity switch.

Proximity switches can influence each other, and therefore it is important that there is sufficient clearance when mounting the switches.

Inductive proximity switches IFL

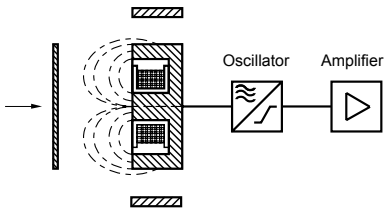


Fig. 2

The oscillator resonant circuit, located in the proximity switch, uses an open core coil to help produce a concentrated high frequency electromagnetic (RF) field, which emerges from the active surface of the sensor. If an electro-conductive target (e.g. metal) enters this field, eddy currents are induced. The floating induced eddy current draws energy from the LC circuit (L: coil, C: capacitor). The load on the oscillator circuit evokes a decrease in the oscillating amplitude. The oscillator is attenuated (Fig. 2).

The decrease of the oscillating amplitude is converted into an electrical signal by the electronic circuit, which leads to a change of switching state of the proximity switch.

When the electroconductive material is removed from the inductive field, the pulse amplitude increases and via the electronic circuit the original switching position is recreated. The oscillator is unattenuated.

Switching distance S

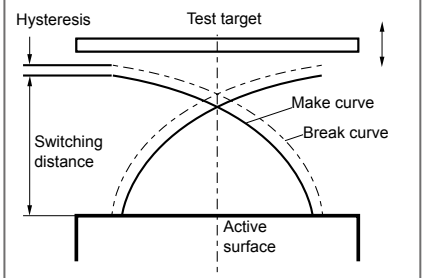


Fig. 3

Operating distance "S" of the inductive proximity switches

The rated operating distance Sn is the device parameter of the proximity switch specified in the type designation (see ordering code). The effective operating distance Sr, for any given switch, at room temperature and design voltage, will be within ± 10 % of the rated operating switching distance Sn. It is determined by using square test targets of steel St 37, 1 mm thick (by axial approach to the active surface) (Fig. 3).

Sr = Sn ± 10%

Since the switch distance of the proximity switch, as explained above, is dependent on temperature, it has afforded a tolerance of the total specified temperature and voltage range to arrive at the actual effective switching distance.

Su = Sr ± 10%

For problem-free switching the proximity switch must, like a mechanical limit switch with snap action, have a switching hysteresis. This switching hysteresis (H) on proximity switches is dependent on the real switching distance and is 3 ... 15 % Sr according to the operating voltage and ambient temperature. The repeat accuracy R is ≤5 % Su.

All mentioned operating distances refer to a 1 mm thick standard target consisting of steel St 37. Other materials have different distances, values are given in the following diagram (Fig. 4). For the capacitive switches the values refer to a grounded metal plate.

Change of the switching distance according to different materials

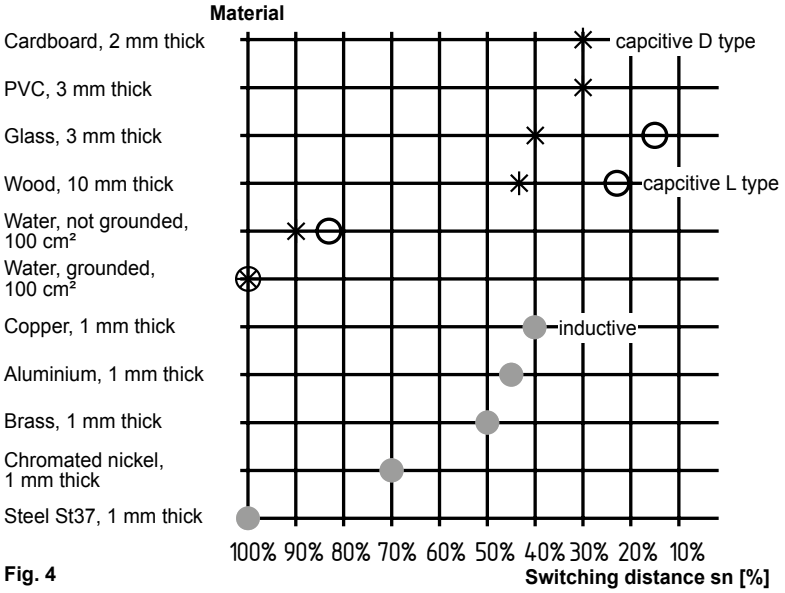


Fig. 4

DC proximity switch (3-/4-wire)

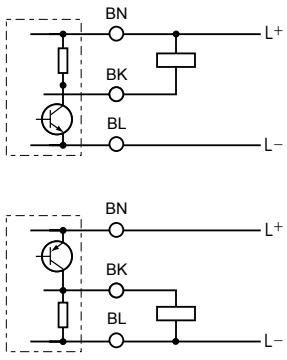


Fig. 5: DC proximity switches

The inductive DC proximity switches have a separate power supply circuit and therefore an additional wire. These switches have a no load supply current in the barred state which does not flow through the load.

The 3-wire proximity switches either work as NO or NC contact and the 4-wire proximity switches have an antivalent output and can be used as change-over contact.

When selecting the proximity switch the output type must be considered:

- P-type proximity switches (PNP) switch the positive potential to the load.
- N-type proximity switches (NPN) switch the negative potential to the load (Fig. 5).

The DC proximity switches are all equipped with wrong polarity protection circuits. The proximity switch will not be destroyed by exchanging the + and – connection. No switching function will occur. A built-in by-pass diode protects the switch from inductive voltage peaks. A built-in offset resistor prevents the transistor output from receiving floating potential caused by spurious pulses when actuating an electronic circuit. Additionally, all optical proximity switches and the majority of the inductive proximity switches are equipped with short-circuit and industrial transients protection.

Parallel switching

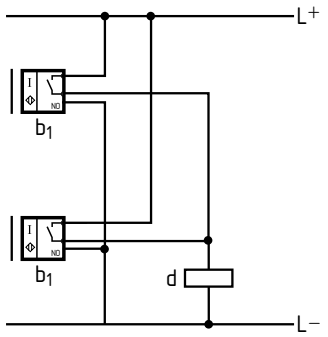


Fig. 6: DC proximity switches

Parallel switching of DC proximity switch

Since each DC switch receives a separate supply voltage, an almost unlimited amount of switches can be wired in parallel (Fig. 6).

If proximity switches with built-in function indicators (LED) are wired in parallel, their outputs must be fitted with isolating diodes. This prevents the other LEDs from lighting up, if one switch is activated.

Series wiring

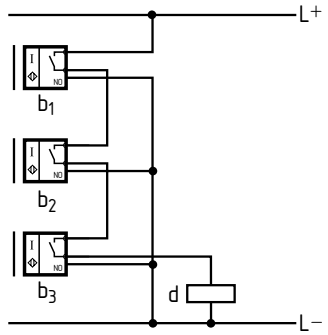


Fig. 7: Series wiring with three PNP DC proximity switches

Series wiring of DC proximity switch

With series switching, the breaking capacity of the first switch has to be taken into consideration. The "b1" proximity switch not only carries the full load currrent but also the sum of the no-load currents of all the other switches in series (Fig. 7).

Connection and wiring identification according to IEC 60947-5-2

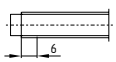
Type	Function	Wire	Conductor colour	Terminal number
3 DC terminals Note the polarity	NO contacts	+	Brown (BN)	1
		–	Blue (BL)	3
		Output	Black (BK)	4
	NC contacts	+	Brown (BN)	1
		–	Blue (BL)	3
		Output	Black (BK)	2
4 DC terminals Note the polarity	Change-over contact (NO output, NC output)	+	Brown (BN)	1
		–	Blue (BL)	3
		NO output	Black (BK)	4
		NC output	White (WH)	2

[1)] It is recommended that both wires are of same colour.

Note
The contact configuration of the NC contact types for all DC switches with plug-in connector does not conform to the IEC 60947-5-2.

For rated operating voltages U_e of over 50 VAC and 120 VDC, switches that are not double-insulated X require a protective wire connection or protective measures against direct or indirect contact.

Permissible tightening torques for proximity switches with thread

Thread design	Wrench size	Max. tightening torque		Limitation at core coil area	
M8 x 1	A/F 13	600 Ncm	Brass	0 Ncm	
		1000 Ncm	Stainless steel	0 Ncm	
M12 x 1	A/F 17	1500 Ncm	Metal	500 Ncm	
		90 Ncm	Thermoplastic	–	
M18 x 1	A/F 24	1800 Ncm	Metal	–	
		300 Ncm	Thermoplastic	–	
M30 x 1.5	A/F 36	3000 Ncm	Metal	–	,
		400 Ncm	Thermoplastic	–	

Inductive proximity switches
DC 4-wire – Thread design



	M18 Cable	M18 Connector	M18 Cable
Key Features			
	• DC 4-wire • Thread design M18 x 1 • Long body • Metal enclosure • Cable	• DC 4-wire • Thread design M18 x 1 • Long body • Metal enclosure • Connector M12	• DC 4-wire • Thread design M18 x 1 • Long body • Thermoplastic enclosure • Cable
Technical features			
Electrical characteristics			
Switching output	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent
Rated operating voltage U_e	10 … 60 VDC	10 … 60 VDC	10 … 60 VDC
Rated operating current I_e	400 mA	400 mA	400 mA
Switching frequency	approx. 500 Hz (embeddable), approx. 350 Hz (non-embeddable)	approx. 500 Hz (embeddable), approx. 350 Hz (non-embeddable)	approx. 350 Hz
No-load current I_0	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)
Voltage drop U_d	approx. 1.5 V (400 mA)	approx. 1.5 V (400 mA)	approx. 1.5 V (400 mA)
Protection circuit	Wrong polarity and inductive interference protection [1]	Wrong polarity and inductive interference protection [1]	Wrong polarity and inductive interference protection [1]
Mechanical data			
Material of the enclosure	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Material of the nut	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Tightening torque for nuts	A/F 24 max. 1800 Ncm [2]	A/F 24 max. 1800 Ncm [2]	A/F 24 max. 300 Ncm [2]
Connection	Cable LiYY 4 x 0.25 mm², 2 m	Screw connector plug M12	Cable LiYY 4 x 0.25 mm², 2 m
Dimensions (Length)	79 mm	91.6 mm	79 mm
LED status display	■	■	■
Ambient conditions			
Ambient temperature	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
Protection class	IP67	IP67	IP67
Safety classification			
Standards	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

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M18 Connector	**M30 Cable**	**M30 Cable**	**M30 Cable**
• DC 4-wire • Thread design M18 x 1 • Long body • Thermoplastic enclosure • Connector M18	• DC 4-wire • Thread design M30 x 1.5 • Long body • Metal enclosure • Cable with strain relief	• DC 4-wire • Thread design M30 x 1.5 • Long body • Metal enclosure • Cable with strain relief • Applicable up to +110 °C	• DC 4-wire • Thread design M30 x 1.5 • Long body • Thermoplastic enclosure • Cable with strain relief
1 NO / 1 NC antivalent	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent
10 … 60 VDC	10 … 60 VDC	10 … 60 VDC	10 … 60 VDC
400 mA	400 mA	200 mA	400 mA
approx. 350 Hz	approx. 200 Hz (embeddable), approx. 100 Hz (non-embeddable)	approx. 150 Hz (embeddable), approx. 50 Hz (non-embeddable)	approx. 100 Hz
approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)
approx. 1.5 V (400 mA)	approx. 1.5 V (400 mA)	approx. 1.0 V (200 mA)	approx. 1.5 V (400 mA)
Wrong polarity and inductive interference protection [1]	Wrong polarity and inductive interference protection [1]	Wrong polarity and inductive interference protection	Wrong polarity and inductive interference protection [1]
Thermoplastic	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Thermoplastic	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
A/F 24 max. 300 Ncm [2]	A/F 36 max. 3000 Ncm [2]	A/F 36 max. 3000 Ncm [2]	A/F 36 max. 400 Ncm [2]
Screw connector plug M18	Cable LiYY 4 x 0.25 mm², 2 m, with strain relief	Cable LiYY 4 x 0.25 mm², 2 m, with strain relief	Cable LiYY 4 x 0.25 mm², 2 m, with strain relief
91 mm	100 mm	100 mm	100 mm
■	■	■	■
−25 °C … +70 °C	−25 °C … +70 °C	0 °C … +110 °C (dry heat)	−25 °C … +70 °C
IP67	IP67	IP67	IP67
IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

[1] On request: overload and short-circuit protection (suffix -1665-1) I_e = 300 mA, U_d = approx. 1 V (300 mA)
[2] Instead of nuts, a mounting clamp can be provided (see accessories on page 27).

Inductive proximity switches

DC 4-wire – Cylindrical and rectangular design

	Ø 20 Cable	Ø 20 Connector	Ø 40 Cable
Key Features			
	• DC 4-wire • Cylindrical design Ø 20 mm • Long body • Thermoplastic enclosure • Cable	• DC 4-wire • Cylindrical design Ø 20 mm • Long body • Thermoplastic enclosure • Connector M18	• DC 4-wire • Cylindrical design Ø 40 mm • Standard body • Thermoplastic enclosure • Cable
Technical features			
Electrical characteristics			
Switching output	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent
Rated operating voltage U_e	10 … 60 VDC	10 … 60 VDC	10 … 60 VDC
Rated operating current I_e	400 mA	400 mA	400 mA
Switching frequency	approx. 350 Hz	approx. 350 Hz	approx. 100 Hz
No-load current I_0	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)
Voltage drop U_d	approx. 1.5 V (400 mA)	approx. 1.5 V (400 mA)	approx. 1.5 V (400 mA)
Protection circuit	Wrong polarity and inductive interference protection [1)]	Wrong polarity and inductive interference protection [1)]	Wrong polarity and inductive interference protection [1)]
Mechanical data			
Material of the enclosure	Thermoplastic	Thermoplastic	Thermoplastic
Material of the fixation	Clamp H 20: thermoplastic (refer to page 27)	Clamp H 20: thermoplastic (refer to page 27)	Clamp H 40: thermoplastic (refer to page 27)
Connection	Cable LiYY 4 x 0.25 mm², 2 m	Screw connector plug M18	Cable LiYY 4 x 0.25 mm², 2 m
Dimensions (Length) or (HxWxL)	79 mm	91 mm	63 mm
LED status display	■	■	■
Ambient conditions			
Ambient temperature	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
Protection class	IP67	IP67	IP67
Safety classification			
Standards	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

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Ø 40 Wiring compart.	**255 Connector**	**333E Cable**	**333 Wiring compart.**	**384 Wiring compart.**	**385 Wiring compart.**
• DC 4-wire • Cylindrical design Ø 40 mm • Standard body • Thermoplastic enclosure • Wiring compartment	• DC 4-wire • Rectangular design 255 • Standard body • Thermoplastic enclosure • Connector M12	• DC 4-wire • Rectangular design 333E • Standard body • Thermoplastic enclosure • Cable	• DC 4-wire • Rectangular design 333 • Standard body • Thermoplastic enclosure • Wiring compartment	• DC 4-wire • Rectangular design 384 • Standard body • Thermoplastic enclosure • Wiring compartment	• DC 4-wire • Rectangular design 385 • Standard body • Thermoplastic encl. • Wiring compartment • Applicable up to +130 °C
1 NO / 1 NC antivalent	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent	1 NO / 1 NC antivalent
10 … 60 VDC	10 … 40 VDC	10 … 60 VDC	10 … 60 VDC	10 … 60 VDC	10 … 60 VDC
400 mA	200 mA each output	400 mA	400 mA	400 mA	400 mA
approx. 100 Hz	approx. 650 Hz	approx. 100 Hz	approx. 100 Hz	approx. 25 Hz	approx. 25 Hz
approx. 5.5 mA (24 V)	approx. 2.7 mA (24 V)	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)	approx. 5.5 mA (24 V)
approx. 1.5 V (400 mA)	approx. 1.2 V (200 mA)	approx. 1.5 V (400 mA)	approx. 1.5 V (400 mA)	approx. 1.5 V (400 mA)	approx. 1.5 V (400 mA)
Wrong polarity and inductive interference protection [1]	Wrong polarity, inductive interference, overload, short-circuit protection	Wrong polarity and inductive interference protection [1]	Wrong polarity and inductive interference protection [1]	Wrong polarity and inductive interference protection [1]	Wrong polarity and inductive interference protection [1]
Thermoplastic	Thermoplastic (Noryl), with 2 screws M5	Thermoplastic	Thermoplastic, cover: transparent Luran	Thermoplastic	Thermoplastic
Clamp H 40: thermoplastic (refer to page 27)	–	–	–	–	–
Wiring compartment with self-lifting pressure clamps max. 2 x 1.5 mm², with cable entry M16	Screw connector plug M12	Cable LiYY 4 x 0.25 mm², 2 m	Wiring compartment with self-lifting pressure clamps max. 2 x 1.5 mm², with cable entry M20	Wiring compartment with self-lifting pressure clamps max. 2 x 1.5 mm², with cable entry 3x M20 (break-out)	Wiring compartment with self-lifting pressure clamps max. 2 x 1.5 mm², with cable entry 3x M20 (break-out)
108 mm	40 x 26 x 26 mm	36.5 x 36.5 x 36.5 mm	112 x 40 x 40 mm	120 x 55 x 40 mm	135 x 80 x 40 mm
■	■	■	■	■	■
−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C (-2130 up to +130 °C)
IP65	IP67	IP67	IP65	IP67	IP67
IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

[1] On request: overload and short-circuit protection (suffix -1665-1) I_e = 300 mA, U_d = approx. 1 V (300 mA)

Inductive proximity switches

DC 3-wire – Cylindrical and rectangular design and M8

	Ø 6.5 Cable	Ø 6.5 Connector	250 Cable
Key Features			
	• DC 3-wire • Cylindrical design Ø 6.5 mm • Miniature body • Metal enclosure • Cable	• DC 3-wire • Cylindrical design Ø 6.5 mm • Miniature body • Metal enclosure • Connector M8	• DC 3-wire • Rectangular design 250 • Standard body • Thermoplastic enclosure • Cable
Technical features			
Electrical characteristics			
Switching output	DC 3-wire	DC 3-wire	DC 3-wire
Rated operating voltage U_e	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
Rated operating current I_e	200 mA	200 mA	200 mA
Switching frequency	ca. 3 kHz	ca. 3 kHz	P: approx. 1 kHz, N: approx. 800 Hz
No-load current I_0	approx. 3.4 mA (24 V)	approx. 3.4 mA (24 V)	approx. 3 mA (24 V)
Voltage drop U_d	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Protection circuit	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection
Mechanical data			
Material of the enclosure	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic, with 2 screws M3
Material of the fixation / nut	Clamp H 6.5: thermoplastic (refer to page 27)	Clamp H 6.5: thermoplastic (refer to page 27)	–
Tightening torque for nuts	–	–	–
Connection	Cable LiYY 3 x 0.14 mm², 2 m	Screw connector plug M8	Cable LiYY 3 x 0.34 mm², 2 m
Dimensions (Length) or (HxWxL)	42 mm	54 mm	40 x 25 x 12 mm
LED status display	■	■	■
Ambient conditions			
Ambient temperature	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
Protection class	IP67	IP67	IP67
Safety classification			
Standards	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

To get detailed information about the products, visit **www.schmersal.net**.

			
M8 Cable	**M8 Connector**	**M8 Cable**	**M8 Connector**
• DC 3-wire • Thread design M8 x 1 • Miniature body • Metal enclosure • Cable	• DC 3-wire • Thread design M8 x 1 • Miniature body • Metal enclosure • Connector M8	• DC 3-wire • Thread design M8 x 1 • Miniature body • Metal enclosure • Cable • Increased switching distance	• DC 3-wire • Thread design M8 x 1 • Standard body • Metal enclosure • Connector M12
DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire
10 … 30 VDC	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
200 mA	200 mA	200 mA	200 mA
ca. 3 kHz	ca. 3 kHz	approx. 1500 Hz	ca. 3 kHz
approx. 3.4 mA (24 V)	approx. 3.4 mA (24 V)	approx. 1.7 mA (10 V) approx. 4 mA (24 V) approx. 5 mA (30 V)	approx. 3.4 mA (24 V)
approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection
Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
A/F 13 max. 600 Ncm [2)]	A/F 13 max. 600 Ncm [2)]	A/F 13 max. 600 Ncm [2)]	A/F 13 max. 600 Ncm [2)]
Cable LiYY 3 x 0.14 mm², 2 m	Screw connector plug M8	Cable LiYY 3 x 0.14 mm², 2 m	Screw connector plug M12
42 mm	54 mm	42 mm	70 mm
■	■	■	■
−25 °C … +70 °C	−25 °C … +70 °C	−10 °C … +70 °C	−25 °C … +70 °C
IP67	IP67	IP67	IP65
IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

* May not be charged in this area!

[2)] Instead of nuts, a mounting clamp can be provided (see accessories on page 27).

Inductive proximity switches
DC 3-wire – M12



	M12 Cable	M12 Connector	M12 Cable
Key Features			
	• DC 3-wire • Thread design M12 x 1 • Miniature body • Metal enclosure • Cable	• DC 3-wire • Thread design M12 x 1 • Miniature body • Metal enclosure • Connector M12	• DC 3-wire • Thread design M12 x 1 • Miniature body • Thermoplastic enclosure • Cable
Technical features			
Electrical characteristics			
Switching output	DC 3-wire	DC 3-wire	DC 3-wire
Rated operating voltage U_e	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
Rated operating current I_e	200 mA	200 mA	200 mA
Switching frequency	P: approx. 1 kHz (embeddable), N: approx. 800 Hz (embeddable); P: approx. 500 Hz (non-embeddable), N: approx. 330 Hz (non-embeddable)	P: approx. 1 kHz (embeddable), N: approx. 800 Hz (embeddable); P: approx. 500 Hz (non-embeddable), N: approx. 330 Hz (non-embeddable)	P: approx. 1 kHz, N: approx. 800 Hz
No-load current I_0	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)
Voltage drop U_d	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Protection circuit	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection
Mechanical data			
Material of the enclosure	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Material of the nut	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Tightening torque for nuts	A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 90 Ncm [2)]
Connection	Cable LiYY 3 x 0.14 mm², 2 m	Screw connector plug M12	Cable LiYY 3 x 0.14 mm², 2 m
Dimensions (Length)	32.6 mm	45.6 mm	12 x 12 x 74 mm
LED status display	■	■	■
Ambient conditions			
Ambient temperature	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
Protection class	IP67	IP67	IP67
Safety classification			
Standards	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

To get detailed information about the products, visit **www.schmersal.net**.

					
M12 Connector	**M12 Cable**	**M12 Connector**	**M12 Connector**	**M12 Connector**	**M12 Connector**
• DC 3-wire • Thread design M12 x 1 • Miniature body • Thermoplastic enclosure • Connector M12	• DC 3-wire • Thread design M12 x 1 • Standard body • Metal enclosure • Cable	• DC 3-wire • Thread design M12 x 1 • Standard body • Metal enclosure • Connector M12	• DC 3-wire • Thread design M12 x 1 • Standard body • Metal enclosure • Connector M12	• DC 3-wire • Thread design M12 x 1 • Standard body • Metal enclosure • Connector M12 • Stainless steel	• DC 3-wire • Thread design M12 x 1 • Standard body • Metal enclosure • Connector M12 • Stainless steel
DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire
10 … 30 VDC	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
P: approx. 1 kHz, N: approx. 800 Hz	P: approx. 1 kHz (embeddable), N: approx. 800 Hz (embeddable); P: approx. 500 Hz (non-embeddable), N: approx. 330 Hz (non-embeddable)	P: approx. 1 kHz, N: approx. 800 Hz	P: approx. 500 Hz, N: approx. 330 Hz	ca. 1 kHz	approx. 500 Hz
approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)
approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection
Thermoplastic	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	V2A	V2A
Thermoplastic	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	V2A	V2A
A/F 17 max. 90 Ncm [2]	A/F 17 max. 1500 Ncm [2]	A/F 17 max. 1500 Ncm [2]	A/F 17 max. 1500 Ncm [2]	A/F 17 max. 1500 Ncm [2]	A/F 17 max. 1500 Ncm [2]
Screw connector plug M12	Cable LiYY 3 x 0.14 mm², 2 m	Screw connector plug M12	Screw connector plug M12	Screw connector plug M12	Screw connector plug M12
45.5 mm	50 mm	61 mm	57 mm	61 mm	57 mm
■	■	■	■	■	■
−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
IP67	IP67	IP67	IP67	IP67	IP67
IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

* May not be charged in this area!

[2] Instead of nuts, a mounting clamp can be provided (see accessories on page 27).

Inductive proximity switches
DC 3-wire – M12



	M12 Cable	M12 Connector	M12 Connector
Key Features			
	• DC 3-wire • Thread design M12 x 1 • Standard body • Metal enclosure • Cable • Increased switching distance	• DC 3-wire • Thread design M12 x 1 • Standard body • Metal enclosure • Connector M12 • Increased switching distance	• DC 3-wire • Thread design M12 x 1 • Standard body • Thermoplastic enclosure • Connector M12
Technical features			
Electrical characteristics			
Switching output	DC 3-wire	DC 3-wire	DC 3-wire
Rated operating voltage U_e	5 … 40 VDC	5 … 40 VDC	10 … 30 VDC
Rated operating current I_e	200 mA	200 mA	200 mA
Switching frequency	approx. 600 Hz (NO), approx. 550 Hz (NC)	approx. 600 Hz (NO), approx. 550 Hz (NC)	P: approx. 700 Hz, N: approx. 440 Hz
No-load current I_0	approx. 0.5 mA (24 V)	approx. 0.5 mA (24 V)	approx. 3 mA (24 V)
Voltage drop U_d	approx. 1.3 V (200 mA)	approx. 1.3 V (200 mA)	approx. 1.2 V (200 mA)
Protection circuit	Wrong polarity, inductive interference, overload and short-circuit protection (pulsed)	Wrong polarity, inductive interference, overload and short-circuit protection (pulsed)	Wrong polarity, inductive interference, overload and short-circuit protection
Mechanical data			
Material of the enclosure	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Material of the nut	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Tightening torque for nuts	A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 90 Ncm [2)]
Connection	Cable LiYY 3 x 0.14 mm², 2 m	Screw connector plug M12	Screw connector plug M12
Dimensions (Length)	53.3 mm	61 mm	54.2 mm
LED status display	■	■	■
Ambient conditions			
Ambient temperature	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
Protection class	IP67	IP67	IP67
Safety classification			
Standards	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

To get detailed information about the products, visit **www.schmersal.net**.

					
M12 Cable	**M12 Cable**	**M12 Cable**	**M12 Connector**	**M12 Connector**	**M12 Cable**
• DC 3-wire • Thread design M12 x 1 • Long body • Metal enclosure • Cable	• DC 3-wire • Thread design M12 x 1 • Long body • Metal enclosure • Cable	• DC 3-wire • Thread design M12 x 1 • Long body • Metal enclosure • Cable with strain relief	• DC 3-wire • Thread design M12 x 1 • Long body • Metal enclosure • Connector M12	• DC 3-wire • Thread design M12 x 1 • Long body • Metal enclosure • Connector M12	• DC 3-wire • Thread design M12 x 1 • Long body • Thermoplastic enclosure • Cable
DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire
10 … 30 VDC	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
P: approx. 1 kHz, N: approx. 800 Hz	P: approx. 500 Hz, N: approx. 330 Hz	P: approx. 500 Hz, N: approx. 330 Hz	P: approx. 1 kHz, N: approx. 800 Hz	P: approx. 500 Hz, N: approx. 330 Hz	P: approx. 700 Hz, N: approx. 400 Hz
approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)
approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection
Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 1500 Ncm [2)]	A/F 17 max. 90 Ncm [2)]
Cable LiYY 3 x 0.34 mm², 2 m	Cable LiYY 3 x 0.34 mm², 2 m	Cable LiYY 3 x 0.34 mm², 2 m with strain relief	Screw connector plug M12	Screw connector plug M12	Cable LiYY 3 x 0.34 mm², 2 m
71 mm	71 mm	71 mm	71 mm	71 mm	71 mm
■	■	■	■	■	■
−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
IP67	IP67	IP67	IP67	IP67	IP67
IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

* May not be charged in this area!

[2)] Instead of nuts, a mounting clamp can be provided (see accessories on page 27).

Inductive proximity switches
DC 3-wire – M18



	M18 Cable	M18 Connector	M18 Cable
Key Features			
	• DC 3-wire • Thread design M18 x 1 • Miniature body • Metal enclosure • Cable	• DC 3-wire • Thread design M18 x 1 • Miniature body • Metal enclosure • Connector M12	• DC 3-wire • Thread design M18 x 1 • Miniature body • Thermoplastic enclosure • Cable
Technical features			
Electrical characteristics			
Switching output	DC 3-wire	DC 3-wire	DC 3-wire
Rated operating voltage U_e	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
Rated operating current I_e	200 mA	200 mA	200 mA
Switching frequency f	approx. 700 Hz (embeddable), approx. 400 Hz (non-embeddable)	approx. 700 Hz (embeddable), approx. 400 Hz (non-embeddable)	approx. 400 Hz
No-load current I_0	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)
Voltage drop U_d	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Protection circuit	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection
Mechanical data			
Material of the enclosure	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Material of the nut	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Tightening torque for nuts	A/F 24 max. 1800 Ncm [2)]	A/F 24 max. 1800 Ncm [2)]	A/F 24 max. 300 Ncm [2)]
Connection	Cable LiYY 3 x 0.14 mm², 2 m	Screw connector plug M12	Cable LiYY 3 x 0.34 mm², 2 m
Dimensions (Length)	36 mm	51 mm	36 mm
LED status display	■	■	■
Ambient conditions			
Ambient temperature	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
Protection class	IP67	IP67	IP67
Safety classification			
Standards	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

To get detailed information about the products, visit **www.schmersal.net**.

			
M18 Connector	**M18 Cable**	**M18 Connector**	**M18 Connector**
• DC 3-wire • Thread design M18 x 1 • Miniature body • Thermoplastic enclosure • Connector M18	• DC 3-wire • Thread design M18 x 1 • Standard body • Metal enclosure • Cable	• DC 3-wire • Thread design M18 x 1 • Standard body • Metal enclosure • Connector M12	• DC 3-wire • Thread design M18 x 1 • Standard body • Metal enclosure • Connector M12 • Stainless steel
DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire
10 … 30 VDC	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
200 mA	200 mA	200 mA	200 mA
approx. 400 Hz	approx. 400 Hz	approx. 400 Hz	approx. 600 Hz
approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)	approx. 3 mA (24 V)
approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection	Wrong polarity, inductive interference, overload and short-circuit protection
Thermoplastic	Brass, nickel-plated	Brass, nickel-plated	V2A
Thermoplastic	Brass, nickel-plated	Brass, nickel-plated	V2A
A/F 24 max. 300 Ncm [2)]	A/F 24 max. 1800 Ncm [2)]	A/F 24 max. 1800 Ncm [2)]	A/F 24 max. 5000 Ncm [2)]
Screw connector plug M18	Cable LiYY 3 x 0.34 mm², 2 m	Screw connector plug M12	Screw connector plug M12
50.6 mm	53 mm	71.4 mm	71.4 mm
■	■	■	■
−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
IP67	IP67	IP67	IP67
IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

* May not be charged in this area!

[2)] Instead of nuts, a mounting clamp can be provided (see accessories on page 27).

Inductive proximity switches
DC 3-wire – M18

	M18 Cable	M18 Cable	M18 Connector
Key Features			
	• DC 3-wire • Thread design M18 x 1 • Long body • Metal enclosure • Cable	• DC 3-wire • Thread design M18 x 1 • Long body • Metal enclosure • Cable with strain relief • Applicable up +130 °C	• DC 3-wire • Thread design M18 x 1 • Long body • Metal enclosure • Connector M12
Technical features			
Electrical characteristics			
Switching output	DC 3-wire	DC 3-wire	DC 3-wire
Rated operating voltage U_e	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
Rated operating current I_e	200 mA	200 mA	200 mA
Switching frequency f	approx. 400 Hz	approx. 200 Hz	approx. 400 Hz
No-load current I_0	approx. 3 mA (24 V)	approx. 1.8 mA (24 V)	approx. 3 mA (24 V)
Voltage drop U_d	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Protection circuit	Wrong polarity, inductive interference, overload, short-circuit protection	Wrong polarity and inductive interference protection	Wrong polarity, inductive interference, overload, short-circuit protection
Mechanical data			
Material of the enclosure	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Material of the nut	Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated
Tightening torque for nuts	A/F 24 max. 1800 Ncm [2)]	A/F 24 max. 1800 Ncm [2)]	A/F 24 max. 1800 Ncm [2)]
Connection	Cable LiYY 3 x 0.14 mm², 2 m	Cable Li32Y32Y (TPE) 3 x 0.34 mm², 2 m, with strain relief	Screw connector plug M12
Dimensions (Length)	79 mm	91 mm	91 mm
LED status display	■		■
Ambient conditions			
Ambient temperature	−25 °C … +70 °C	−25 °C … +130 °C (dry heat)	−25 °C … +70 °C
Protection class	IP67	IP67	IP67
Safety classification			
Standards	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

To get detailed information about the products, visit **www.schmersal.net**.

			
M18 Wiring compart.	**M18 Cable**	**M18 Connector**	**M18 Wiring compart.**
• DC 3-wire • Thread design M18 x 1 • Long body • Metal enclosure • Wiring compartment	• DC 3-wire • Thread design M18 x 1 • Long body • Thermoplastic enclosure • Cable	• DC 3-wire • Thread design M18 x 1 • Long body • Thermoplastic enclosure • Connector M18	• DC 3-wire • Thread design M18 x 1 • Long body • Thermoplastic enclosure • Wiring compartment
DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire
10 … 60 VDC	10 … 30 VDC	10 … 30 VDC	10 … 60 VDC
400 mA	200 mA	200 mA	400 mA
approx. 500 Hz (embeddable), approx. 350 Hz (non-embeddable)	approx. 400 Hz	approx. 400 Hz	approx. 350 Hz
approx. 5.5 mA (24 V)	approx. 3 mA (24 V)	approx. 3.5 mA (24 V)	approx. 5.5 mA (24 V)
approx. 1.5 V (400 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.5 V (400 mA)
Wrong polarity and inductive interference protection [1]	Wrong polarity, inductive interference, overload, short-circuit protection	Wrong polarity, inductive interference, overload, short-circuit protection	Wrong polarity and inductive interference protection [1]
Brass, nickel-plated	Thermoplastic	Thermoplastic	Thermoplastic
Brass, nickel-plated	Thermoplastic	Thermoplastic	Thermoplastic
A/F 24 max. 1800 Ncm [2]	A/F 24 max. 300 Ncm [2]	A/F 24 max. 300 Ncm [2]	A/F 24 max. 300 Ncm [2]
Wiring compartment with terminal screws max. 1.5 mm², with cable entry M16	Cable LiYY 3 x 0.34 mm², 2 m	Screw connector plug M18	Wiring compartment with terminal screws max. 1.5 mm², with cable entry M16
126 mm	79 mm	91 mm	125.6 mm
■	■	■	■
−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
IP65	IP67	IP67	IP65
IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

* May not be charged in this area!

[1] On request: overload and short-circuit protection (suffix -1665-1) I_e = 300 mA, U_d = approx. 1 V (300 mA)

[2] Instead of nuts, a mounting clamp can be provided (see accessories on page 27).

Inductive proximity switches
DC 3-wire – M30

M30 Cable

M30 Connector

M30 Cable

Key Features

	• DC 3-wire • Thread design M30 x 1.5 • Miniature body • Metal enclosure • Cable	• DC 3-wire • Thread design M30 x 1.5 • Miniature body • Metal enclosure • Connector M12	• DC 3-wire • Thread design M30 x 1.5 • Miniature body • Thermoplastic enclosure • Cable

Technical features

Electrical characteristics			
Switching output	DC 3-wire	DC 3-wire	DC 3-wire
Rated operating voltage U_e	10 … 30 VDC	10 … 30 VDC	10 … 30 VDC
Rated operating current I_e	200 mA	200 mA	200 mA
Switching frequency f	approx. 200 Hz (embeddable), approx. 100 Hz (non-embeddable)	approx. 200 Hz (embeddable), approx. 100 Hz (non-embeddable)	approx. 100 Hz
No-load current I_0	approx. 3.5 mA (24 V)	approx. 3.5 mA (24 V)	approx. 3.5 mA (24 V)
Voltage drop U_d	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)
Protection circuit	Wrong polarity, inductive interference, overload, short-circuit protection	Wrong polarity, inductive interference, overload, short-circuit protection	Wrong polarity, inductive interference, overload, short-circuit protection
Mechanical data			
Material of the enclosure	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Material of the nut	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic
Tightening torque for nuts	A/F 36 max. 3000 Ncm [2)]	A/F 36 max. 3000 Ncm [2)]	A/F 36 max. 400 Ncm [2)]
Connection	Cable LiYY 3 x 0.34 mm², 2 m	Screw connector plug M12	Cable LiYY 3 x 0.34 mm², 2 m
Dimensions (Length)	30 mm	45 mm	30 mm
LED status display	■	■	■
Ambient conditions			
Ambient temperature	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
Protection class	IP67	IP67	IP67

Safety classification

Standards	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

To get detailed information about the products, visit **www.schmersal.net**.

				
M30 Cable	**M30 Cable**	**M30 Wiring compart.**	**M30 Cable**	**M30 Wiring compart.**
• DC 3-wire • Thread design M30 x 1.5 • Long body • Metal enclosure • Cable with strain relief	• DC 3-wire • Thread design M30 x 1.5 • Long body • Metal enclosure • Cable with strain relief • Applicable up +130 °C	• DC 3-wire • Thread design M30 x 1.5 • Long body • Metal enclosure • Wiring compartment	• DC 3-wire • Thread design M30 x 1.5 • Long body • Thermoplastic enclosure • Cable with strain relief	• DC 3-wire • Thread design M30 x 1.5 • Long body • Thermoplastic enclosure • Wiring compartment
DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire	DC 3-wire
10 … 30 VDC	10 … 30 VDC	10 … 60 VDC	10 … 30 VDC	10 … 60 VDC
200 mA	200 mA	400 mA	200 mA	400 mA
approx. 200 Hz (embeddable), approx. 100 Hz (non-embeddable)	approx. 60 Hz	approx. 200 Hz (embeddable), approx. 100 Hz (non-embeddable)	approx. 100 Hz	approx. 100 Hz
approx. 3.5 mA (24 V)	approx. 1.8 mA (24 V)	approx. 5.5 mA (24 V)	approx. 3 mA (24 V)	approx. 5.5 mA (24 V)
approx. 1.2 V (200 mA)	approx. 1.2 V (200 mA)	approx. 1.5 V (400 mA)	approx. 1.2 V (200 mA)	approx. 1.5 V (400 mA)
Wrong polarity, inductive interference, overload, short-circuit protection	Wrong polarity and inductive interference protection	Wrong polarity and inductive interference protection [1]	Wrong polarity, inductive interference, overload, short-circuit protection	Wrong polarity and inductive interference protection [1]
Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic	Thermoplastic
Brass, nickel-plated	Brass, nickel-plated	Brass, nickel-plated	Thermoplastic	Thermoplastic
A/F 36 max. 3000 Ncm [2]	A/F 36 max. 3000 Ncm [2]	A/F 36 max. 3000 Ncm [2]	A/F 36 max. 400 Ncm [2]	A/F 36 max. 400 Ncm [2]
Cable LiYY 3 x 0.34 mm², 2 m, with strain relief	Cable Li32Y32Y (TPE) 3 x 0.34 mm², 2 m, with strain relief	Wiring compartment with terminal screws max. 1.5 mm², with cable entry M16	Cable LiYY 3 x 0.34 mm², 2 m, with strain relief	Wiring compartment with terminal screws max. 1.5 mm², with cable entry M16
100 mm	98 mm	118 mm	100 mm	118 mm
■		■	■	■
−25 °C … +70 °C	−25 °C … +130 °C (dry heat) [3]	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
IP67	IP67	IP65	IP67	IP65
IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208	IEC/EN 60947-5-2; VDE 0660-208

* May not be charged in this area!

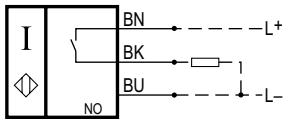
[1] On request: overload and short-circuit protection (suffix -1665-1) I_e = 300 mA, U_d = approx. 1 V (300 mA)

[2] Instead of nuts, a mounting clamp can be provided (see accessories on page 27).

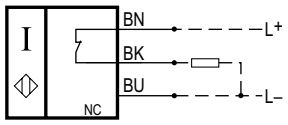
[3] On request with silicon cable for humid environments (ordering suffix -2130-1)

Inductive proximity switches
Overview contact diagrams

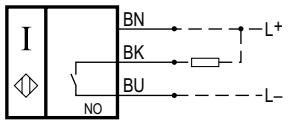
IFL DC 3-wire Cable NO contacts PNP



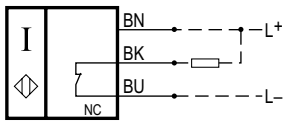
IFL DC 3-wire Cable NC contacts PNP



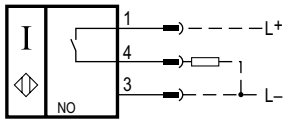
IFL DC 3-wire Cable NO contacts NPN



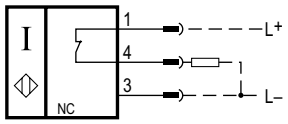
IFL DC 3-wire Cable NC contacts NPN



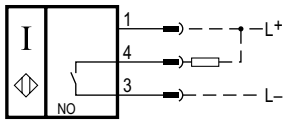
IFL DC 3-wire Connector plug NO contacts PNP



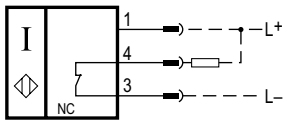
IFL DC 3-wire Connector plug NC contacts PNP



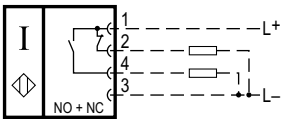
IFL DC 3-wire Connector plug NO contacts NPN



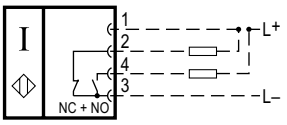
IFL DC 3-wire Connector plug NC contacts NPN



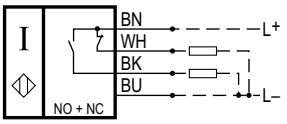
IFL DC 4-wire Wiring compartment Antivalent PNP



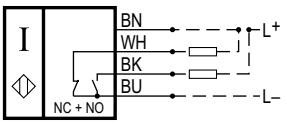
IFL DC 4-wire Wiring compartment Antivalent NPN



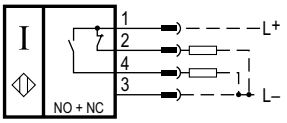
IFL DC 4-wire Cable Antivalent PNP



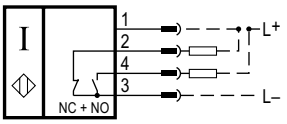
IFL DC 4-wire Cable Antivalent NPN



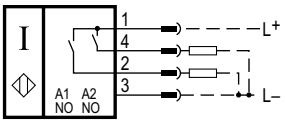
IFL DC 4-wire Connector plug Antivalent PNP



IFL DC 4-wire Connector plug Antivalent NPN



IFL DC 4-wire Connector plug NO/NO contact PNP



Inductive proximity switches
Accessories

Clamp H 4 — 101103610

- Clamp H 4
- For a smooth fitting of the proximity switches with cylindric design Ø 4 mm

Clamp H 6.5 — 101095263

- Clamp H 6.5
- For a smooth fitting of the proximity switches with cylindric design Ø 6.5 mm

Clamp H 12 — 101068880

- Clamp H 12
- For a smooth fitting of the proximity switches with cylindric design Ø 12 mm

Clamp H 18 — 101068879

- Clamp H 18
- For a smooth fitting of the proximity switches with cylindric design Ø 18 mm

Clamp H 20 — 101097871

- Clamp H 20
- For a smooth fitting of the proximity switches with cylindric design Ø 20 mm

Clamp H 30 — 101068520

- Clamp H 30
- For a smooth fitting of the proximity switches with cylindric design Ø 30 mm

Clamp H 40 — 101068521

- Clamp H 40
- For a smooth fitting of the proximity switches with cylindrical design Ø 40 mm

Detailed information for the selection of accessories can be found at **www.schmersal.net**.

The Schmersal Group

In the demanding field of machine safety, the owner-managed Schmersal Group is one of the international market leaders. The company, which was founded in 1945, has a workforce of about 2000 people and seven manufacturing sites on three continents along with its own companies and sales partners in more than 60 countries.

Customers of the Schmersal Group include global players from the area of mechanical engineering and plant manufacturing as well as operators of machinery. They profit from the company's extensive expertise as a provider of systems and solutions for machine safety. Furthermore, Schmersal specialises in various areas including food & beverage, packaging, machine tools, lift switchgear, heavy industry and automotive.

A major contribution to the systems and solutions offered by the Schmersal Group is made by tec.nicum with its comprehensive range of services: certified Functional Safety Engineers advise machinery manufacturers and machinery operators in all aspects relating to machinery and occupational safety – and do so with product and manufacturer neutrality. Furthermore, they design and realise complex solutions for safety around the world in close collaboration with the clients.

Safety Products

- Safety switches and sensors, solenoid interlocks
- Safety controllers and safety relay modules, safety bus systems
- Optoelectronic and tactile safety devices
- Automation technology: position switches, proximity switches

Safety Systems

- Complete solutions for safeguarding hazard areas
- Individual parametrisation and programming of safety controllers
- Tailor-made safety technology – be it for individual machines or a complex production line
- Industry-specific safety solutions

Safety Services

- tec.nicum academy – Seminars and training
- tec.nicum consulting – Consultancy services
- tec.nicum engineering – Design and technical planning
- tec.nicum integration – Execution and installation

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