KLASCHKA
Industrieelektronik

Sensors for Automation

Catalog Section Inductive Proximity Switches and Accessories

ALSEN TK 1 + 12.1
Edition 9.13

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Inductive Proximity Switches
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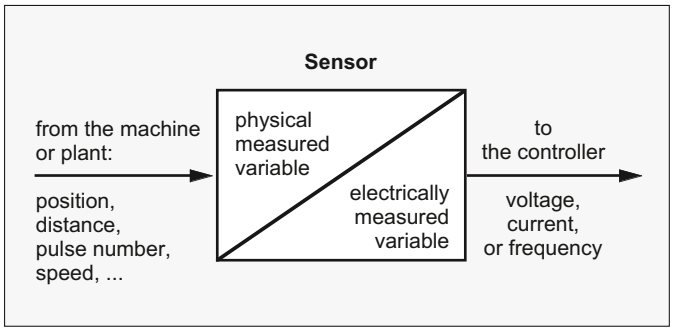
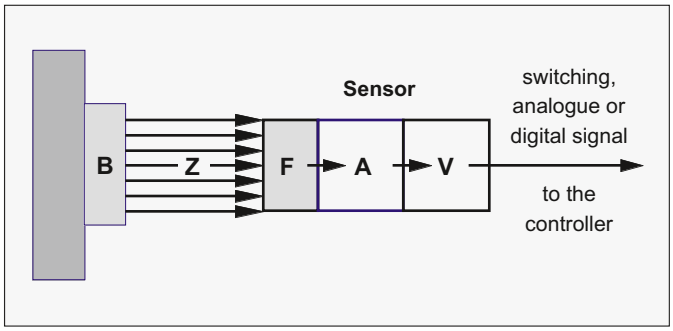
Principle and function

Sensors are physical-electrical converters, whose task is to acquire measured variables such as distance, pressure and temperature, speed and acceleration and to convert these into an electrical variable. In combination with conrols, these serve for detection of the actual value.

Sensors in machines and plants are usually **position, distance or motion sensors**. Their task is to take up the current values of the physical measured variables and to convert these into electrically measured variables for the controller.



The principal internal configuration of a sensor has the following features:



- an actuating element B influences the sensor element F when entering the sensitive zone Z of the sensor,
- the sensor element F generates or alters an electrical signal (current, voltage, frequency or phase) as a function of the physical measured variable,
- a coupling element A transforms the usually weak electrical measuring signal into the desired signal form, e. g. in a switching-, analogue or digital signal,
- a switching- or output amplifier generates a high performance signal which is suitable to bridge large distances between sensor and controller without of information.

Our sensors are based on the most modern circuit concepts and technologies and show the following characteristics:

- contactless, feedback-free detection,
- high resolution and sensitivity,
- short transformation time,
- large ambient temperature range,
- free of wear and therefore long operating life
- fully encapsulated and poured,
- to a large extent insensitive against chemicals and other environmental influences,
- contactless electronic output,
- high resistance to ageing,
- small design,
- low failure rate.

Characteristics and types

Proximity sensors are position sensors that work non-contacting and contactless. They are to a large extent insensitive against environmental influences and do not contain any parts which are subject to wear. We distinguish between switches and analogue sensors.

They are employed in those areas where the customer has high requirements with regard to operating life, reliability, switching point accuracy, response time and speed.

The physical **operating mode** can be distinguished as follows:

- Acoustic proximity sensors, suitable for medium to large distances, with medium operating times,
- Inductive proximity sensors for the detection of ferrous and non-ferrous metals; the special designs are pressure-; magnetic field-resistant, surface switches and non-ferrous metal switches,
- Capacitive proximty sensors for the detection of metals and non-metals,
- Optical proximity sensors for large distances according to the barrier and reflection principle,
- Magnetic field proximity sensors for a high geometrical resolution and high operating frequencies.

The following **designs** are available:

- Cylindrical designs with or without thread,
- Rectangular designs,
- Surface-, barrier-type or slot designs.

The following **versions** are available:

- DC-voltage versions according to NAMUR, with 2, 3, 4 or 5 terminals,
- AC-voltage versions with 2 terminals,
- All voltage versions with 2 terminals.

The DC voltage versions of the proximity sensors are mainly used for the connection to programmable controllers such as the SECONIX. The AC- and all-voltage versions can only be employed with conventional applications in connection with relays or magnetic switches.

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Example of a type code	I	A	D	2	/	A	-	12	m	g	55	b	5	-	1	Kd	2	A	2
Consecutive number	1	2	3	4	/	5	-	6	7	8	9	10	11	-	12	13	14	15	16

1 Type Series: Principle

A	acoustic	**O**	optical
B	rotation speed dependent	**R**	rotary
H	hall	**T**	temperature-dependent
I	inductive	**Y**	safety-oriented
K	capacitive	**SIDENT**	safety sensor
M	magneto-resistive	**WIDENT**	tool recognition

2 Type Series: Properties

A	proximity switch	**N**	seam detection
B	non-ferrous metal switch	**P**	pressure-resistant
C	code reader	**Q**	fork-shaped
D	speed and frequency	**R**	ring-shaped
E	foil detection	**S**	safety switch
F	surface switch	**T**	temperature-resistant
G	distance sensor	**V**	valve position detection
H	thickness measurement	**X**	detector
J	sensor	**III, IV**	safety category

3 Type of the Output and Supply Voltage

- **A** analogue voltage output, 10 ... 30 V DC
- **B** two-pole, 8 / 10 ... 30 / 60 V DC
- **C** analogue current output 0 ... 20 mA, 10 ... 30 V DC
- **D** three-pole, four-pole, 8 / 10 ... 30 / 60 V DC
- **E** three-pole, four-pole, 5 V DC stabilized
- **F** frequency output (safety sensor)
- **N** NAMUR sensor
- **G** push-pull output GS three-pole, four-pole, 8 / 10 ... 30 / 60 V DC
- **H** analogue current output 4 ... 20 mA, 10 ... 30 V DC
- **P** passive output (sensor)
- **U** two-pole, 20 ... 320 V DC and 20 ... 265 V AC
- **V** two-pole, 20 .... 70 V AC
- **W** two-pole, 20 / 90 ... 250 / 265 / 280 V AC

4 Number of Sensors per Unit (optional entry)

- **2** double sensor
- **n** multiple sensor, n whole number ≥ 3

5 Special Characteristics (optional entries, several entries are possible)

Co, Pb, Is, Se with field bus interface CANopen, Profibus, Interbus, serial

A	all metal sensor	**K**	with coupling unit
D	rotationally symmetrical coil	**M**	magnetic field-resistant
E	with fault detection and display	**N**	radiation-proof
F	ferrous sensor, with red. factor r	**S**	weld-proof
H	switch. frequency > 10 kHz		

6 Cylinder: housing Ø in mm **Rectangular:** edge length in mm

7 Housing Material

a	aluminium	**e**	stainless steel	**f**	moulded plastic
g	mica	**k**	ceramic	**m**	brass
s	steel	**w**	special material	**z**	pressure-moulded zinc

8 Housing Design

f	flat	**g**	cylindrical with thread	**q**	rectangular
r	cylindrical, smooth	**s**	special design		
v	rectangular, turnable surface				

9 Total Length, without socket or sleeve

10 Mounting Type

b	flush	**t**	partly flush	**n**	non-flush
e	non-flush, increased switching distance				
m	flush, maximized switching distance				

11 Operating Distance or Distance Range in mm

16 Length of the Connecting Lead in m (optional entry)

15 Display

/	without LED display	**A**	with 1 LED display
B ... F	with 2 ... 6 LED displays		

14 Consecutive **Version Number**, starting with 1

13 Connection via Connector or Terminal

Identification with one capital letter = type and size
and one lower-case letter = pole number

Type and Size

F	flat connector (AMP or other manufacturer)		
K, L, M, N	clamp terminal 3-, 4-, 5-, 6-pole		
S	connector M12	**T**	connector Ø 28 mm
U	connector Ø 30 mm	**V**	connector M18
W	connector M8	**X**	connector M6
Y, Z	special connector see brief description KB		

Manufacturers: Amphenol-Tuchel, Binder, Hirschmann, Lumberg, Torson.

Connection via outgoing lead Identification with 2 capital letters	Lead material: PVC normal	PVC very flexible	PUR very flexible	Silicone rubber	Teflon or special
directly	**ND**	**HD**	**PD**	**GD**	**TD**
via kink protection	**NK**	**HK**	**PK**	**GK**	**TK**
via hose bush	**NT**	**HT**	**PT**	**GT**	**TT**
via PG-thread	**NV**	**HV**	**PV**	**GV**	**TV**

Pole Number (optional entry)

a	1-pole	**b**	2-pole	**c**	3-pole
d	4-pole	**e**	5-pole	**f**	6-pole
g	7-pole	**h**	8-pole	**i**	9-pole
j	10-pole	**k**	11-pole	**l**	12-pole

12 Output Plus-Switching

1	NO short-circuit-protected	**2**	NC short-circuit-protected
3	NO not short-circuit-protected	**4**	NC not short -circuit-protected

Output Minus-Switching

6	NO short-circuit-protected	**7**	NC short-circuit-protected
8	NO short-circuit-protected	**9**	NC not short-circuit-protected

Push-Pull Output

- **5** NO plus-switching, NC minus-switching
- **0** NO minus-switching, NC plus-switching

Combinations (Examples)

- **12** NO **and** NC
- **1o2** NO **or** NC

Output Analogue or Digital

1	voltage	**2**	current 0 ... a	**3**	current a ... b
4	passive	**5**	digital serial	**6**	digital parallel
7	digital contactless				

Power supplies and frequencies
Sensors are preferably operated at **DC-voltage 24 V**. They are, however, designed in such a way that they can be operated within a large **connecting voltage range**, ranging from 10 V DC to 30 V DC, e.g. at 12, 18 or at 24 V DC.

Thus the **remaining ripple σ**, which is the content of a possibly superimposed alternating voltage, is measured peak to peak and may not exceed 15% of the measured effective value Uv of the supply voltage (according to DIN 41 755).

The design of the **power supply unit** for the voltage supply of the sensors must be stable enough to retain the **voltage fluctuations us** of the effective value of the supply network within a threshold of ± 15%. These fluctuations develop due to a fluctuation of the supply network and when operating the sensors.

When selecting the power supply units it also has to be considered that **transients** from the power system (low- and high-frequency pulses of a high voltage) are reliably **suppressed**. This can be accomplished best with suitable filters and HF-capacitors as well as via peak voltage limiters at the output of the power supply unit.

Sensors are used less frequently for AC- and/or DC-voltage (AC/DC). If used as so-called **all-voltage sensors,** they can be operated in a large range from **20 to 250 V** with an **alternating voltage from 50 to 60 Hz** or with **DC-voltage**. In case of operation with alternating voltage the operating frequency (maximum operating frequency) is limited, however, to the frequency of the supply voltage. The time delay before availability is then augmented to over 20 ms.

When all-voltage sensors are operated with DC-voltage the above applies with regard to ripple voltage and voltage fluctuations..

Currents

The **current consumption** of a sensor has two portions: The **idle- or no-load current I_R** flows as long as no load resistance is connected. Its task is the supply of the sensor electronics. When connecting the load resistance / the load resistances, an **operating current** additionally develops during operation of the output / the outputs. The sum of idle current and operating current results in the total current consumption.

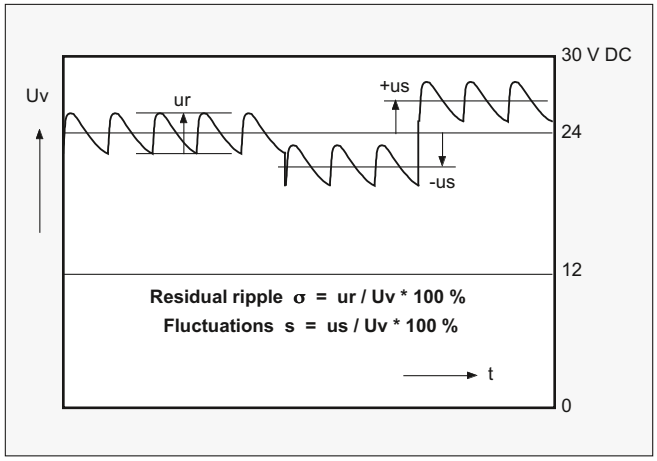
Each exit is protected against overloading by a clocking **short-circuit- protection**, which becomes effective from a **maximum load current I_{Lmax}**. For the verification of the short-circuit-resistance the standard EN 60947-5-2 requires for the type examination a power supply unit, which is capable to quickly supply a current > 100 A.

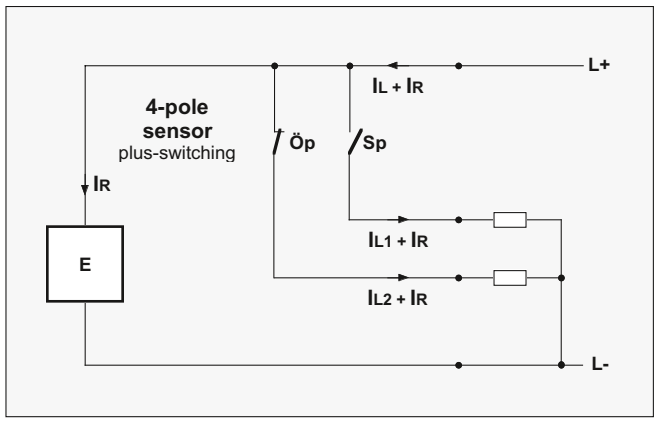
A **voltage drop** over the current-carrying output, whose extent depends to a certain degree on the magnitude of the load current, develops due to the short-circuit protection, pole protection, and a residual voltage.

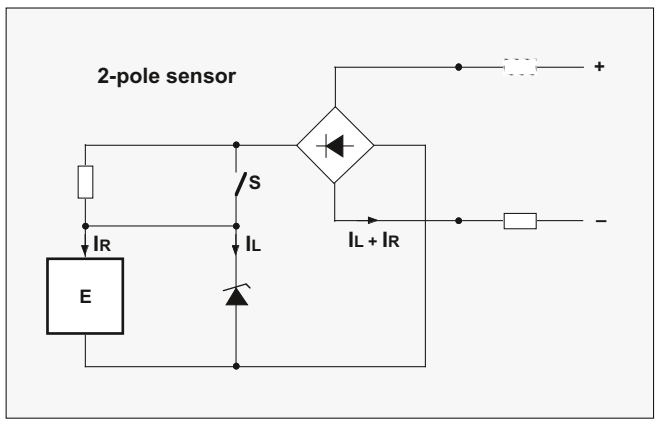
In the case of **3- and 4-pole sensors** a very small **residual current** of a few µA develops due to the load arising when the output is closed. In the Technical Data the residual current is usually not indicated because the voltage drop at the load resistance caused by it is negligibly small. The idle current of 2-pole sensors flows over the load and generates a voltage drop, which is to be considered when connecting the sensor.

Switching capacity

The switching capacity is divided into utilization categories according to the standard EN 60947-5-2.







Supply	Category	Typical applications
AC-voltage	AC -12	Control of resistive loads and semiconductor loads with isolation via opto-coupler
	AC-140	Control of small electromagnetic loads with holding current ≤ 0.2 A; e.g. auxiliary contact
DC-voltage	DC-12	Control of resistive loads and semiconductor loads with isolation via opto-coupler
	DC-13	Control of electromagnets

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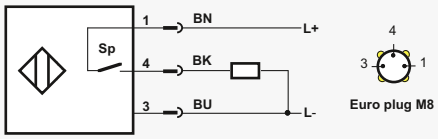
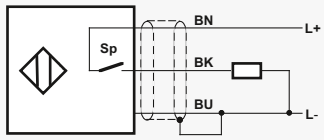
DC 3 and 4-pole plus-switching (p)

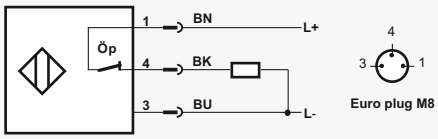
Connector | **Outgoing lead**

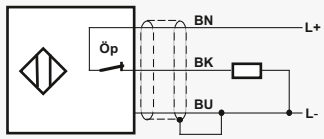
NO plus-switching NOp



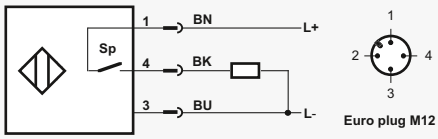


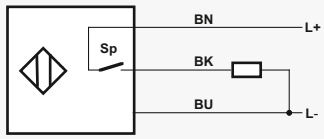
NC plus-switching NCp



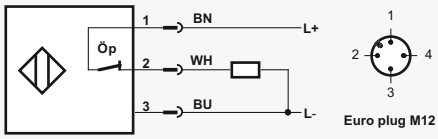


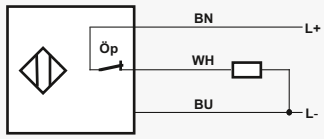
NO plus-switching NOp



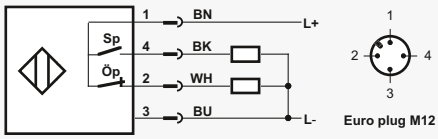


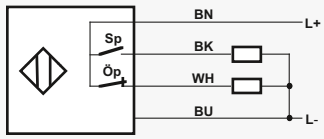
NC plus-switching NCp





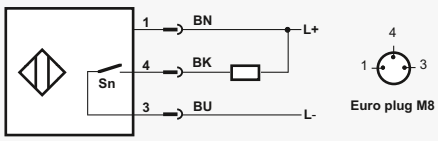
NO and NC plus-switching NOp + NCp



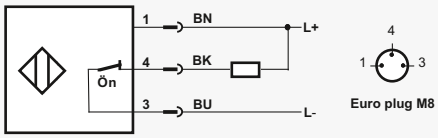


DC 3 and 4-pole minus-switching (n)

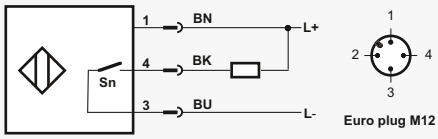
NO minus-switching NOn

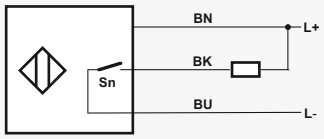


NC minus-switching NCn

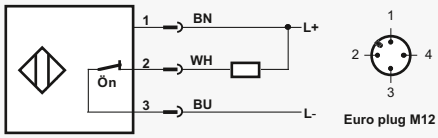


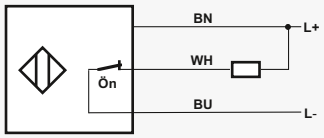
NO minus-switching NOn



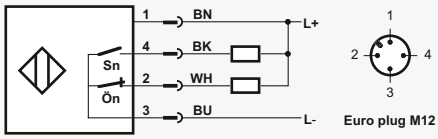


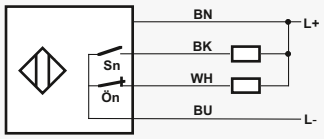
NC minus-switching NCn





NO and NC minus-switching NOn + NCn





Metal

employed as material for housings and mounting parts

Al **Aluminium wrought alloy**
Material for housings and mounting. Suitable for metal-cutting forming. Transformable and cold-flow pressable. Small specific weight. Colour anodization. It shall be considered that the anodized coat has an insulating effect.

Al-DG **Aluminium alloyage for die casting**
Aluminium die cast alloy. Material with low specific weight. Anodizable. The anodized coat has an insulating coat.

CuZn **Brass**
Housing material for cut round housings with and without thread. The surface is usually nickel-plated.

X... **Stainless high-grade steel**
A magnetic, high-grade steel with a medium or high cutting property, and with a medium coefficient of thermal expansion of ca. 16 ppm/K, mainly used for cut round housings, but also for formed rectangular or cuboid housings.

X5CrNi 18-10 For application in automotive, chemical, petrochemical and food industry. Transformable, compressable, forgeable, polishingable.

X5CrNiMo 17-12-2 For application in oil and food industry. Transformable, forgeable, polishingable.

X2CrNiMo 17-12-2 For application in chemical, oil, food, medical and pharamceutic industry. Transformable, forgeable and compressable, polishable.

X6CrNiMoTi 17-12-2 For application in apparatus engineering and piping construction, in chemical and food industry, in medical and pharmaceutic industry as well as in ship building.

Zn-DG **Die-cast zinc**
Alloy of zinc, aluminium and copper. High dimensional accuracy. Usually with surface refinement, solderable.

Technical Ceramics

employed as material for housings and substrates

Al2O3 **Aluminiumoxide**
Material for substrates, protective pipes, insulating parts. High stability and hardness, further application termperature range, low coefficient of thermal expansion with 6 ppm/K in the range 20 to 1000 °C, corrosion-resistant.

Plastic material

employed as material for housings and mounting parts; cast resin lead sheath

ABS **Acrylonitrile-butadiene-styrene-copolymere**
Housing material, heat-resistant up to 80 °C, limited chemical resistance, hard, scratch- and impact proof.

EP **Epoxy resin**
Liquid, then hard-setting for pouring, heat-resistant up to 110 °C, coefficient of thermal expansion with filling material 75 ppm/K, with inorganic filling material content 60% 40 ppm/K, dielectricity constant 4.

LCP **Liquid crystalline copolyeter**
High quality material for housings and mounting parts, with fibre optic or mineral filling material, application temperature range -200 to +220 °C

PA **Polyamide**
Materials for housings and mounting parts.

PA 6 Application termperature range -40 to +90 °C, for injection moulding or metal-cutting transformation.

PA 12 Application temperature range -70 to +110 °C, for injection moulding or metal-cutting transformation, suitable for food industry.

PA 66 Application temperature range -40 to +100 °C, for injection moulding or metal-cutting transformation.

PBT **Polybutylenenterephtalate**
Material for housings and mounting parts. Application temperature range -50 to +120 °C, for injection moulding, good resistance against oil and chemicals.

PC **Polycarbonate**
Material for housings and mounting parts with high resistance. Application temperature range -100 to +125 °C, for injection moulding, Thermal forming or metal-cutting transformation, sensitive against chemicals and stress cracking.

PEEK **Polyetheretherketone**
High-quality and high-strength, but very expensive material for housings and mounting parts. For injection moulding or metal-cutting transformation, application temperature range -65 to +250 °C, good resistance against chemicals.

POM **Polyoxymethylene**
Universal material for housings and mounting parts. Application temperature range -50 to +80 °C, for injection moulding. Good resistance against oil and chemicals, especially against solvents. Resistance agianst stress cracking.

PTFE **Polytetrafluorethylene**
Material with the highest resistance against chemicals. For injection moulding or transformation. Application temperature range -200 to +260 °C, low mechanical quality level.

PUR, TPU **Polyurethane**
Material for lead sheath and seals. Application temperature range -40 to +120 °C. High impact resistance and form stability, good resistance against oil and chemicals.

PVC **Polyvinylchloride**
Material for lead sheath. Good mechanical stability and resistance against chemicals, application temperature range -30 to +60 °C.

Leads

for sensors and as sensor accessories with plug

PVC leads		PUR leads		Temperature-resistant leads	
Number x lead cross section in mm^2	Outer diameter of the leads in mm	Number x lead cross section in mm^2	Outer diameter of the leads in mm	Number x lead cross section in mm^2	Outer diameter of the leads in mm
2x0.14	3.0				
2x0.19	3.5				
2x0.25	4.5				
2x0.34	3.6 shielded	2x0.34	5.2	2x0.34	3.6
2x0.50	4.6	2x0.50	4.3		
2x0.75	6.0 shielded				
3x0.09	2.3				
3x0.14	3.5	3x0.14	3.5		
3x0.14	4.0 shielded				
3x0.25	4.0	3x0.25	4.0		
3x0.25	4.5 shielded				
3x0.34	4.8	3x0.34	4.9		
3x0.34	4.8 shielded				
3x0.50	5.8	3x0.50	5.2		
3x0.50	6.5 shielded				
3x0.75	6.4			3x0.75	6.8
3x0.75	7.0 shielded				
4x0.14	3.5				
4x0.25	4.5 shielded	4x0.25	4.8		
4x0.34	5.4	4x0.34	5.4		
4x0.34	shielded				
4x0.50	6.3				
4x0.50	shielded			4x0.50	7.0
4x0.75	8.0 shielded				
4x0.75	7.4				
5x0.75	7.6				
6x0.14	4.4				
6x0.25	5.0				
6x0.75	8.5 shielded				
7x0.34	6.3				
7x0.75	7.8				

Inductive Proximity Switches
Tasks, mode of operation, requirement profiles

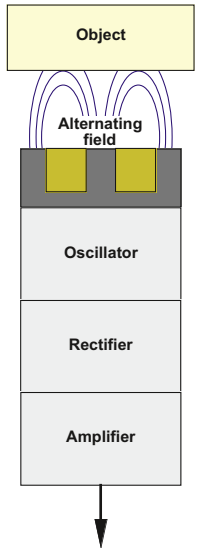
KLASCHKA Industrieelektronik

Mode of operation of Inductive Proximity Switches

An inductive proximity switch consists of an oscillator with a resonant circuit, rectifier and an output amplifier.

The coil of the oscillating circuit determines the size and shape of the "sensing face" of the proximity switch. The oscillator generates a high frequency oscillation, whose alternating field emanates on the open side of the coil and/or the ferrite core. If a metal piece is inserted into this field, energy is absorbed from the oscillating circuit by eddy current and losses of the alternating magnetization. Thus the oscillator amplitude is being reduced by sufficient approximation of the metal object; the switch is said to be "damped". As a result, the threshold of the rectifier falls short and the switching amplifier alters the switching condition of the output. An internal feedback leads to a sweeping behaviour and hysteresis of the switch-over procedure.

The dimensions of the alternating field depend on the dimensions of the switch and determine the radius of the alternating field, and thus the switching distance of the sensor.



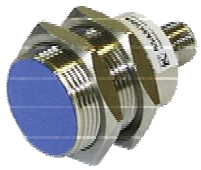
Inductive Proximity Switches for machinery and plant

are position sensors which require no mechanical contact. They are not subject to mechanical wear. They are mainly used as final position switches. Due to their ruggedness (completely encapsulated) and the highly reliable operating frequency they can be employed for many other tasks, such as pulse sensors for the detection of rotation speed.

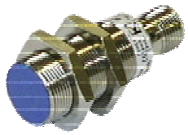
Inductive proximity switches are normally used in applications demanding a high operating frequency and actuation speed, switching point accuracy and reliability as well as an operation under harsh conditions (e.g. under water), and a long operational life expectancy.

The company "Industrieelektronik Dr. Klaschka", predecessor to the Klaschka GmbH & Co. KG, launched the first inductive proximity switch in 1964. Today the product range of sensors comprises several hundred types. This "Sensor" Catalogue presents the most important types which are usually available directly from stock.

In addition to the selection in this catalogue, we carry a large number of standard- and customer-specific versions, for which we can send you the Technical Data on request.



Requirement profiles and executions of Inductive Proximity Switches



A. For the application at PLCs and Field Bus Interface connections
- Supply voltage range 8 ... 30 V DC
- Outputs are protected against polarity reversal and short-circuit-proof, with LED display,
  2-poles with 1 NO with 5 ... 60 mA or
  3-poles with 1 NOp ≤ 200 mA or
  4-poles with 1 NOp + 1 NCp ≤ 200 mA
- Switching frequencies up to 100 kHz
- Normal switching distances for flush mounting according to standard or
  increased for non-flush mounting according to standard, or
  maximized for flush mounting

B. For contactor- or relay-optimized applications
- Supply voltage range 18 ... 230 V AC
- Outputs protected against polarity reversal and short-circuit-proof, with LED display,
  2-poles 1 NO with 10 ... 240 mA
- Switching frequencies up to 10 Hz
- Normal switching frequencies for flush mounting according to standard
- in housings from 18 mm Ø and/or from 34 mm edge length

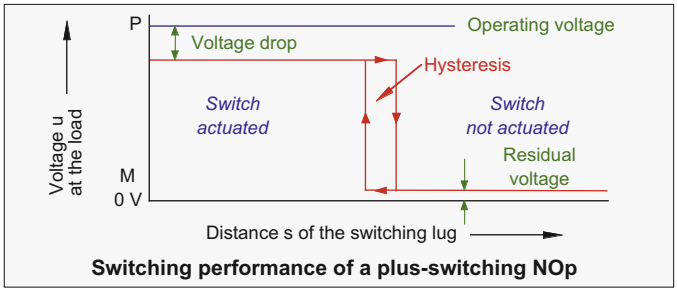
C. For NAMUR and DIN 60947-5-6 applications
- Voltage range 7.7 ... 30 VsDC
- Output 2-conductor-current loop with subsequent ZSN-auxiliary device
- Switching frequencies up to 5 kHz (4 mm Ø)
- Switching distances as described under A.

D. For special applications
adapted to the special requirements of the automotive industry such as
- All metal switches,
- Non-ferrous metal switches,
- Double switches,
- Magnetic field- and weld-proof executions,
- Pressure-resistant executions up to 300 bar,
- Extended surface switches up to 200 cm edge length and with switching distances up to 50 cm,
- Supply voltage ranges 8 ... 65 V DC, 20 ... 320 V DC,
- Totally insulated executions etc.

Inductive Proximity Switches
Switching performance

KLASCHKA Industrieelektronik

See also EN 60947-5-2.



Switching performance of a plus-switching NOp

The switching distance s is the distance at which an actuating element (object) approaching the sensing face causes a signal change. The switching distance depends on the size of the sensing face as well as on the size, the shape, and the material of the actuating element. The VDE standard 660 part 208 defines in addition to the application switching distance s the rated operating distance s_n, the real switching distance s_r, and the operating distance s_a, measured with a standard reference plate.

The high frequency magnetic field emanates from the **sensing face**. It depends on the size of the measuring coil and/or the ferrite core, and can be compared with the diameter and/or the edge length of the cap (blue marked).

According to ISO 630 the **standard reference plate a*a*1** is a square actuating element made of Fe 360 with a thickness of 1 mm which permits comparing measurements with the switching distance s. The surface of the measuring plate shall always be moved parallel to the sensing face. The side length a corresponds to the diameter r of the written circle of the sensing face or the triple rated operating distance, if this value is larger.

The **reduction factor R** refers to the switching distance and indicates the factor of the so-called **ferrous** proximity switches, by which the switching distance of metallic actuating elements, which aren't made of iron or steel, is reduced. The switching distance of **all metal** proximity switches is not being reduced. All metals always have the reduction factor R = 1.

Reproducibility is the repetition accuracy of at least two measurements of the switching distance within a time interval of 8 hours with a housing temperature between +15 °C and +30 °C and a voltage between 95 % and 105 % of the nominal voltage. Switches with Ø of up to 12 mm may measure the difference between two measurements by maximally ≤ 10 %. Larger ones may have a difference of maximally ≤ 5 %.

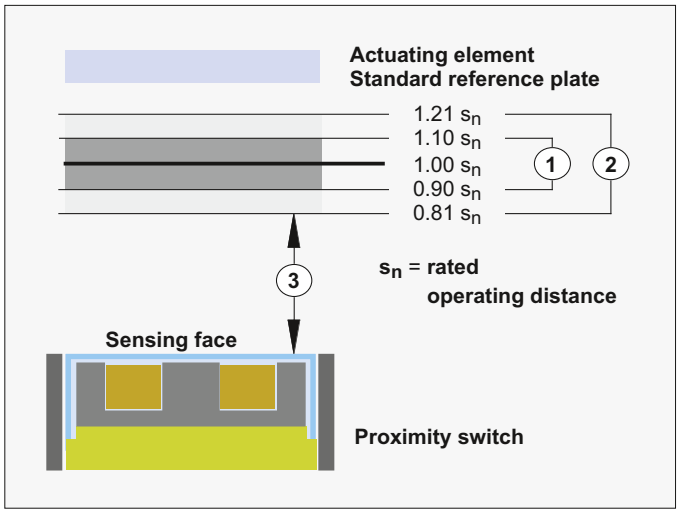
The **characteristic response curves** are determined by the size and type of the coil of the resonant circuit and the ferrite core material. In case of cylindrical coils, the field is rotationally symmetric and can be illustrated two-dimensionally by a cross sectional diagram through the axis s.

w = path axis, s = distance axis, s_n = switching distance, r = switching radius, A_w, A_s = switching-on points, B_w, B_s, C = switching-off points, K_a, K_b = characteristic response curves,
H_w, H_s = switching hysteresis in w-direction and s-direction,
Ø = diameter of the proximity switch and the reference plate.

From the **starting direction** of the reference plate you can distinguish between
- **s-direction** the **distance switching points A_s and B_s** when entering und leaving the sensor field, and
- **w-direction** the **path-switching-points A_w and B_w** (actuation by front edge) and **A_w and C_w** (actuation by front edge when entering and by back edge when leaving the sensor field).

The differences between the switching-on- and switching-off points with an approaching and a receding reference plate are called **the switching hysteresis H_s, H_w** . For all proximity switches applies: 0.03 s_n ≤ H_s ≤ 0.2 s_n.

The switching radius r is the distance of the switching point from the central axis of the sensing face, when a reference plate approaches radially and with the axial distance of s=0.

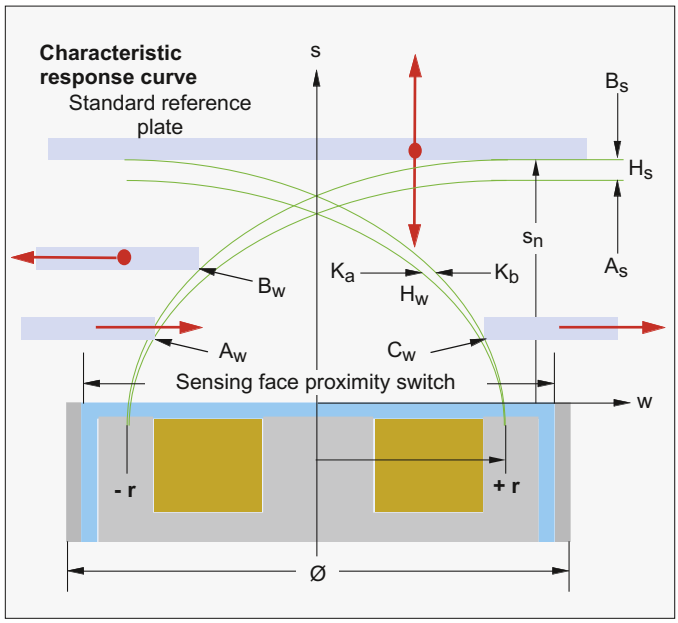


(1) The **real switching distance s_r** is measured at a nominal voltage and ambient temperature: 0.9 s_n ≤ s_r ≤ 1.1 s_n. Its tolerance zone considers the permissible manufacturer's tolerance.

(2) The **application switching distance s** considers external influences of supply voltage, termperature and mounting: 0.81 s_n ≤ s ≤ 1.21 s_n.

(3) The **operating distance s_a** = 0 ... 0.81 s_n corresponds to the safe operating range.

Reduction Factor R	Fe Switch	All Metal Switch
Iron	1.00	1.00
Aluminium	0.33 ... 0.42	1.00
Brass	0.33 ... 0.45	1.00
Stainless steel	0.56 ... 1.00	1.00
Copper	0.30 ... 0.45	1.00
Cast iron	0.88 ... 1.00	1.00



Switching frequencies and response times

In the Technical Data of the inductive proximity switches the **switching frequency f** is defined as the maximum possible number of switching operations per second. The diagram shows the system for measuring the switching frequency according to IEC 60947-5-2.

Standard reference plates are mounted on a non-conductive rotary reference wheel. The distance between two reference plates must be twice as large as the edge length A of the square reference plate. The dimension A of the standard reference plate depends on the sensing face of the proximity switch used (see standard reference plate).

The quoted standard specifies that the calculation value of switching frequency is reached, if either the switching-on signal or the switching-off signal at the output of the proximity switch amounts to periodically 50 µs. This regulation supposes that the possible switching frequency of a proximity switch is limited to values under 20 kHz.

Indeed switching frequencies over 5 kHz can hardly be realized with the current proximity switches.

Klaschka surpassed this margin clearly with all types of its **All Metal Series** IAD/AHM. Therefore the internal company standard KWN "switching frequency inductive proximity sensors" sets the value quoted on 10 for the **nominal switching frequency fb** indicated in the Technical Data.

Altering the conditions indicated in the diagram, e. g. with reference to the damping surfaces, the spacing between the sensing faces, stability of the adjusted switching distance etc. will result in lower values than indicated in the catalogue.

The limit of the maximum switching frequency on a maximum value mainly lies in the time required for the building-up of the measuring oscillator as well as in the time required for the remaining circuit.

The diagram shows the principal course of the switching frequency f over the switching distance s. The curve a was taken up with the configuration shown above according to the IEC standard. The curve b was determined with an individual actuator (actuating cam).

The **minimum damping time** is measured in the same configuration as the switching frequency. It corresponds to half the period of the switching frequency.

The **time delay before availability** is the time required from the provision of the supply voltage at the sensor until its availability. It may amount to maximally 300 ms. In this period incorrect signals of maximally 2 ms duration may arise.

External influences on the switching behaviour

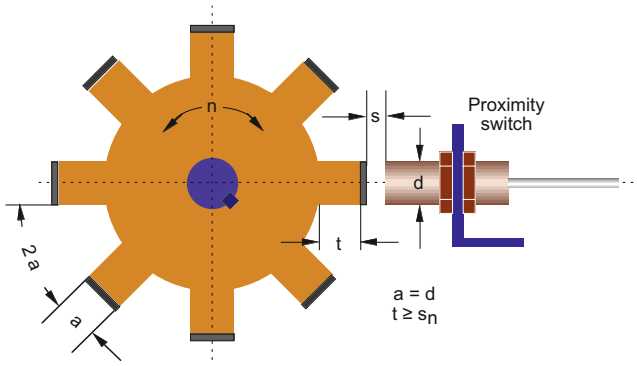
Disturbing **magnetic fields** are mainly produced in industrial plants by electrical welding and electrical drives. If an inductive proximity switch is within the magnetic interference field, fault signals may arise. Also see EN 60947-5-2 (1998) appendix E.

Magnetic-field-resistant proximity switches, as e.g. our All Metal Standard and All Metal Automotive Sensors, comply with this standard due to their special construction of sensor coil and circuit.

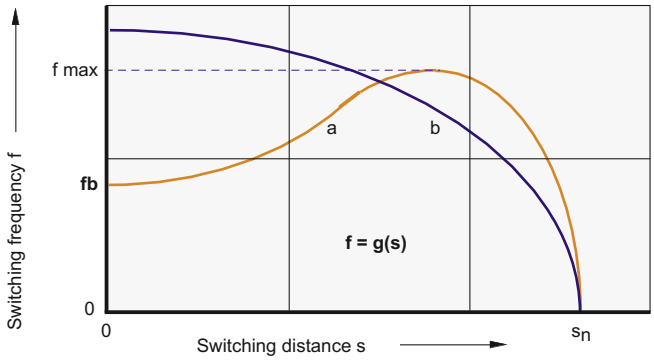
The **ambient temperature** also influences the switching behaviour.

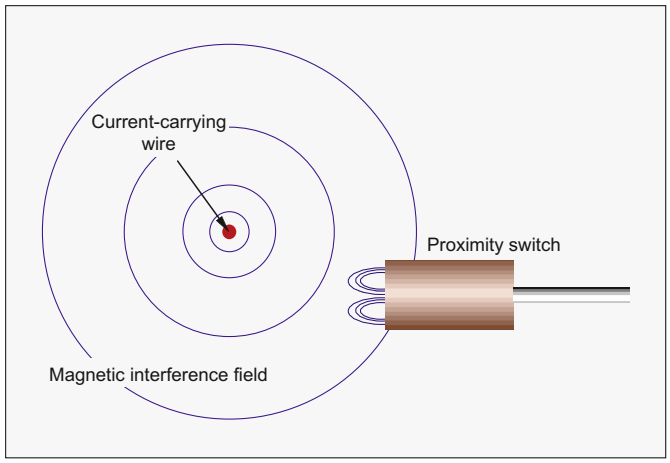
The **temperature dependency** of the switching distance s in the indicated ambient temperature range is described by a function s = f (T) which is to be determined empirically.

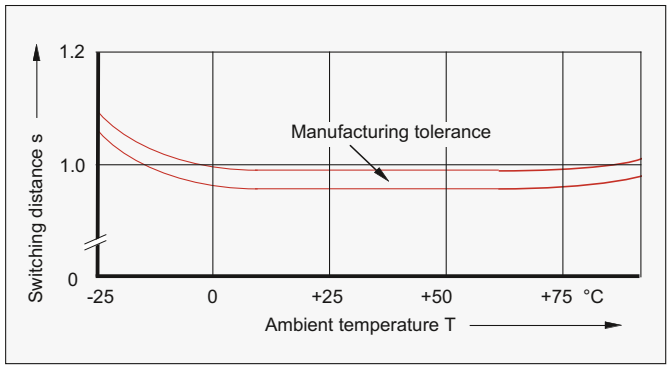
According to EN 60947-5-2 the permissible alternation or **drift of the switching distance** in the indicated ambient temperature range may not exceed a value of 10%.



Measurement according to EN 60947-5-2:
The measuring wheel is a non-conducting disc with an applied squared standard measuring plate







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Mounting instructions for cylindrical sensors

Flush mounting (b): A cylindrical inductive sensor is flush mountable if an arbitrary damping material can be attached around the sensing face, without affecting the characteristics.

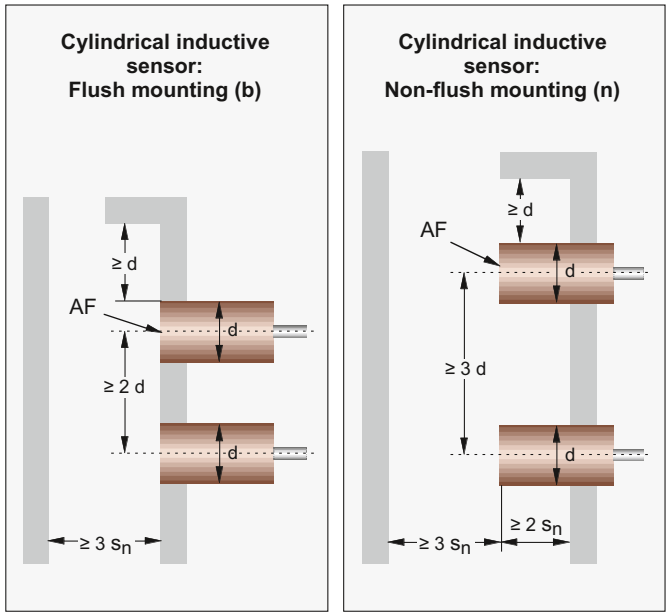
The flush mountable sensor with the diameter d and the rated operating distance s_n can be mounted with the sensing face AF flush in metal. The following mounting instructions apply:

- Distance between the centre of two sensors when these are arranged in row ≥ 2d
- Distance to an opposite metal face ≥ 3 s_n
- Distance to a side face ≥ d

Non-flush mounting (n): A cylindrical inductive sensor is non-flush mountable if a certain free zone around its sensing face is required in order to maintain its characteristics.

The non-flush mountable sensor with the diameter d and the rated operating distance s_n has to stick out of the metal surface by at least 2 s_n. The following mounting instructions apply:

- Distance between the centre of two sensors when these are arranged in a row ≥ 3 d
- Distance of the sensing face to an opposite metal face ≥ 3 s_n
- Distance to a side face ≥ d



Mounting instructions for rectangular sensors

Flush mounting (b): A rectangular inductive sensor allows flush mounting if it can be mounted up to the sensing face **on** an arbitrary damping material without affecting the characteristics.

The flush mountable sensor with the width b and the rated operating distance s_n can be mounted with the sensing face AF flush in metal. The following mounting instructions apply:

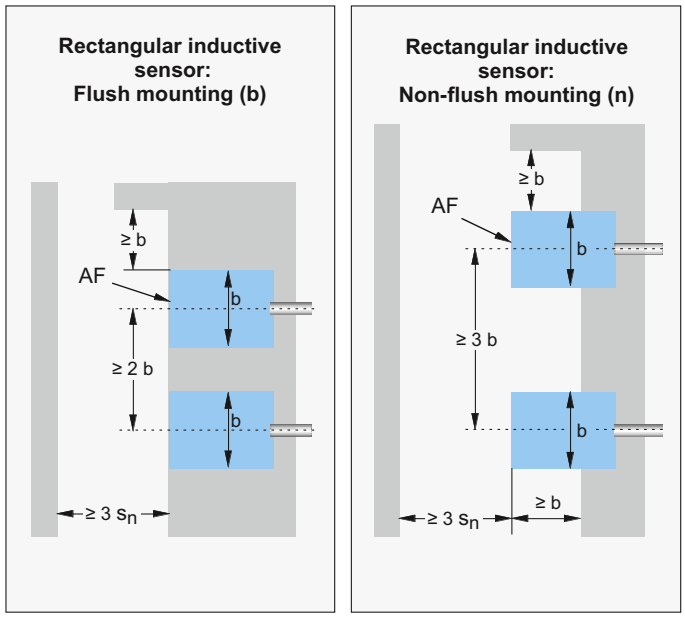
- Distance between the centre of two sensors when these are arranged in a row ≥ 2 b
- Distance to an opposite metal face ≥ 3 s_n
- Distance to a side face ≥ b

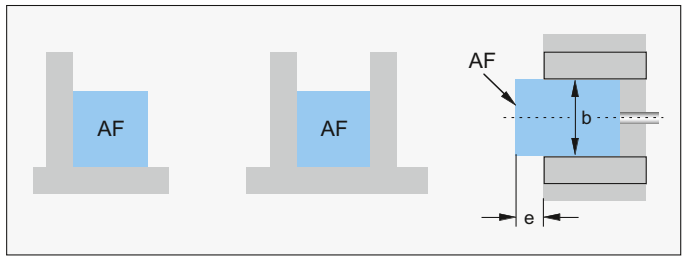
In case of L- or U-shaped mounting into a metallic environment (see diagram below) the value e ≥ s is to be kept.

Non-flush mounting (n): A rectangular inductive sensor is non-flush mountable if a certain free zone around its sensing face is necessary in order to maintain its characteristics.

The non-flush mountable sensor with the width b and the rated operating distance s_n has to stick out of the metal at least by b. The following mounting instructions apply:

- Distance between the centre of two sensors when these are arranged in a row ≥ 3 b
- Distance of the sensing face to an opposite metal face ≥ 3 s_n
- Distance to a side face ≥ b



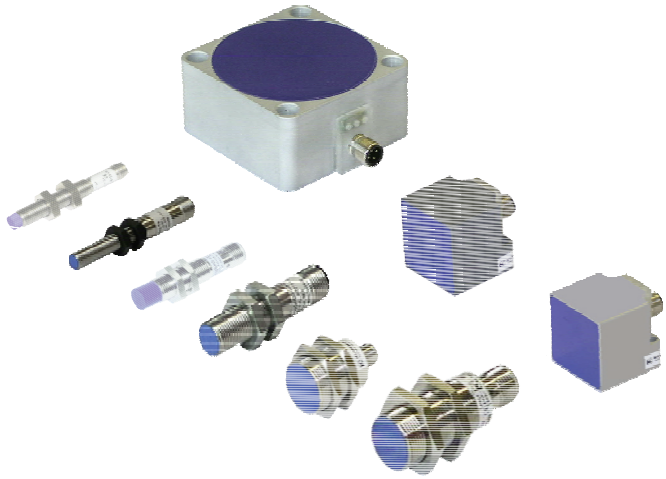


Notes

Inductive Proximity Switches
Type All Metal Standard

KLASCHKA Industrieelektronik

Characteristics



The Inductive Proximity Switches of the **Type All Metal Standard** IAD / AHM have an ironless coil in connection with an ironless housing. Therefore this type has the

- **reduction factor 1 for all metals (A)**
- **magnetic field-resistance to over 150 mT (M)**

and properties, which exceed the requirements stipulated by DIN EN 60 947-5-2 by far such as

- **increased switching distance with the flush mounting version**
- **increased ambient temperature range - 25 ... + 85 °C**
- **increased switching frequency of over 10 kHz (H)**

The increased maximum **switching frequencies** (maximum operating frequencies) **of over 10 kHz** have to be considered in particular. Unlike these, conventional proximity switches with maximum operating frequencies of 200 Hz to 2 kHz are comparably slow.

Apart from the high maximum possible operating frequencies these sensors also offer **very short operating times ≤ 50 µs** (instead of 0.2 to 5 ms with conventional proximity switches).

The LED displays of the Q40 and Q80 versions in the metal housing lead into **bright lightened printed-circuit boards**, which can be well seen by the operator.

Type All Metal Standard

Type	Ref. No.	Switching distance in mm Mounting *)
IAD/AHM-8eg60b1,5-1Wc1A	11.37-22	1,5 b
IAD/AHM-8eg60b1,5-2Wc1A	11.37-24	1,5 b
IAD/AHM-8eg60b1,5-1Sd1A	11.37-23	1,5 b
IAD/AHM-8eg60b1,5-2Sd1A	11.37-25	1,5 b
IAD/AHM-8eg45b1,5-1NDc1A	11.37-26-020	1,5 b
IAD/AHM-8eg45b1,5-2NDc1A	11.37-27-020	1,5 b
IAD/AHM-8eg60n3-1Wc1A	11.37-57	3,0 n
IAD/AHM-8eg60n3-1Sd1A	11.37-58	3,0 n
IAD/AHM-8eg60n3-2Wc1A	11.37-59	3,0 n
IAD/AHM-8eg60n3-2Sd1A	11.37-60	3,0 n
IAD/AHM-8eg45n3-1NDc1A	11.37-61-020	3,0 n
IAD/AHM-8eg45n3-2NDc1A	11.37-62-020	3,0 n
IAD/AHM-12mg50b3,5-1Sd1A	11.37-03	3,5 b
IAD/AHM-12mg50b3,5-2Sd1A	11.37-10	3,5 b
IAD/AHM-12mg50b3,5-1NDc1A	11.37-28-020	3,5 b
IAD/AHM-12mg50b3,5-2NDc1A	11.37-29-020	3,5 b
IAD/AHM-12mg60n6-1Sd1A	11.37-52	6,0 n
IAD/AHM-12mg60n6-2Sd1A	11.37-53	6,0 n
IAD/AHM-12mg60n6-1NDc1A	11.37-63-020	6,0 n
IAD/AHM-12mg60n6-2NDc1A	11.37-64-020	6,0 n

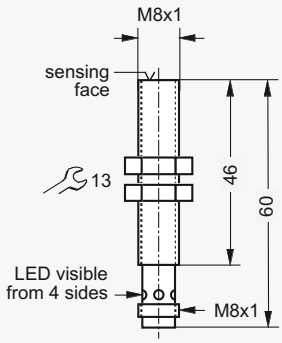
Type	Ref. No.	Switching distance in mm Mounting *)
IAD/AHM-18mg50b6-1Sd1A	11.37-04	6,0 b
IAD/AHM-18mg50b6-12Sd1A	11.37-06	6,0 b
IAD/AHM-18mg50b6-1NDc1A	11.37-30-020	6,0 b
IAD/AHM-18mg50b6-12NDd1A	11.37-32-020	6,0 b
IAD/AHM-18mg60n10-1Sd1A	11.37-54	10,0 n
IAD/AHM-18mg60n10-12Sd1A	11.37-55	10,0 n
IAD/AHM-18mg60n10-1NDc1A	11.37-67-020	10,0 n
IAD/AHM-18mg60n10-12NDd1A	11.37-69-020	10,0 n
IAD/AHM-30mg50b10-12Sd1A	11.37-07	10,0 b
IAD/AHM-30mg50b10-12NDd1A	11.37-33-020	10,0 b
IAD/AHM-30mg85n20-12Sd1A	11.37-70	20,0 n
IAD/AHM-30mg65n20-12NDd1A	11.37-71-020	20,0 n
IAD/AHM-40aq40b15-12Sd1B	11.37-16	15,0 b
IAD/AHM-80aq40b40-12NKd1B	11.37-35-050	40,0 b
IAD/AHM-80aq40b40-12Sd1B	11.37-18	40,0 b

***)** b = flush mounting, n = non-flush mounting

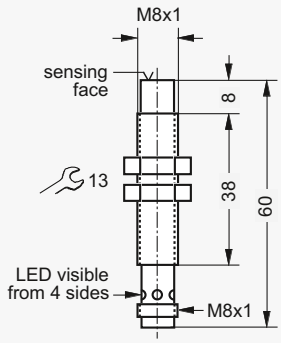
Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-8eg

	Design; length		**O M8 x 1;** 60 mm	**O M8 x 1;** 60 mm
	Material of the sensing face / of the housing		PBT / stainless steel	PBT / stainless steel
	Rated operating distance, mounting (see page 1.0.4)		**1.5 mm, flush**	**3 mm, non-flush**
	Range assured operating distance		0 ... 1.22 mm	0 ... 2.43 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD/AHM-8eg60b1.5-1Wc1A, 11.37-22 (1)	IAD/AHM-8eg60n3-1Wc1A, 11.37-57 (1)
	NC plus-switching	NCp	IAD/AHM-8eg60b1.5-2Wc1A, 11.37-24 (2)	IAD/AHM-8eg60n3-2Wc1A, 11.37-59 (2)
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimum damping period		**20 kHz / 25 µs**	**20 kHz / 25 µs**
	Wiring (connector or lead; number of wires)		connector M8; 3 wires	connector M8; 3 wires

Common Technical Data	
Reduction factor	**1 for all metals**
Hysteresis of the switching point s	3 ... 10 %
Repetition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C



Dimensions subject to change!



Dimensions subject to change!

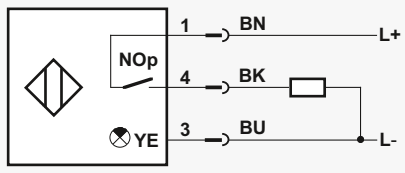
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	6.4 mm	6.4 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	1.0 mm	3.0 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	500 m	500 m
Lead type / standard lead length / number of wires x lead cross section		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc	8 Nm / 20 Nm	8 Nm / 20 Nm
Weight	10 g	10 g
Recommended accessories		

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

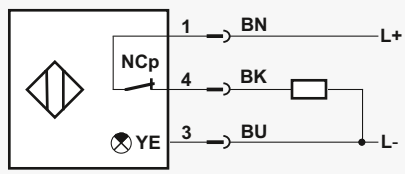
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Wiring (1)
DC 3-pole, plug



Euro Plug M8
with LED display YE
visible from 4 sides

Wiring (2)
DC 3-pole, plug

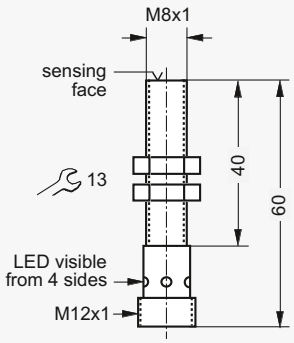
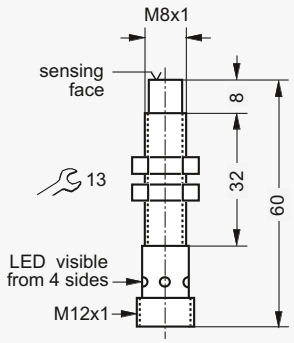
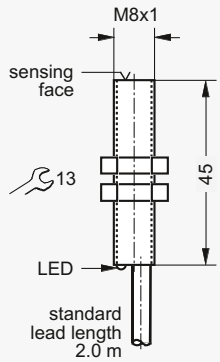
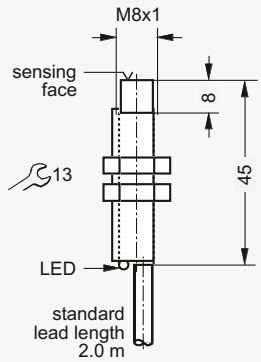


Euro Plug M8
with LED display YE
visible from 4 sides

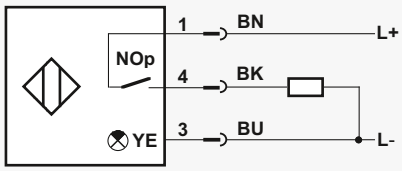
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

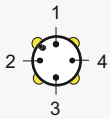
Subject to technical changes!

O M8 x 1; 60 mm	**O M8 x 1;** 60 mm	**O M8 x 1;** 45 mm	**O M8 x 1;** 45 mm
PBT / stainless steel	PBT / stainless steel	PBT / stainless steel	PBT / stainless steel
1.5 mm, flush	**3 mm, non-flush**	**1.5 mm, flush**	**3 mm, non-flush**
0 ... 1.22 mm	0 ... 2.43 mm	0 ... 1.22 mm	0 ... 2.43 mm
IAD/AHM-8eg60b1.5-1Sd1A, 11.37-23 (3)	IAD/AHM-8eg60n3-1Sd1A, 11.37-58 (3)	IAD/AHM-8eg45b1.5-1NDc1A, 11.37-26-020 (5)	AD/AHM-8eg45n3-1NDc1A, 11.37-61-020 (5)
IAD/AHM-8eg60b1.5-2Sd1A, 11.37-25 (4)	IAD/AHM-8eg60n3-2Sd1A, 11.37-60 (4)	IAD/AHM-8eg45b1.5-2NDc1A, 11.37-27-020 (6)	IAD/AHM-8eg45n3-2NDc1A, 11.37-62-020 (6)
20 kHz / 25 µs	**20 kHz / 25 µs**	**20 kHz / 25 µs**	**20 kHz / 25 µs**
connector M12; 3 wires	connector M8; 3 wires	lead; 3 wires	lead; 3 wires
			
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
6.4 mm	6.4 mm	6.4 mm	6.4 mm
1.0 mm	3.0 mm	1.0 mm	3.0 mm
yes, YE	yes, YE	yes, YE	yes, YE
500 m	500 m	500 m	500 m
		ND / 2.0 m / 3 x 0.14 mm^2	ND / 2.0 m / 3 x 0.14 mm^2
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
II, ⧈	II, ⧈	II, ⧈	II, ⧈
8 Nm / 20 Nm	8 Nm / 20 Nm	8 Nm / 20 Nm	8 Nm / 20 Nm
12 g	12 g	12 g + weight of the lead	12 g + weight of the lead

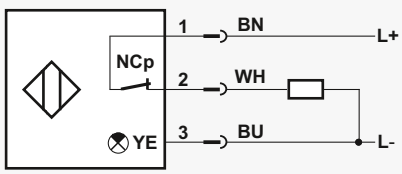
Wiring (3)
DC 3-pole, plug



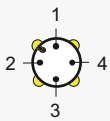
Euro Plug M12
with LED display YE
visible from 4 sides



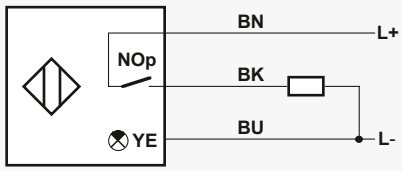
Wiring (4)
DC 3-pole, plug



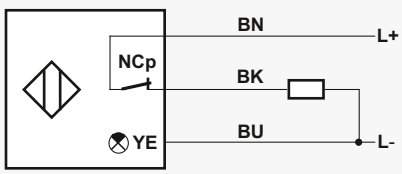
Euro Plug M12
with LED display YE
visible from 4 sides



Wiring (5)
DC 3-pole, outgoing lead

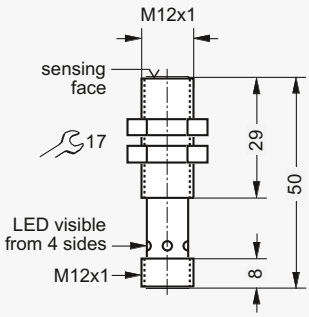


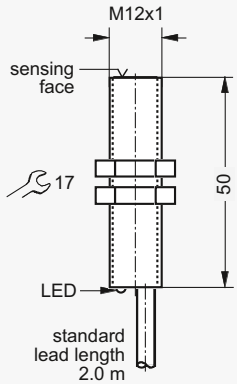
Wiring (6)
DC 3-pole, outgoing lead



Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-12mg

	Design; length		**O M12 x 1;** 50 mm	**O M12 x 1;** 50 mm
	Material of the sensing face / of the housing		PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Rated operating distance, mounting (see page 1.0.4)		**3,5 mm, flush**	**3.5 mm, flush**
	Range assured operating distance		0 ... 2.83 mm	0 ... 2.83 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD/AHM-12mg50b3.5-1Sd1A, 11.37-03 (1)	IAD/AHM-12mg50b3.5-1NDc1A, 11.37-28-020 (3)
	NC plus-switching	NCp	IAD/AHM-12mg50b3.5-2Sd1A, 11.37-10 (2)	IAD/AHM-12mg50b3.5-2NDc1A, 11.37-29-020 (4)
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimum damping period		**20 kHz / 25 µs**	**20 kHz / 25 µs**
	Wiring (connector or lead); number of wires		connector M12; 3 wires	lead; 3 wires





Common Technical Data		
Reduction factor	**1 for all metals**	
Hysteresis of the switching point s	3 ... 10 %	
Repetition accuracy of the switching point s	≤ 10 %	
- with permanent operating voltage		
... and ambient temperature	≤ 2 %	
Magnetic field-resistant	≤ 150 mT	
Permissible ripple voltage	≤ 15 %	
Short-circuit-proof ?	yes, clocking	
Reverse polarity protection ?	yes	
Voltage drop over a closed output	≤ 2.5 V DC	
Ambient temperature range	- 25 ... + 85 °C	
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	10.5 mm	10.5 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	4.5 mm	4.5 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	500 m	500 m
Lead type / standard lead length / number of wires x lead cross section		ND / 2.0 m / 3 x 0.34 mm^2
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc	9 Nm / 30 Nm	9 Nm / 30 Nm
Weight	14 g	14 g + weight of the lead
Recommended accessories		

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

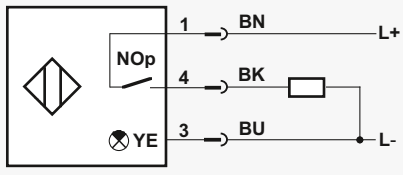
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

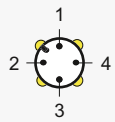
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

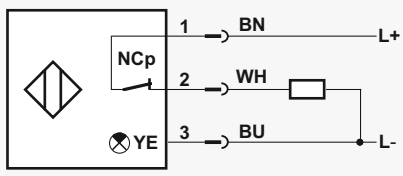
Wiring (1)
DC 3-pole, plug



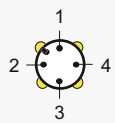
Euro Plug M12
with LED display YE
visible from 4 sides

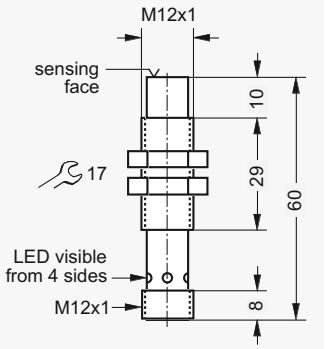
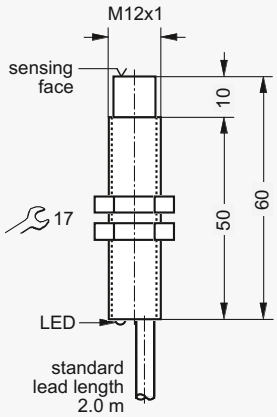


Wiring (2)
DC 3-pole, plug

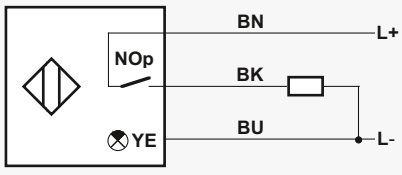


Euro Plug M12
with LED display YE
visible from 4 sides

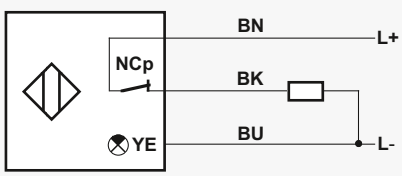


O M12 x 1; 60 mm	**O M12 x 1;** 60 mm		
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated		
6 mm, non-flush	**6 mm, non-flush**		
0 ... 4.86 mm	0 ... 4.86 mm		
IAD/AHM-12mg60n6-1Sd1A, 11.37-52 (1)	IAD/AHM-12mg60n6-1NDc1A, 11.37-63-020 (3)		
IAD/AHM-12mg60n6-2Sd1A, 11.37-53 (2)	IAD/AHM-12mg60n6-2NDc1A, 11.37-64-020 (4)		
20 kHz / 25 µs	**20 kHz / 25 µs**		
connector M12; 3 wires	lead; 3 wires		
			
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC		
≤ 20 mA	≤ 20 mA		
≤ 200 mA	≤ 200 mA		
75 V DC	75 V DC		
≤ 1.0 µF	≤ 1.0 µF		
10.5 mm	10.5 mm		
4.5 mm	4.5 mm		
yes, YE	yes, YE		
500 m	500 m		
	ND / 2.0 m / 3 x 0.34 mm^2		
DC 13	DC 13		
IP 67	IP 67		
II, ⧈	II, ⧈		
9 Nm / 30 Nm	9 Nm / 30 Nm		
14 g	14 g + weight of the lead		

Wiring (3)
DC 3-pole, outgoing lead



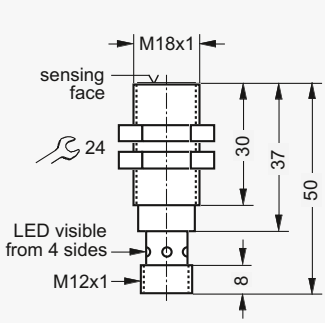
Wiring (4)
DC 3-pole, outgoing lead

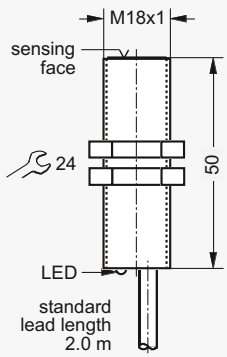


Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-18mg

	Design; length		**O M18 x 1;** 50 mm	**O M18 x 1;** 50 mm
	Material of the sensing face / of the housing		PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Rated operating distance, mounting (see page 1.0.4)		**6 mm, flush**	**6 mm, flush**
	Range assured operating distance		0 ... 4.86 mm	0 ... 4.86 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD/AHM-18mg50b6-1Sd1A, 11.37-04 (1)	IAD/AHM-18mg50b6-1NDc1A, 11.37-30-020 (3)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp	IAD/AHM-18mg50b6-12Sd1A, 11.37-06 (2)	IAD/AHM-18mg50b6-12NDd1A, 11.37-32-020 (4)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimim damping period		**20 kHz / 25 µs**	**20 kHz / 25 µs**
	Wiring (connector or lead); number of wires		connector M12; 3 / 4 wires	lead; 3 / 4 wires

Common Technical Data	
Reduction factor	**1 for all metals**
Hysteresis of the switching point s	3 ... 10 %
Repition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed output	≤ 2.5 V DC





Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	6.0 mm	6.0 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	500 m	500 m
Lead type / standard lead length / number of wires x lead cross section		ND / 2.0 m / 3 x 0.34 mm^2
Ambient temperature range	- 25 ... + 85 °C	- 25 ... + 85 °C
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc	34 Nm / 70 Nm	34 Nm / 70 Nm
Weight	28 g	28 g + weight of the lead
Recommended accessories		

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

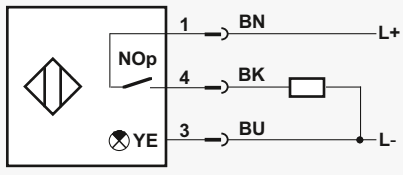
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

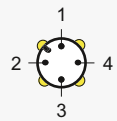
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

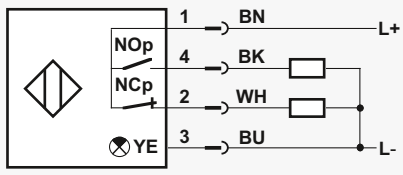
Wiring (1)
DC 3-pole, plug



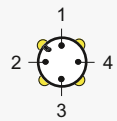
Euro Plug M12
with LED display YE
visible from 4 sides



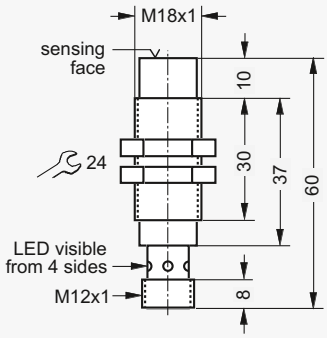
Wiring (2)
DC 4-pole, plug

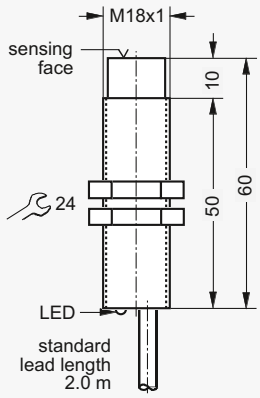


Euro Plug M12
with LED display YE
visible from 4 sides



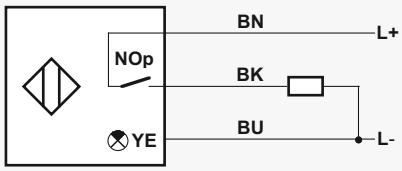
O M18 x 1; 60 mm	**O M18 x 1;** 60 mm		
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated		
10 mm, non-flush	**10 mm, non-flush**		
0 ... 8.1 mm	0 ... 8.1 mm		
IAD/AHM-18mg60n10-1Sd1A, 11.37-54 (1)	IAD/AHM-18mg60n10-1NDc1A, 11.37-67-020 (3)		
IAD/AHM-18mg60n10-12Sd1A, 11.37-55 (2)	IAD/AHM-18mg60n10-12NDd1A,11.37-69-020(4)		
20 kHz / 25 µs	**20 kHz / 25 µs**		
connector M12; 3 wires	lead; 3 / 4 wires		



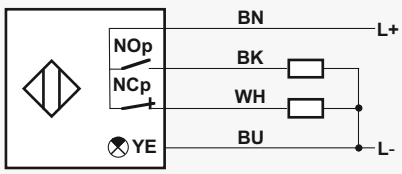


10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC		
≤ 20 mA	≤ 20 mA		
≤ 200 mA	≤ 200 mA		
75 V DC	75 V DC		
≤ 1.0 µF	≤ 1.0 µF		
16.5 mm	16.5 mm		
7.0 mm	7.0 mm		
yes, YE	yes, YE		
500 m	500 m		
	ND / 2.0 m / 3 x 0.34 mm^2		
- 25 ... + 85 °C	- 25 ... + 85 °C		
DC 13	DC 13		
IP 67	IP 67		
II, ⧈	II, ⧈		
34 Nm / 70 Nm	34 Nm / 70 Nm		
28 g	28 g + weight of the lead		

Wiring (3)
DC 3-pole, outgoing lead



Wiring (4)
DC 4-pole, outgoing lead

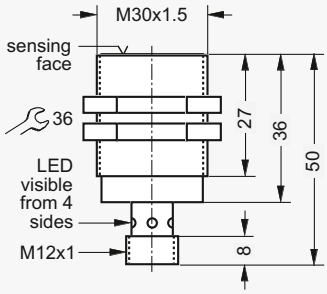


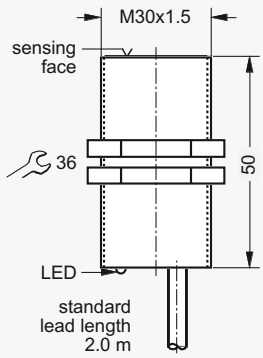
Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-30mg

		Design; length	**O M30 x 1.5;** 50 mm	**O M30 x 1.5;** 50 mm
		Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
		Rated operating distance, mounting (see page 1.0.4)	**10 mm, flush**	**10 mm, flush**
		Range assured operating distance	0 ... 8.1 mm	0 ... 8.1 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp		
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp	IAD/AHM-30mg50b10-12Sd1A, 11.37-07 (1)	IAD/AHM-30mg50b10-12NDd1A,11.37-33-020 (2)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**15 kHz / 33 µs**	**15 kHz / 33 µs**
		Wiring (connector or lead); number of wires	connector M12; 4 wires	lead; 4 wires

Common Technical Data

Reduction factor	**1 for all metals**
Hysteresis of the switching point s	3 ... 10 %
Repetition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C





Specific Technical Data

Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 25 mA	≤ 25 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	27.4 mm	27.4 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	11.0 mm	11.0 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	500 m	500 m
Lead type / standard lead length / number of wires x lead cross section		ND / 2.0 m / 4 x 0.34 mm^2
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc	150 Nm / < 200 Nm	150 Nm / < 200 Nm
Weight	75 g	75 g + weight of the lead
Recommended accessories		

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

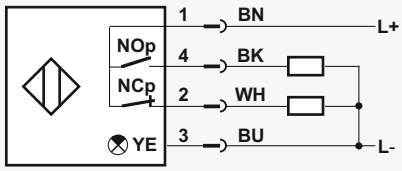
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

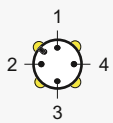
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

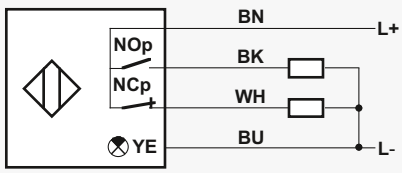
Wiring (1)
DC 4-pole, plug

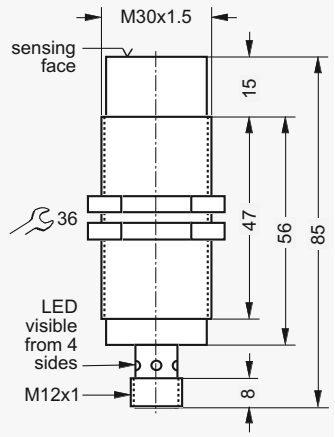
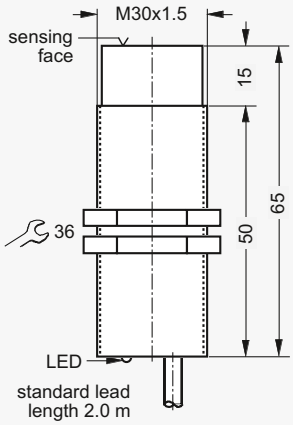


Euro Plug M12
with LED display YE
visible from 4 sides



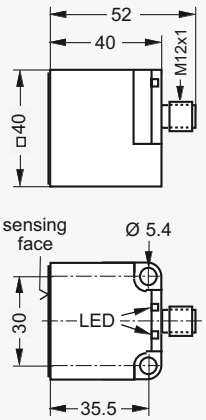
Wiring (2)
DC 4-pole, outgoing lead

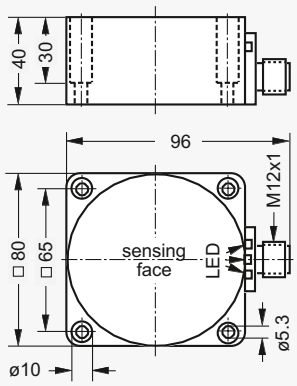


O M30 x 1.5; 85 mm	**O M30 x 1.5;** 65 mm		
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated		
20 mm, non-flush	**20 mm, non-flush**		
0 ... 16.2 mm	0 ... 16.2 mm		
IAD/AHM-30mg85n20-12Sd1A, 11.37-70 (1)	IAD/AHM-30mg65n20-12NDd1A,11.37-71-020 (2)		
15 kHz / 33 µs	**15 kHz / 33 µs**		
connector M12; 4 wires	lead; 4 wires		
			
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC		
≤ 25 mA	≤ 25 mA		
≤ 200 mA	≤ 200 mA		
75 V DC	75 V DC		
≤ 1.0 µF	≤ 1.0 µF		
27.4 mm	27.4 mm		
13.5 mm	13.5 mm		
yes, YE	yes, YE		
500 m	500 m		
	ND / 2.0 m / 4 x 0.34 mm^2		
DC 13	DC 13		
IP 67	IP 67		
II, ⧈	II, ⧈		
150 Nm / < 200 Nm	150 Nm / < 200 Nm		
130 g	100 g + weight of the lead		

Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-40aq, -80aq

		Design; height; length	□ **40 mm;** 40 mm; 40 mm	□ **80 mm;** 40 mm; 80 mm
		Material of the sensing face / of the housing	PBT / Al	PBT / Al
		Rated operating distance, mounting (see page 1.0.4)	**15 mm, flush**	**40 mm, flush**
		Range assured operating distance	0 ... 12.2 mm	0 ... 32.4 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp		
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp	IAD/AHM-40aq40b15-12Sd1B, 11.37-16 (1)	IAD/AHM-80aq40b40-12Sd1B, 11.37-18 (1)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**15 kHz / 33 µs**	**15 kHz / 33 µs**
		Wiring (connector or lead); number of wires	connector M12; 4 wires	connector M12; 4 wires





Common Technical Data	
Reduction factor	**1 for all metals**
Hysteresis of the switching point s	3 ... 10 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C

Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 30 mA	≤ 30 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	38 x 38 mm	78 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	17.0 mm	32.0 mm
Function indication ?	GN for operation, YE for actuated	GN for operation, YE for actuated
Maximum lead length	500 m	500 m
Lead type / standard lead length / number of wires x lead cross section		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc		
Weight	110 g	450 g
Recommended accessories		

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

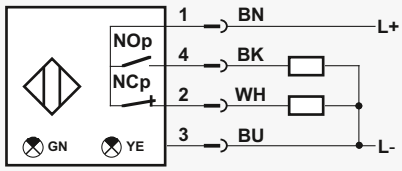
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

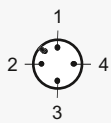
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

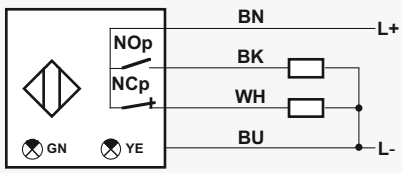
Wiring (1)
DC 4-pole, plug



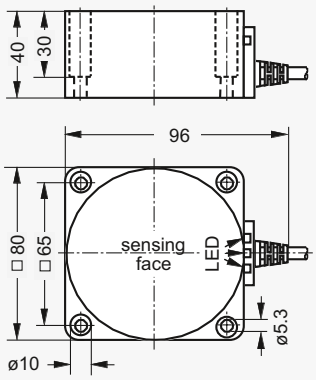
Euro Plug M12



Wiring (2)
DC 4-pole, outgoing lead



□ **80 mm;** 40 mm; 80 mm			
PBT / Al			
40 mm, flush			
0 ... 32.4 mm			
IAD/AHM-80aq40b40-12NKd1B, 11.37-35-050 (2)			
15 kHz / 33 µs			
lead; 4 wires			



10 ... 24 ... 30 V DC			
≤ 30 mA			
≤ 200 mA			
75 V DC			
≤ 1.0 µF			
78 mm			
32.0 mm			
GN for operation, YE for actuated			
500 m			
NK / 2.0 m / 4 x 0.34 mm^2			
DC 13			
IP 67			
II, □			
450 g			

Notes

Inductive Proximity Switches
Series All Metal Automotive

KLASCHKA Industrieelektronik

Characteristics

The **Series All Metal Automotive IAD / AHMS** consists of Inductive Proximity Switches, which were particularly developed for the production lines in the Automotive Industry. They durably withstand the extreme environmental conditions occurring there.

Some of the **special requirements** Inductive Proximity Switches have to fulfill are

1. the detection of **targets of different metals** such as iron and aluminium, copper and brass, V2A- and other steels has to be possible without causing a change of the switching distance.
2. the reliable **operation in strong electromagnetic fields has to be guaranteed.**
3. **welding splashes,** which can't be avoided in body shops, may not impair the characteristics of the switch.

The **proximity switches of the Series All Metal Automative** made by KLASCHKA have an ironless coil in connection with an ironless housing. The housings are Teflon-coated, the sensing faces are ceramic-coated. Thus these sensors offer

- the **reduction factor 1 for all metals (A),**
- a high switching frequency and **short operating time (H),**
- a **magnetic field-resistance of more than 150 mT (M),**
- a **weld-resistance (S).**

The proximity switches of the series All Metal Automotive offer features, which go far beyond the requirements of DIN EN 60 947-5-2 such as

- **an increased switching distance with flush mounting**
- **an increased ambient temperature range - 25 ... + 85 °C**
- **an increased switching frequency of more than 10 kHz**

The **switching frequencies** (maximally possible operating frequencies) **of more than 10 kHz** have to be considered in particular. Unlike these, conventional proximity switches with switching frequencies from 200 Hz to 2 kHz are relatively slow.

Apart from the high maximally possible operating frequencies these sensors offer **very short operating times ≤ 50 µs** (instead of 0.2 to 5 ms of conventional proximity switches).

All versions can be mounted **flush** into a metal environment and have the **connectors M12, O M8** also has the **connector M8**.

The LED displays of the 40aq and 80aq lead into **bright lightened printed-circuit-boards,** which can be well seen by the operator.

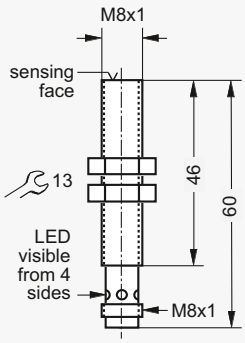
Type	Ref. No.	Switching distance in mm Mounting *)
IAD/AHMS-8eg60b1,5-1Wc1A	11.36-22	1,5 b
IAD/AHMS-8eg60b1,5-1Sd1A	11.36-23	1,5 b
IAD/AHMS-12mg50b3,5-1Sd1A	11.36-03	3,5 b
IAD/AHMS-18mg50b6-1Sd1A	11.36-04	6,0 b
IAD/AHMS-30mg50b10-12Sd1A	11.36-07	10,0 b
IAD/AHMS-40aq40b15-12Sd1B	11.36-16	15,0 b
IAD/AHMS-80aq40b40-12Sd1B	11.36-18	40,0 b

*) b = flush mounting

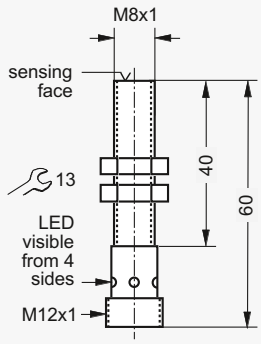
Inductive Proximity Switches, All Metal Automotive
Series IAD/AHMS-8eg, -12mg, -18mg, -30 mg

		Design; length	**Ø M8 x 1;** 60 mm	**Ø M8 x 1;** 60 mm
		Material of the sensing face / of the housing	PBT rad. cross-linked/V2A Tefl.-coated	PBT rad. cross-linked/V2A Tefl.-coated
		Rated operating distance, mounting (see page 1.0.4)	**1.5 mm, flush**	**1.5 mm, flush**
		Range assured operating distance	0 ... 1.22 mm	0 ... 1.22 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD/AHMS-8eg60b1.5-1Wc1A, 11.36-22 (1)	IAD/AHMS-8eg60b1.5-1Sd1A, 11.36-23 (2)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**20 kHz / 25 µs**	**20 kHz / 25 µs**
		Wiring (connector or lead); number of wires	connector M8; 3 wires	connector M12; 3 wires

Common Technical Data	
Reduction factor	**1 for all metals**
Hysteresis of the switching point s	3 ... 10 %
Repition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	-25 ... + 85 °C



Dimensions subject to change!



Dimensions subject to change!

Specific Technical Data			
	Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
	Current consumption without load	≤ 20 mA	≤ 20 mA
	Load current	≤ 200 mA	≤ 200 mA
	Nominal insulation voltage	75 V DC	75 V DC
	Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
	Ø Sensing face	6.4 mm	6.4 mm
	Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	3.0 mm	3.0 mm
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	500 m	500 m
	Lead type / standard lead length / number of wires x lead cross section		
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 67	IP 67
	Protection class		
	Permissible torque without / with toothed disc	8 Nm / 20 Nm	8 Nm / 20 Nm
	Weight	10 g	12 g
	Recommended accessories		

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

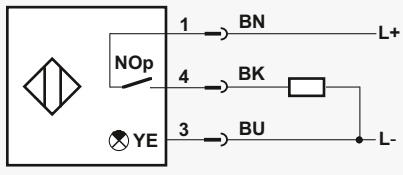
CE

Safety Regulations

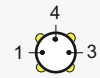
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

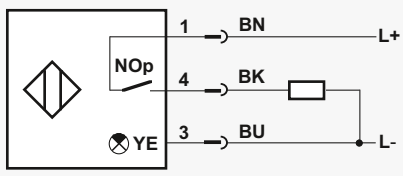
Wiring (1)
DC 3-pole, plug



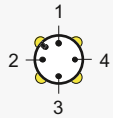
Euro Plug M8
with LED display YE
visible from 4 sides

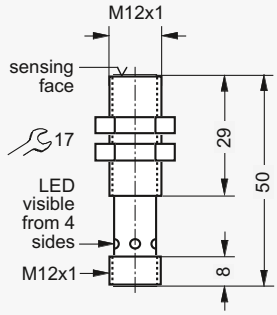
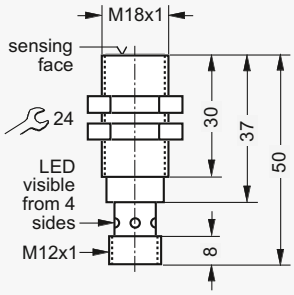
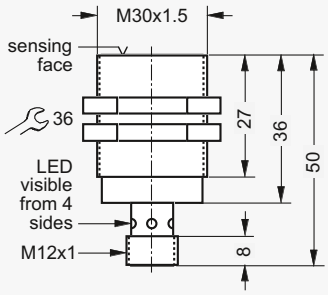


Wiring (2)
DC 3-pole, plug

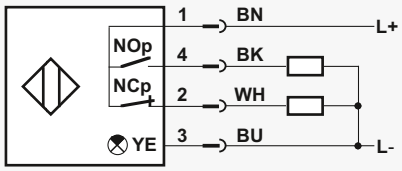


Euro Plug M12
with LED display YE
visible from 4 sides

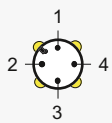


O M12 x 1; 50 mm	**O M18 x 1;** 50 mm	**O M30 x 1.5;** 50 mm	
PBT rad. cross-linked/V2A Tefl.-coated	PBT rad. cross-linked/V2A Tefl.-coated	PBT rad. cross-linked/V2A Tefl.-coated	
3.5 mm, flush	**6 mm, flush**	**10 mm, flush**	
0 ... 2.83 mm	0 ... 4.86 mm	0 ... 8.1 mm	
IAD/AHMS-12mg50b3.5-1Sd1A, 11.36-03 (2)	IAD/AHMS-18mg50b6-1Sd1A, 11.36-04 (2)	IAD/AHMS-30mg50b10-12Sd1A, 11.36-07 (3)	
20 kHz / 25 µs	**20 kHz / 25 µs**	**15 kHz / 33 µs**	
connector M12; 3 wires	connector M12; 3 wires	connector M12; 4 wires	
			
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	
≤ 20 mA	≤ 20 mA	≤ 25 mA	
≤ 200 mA	≤ 200 mA	≤ 200 mA	
75 V DC	75 V DC	75 V DC	
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	
12 mm	16.5 mm	27.4 mm	
4.5 mm	6.0 mm	11.0 mm	
yes, YE	yes, YE	yes, YE	
500 m	500 m	500 m	
DC 13	DC 13	DC 13	
IP 67	IP 67	IP 67	
II, ⧈	II, ⧈	II, ⧈	
9 Nm / 30 Nm	34 Nm / 70 Nm	150 Nm / < 200 Nm	
14 g	28 g	75 g	

Wiring (3)
DC 4-pole, plug

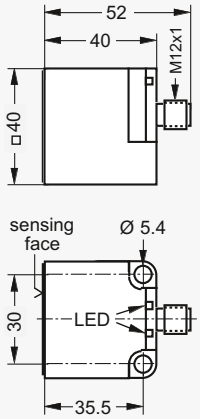


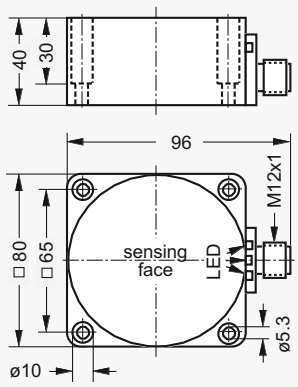
Euro Plug M12
with LED display YE
visible from 4 sides



Inductive Proximity Switches, All Metal Automotive
Series IAD/AHMS-40aq, -80aq

		Design; height; length	□ **40 mm;** 40 mm; 40 mm	□ **80 mm;** 40 mm; 80 mm
		Material of the sensing face / of the housing	PBT ceramic-coated / Al	PBT ceramic-coated / Al
		Rated operating distance, mounting (see page 1.0.4)	**15 mm, flush**	**40 mm, flush**
		Range assured operating distance	0 ... 12.2 mm	0 ... 32.4 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp		
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp	IAD/AHMS-40aq40b15-12Sd1B, 11.36-16 (1)	IAD/AHMS-80aq40b40-12Sd1B, 11.36-18 (1)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**15 kHz / 33 µs**	**15 kHz / 33 µs**
		Wiring (connector or lead); number of wires	connector M12; 4 wires	connector M12; 4 wires





Common Technical Data	
Reduction factor	**1 for all metals**
Hysteresis of the switching point s	3 ... 10 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C

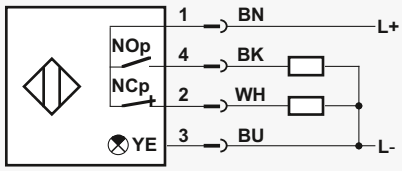
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 30 mA	≤ 30 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	38 x 38 mm	78 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	17.0 mm	32.0 mm
Function indication ?	GN for operation, YE for actuated	GN for operation, YE for actuated
Maximum lead length	500 m	500 m
Lead type / standard lead length / number of wires x lead cross section		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc		
Weight	110 g	360 g
Recommended accessories		

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

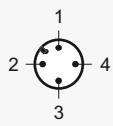
For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Wiring (1)
DC 4-pole, plug



Euro Plug M12



Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

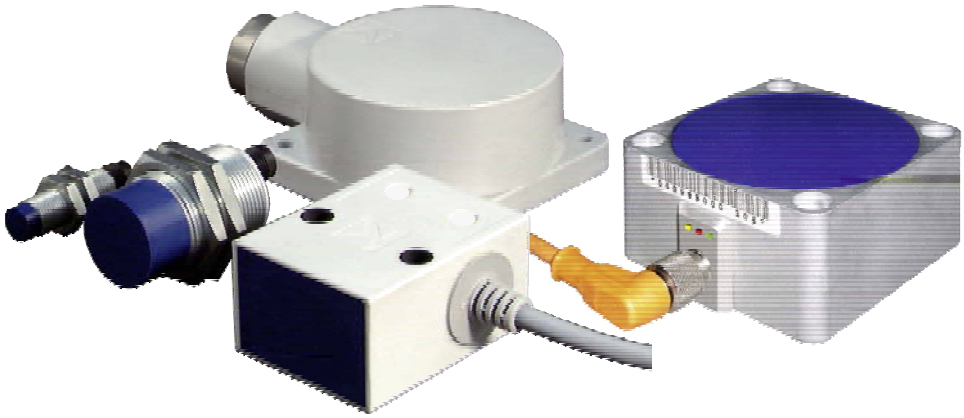
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

KLASCHKA Industrieelektronik

Inductive Proximity Switches
Type Ferrous DC 3- and 4-pole

Characteristics

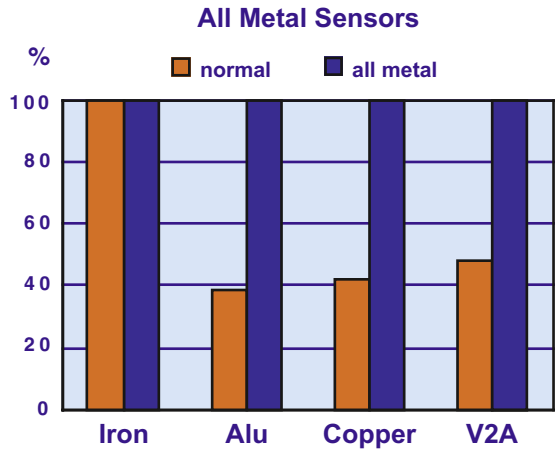


The **series ferrous 3- and 4-pole** comprises the „orthodox“ Inductive Proximity Switches, which have been developed in the last decades under consideration of the special requirements of our customers. This series is standardized according to EN 60947-5-2.

On behalf of our clients we developed numerous different types whose dimensions deviate from the dimensions indicated in the standard.

When applying these types of the ferrous series it has to be considered that only ferrous metals have the indicated switching distance. When other metals are involved, a reduction factor has to be taken into consideration (see table and diagram).

Reduction Factor R	Fe-Switch	All Metal Switch
Iron	1.00	1.00
Aluminium	0.33 ... 0.42	1.00
Brass	0.33 ... 0.45	1.00
Stainless steel	0.56 ... 1.00	1.00
Copper	0.30 ... 0.45	1.00
Cast-iron	0.88 ... 1.00	1.00



Type Ferrous DC 3- and 4-pole

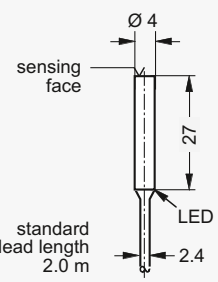
Type	Ref. No.	Switching distance in mm Mounting *)	Page
cylindrical smooth Ø 4 x L			
IAD-4er27b0,8-1PD1A	11.35-87-020	0,8 b	1.3.1.1
cylindrical smooth Ø 6,5 x L			
IAD-6,5mr30b2-1ND1A	11.35-88-020	2 b	1.3.1.1
cylindrical M8 x L			
IAD-8mg33b2-1ND1A	11.35-89-020	2 b	1.3.2.1
IAD-8mg33n3-1ND1A	11.35-90-020	3 n	1.3.2.1
IAD-8mg50b2-1Wc1A	11.35-92	2 b	1.3.2.2
IAD-8mg50n3-1Wc1A	11.35-93	3 n	1.3.2.2
IAD-8mg58b2-1Sd1A	11.35-96	2 b	1.3.2.2
IAD-8mg58n3-1Sd1A	11.35-95	3 n	1.3.2.2
IAD-8zq40b2-1ND1A	11.35-91-020	2 b	1.3.2.3
IAD-8zq60b2-1Wc1A	11.35-94	2 b	1.3.2.3
cylindrical M12 x L			
IAD-12eg60b2-12S2A	11.24-89	2 b	1.3.3.1
IAD-12eg60b2-12S3A	11.32-85	2 b	1.3.3.1
IAD-12fg50b2-1NK1A	11.32-61-020	2 b	1.3.3.2
IAD-12fg50n5-1NK1A	11.32-62-030	5 n	1.3.3.2
IAD-12mg35m4-1PD1A	11.33-05-030	4 m	1.3.3.2
IAD-12mg35m4-1ND2A	11.35-01-030	4 m	1.3.3.3
IAD-12mg35m4-2ND1A	11.35-02-020	4 m	1.3.3.3
IAD-12mg35m4-6ND1A	11.33-10-020	4 m	1.3.3.4
IAD-12mg40b2-1NK1A	11.20-67-030	2 b	1.3.3.4
IAD-12mg45b2-1NK1A	11.32-17-020	2 b	1.3.3.4
IAD-12mg45b2-7NK1A	11.32-19-050	2 b	1.3.3.4
IAD-12mg50b2-1PK1A	11.22-42-020	2 b	1.3.3.5
IAD-12mg50b2-1S1A	11.20-73	2 b	1.3.3.5
IAD-12mg60b2-12NK1A	11.22-11-020	2 b	1.3.3.6
IAD-12mg60b2-12S1A	11.22-12	2 b	1.3.3.6
IAD-12mg60b2-1NT1A	11.20-01-020	2 b	1.3.3.6
IAD-12mg60b2-1S2A	11.25-85	2 b	1.3.3.6
IAD-12mg60m4-1NT1A	11.24-09-030	4 m	1.3.3.7
IAD-12mg60m4-1PD1A	11.25-81-030	4 m	1.3.3.7
IAD-12mg60m4-1S1A	11.25-03	4 m	1.3.3.8
IAD-12mg60n5-12S1A	11.22-23	5 n	1.3.3.8
IAD-12mg60n5-1NK1A	11.20-15-020	5 n	1.3.3.8
IAD-12mg60n5-1S1A	11.25-04	5 n	1.3.3.8
cylindrical M18 x L			
IAD-18fg80b5-1NK1A	11.17-12-020	5 b	1.3.4.1
IAD-18fg80n10-1NK1A	11.20-95-020	10 n	1.3.4.1
IAD-18mg35b5-1NK1A	11.20-30-020	5 b	1.3.4.2
IAD-18mg40m8-1ND2A	11.35-03-020	8 m	1.3.4.2
IAD-18mg40m8-6ND1A	11.33-11-020	8 m	1.3.4.2
IAD-18mg45m8-2ND1A	11.35-04-020	8 m	1.3.4.2
IAD-18mg50b5-1S1A	11.22-06	5 b	1.3.4.3
IAD-18mg50m8-1S1A	11.33-18	8 m	1.3.4.3
IAD-18mg50n10-1S1A	11.22-16	10 n	1.3.4.4
IAD-18mg60b5-12S1A	11.22-03	5 b	1.3.4.4
IAD-18mg70b5-1S1A	11.25-86	5 b	1.3.4.4
IAD-18mg70m8-1PD1A	11.25-82-030	8 m	1.3.4.4
IAD-18mg70m8-1S1A	11.25-97	8 m	1.3.4.5
IAD-18mg70n10-12V1A	11.32-91	10 n	1.3.4.5
IAD-18mg80b5-1S1A	11.22-85	5 b	1.3.4.6
IAD-18mg80n10-1S1A	11.22-91	10 n	1.3.4.6
cylindrical M18 x L			
IAD-18mg85b5-1NT1A	11.20-02-020	5 b	1.3.4.6
IAD-18mg85b5-12NK1A	11.18-32-020	5 b	1.3.4.6
IAD-18mg85n10-1NT1A	11.20-75-020	10 n	1.3.4.7
cylindrical M30 x L			
IAD-30fg80b10-12NK1A	11.16-50-020	10 b	1.3.5.1
IAD-30mg50b10-1S1A	11.22-19	10 b	1.3.5.1
IAD-30mg65n20-1S1A	11.32-36	20 n	1.3.5.2
IAD-30mg70b10-1S1A	11.25-88	10 b	1.3.5.2
IAD-30mg80b10-1NT1A	11.20-03-020	10 b	1.3.5.2
IAD-30mg80n20-12S1A	11.22-05	20 n	1.3.5.2
IAD-30mg95b10-1S1A	11.22-86	10 b	1.3.5.3
IAD-30sg80b10-12S1A	11.22-04	10 b	1.3.5.3
IAD-30sg80b10-12NT1A	11.18-71-020	10 b	1.3.5.4
rectangular 34 x 50 x 65			
IAD-34aq65b12-1S1A	11.25-90	12 b	1.3.6.1
rectangular 40 x 40 x L			
IAD-40fv114b15-12L1B	11.25-52	15 b	1.3.7.1
IAD-40fv114n25-12L1B	11.25-53	25 n	1.3.7.1
IAD-40fv114b15-12S1B	11.25-66	15 b	1.3.7.2
IAD-40fv114n25-12S1B	11.32-98	25 n	1.3.7.2
cylindrical 80 x L			
IAD-80fr70e80-1Sd1A	11.43-08	80 n	1.3.8.1
IAD-80fr70n35-12S1A	11.35-22	35 n	1.3.8.1
IAD-80fr70n50-1S1A	11.25-92	50 n	1.3.8.2
IAD-80fr70n50-1NT1A	11.03-94-050	50 n	1.3.8.2

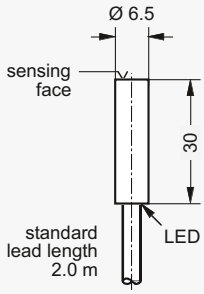
***)** b = flush mounting, n = non-flush mounting, m = maximized; flush mounting

Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-4er, -6.5mr

		Design; length	**Ø 4;** 27 mm	**Ø 6.5;** 30 mm
		Material of the sensing face / of the housing	PA 6.6 / stainless	PA 6.6 / brass
		Rated operating distance, mounting (see page 1.0.4)	**0.8 mm, flush**	**2 mm, flush**
		Range assured operating distance	0 ... 0.65 mm	0 ... 1.62 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-4er27b0,8-1PD1A, 11.35-87-020 (1)	IAD-6,5mr30b2-1ND1A, 11.35-88-020 (1)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**3 kHz / ≥ 0.17 ms**	**3 kHz / ≥ 0.17 ms**
		Wiring (connector or lead); number of wires	lead; 3 wires	lead; 3 wires

Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	≤ 15 %
Repitition accuracy of the switching point s	≤ 11 %
- with permanent operating voltage	
... and ambient temperature	≤ 1 %
Permissible ripple voltage	≤ 10 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.4 V DC
Ambient temperature range	- 25 ... + 70 °C





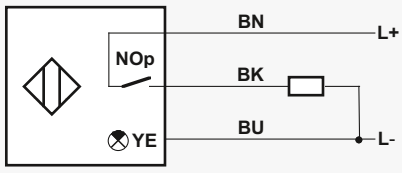
Specific Technical Data			
	Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
	Current consumption without load	≤ 13 mA	≤ 15 mA
	Load current	≤ 200 mA	≤ 200 mA
	Nominal insulation voltage	75 V DC	75 V DC
	Permissible capacity at output		
	Ø Sensing face		
	Switching radius r (at operating distance of the target s = 0; see page 1.0.2)		
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	150 m	150 m
	Lead type / standard lead length / number of wires x lead cross section	PD / 2.0 m / 3 x 0.08 mm^2	ND / 2.0 m / 3 x 0.14 mm^2
	EMV-class	EN 60947-5-2	EN 60947-5-2
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 67	IP 67
	Protection class		
	Permissible torque without / with toothed disc		
	Weight	2 g + weight of the lead	4 g + weight of the lead
	Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Wiring (1)
DC 3-pole, outgoing lead



Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

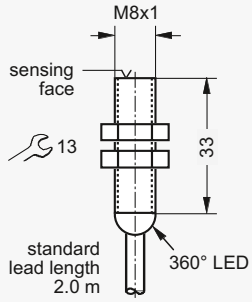
Subject to technical changes!

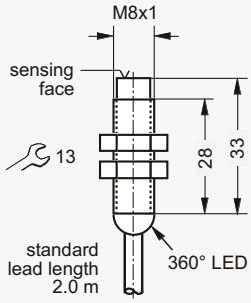
Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-8mg

		Design; length	**O M8 x 1;** 33 mm	**O M8 x 1;** 33 mm
		Material of the sensing face / of the housing	PCP / brass nickel-plated	PCP / brass nickel-plated
		Rated operating distance, mounting (see page 1.0.4)	**2 mm, flush**	**3 mm, non-flush**
		Range assured operating distance	0 ... 1.62 mm	0 ... 2.43 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-8mg33b2-1ND1A, 11.35-89-020 (1)	IAD-8mg33n3-1ND1A, 11.35-90-020 (1)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**3 kHz / ≥ 0.17 ms**	**2.5 kHz / ≥ 0.2 ms**
		Wiring (connector or lead); number of wires	lead; 3 wires	lead; 3 wires

Common Technical Data

Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	≤ 15 %
Repitition accuracy of the switching point s	≤ 15 %
- with permanent operating voltage	
... and ambient temperature	≤ 5 %
Permissible ripple voltage	≤ 10 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.4 V DC
Ambient temperature range	- 25 ... + 70 °C





Specific Technical Data

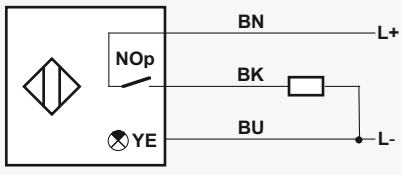
	Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
	Current consumption without load	≤ 10 mA	≤ 10 mA
	Load current	≤ 200 mA	≤ 200 mA
	Nominal insulation voltage	75 V DC	75 V DC
	Permissible capacity at output		
	Ø Sensing face		
	Switching radius r (at operating distance of the target s = 0; see page 1.0.2)		
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	150 m	150 m
	Lead type / standard lead length / number of wires x lead cross section	ND / 2.0 m / 3 x 0.14 mm^2	ND / 2.0 m / 3 x 0.14 mm^2
	EMV-class	EN 60947-5-2	EN 60947-5-2
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 67	IP 67
	Protection class		
	Permissible torque without / with toothed disc	8 Nm / 20 Nm	8 Nm / 20 Nm
	Weight	5 g + weight of the lead	5 g + weight of the lead
	Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Wiring (1)
DC 3-pole, outgoing lead

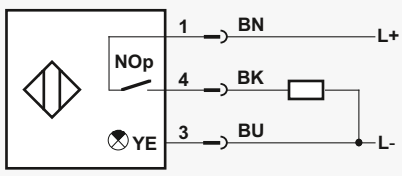


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

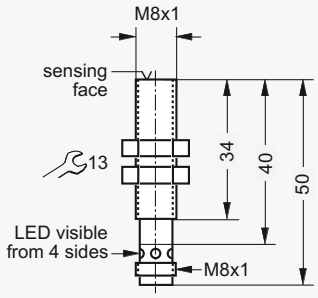
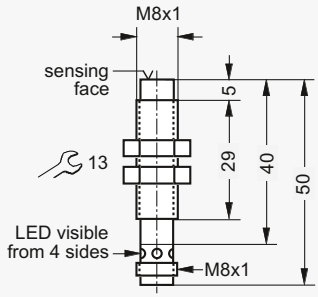
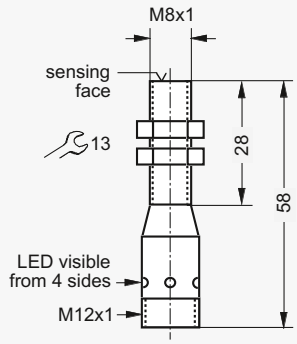
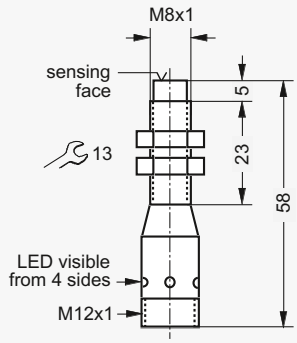
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

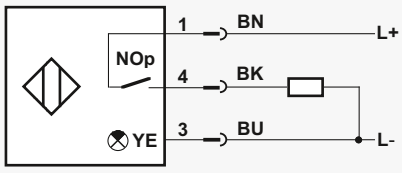
Wiring (2)
DC 3-pole, plug



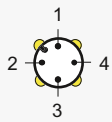
Euro Plug M8
with LED display YE
visible from 4 sides

O M8 x 1; 50 mm	**O M8 x 1;** 50 mm	**O M8 x 1 mm;** 58 mm	**O M8 x 1 mm;** 58 mm
PCP / brass nickel-plated	PCP / brass nickel-plated	PCP / brass nickel-plated	PA 6.6 / brass nickel-plated
2 mm, flush	**3 mm, non-flush**	**2 mm, flush**	**3 mm, non-flush**
0 ... 1.62 mm	0 ... 2.43 mm	0 ... 1.62 mm	0 ... 2.43 mm
IAD-8mg50b2-1Wc1A, 11.35-92 (2)	IAD-8mg50n3-1Wc1A, 11.35-93 (2)	IAD-8mg58b2-1Sd1A, 11.35-96 (3)	IAD-8mg58n3-1Sd1A 11.35-95 (3)
3 kHz / ≥ 0.17 ms	**2.5 kHz / ≥ 0.2 ms**	**3 kHz / ≥ 0.17 ms**	**2 kHz / ≥ 0.25 ms**
connector M8; 3 wires	connector M8; 3 wires	connector M12; 3 wires	connector M12; 3 wires
			
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 13 mA
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
75 V DC	75 V DC	75 V DC	75 V DC
yes, YE	yes, YE	yes, YE	yes, YE
150 m	150 m	150 m	150 m
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
8 Nm / 20 Nm	8 Nm / 20 Nm		
12 g	12 g	19 g	18 g
chapter 12	chapter 12	chapter 12	chapter 12

Wiring (3)
DC 3-pole, plug



Euro Plug M12
with LED display YE
visible from 4 sides

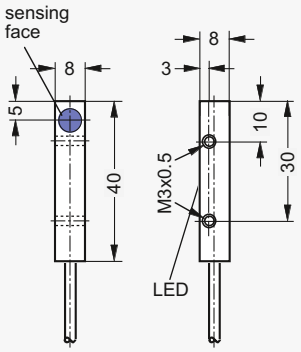


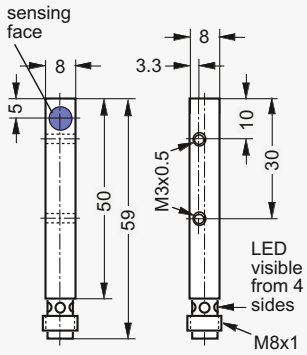
Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-8zq

		Design; length	☐ **8 x 8 mm;** 40 mm	☐ **8 x 8 mm;** 60 mm
		Material of the sensing face / of the housing	PBT / die-cast zinc	PA 6.6 / die-cast zinc
		Rated operating distance, mounting (see page 1.0.4)	**2 mm, flush**	**2 mm, flush**
		Range assured operating distance	0 ... 1.62 mm	0 ... 1.62 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-8zq40b2-1ND1A, 11.35-91-020 (1)	IAD-8zq60b2-1Wc1A 11.35-94 (2)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimum damping period		**2 kHz / ≥ 0.25 ms**	**1 kHz / ≥ 0.5 ms**
	Wiring (connector or lead); number of wires		lead; 3 wires	connector M8; 3 wires

Common Technical Data

Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	≤ 15 %
Repitition accuracy of the switching point s	≤ 15 %
- with permanent operating voltage	
... and ambient temperature	≤ 5 %
Permissible ripple voltage	≤ 10 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.4 V DC
Ambient temperature range	- 25 ... + 70 °C





Specific Technical Data

	Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
	Current consumption without load	≤ 13 mA	≤ 20 mA
	Load current	≤ 200 mA	≤ 200 mA
	Nominal insulation voltage	75 V DC	75 V DC
	Permissible capacity at output		
	Ø Sensing face		
	Switching radius r (at operating distance of the target s = 0; see page 1.0.2)		
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	150 m	150 m
	Lead type / standard lead length / number of wires x lead cross section	ND / 2.0 m / 3 x 0.14 mm^2	
	EMV-class	EN 60947-5-2	EN 60947-5-2
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 67	IP 67
	Protection class		
	Permissible torque without / with toothed disc		
	Weight	12 g + weight of the lead	7 g
	Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

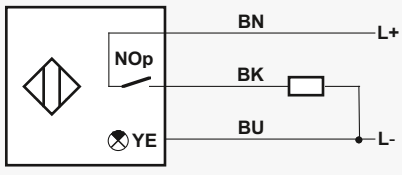
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

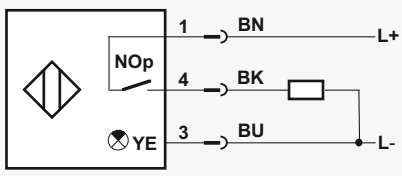
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

Wiring (1)
DC 3-pole, outgoing lead



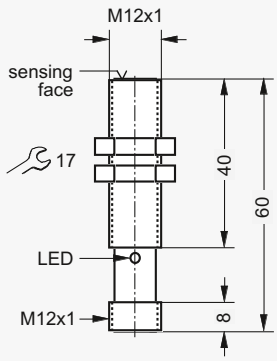
Wiring (2)
DC 3-pole, plug

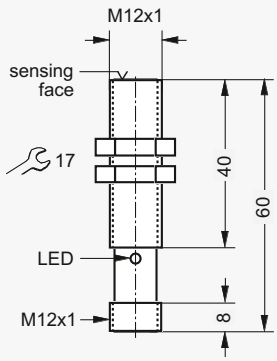


Euro Plug M8

Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-12eg, -12fg, -12mg

	Design; length		**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm
	Material of the sensing face / of the housing		PBT / stainless steel	PBT / stainless steel
	Rated operating distance, mounting (see page 1.0.4)		**2 mm, flush**	**2 mm, flush**
	Range assured operating distance		0 ... 1.62 mm	0 ... 1.62 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp		
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp	IAD-12eg60b2-12S2A, 11.24-89 (1)	IAD-12eg60b2-12S3A, 11.32-85 (1)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimum damping period		**3 kHz / ≥ 0.1 ms**	**3 kHz / ≥ 0.1 ms**
	Wiring (connector or lead); number of wires		connector M12; 4 wires	connector M12; 4 wires





	Common Technical Data		
	Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**	
	Hysteresis of the switching point s	3 ... 20 %	
	Repitition accuracy of the switching point s	≤ 10 %	
	- with permanent operating voltage		
	... and ambient temperature	≤ 2 %	
	Permissible ripple voltage	≤ 15 %	
	Short-circuit-proof ?	yes, clocking	
	Reverse polarity protection ?	yes	
	Voltage drop over a closed contact	≤ 2.5 V DC	
		11.24-89: ≤ 1.5 V DC	
		11.32-85: ≤ 1.5 V DC	
	Ambient temperature range	- 25 ... + 75 °C	
	Specific Technical Data		
	Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
	Current consumption without load	≤ 10 mA	≤ 10 mA
	Load current	≤ 200 mA	≤ 200 mA
	Nominal insulation voltage	75 V DC	75 V DC
	Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
	Ø Sensing face	10.5 mm	10.5 mm
	Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	1.85 mm	1.85 mm
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	300 m	300 m
	Lead type / standard lead length / number of wires x lead cross section		
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 67	IP 67
	Protection class		II, ⧈
	Permissible torque without / with toothed disc	12 Nm / 45 Nm	12 Nm / 45 Nm
	Weight	30 g	30 g
	Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

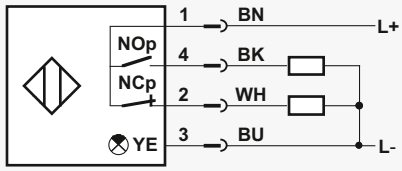
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

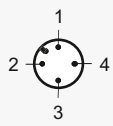
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

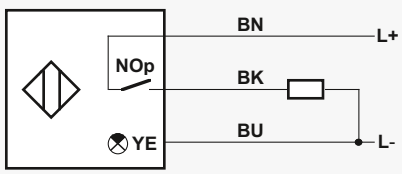
Wiring (1)
DC 4-pole, plug

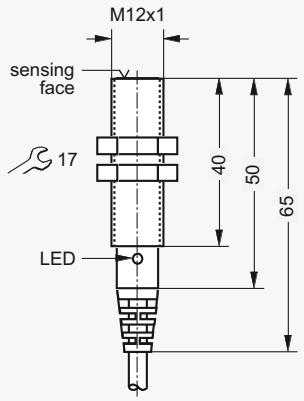
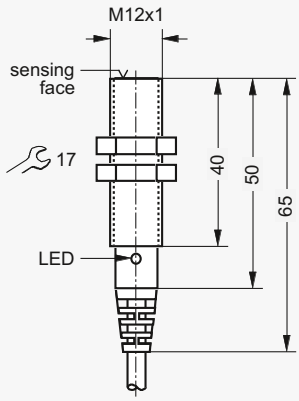
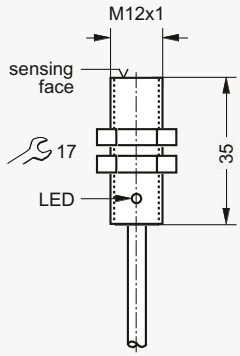


Eurostecker M12



Wiring (2)
DC 3-pole, outgoing lead

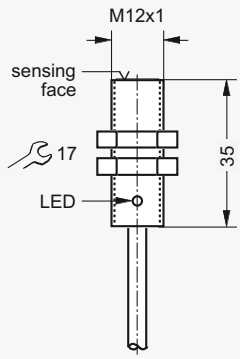


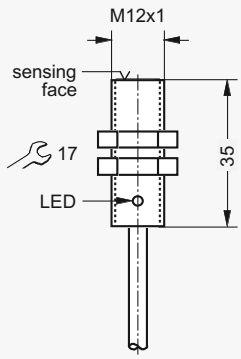
O M12 x 1; 50 mm	**O M12 x 1;** 50 mm	**O M12 x 1;** 35 mm	
PBT / PBT	PBT / PBT	PBT / CuZn nickel-plated	
2 mm, flush	**5 mm, non-flush**	**4 mm, flush, maximized**	
0 ... 1.62 mm	0 ... 4.05 mm	0 ... 3.24 mm	
IAD-12fg50b2-1NK1A, 11.32-61-020 (2)	IAD-12fg50n5-1NK1A, 11.32-62-030 (2)	IAD-12mg35m4-1PD1A, 11.33-05-030 (2)	
2 kHz / ≥ 0.2 ms	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 0.3 ms**	
lead; 3 wires	lead; 3 wires	lead; 3 wires	
			
8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	
≤ 10 mA	≤ 10 mA	≤ 10 mA	
≤ 400 mA	≤ 400 mA	≤ 400 mA	
75 V DC	75 V DC	75 V DC	
≤ 1.0 µF	≤ 0.47 µF	≤ 1.0 µF	
10.5 mm	10.7 mm	10.5 mm	
1.85 mm	3.5 mm	3.6 mm	
yes, YE	yes, YE	yes, YE	
300 m	300 m	300 m	
NK / 2.0 m / 3 x 0.34 mm^2	NK / 3.0 m / 3 x 0.34 mm^2	PD / 3.0 m / 3 x 0.34 mm^2	
DC13	DC13	DC 13	
IP 67	IP 67	IP 67	
		II, ⧈	
1.5 Nm / 2 Nm	1.5 Nm / 2 Nm	9 Nm / 30 Nm	
30 g + weight of the lead	30 g + weight of the lead	20 g + weight of the lead	
chapter 12	chapter 12	chapter 12	

Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-12mg

		Design; length	**O M12 x 1;** 35 mm	**O M12 x 1;** 35 mm
		Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
		Rated operating distance, mounting (see page 1.0.4)	**4 mm, flush, maximized**	**4 mm, flush, maximized**
		Range assured operating distance	0 ... 3.24 mm	0 ... 3.24 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-12mg35m4-1ND2A, 11.35-01-030 (1)	
	NC plus-switching	NCp		IAD-12mg35m4-2ND1A, 11.35-02-020 (2)
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**≤ 1.5 kHz / ≥ 0.3 ms**	**≤ 1.5 kHz / ≥ 0.3 ms**
		Wiring (connector or lead); number of wires	lead; 3 wires	lead; 3 wires

Gemeommon Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
	11.35-01, -02: ≤ 0.5 %
Permissible ripple voltage	≤ 15 %
	11.35-01, -02: ≤ 10 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC,
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	10.5 mm	10.5 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	3.6 mm	3.6 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	300 m	300 m
Lead type / standard lead length / number of wires x lead cross section	ND / 3.0 m / 3 x 0.34 mm^2	ND / 2.0 m / 3 x 0.34 mm^2
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc	9 Nm / 30 Nm	9 Nm / 30 Nm
Weight	90 g + weight of the lead	90 g + weight of the lead
Note	no internal load resistance	no internal load resistance
Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

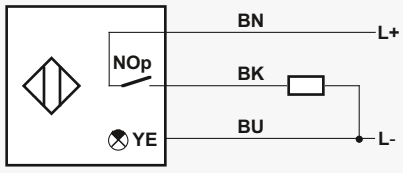
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

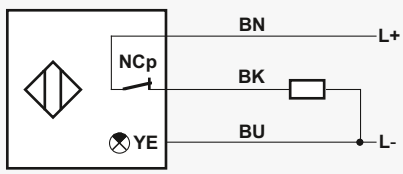
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

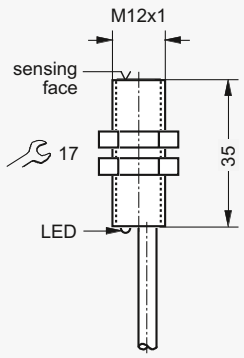
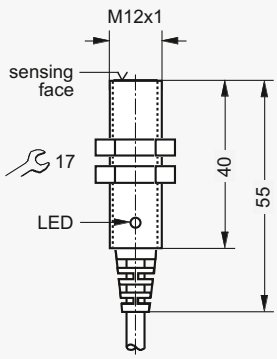
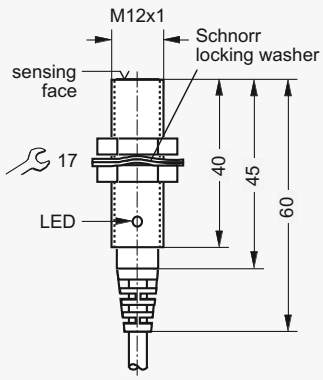
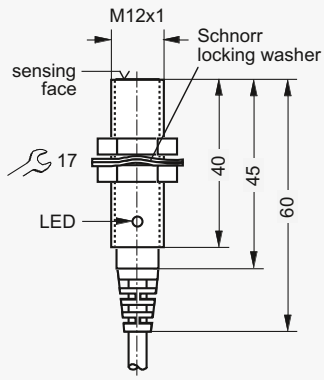
Subject to technical changes!

Wiring (1)
DC 3-pole, outgoing lead

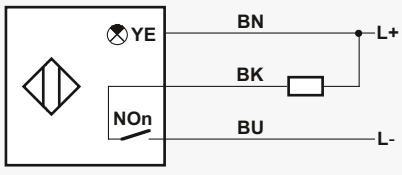


Wiring (2)
DC 3-pole, outgoing lead

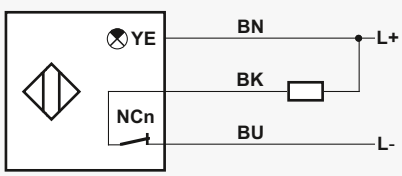


O M12 x 1; 35 mm	**O M12 x 1;** 40 mm	**O M12 x 1;** 45 mm	**O M12 x 1;** 45 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
4 mm, flush, maximized	**2 mm, flush**	**2 mm, flush**	**2 mm, flush**
0 ... 3.24 mm	0 ... 1.62 mm	0 ... 1.62 mm	0 ... 1.62 mm
	IAD-12mg40b2-1NK1A, 11.20-67-030 (1)	IAD-12mg45b2-1NK1A, 11.32-17-020 (1)	
IAD-12mg35m4-6ND1A, 11.33-10-020 (3)			IAD-12mg45b2-7NK1A, 11.32-19-050 (4)
1.5 kHz / ≥ 0.3 ms	**2 kHz / ≥ 0.2 ms**	**3 kHz / ≥ 0.1 ms**	**3 kHz / ≥ 0.1 ms**
lead; 3 wires	lead; 3 wires	lead; 3 wires	lead; 3 wires
			
10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
10.5 mm	10.5 mm	10.5 mm	10.5 mm
3.6 mm	1.85 mm	1.85 mm	1.85 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
ND / 2.0 m / 3 x 0.34 mm^2	NK / 3.0 m / 3 x 0.34 mm^2	NK / 2.0 m / 3 x 0.34 mm^2	NK / 5.0 m / 3 x 0.34 mm^2
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
II, ⧈	II, ⧈	II, ⧈	II, ⧈
9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm
20 g + weight of the lead	25 g + weight of the lead	40 g + weight of the lead	40 g + weight of the lead
chapter 12	chapter 12	chapter 12	chapter 12

Wiring (3)
DC 3-pole, outgoing lead

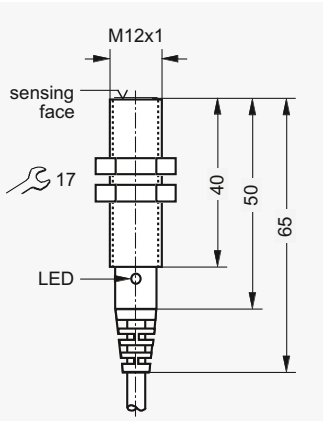


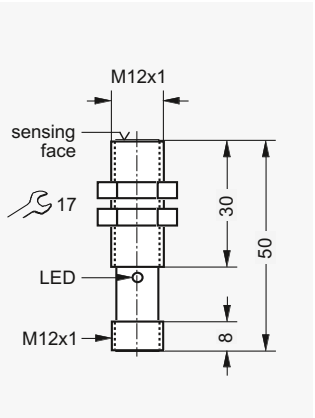
Wiring (4)
DC 3-pole, outgoing lead



Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-12mg

	Design; length		**O M12 x 1;** 50 mm	**O M12 x 1;** 50 mm
	Material of the sensing face / of the housing		PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Rated operating distance, mounting (see page 1.0.4)		**2 mm, flush**	**2 mm, flush**
	Range assured operating distance		0 ... 1.62 mm	0 ... 1.62 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-12mg50b2-1PK1A, 11.22-42-020 (1)	IAD-12mg50b2-1S1A, 11.20-73 (2)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimum damping period		**2 kHz / ≥ 0.2 ms**	**2 kHz / ≥ 0.2 ms**
	Wiring (connector or lead); number of wires		lead; 3 wires	connector M12; 3 wires





Common Technical Data		
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**	
Hysteresis of the switching point s	3 ... 20 %	
Repitition accuracy of the switching point s	≤ 10 %	
- with permanent operating voltage		
... and ambient temperature	≤ 2 %	
Permissible ripple voltage	≤ 15 %	
Short-circuit-proof ?	yes, clocking	
Reverse polarity protection ?	yes	
Voltage drop over a closed contact	≤ 1.5 V DC	
	11.25-85: ≤ 2.5 V DC	
Ambient temperature range	- 25 ... + 75 °C	
Specific Technical Data		
Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	10.5 mm	10.5 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	1.85 mm	1.85 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	300 m	300 m
Lead type / standard lead length / number of wires x lead cross section	PK / 2.0 m / 3 x 0.34 mm^2	
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc	9 Nm / 30 Nm	9 Nm / 30 Nm
Weight	45 g + weight of the lead	30 g
Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

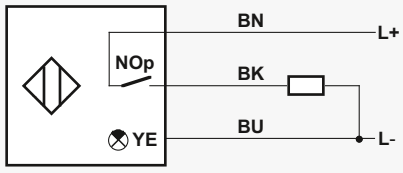
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

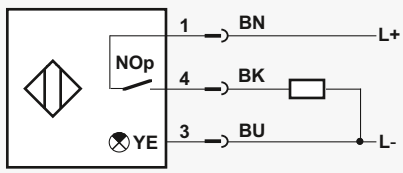
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

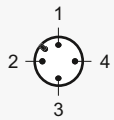
Wiring (1)
DC 3-pole, outgoing lead

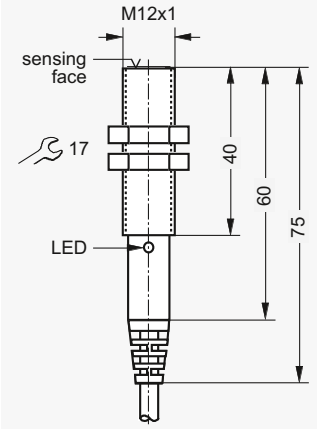
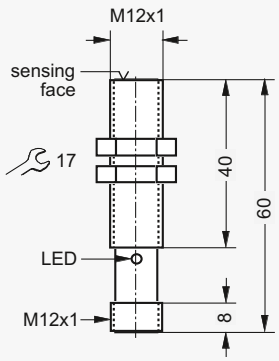
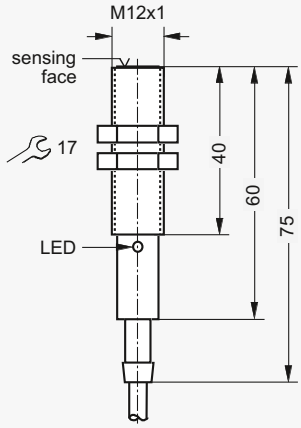
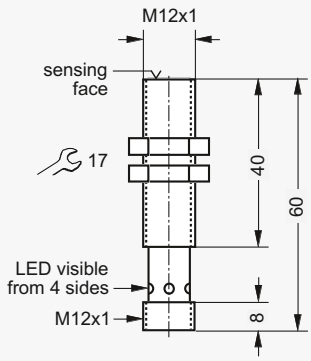


Wiring (2)
DC 3-pole, plug

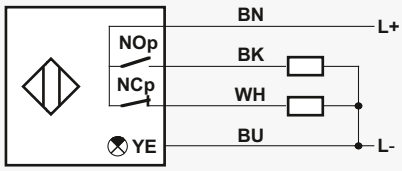


Euro Plug M12

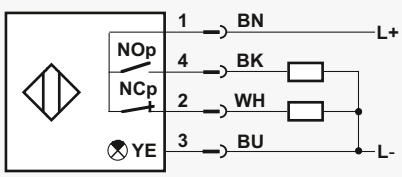


O M12 x 1; 60 mm	**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
2 mm, flush	**2 mm, flush**	**2 mm, flush**	**2 mm, flush**
0 ... 1.62 mm	0 ... 1.62 mm	0 ... 1.62 mm	0 ... 1.62 mm
		IAD-12mg60b2-1NT1A, 11.20-01-020 (1)	IAD-12mg60b2-1S2A, 11.25-85 (5)
IAD-12mg60b2-12NK1A, 11.22-11-020 (3)	IAD-12mg60b2-12S1A, 11.22-12 (4)		
3 kHz / ≥ 0.1 ms	**3 kHz / ≥ 0.1 ms**	**2 kHz / ≥ 0.2 ms**	**2 kHz / ≥ 0.2 ms**
lead; 4 wires	connector M12; 4 wires	lead; 3 wires	connector M12; 3 wires
			
8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
10.5 mm	10.5 mm	10.5 mm	10.5 mm
1.85 mm	1.85 mm	1.85 mm	1.85 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
NK / 2.0 m / 4 x 0.34 mm^2		NT / 2.0 m / 3 x 0.34 mm^2	
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
II, ⧈	II, ⧈	II, ⧈	II, ⧈
9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm
40 g + weight of the lead	30 g	40 g + weight of the lead	30 g
chapter 12	chapter 12	chapter 12	chapter 12

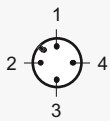
Wiring (3)
DC 4-pole, outgoing lead



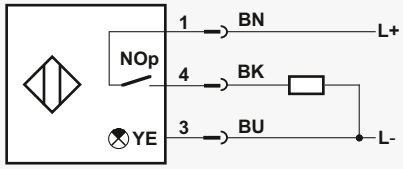
Wiring (4)
DC 4-pole, plug



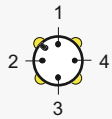
Euro Plug M12



Wiring (5)
DC 3-pole, plug



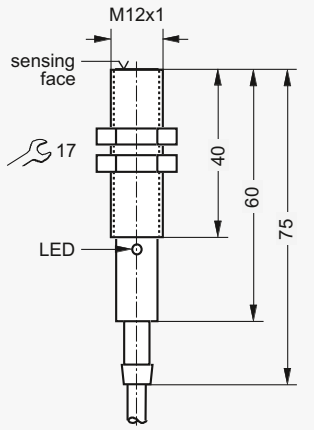
Euro Plug M12
with LED YE
visible from 4 sides

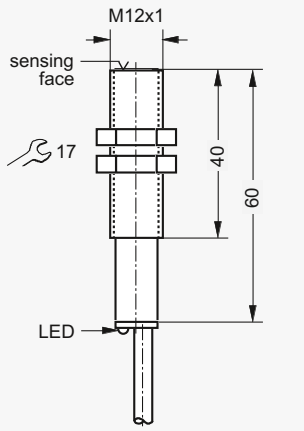


Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-12mg

	Design; length		**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm
	Material of the sensing face / of the housing		PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Rated operating distance, mounting (see page 1.0.4)		**4 mm, flush, maximized**	**4 mm, flush, maximized**
	Range assured operating distance		0 ... 3.24 mm	0 ... 3.24 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-12mg60m4-1NT1A, 11.24-09-030 (1)	IAD-12mg60m4-1PD1A, 11.25-81-020 (1)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimum damping period		**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 0.1 ms**
	Wiring (connector or lead); number of wires		lead; 3 wires	lead; 3 wires

Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
	11.22-23: ≤ 1.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data			
Permissible operating voltage range		10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load		≤ 10 mA	≤ 10 mA
Load current		≤ 400 mA	≤ 400 mA
Nominal insulation voltage		75 V DC	75 V DC
Permissible capacity at output		≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face		10.5 mm	10.5 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)		3.6 mm	3.6 mm
Function indication ?		yes, YE	yes, YE
Maximum lead length		300 m	300 m
Lead type / standard lead length / number of wires x lead cross section		NT / 3.0 m / 3 x 0.34 mm^2	PD / 2.0 m / 3 x 0.34 mm^2
Utilization category according to IEC 60947-5-2		DC 13	DC 13
Protection rating according to IEC 60529		IP 67	IP 67
Protection class		II, ⧈	II, ⧈
Permissible torque without / with toothed disc		9 Nm / 30 Nm	9 Nm / 30 Nm
Weight		40 g + weight of the lead	40 g + weight of the lead
Recommended accessories		chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

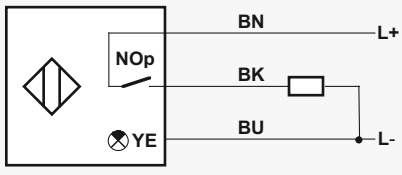
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

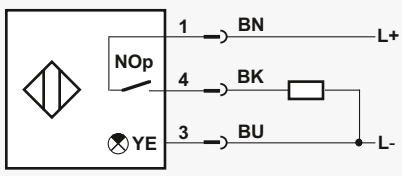
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

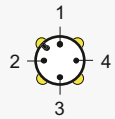
Wiring (1)
DC 3-pole, outgoing lead

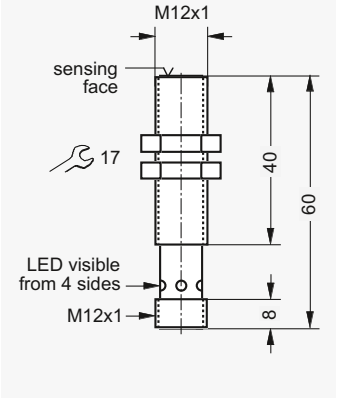
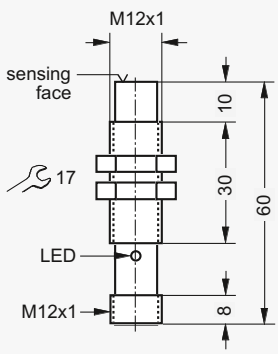
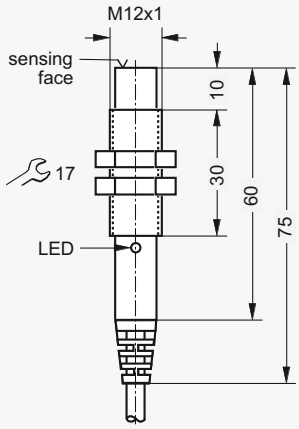
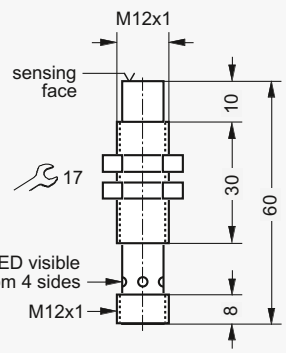


Wiring (2)
DC 3-pole, plug

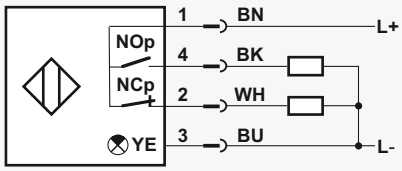


Euro Plug M12
with LED YE
visible from 4 sides

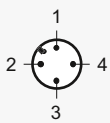


O M12 x 1; 60 mm	**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn	PBT / CuZn nickel-plated
4 mm, flush, maximized	**5 mm, non-flush**	**5 mm, non-flush**	**5 mm, non-flush**
0 ... 3.24 mm	0 ... 4.05 mm	0 ... 4.05 mm	0 ... 4.05 mm
IAD-12mg60m4-1S1A, 11.25-03 (2)		IAD-12mg60n5-1NK1A, 11.20-15-020 (1)	IAD-12mg60n5-1S1A, 11.25-04 (2)
	IAD-12mg60n5-12S1A, 11.22-23 (3)		
1 kHz / ≥ 0.3 ms	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 0.3 ms**
connector M12; 3 wires	connector M12; 4 wires	lead; 3 wires	connector M12; 3 wires
			
8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 200 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 0.47 µF	≤ 0.47 µF	≤ 0.47 µF
10.5 mm	10.7 mm	10.7 mm	10.7 mm
3.6 mm	3.5 mm	3.5 mm	3.5 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
		NK / 2.0 m / 3 x 0.34 mm^2	
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
II, ⧈	II, ⧈	II, ⧈	II, ⧈
9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm
30 g	30 g	40 g + weight of the lead	30 g
chapter 12	chapter 12	chapter 12	chapter 12

Wiring (3)
DC 4-pole, plug



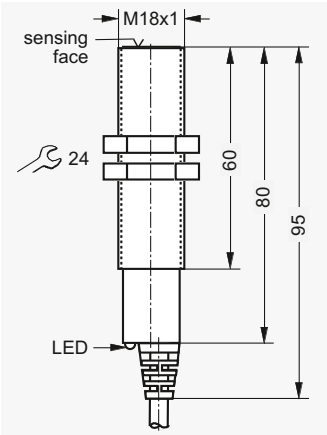
Euro Plug M12

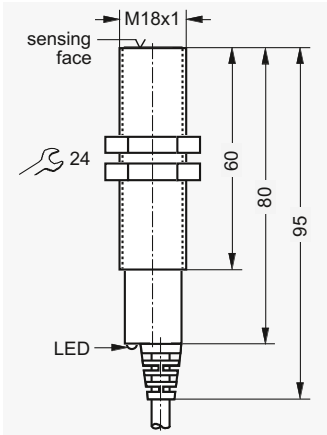


Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-18fg, -18mg

		Design; length	**O M18 x 1;** 80 mm	**O M18 x 1;** 80 mm
		Material of the sensing face / of the housing	PBT / PBT	PBT / PBT
		Rated operating distance, mounting (see page 1.0.4)	**5 mm, flush**	**10 mm, non-flush**
		Range assured operating distance	0 ... 4.05 mm	0 ... 8.1 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-18fg80b5-1NK1A, 11.17-12-020 (1)	IAD-18fg80n10-1NK1A, 11.20-95-020 (1)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**1 kHz / ≥ 0.3ms**	**800 Hz / ≥ 1 ms**
		Wiring (connector or lead); number of wires	lead; 3 wires	lead; 3 wires

Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
	11.35-03: ≤ 0.5 %
	11.33-11: ≤ 0.5 %
Permissible ripple voltage	≤ 15 %
	11.35-03: ≤ 10 %
	11.33-11: ≤ 10 %
Short-circuit-proof ? / Reverse polarity protection ?	yes, clocking / yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data			
Permissible operating voltage range		8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load		≤ 10 mA	≤ 10 mA
Load current		≤ 400 mA	≤ 400 mA
Nominal insulation voltage		75 V DC	75 V DC
Permissible capacity at output		≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face		16.5 mm	16.5 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)		4.8 mm	6.0 mm
Function indication ?		yes, YE	yes, YE
Maximum lead length		300 m	300 m
Lead type / standard lead length / number of wires x lead cross section		NK / 2.0 m / 3 x 0.34 mm^2	NK / 2.0 m / 3 x 0.34 mm^2
Utilization category according to IEC 60947-5-2		DC 13	DC 13
Protection rating according to IEC 60529		IP 67	IP 67
Protection class			
Permissible torque without / with toothed disc		2.5 Nm / 3.5 Nm	2.5 Nm / 3.5 Nm
Weight		80 g + weight of the lead	80 g + weight of the lead
Note			
Recommended accessories		chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

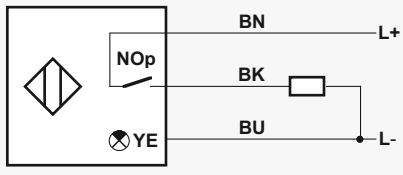
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

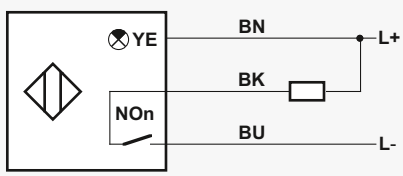
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

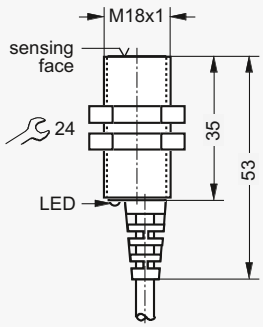
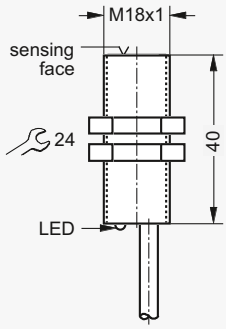
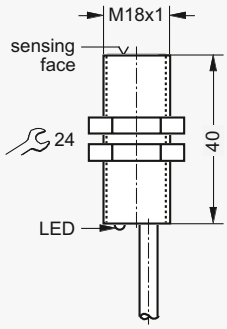
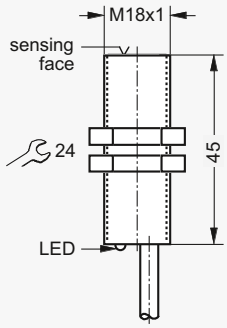
Subject to technical changes!

Wiring (1)
DC 3-pole, outgoing lead

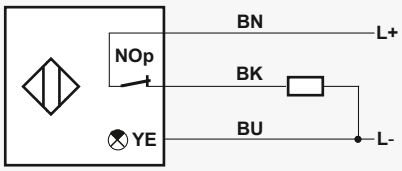


Wiring (2)
DC 3-pole, outgoing lead



O M18 x 1; 35 mm	**O M18 x 1;** 40 mm	**O M18 x 1;** 40 mm	**O M18 x 1;** 45 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
5 mm, flush	**8 mm, flush, maximized**	**8 mm, flush, maximized**	**8 mm, flush, maximized**
0 ... 4.05 mm	0 ... 6.48 mm	0 ... 6.48 mm	0 ... 6.48 mm
IAD-18mg35b5-1NK1A, 11.20-30-020 (1)		IAD-18mg40m8-1ND2A, 11.35-03 (1)	
			IAD-18mg45m8-2ND1A, 11.35-04 (3)
	IAD-18mg40m8-6ND1A, 11.33-11-020 (2)		
1 kHz / ≥ 0.3 ms	**1 kHz / ≥ 1 ms**	**≤ 1 kHz / ≥ 1 ms**	**≤ 1 kHz / ≥ 1 ms**
lead; 3 wires	lead; 3 wires	lead; 3 wires	lead; 3 wires
			
8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
16.5 mm	16.5 mm	16.5 mm	16.5 mm
4.8 mm	6.0 mm	4.8 mm	6.0 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
NK / 2.0 m / 3 x 0.34 mm^2	ND / 2.0 m / 3 x 0.34 mm^2	ND / 2.0 m / 3 x 0.34 mm^2	ND / 2.0 m / 3 x 0.34 mm^2
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
II, ⧈			II, ⧈
34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm
35 g + weight of the lead	40 g + weight of the lead	40 g + weight of the lead	40 g + weight of the lead
		no internal load resistance	no internal load resistance
chapter 12	chapter 12	chapter 12	chapter 12

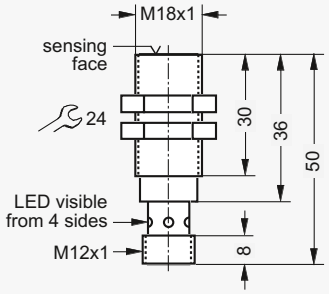
Wiring (3)
DC 3-pole, outgoing lead

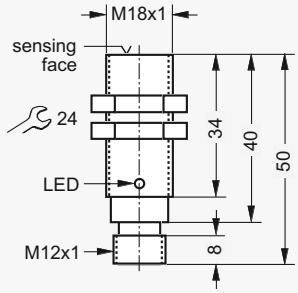


Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-18mg

	Design; length		**O M18 x 1;** 50 mm	**O M18 x 1;** 50 mm
	Material of the sensing face / of the housing		PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Rated operating distance, mounting (see page 1.0.4)		**5 mm, flush**	**8 mm, flush, maximized**
	Range assured operating distance		0 ... 4.05 mm	0 ... 6.48 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-18mg50b5-1S1A, 11.22-06 (1)	IAD-18mg50m8-1S1A, 11.33-18 (2)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimum damping period		**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 1 ms**
	Wiring (connector or lead); number of wires		connector M12; 3 wires	connector M12; 3 wires

Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data		
Permissible operating voltage range	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	4.8 mm	6.0 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	300 m	300 m
Lead type / standard lead length / number of wires x lead cross section		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class		II, ⧈
Permissible torque without / with toothed disc	34 Nm / 70 Nm	34 Nm / 70 Nm
Weight	50 g	50 g
Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

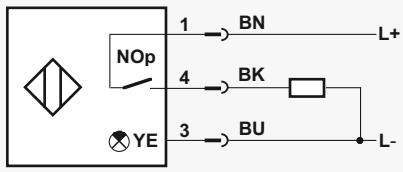
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

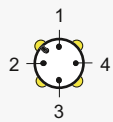
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

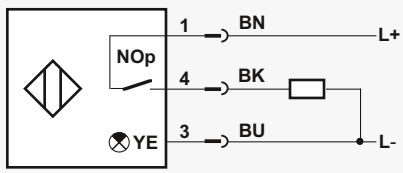
Wiring (1)
DC 3-pole, plug



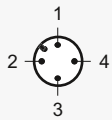
Euro Plug M12
with LED YE
visible from 4 sides

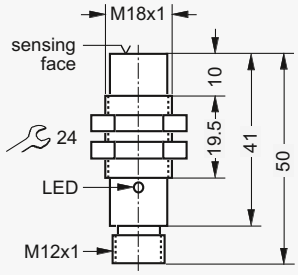
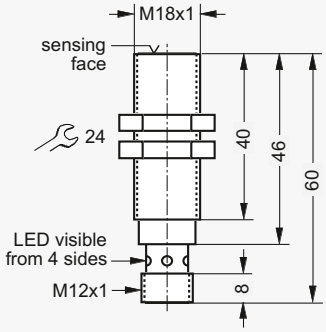
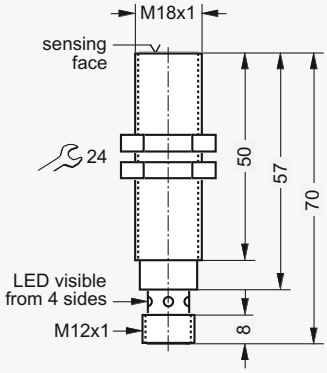
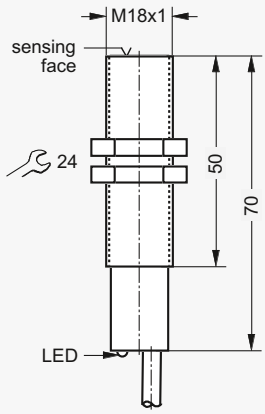


Wiring (2)
DC 3-pole, plug

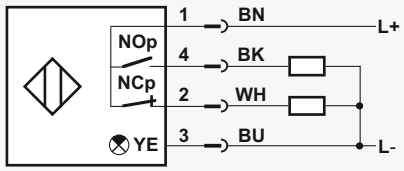


Euro Plug M12

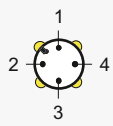


O M18 x 1; 50 mm	**O M18 x 1;** 60 mm	**O M18 x 1;** 70 mm	**O M18 x 1;** 70 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
10 mm, non-flush	**5 mm, flush**	**5 mm, flush**	**8 mm, flush, maximized**
0 ... 8.1 mm	0 ... 4.05 mm	0 ... 4.05 mm	0 ... 6.48 mm
IAD-18mg50n10-1S1A, 11.22-16 (2)		IAD-18mg70b5-1S1A, 11.25-86 (1)	IAD-18mg70m8-1PD1A, 11.25-82-030 (4)
	IAD-18mg60b5-12S1A, 11.22-03 (3)		
800 Hz / ≥ 1 ms	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 1 ms**
connector M12; 3 wires	connector M12; 3 wires	connector M12; 3 wires	lead; 3 wires
			
10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
16.5 mm	16.5 mm	16.5 mm	16.5 mm
6.0 mm	4.8 mm	4.8 mm	6.5 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
			PD / 3.0 m / 3 x 0.34 mm^2
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
II, ⧈	II, ⧈	II, ⧈	II, ⧈
34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm
45 g	60 g	70 g	70 g + weight of the lead
chapter 12	chapter 12	chapter 12	chapter 12

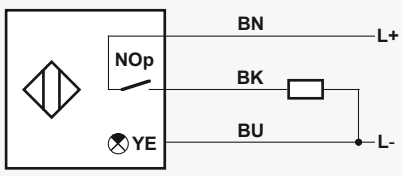
Wiring (3)
DC 4-pole, plug



Euro Plug M12
with LED YE
visible from 4 sides



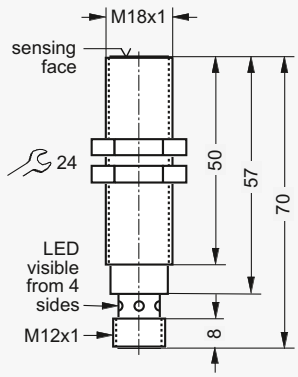
Wiring (4)
DC 3-pole, outgoing lead

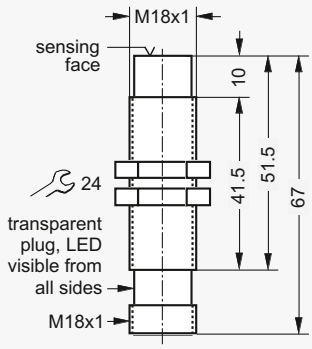


Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-18mg

		Design; length	**O M18 x 1;** 70 mm	**O M18 x 1;** 67 mm
		Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
		Rated operating distance, mounting (see page 1.0.4)	**8 mm, flush, maximized**	**10 mm, non-flush**
		Range assured operating distance	0 ... 6.48 mm	0 ... 8.1 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-18mg70m8-1S1A, 11.25-97 (1)	
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		IAD-18mg70n10-12V1A, 11.32-91 (2)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**1 kHz / ≥ 1 ms**	**200 Hz / ≥ 1 ms**
		Wiring (connector or lead); number of wires	connector M12; 3 wires	connector M18; 4 wires

Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data			
	Permissible operating voltage range	10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
	Current consumption without load	≤ 10 mA	≤ 10 mA
	Load current	≤ 400 mA	≤ 400 mA
	Nominal insulation voltage	75 V DC	75 V DC
	Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
	Ø Sensing face	16.5 mm	16.5 mm
	Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	6.5 mm	6.0 mm
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	300 m	300 m
	Lead type / standard lead length / number of wires x lead cross section		
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 67	IP 67
	Protection class	II, ⧈	II, ⧈
	Permissible torque without / with toothed disc	34 Nm / 70 Nm	34 Nm / 70 Nm
	Weight	70 g	60 g
	Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

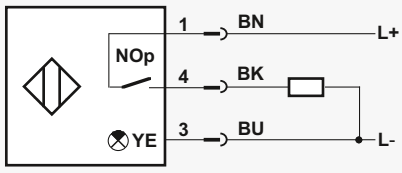
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

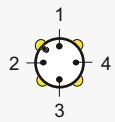
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

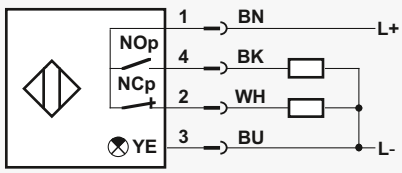
Wiring (1)
DC 3-pole, plug



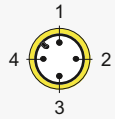
Euro Plug M12
with LED YE
visible from 4 sides

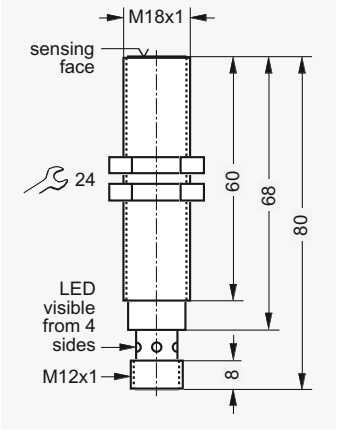
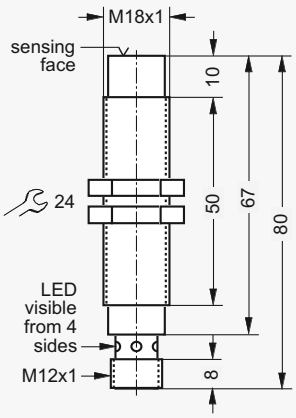
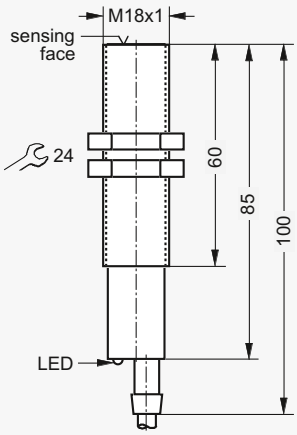
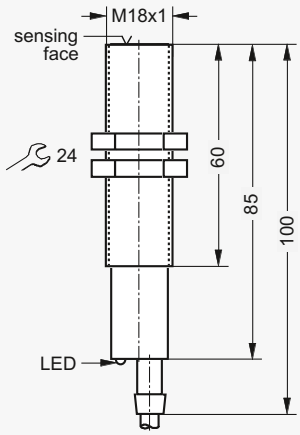


Wiring (2)
DC 4-pole, plug

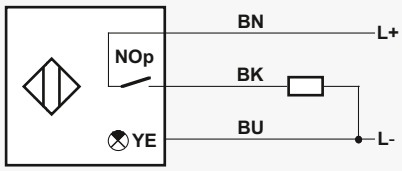


Euro Plug M18
with LED YE
visible from all sides

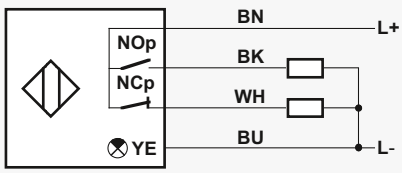


O M18 x 1; 80 mm	**O M18 x 1;** 80 mm	**O M18 x 1;** 85 mm	**O M18 x 1;** 85 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
5 mm, flush	**10 mm, non-flush**	**5 mm, flush**	**5 mm, flush**
0 ... 4.05 mm	0 ... 8.1 mm	0 ... 4.05 mm	0 ... 4.05 mm
IAD-18mg80b5-1S1A, 11.22-85 (1)	IAD-18mg80n10-1S1A, 11.22-91 (1)	IAD-18mg85b5-1NT1A, 11.20-02-020 (3)	
			IAD-18mg85b5-12NK1A, 11.18-32-020 (4)
1 kHz / ≥ 0.3 ms	**800 Hz / ≥ 1 ms**	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 0.3 ms**
connector M12; 3 wires	connector M12; 3 wires	lead; 3 wires	lead; 4 wires
			
8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
16.5 mm	16.5 mm	16.5 mm	16.5 mm
4.8 mm	6.0 mm	4.8 mm	4.8 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
		NT / 2.0 m / 3 x 0.34 mm^2	NT / 2.0 m / 4 x 0.34 mm^2
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
	II, ⧈	II, ⧈	II, ⧈
34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm
80 g	80 g	100 g + weight of the lead	100 g + weight of the lead
chapter 12	chapter12	chapter 12	chapter 12

Wiring (3)
DC 3-pole, outgoing lead



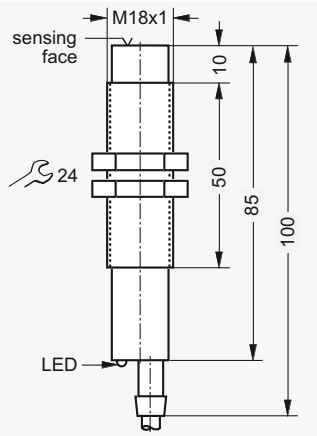
Wiring (4)
DC 4-pole, outgoing lead



Inductive Proximidy Switches, Ferrous DC 3- and 4-pole
Series IAD-18mg

		Design; length	**O M18 x 1;** 85 mm	
		Material of the sensing face / of the housing	PBT / CuZn nickel-plated	
		Rated operating distance, mounting (see page 1.0.4)	**10 mm, non-flush**	
		Range assured operating distance	0 ... 8.1 mm	
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-18mg85n10-1NT1A, 11.20-75-020 (1)	
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**800 Hz / ≥ 1 ms**	
		Wiring (connector or lead); number of wires	lead; 3 wires	

Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C



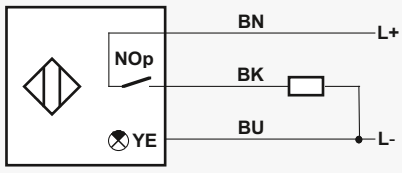
Specific Technical Data	
Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 400 mA
Nominal insulation voltage	75 V DC
Permissible capacity at output	≤ 1.0 µF
Ø Sensing face	16.5 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	6.0 mm
Function indication ?	yes, YE
Maximum lead length	300 m
Lead type / standard lead length / number of wires x lead cross section	NT / 2.0 m / 3 x 0.34 mm^2
Utilization category according to IEC 60947-5-2	DC 13
Protection rating according to IEC 60529	IP 67
Protection class	II, ⧈
Permissible torque without / with toothed disc	34 Nm / 70 Nm
Weight	90 g + weight of the lead
Recommended accessories	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Wiring (1)
DC 3-pole, outgoing lead



Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

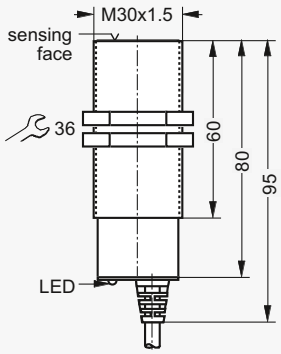
Subject to technical changes!

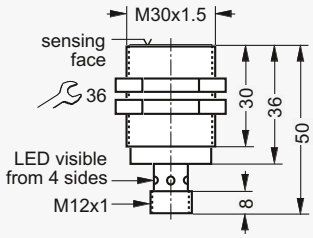
KLASCHKA Industrieelektronik

Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-30fg, -30mg

		Design; length	**O M30 x 1.5;** 80 mm	**O M30 x 1.5;** 50 mm
		Material of the sensing face / of the housing	PBT / PBT	PBT / CuZn nickel-plated
		Rated operating distance, mounting (see page 1.0.4)	**10 mm, flush**	**10 mm, flush**
		Range assured operating distance	0 ... 8.1 mm	0 ... 8.1 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp		IAD-30mg50b10-1S1A, 11.22-19 (2)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp	IAD-30fg80b10-12NK1A, 11.16-50-020 (1)	
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**300 Hz / ≥ 1 ms**	**300 Hz / ≥ 1 ms**
		Wiring (connector or lead); number of wires	lead; 4 wires	connector M12; 3 wires

Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





	Specific Technical Data		
	Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
	Current consumption without load	≤ 10 mA	≤ 10 mA
	Load current	≤ 400 mA	≤ 400 mA
	Nominal insulation voltage	75 V DC	75 V DC
	Permissible capacity at output	≤ 0.47 µF	≤ 0.47 µF
	Ø Sensing face	27.4 mm	27.4 mm
	Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	9.4 mm	9.4 mm
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	300 m	300 m
	Lead type / standard lead length / number of wires x lead cross section	NK / 2.0 m / 4 x 0.34 mm^2	
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 67	IP 67
	Protection class		
	Permissible torque without / with toothed disc	8 Nm / 10 Nm	150 Nm / < 200 Nm
	Weight	90 g + weight of the lead	100 g
	Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

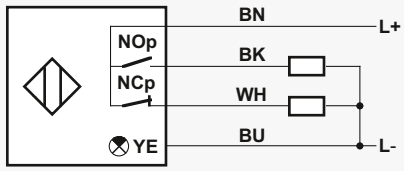
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

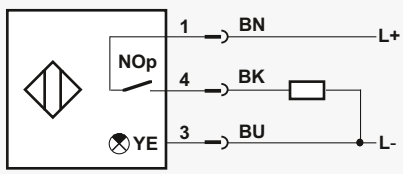
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

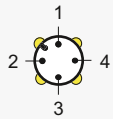
Wiring (1)
DC 4-pole, outgoing lead

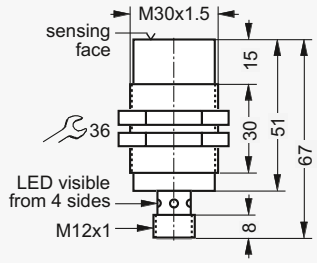
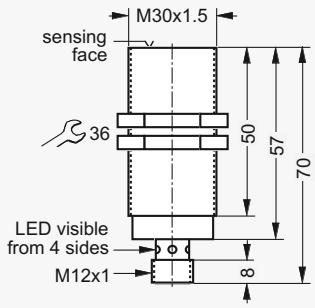
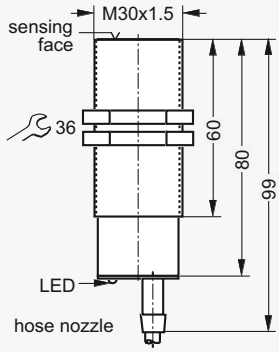
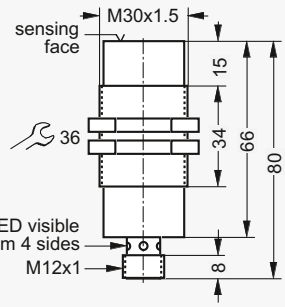


Wiring (2)
DC 3-pole, plug

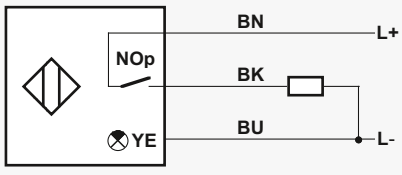


Euro Plug M12
with LED YE
visible from 4 sides

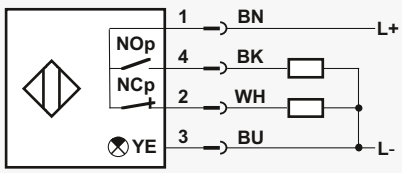


O M30 x 1.5; 65 mm	**O M30 x 1.5;** 70 mm	**O M30 x 1.5;** 80 mm	**O M30 x 1.5;** 80 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
20 mm, non-flush	**10 mm, flush**	**10 mm, flush**	**20 mm, non-flush**
0 ... 16.2 mm	0 ... 8.1 mm	0 ... 8.1 mm	0 ... 16.2 mm
IAD-30mg65n20-1S1A, 11.32-36 (2)	IAD-30mg70b10-1S1A, 11.25-88 (2)	IAD-30mg80b10-1NT1A, 11.20-03-020 (3)	
			IAD-30mg80n20-12S1A, 11.22-05 (4)
150 Hz / ≥ 2 ms	**300 Hz / ≥ 1 ms**	**300 Hz / ≥ 1 ms**	**150 Hz / ≥ 2 ms**
connector M12; 3 wires	connector M12; 3 wires	lead; 3 wires	connector M12; 4 wires
			
8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 0.47 µF	≤ 0.47 µF	≤ 1.0 µF
27.4 mm	27.4 mm	27.4 mm	27.4 mm
12.2 mm	9.4 mm	9.4 mm	12.2 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
		NT / 2.0 m / 3 x 0.34 mm^2	
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
II, ⧈	II, ⧈	II, ⧈	II, ⧈
150 Nm / < 200 Nm	150 Nm / < 200 Nm	150 Nm / < 200 Nm	150 Nm / < 200 Nm
100 g	150 g	190 g + weight of the lead	100 g
chapter 12	chapter 12	chapter 12	chapter 12

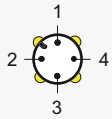
Wiring (3)
DC 3-pole, outgoing lead



Wiring (4)
DC 4-pole, plug



Euro Plug M12
with LED YE
visible from 4 sides

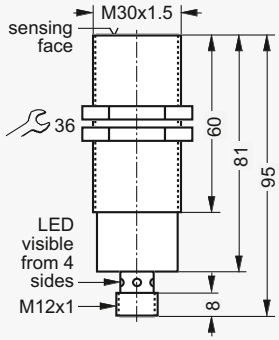


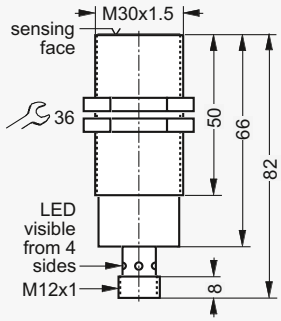
Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-30mg, -30sg

		Design; length	**O M30 x 1.5;** 95 mm	**O M30 x 1.5;** 82 mm
		Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / stainless nickel-plated
		Rated operating distance, mounting (see page 1.0.4)	**10 mm, flush**	**10 mm, flush**
		Range assured operating distance	0 ... 8.1 mm	0 ... 8.1 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-30mg95b10-1S1A, 11.22-86 (1)	
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		IAD-30sg80b10-12S1A, 11.22-04 (2)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**300 Hz / ≥ 1 ms**	**300 Hz / ≥ 1 ms**
		Wiring (connector or lead); number of wires	connector M12; 3 wires	connector M12; 4 wires

Common Technical Data

Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data

Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 0.47 µF	≤ 0.47 µF
Ø Sensing face	27.4 mm	27.4 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	9.4 mm	9.4 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	300 m	300 m
Lead type / standard lead length / number of wires x lead cross section		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	
Permissible torque without / with toothed disc	150 Nm / < 200 Nm	170 Nm / < 200 Nm
Weight	180 g	175 g
Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

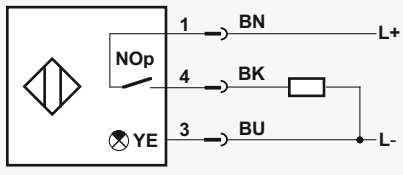
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

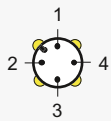
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

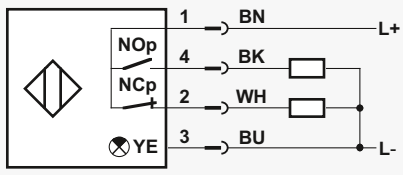
Wiring (1)
DC 3-pole, plug



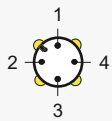
Euro Plug M12
with LED YE
visible from 4 sides



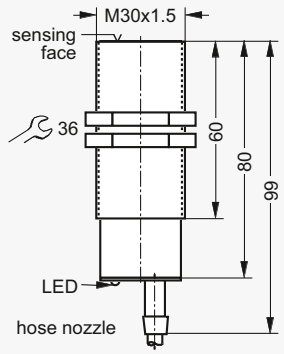
Wiring (2)
DC 4-pole, plug



Euro Plug M12
with LED YE
visible from 4 sides

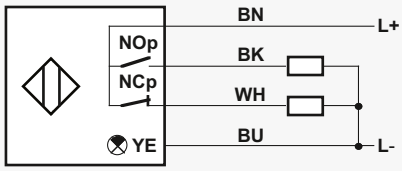


O M30 x 1.5; 80 mm			
PBT / stainless nickel-plated			
10 mm, flush			
0 ... 8.1 mm			
IAD-30mg80b10-12NT1A, 11.18-71-020 (3)			
300 Hz / ≥ 1 ms			
lead; 3 wires			



8 ... 24 ... 30 V DC			
≤ 10 mA			
≤ 400 mA			
75 V DC			
≤ 0.47 µF			
27.4 mm			
9.4 mm			
yes, YE			
300 m			
NT / 2.0 m / 4 x 0.34 mm^2			
DC 13			
IP 67			
II, ⧈			
170 Nm / < 200 Nm			
190 g + weight of the lead			
chapter 12			

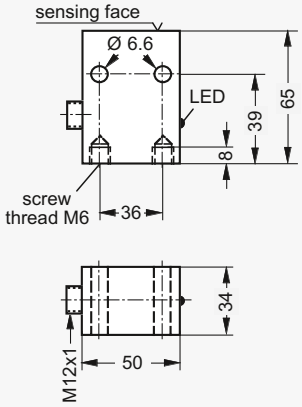
Wiring (3)
DC 4-pole, outgoing lead



Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-34aq

		Design; length	▭ **50 x 34 mm;** 65 mm	
		Material of the sensing face / of the housing	PBT / Al	
		Rated operating distance, mounting (see page 1.0.4)	**12 mm, flush**	
		Range assured operating distance	0 ... 9.72 mm	
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-34aq65b12-1S1A, 11.25-90 (1)	
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**300 Hz / ≥ 1 ms**	
		Wiring (connector or lead); number of wires	connector M12; 4 wires	

Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C



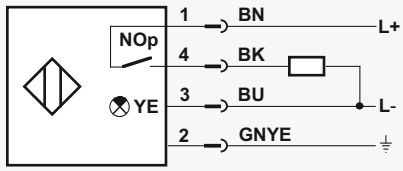
Specific Technical Data	
Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 400 mA
Nominal insulation voltage	75 V DC
Permissible capacity at output	≤ 0.47 µF
Ø Sensing face	48 mm x 32 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	11.8 mm
Function indication ?	yes, YE
Maximum lead length	300 m
Lead type / standard lead length / number of wires x lead cross section	
Utilization category according to IEC 60947-5-2	DC 13
Protection rating according to IEC 60529	IP 67
Protection class	
Permissible torque without / with toothed disc	
Weight	300 g
Recommended accessories	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

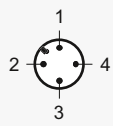
For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Wiring (1)
DC 5-pole, plug



Euro Plug M12



Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

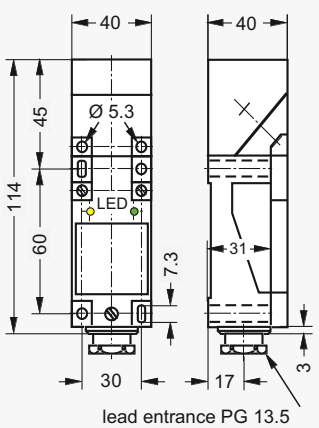
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

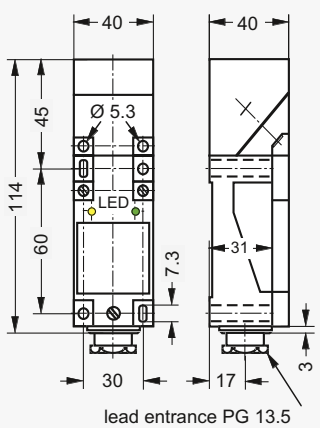
Subject to technical changes!

KLASCHKA
Industrieelektronik

Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-40fv

	Design; length		☐ **40 mm;** 40 mm; 114 mm	☐ **40 mm;** 40 mm; 114 mm
	Material of the sensing face / of the housing		PBT / PBT	PBT / PBT
	Rated operating distance, mounting (see page 1.0.4)		**15 mm, flush**	**25 mm, non-flush**
	Range assured operating distance		0 ... 12.2 mm	0 ... 20.25 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp		
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp	IAD-40fv114b15-12L1B, 11.25-52 (1)	IAD-40fv114n25-12L1B, 11.25-53 (1)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
	Maximum switching frequency / Minimum damping period		**200 Hz / ≥ 1.5 ms**	**100 Hz / ≥ 3 ms**
	Wiring (connector or lead); number of wires		terminals; 4 wires	terminals; 4 wires





	Common Technical Data		
	Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**	
	Hysteresis of the switching point s	3 ... 20 %	
	Repitition accuracy of the switching point s	≤ 10 %	
	- with permanent operating voltage		
	... and ambient temperature	≤ 2 %	
	Permissible ripple voltage	≤ 15 %	
	Short-circuit-proof ?	yes, clocking	
	Reverse polarity protection ?	yes	
	Voltage drop over a closed contact	≤ 2.5 V DC	
	Ambient temperature range	- 25 ... + 75 °C	
	Specific Technical Data		
	Permissible operating voltage range	10 ... 24 ... 45 V DC	8 ... 24 ... 30 V DC
	Current consumption without load	≤ 20 mA	≤ 15 mA
	Load current	≤ 400 mA	≤ 400 mA
	Nominal insulation voltage	75 V DC	75 V DC
	Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
	Ø Sensing face	38 x 38 mm	38 x 38 mm
	Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	13.0 mm	15.0 mm
	Function indication ?	GN for operation, YE for actuated	GN for operation, YE for actuated
	Maximum lead length	300 m	300 m
	Lead type / standard lead length / number of wires x lead cross section		
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 67	IP 67
	Protection class		
	Permissible torque without / with toothed disc		
	Weight	220 g	220 g
	Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

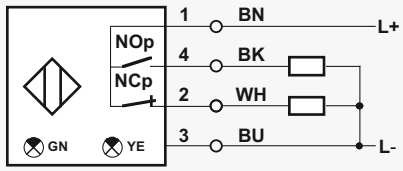
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

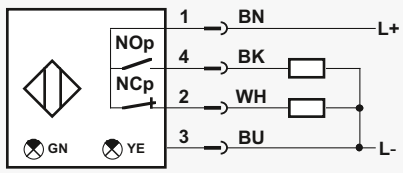
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

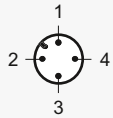
Wiring (1)
DC 4-pole, clamp terminal

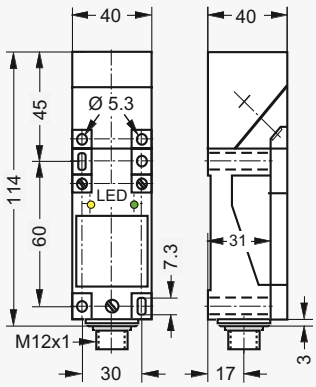
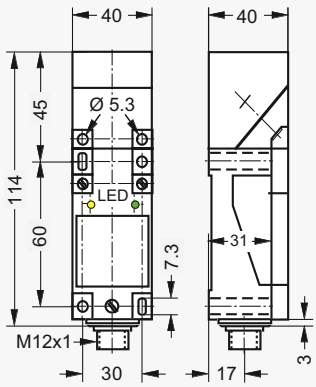


Wiring (2)
DC 4-pole, plug



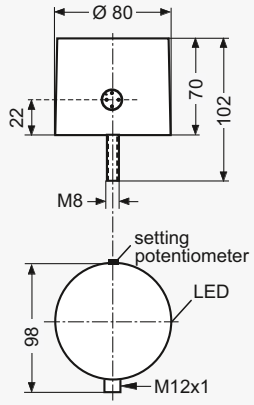
Euro Plug M12

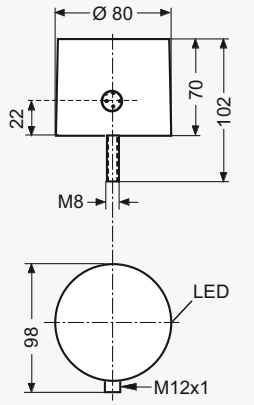


☐ **40 mm;** 40 mm; 114 mm	☐ **40 mm;** 40 mm; 114 mm
PBT / PBT	PBT / PBT
15 mm, flush	**25 mm, non-flush**
0 ... 12.2 mm	0 ... 20.25 mm
IAD-40fv114b15-12S1B, 11.25-66 (2)	IAD-40fv114n25-12S1B, 11.32-98 (2)
200 Hz / ≥ 1.5 ms	**100 Hz / ≥ 3 ms**
connector M12; 4 wires	connector M12; 4 wires
	
10 ... 24 ... 45 V DC	8 ... 24 ... 30 V DC
≤ 20 mA	≤ 15 mA
≤ 400 mA	≤ 400 mA
75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF
38 x 38 mm	38 x 38 mm
13.0 mm	15.0 mm
GN for operation, YE for actuated	GN for operation, YE for actuated
300 m	300 m
DC 13	DC 13
IP 67	IP 67
230 g	230 g
chapter 12	chapter 12

Inductive Proximity Switches, Ferrous DC 3- and 4-pole
Series IAD-80fr

		Design; length	**Ø 80 mm;** 70 mm	**Ø 80 mm;** 70 mm
		Material of the sensing face / of the housing	PBT / PBT	PBT / PBT
		Rated operating distance, mounting (see page 1.0.4)	**80 mm, non-flush, adjustable**	**35 mm, non-flush**
		Range assured operating distance	0 ... 64.8 mm	0 ... 28.35 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IAD-80fr70e80-1Sd1A, 11.43-08 (1)	
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		IAD-80fr70n35-12S1A, 11.35-22 (2)
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**100 Hz / ≥ 4 ms**	**100 Hz / ≥ 4 ms**
		Wiring (connector or lead); number of wires	connector ø 28; 3 wires	connector ø 28; 4 wires





Common Technical Data	
Reduction factor Fe / Al / V2A	**1 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 2 %
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C

Specific Technical Data			
Permissible operating voltage range	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	80 mm	80 mm
Switching radius r (at operating distance of the target s = 0; see page 1.0.2)	48.0 mm	25.3 mm
Function indication ?	yes, YE	yes, YE
Maximum lead length	300 m	300 m
Lead type / standard lead length / number of wires x lead cross section		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Protection rating according to IEC 60529	IP 64	IP 65
Protection class		
Permissible torque without / with toothed disc		
Weight	600 g	600 g
Recommended accessories	chapter 12	chapter 12

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

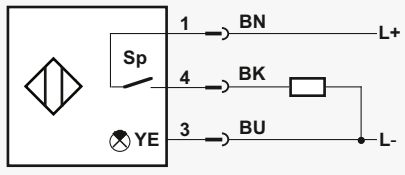
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

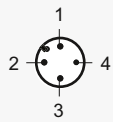
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

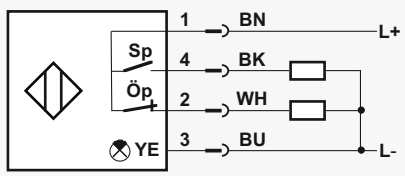
Wiring (1)
DC 3-pole, plug



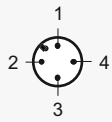
Euro plug M12

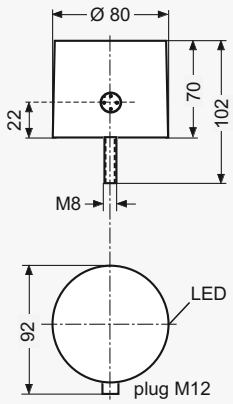
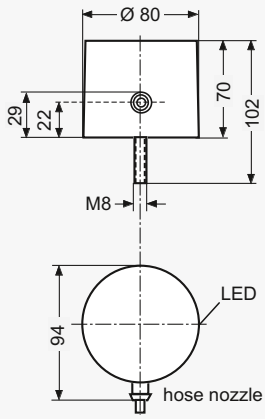


Wiring (2)
DC 4-pole, plug

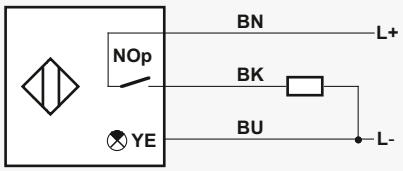


Euro plug M12



Ø 80 mm; 70 mm	**Ø 80 mm;** 70 mm		
PBT / PBT	PBT / PBT		
50 mm, non-flush	**50 mm, non-flush**		
0 ... 40.5 mm	0 ... 40.5 mm		
IAD-80fr70n50-1S1A, 11.25-92 (1)	IAD-80fr70n50-1NT1A, 11.03-94-050 (3)		
100 Hz / ≥ 3 ms	**100 Hz / ≥ 4 ms**		
connector M12; 3 wires	lead; 3 wires		
			
8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC		
≤ 10 mA	≤ 10 mA		
≤ 400 mA	≤ 400 mA		
75 V DC	75 V DC		
≤ 1.0 µF	≤ 1.0 µF		
80 mm	80 mm		
31.0 mm	31.0 mm		
yes, YE	yes, YE		
300 m	300 m		
	NT / 5.0 m / 3 x 0.75 mm^2		
DC 13	DC 13		
IP 67	IP 67		
II, ⧈			
600 g	600 g + weight of the lead		
chapter 12	chapter 12		

Wiring (3)
DC 3-pole, outgoing lead



Inductive Proximity Switches
Type Non-ferrous Metal

Characteristics

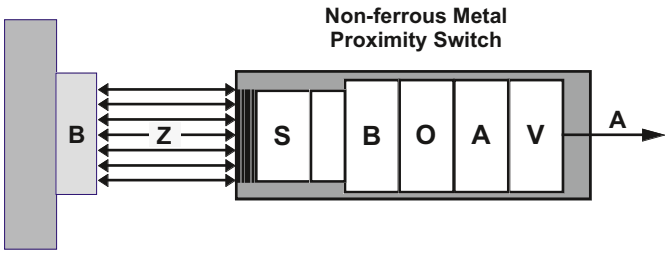
Task

Non-ferrous Metal Switches detect only non-ferrous metals such as aluminium and brass. They attain the same switching distances as Inductive Proximity Switches of the same size.

Non-ferrous Metal Switches cannot detect materials that contain iron, which makes this type of proximity switch especially suitable for distinguishing between ferrous and non-ferrous metals.

Mode of operation

A frequency and amplitude stabilised oscillator O supplies an AC bridge circuit B. The oscillating circuit S, consisting of a coil contained in a channel-shaped ferritic core and a capacitor, forms one branch of the bridge. The output stage A amplifies the voltage of the bridge and a comparator converts it into a switching signal. This low resistance switching signal is available at the output of the amplifier stage V.



When non-ferrous metal approaches, an Inductive Non-ferrous Metal Proximity Switch operates in a very different way to a standard, Inductive Proximity Switch.

When a **piece** of **ferrous metal** enters the alternating magnetic field of the oscillating circuit coil, the magnetic properties of the iron lead to a high proportion of magnetization losses and only a low proportion of eddy current losses. As with Standard Proximity Switches, these high losses lead to damping of the oscillating circuit. In addition, the permeability of the iron lowers the frequency of the oscillating circuit.

Under the same conditions with a **non-ferrous metal,** the behaviour is completely different. As a result of the sensor‘s specific arrangement, only eddy currents are generated and they attenuate the damping and increase the frequency of the oscillating circuit.

Application examples

- Detection of non-ferrous metals without reduction of the switching distance.
- Separation of ferrrous and non-ferrous metals, e. g. aluminium tubes on steel mandrels.
- Simple guidance system for conveying vehicles (e. g. tool change carriage).

Application notes

- Ferrous metals behind a non-ferrous metal target have no influence, as long as the dimensions of the target are larger or equal to those of a standard target.
- The switching distance is reduced when the target is segmented.
- Thin-walled ferrous rings and holes (Ø 25 ... 60 mm) in metals can damp the switch when the distance of the target is less than approx. 10 % of the switching distance and centred on the sensing face. This is caused by eddy-current effects.
- Within the hysteresis field ferrous metals between sensing face and non-ferrous metal target can activate the output .
- Distinction between workpieces.
- Simple encoding tasks.

Mounting

Non-ferrous Metal Switches can be mounted so that they are flush with ferrous metals. Three faces of the rectangular version of the housing with pivoting head can be flush-mounted.

For non-ferrous metals the minimum distance must be the same than the single nominal switching distance.

Note

The product described here is for use in machinery or plant only. Connection, commissioning or maintenance must only be carried out by suitably-qualified specialists. Commissioning is only permissible after it has been established that the installation or plant complies with current EU directives.

Type Non-ferrous Metal

Type	Ref. No.	Switching distance in mm Mounting *)
cylindrical M30 x L		
IBD-30mg95b8-1T1A	13.17-04	8,0 b
IBD-30mg80b8-1S1A	13.17-09	8,0 b
rectangular 34 x 50 x 65		
IBD-34fq65b10-1T1A	13.17-08	10,0 b
rectangular 40 x 40 x L		
IBD-40fv114b20-12T1B	13.22-02	20,0 b
IBD-40fv114b20-12K2B	13.22-05	20,0 b
IBD-40fv114b20-12S1B	13.22-06	20,0 b

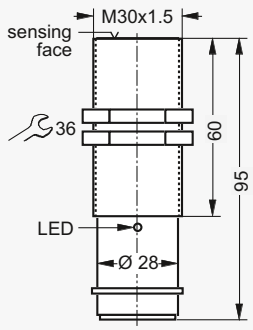
Type	Ref. No.	Switching distance in mm Mounting *)

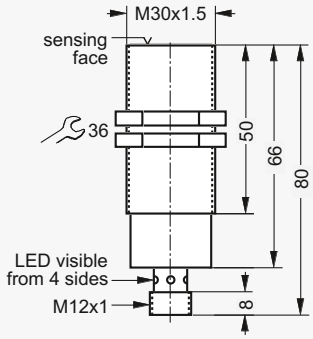
*) b = flush mounting, n = non-flush mounting

Inductive Proximity Switches, Non-ferrous Metal
Series IBD-30mg, 34fq

		Design; length	**O M30 x 1.5;** 95 mm	**O M30 x 1.5;** 80 mm
		Material of the sensing face / of the housing	PBT / CuZn	PBT / CuZn
		Rated operating distance, mounting (see page 1.0.4)	**8 mm, flush**	**8 mm, flush**
		Range assured operating distance	0 ... 6.48 mm	0 ... 6.48 mm
Type designation, Ref. no. (Wring)	NO plus-switching	NOp	IBD-30mg95b8-1T1A, 13.17-04 (1)	IBD-30mg80b8-1S1A, 13.17-09 (2)
	NC plus-switching	NCp		
	NO and NC plus-switching	NOp + NCp		
	NO plus-, NC minus-switching	NOp + NCn		
	NO minus-switching	NOn		
	NC minus-switching	NCn		
		Maximum switching frequency / Minimum damping period	**≤ 300 Hz / ≥ 1 ms**	**≤ 300 Hz / ≥ 1 ms**
		Wiring (connector or lead); number of wires	connector ø 28; 3 wires	connector M12; 3 wires

Common Technical Data	
Reduction factor for all Non-ferrous Metals	**1.0**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 0.5 %
Permissible ripple voltage	≤ 10 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





	Specific Technical Data		
	Permissible operating voltage range	12 ... 24 ... 30 V DC	12 ... 24 ... 30 V DC
	Current consumption without load	≤ 20 mA	≤ 20 mA
	Load current	≤ 400 mA	≤ 400 mA
	Ø Sensing face		
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	300 m	300 m
	Lead type / standard lead length / number of wires x lead cross section		
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Protection rating according to IEC 60529	IP 65	IP 65
	Protection class		
	Permissible torque without / with toothed disc	150 Nm / 200 Nm	150 Nm / < 200 Nm
	Weight	200 g	175 g
	Recommended accessories	chapter 12.1	chapter 12.1

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

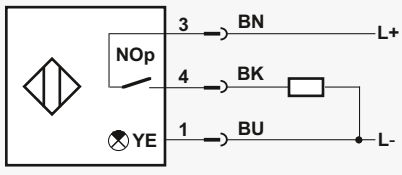
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

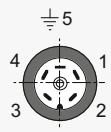
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

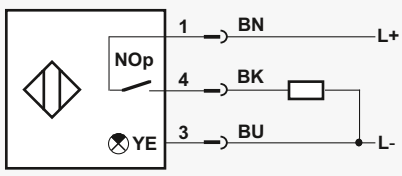
Wiring (1)
DC 3-pole, plug



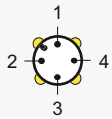
Plug
Amphenol, 5-pole

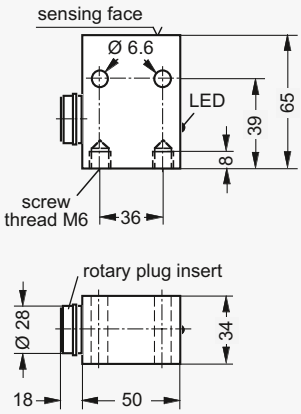


Wiring (2)
DC 3-pole, plug



Euro Plug M12
with LED display YE
visible from 4 sides



34 x 50 mm; 65 mm			
PBT / plastic			
10 mm, flush			
0 ... 8.1 mm			
IBD-34fq65b10-1T1A, 13.17-08 (1)			
≤ 150 Hz / ≥ 2 ms			
connector ø 28; 3 wires			
			
12 ... 24 ... 30 V DC			
≤ 20 mA			
≤ 400 mA			
yes, YE			
300 m			
DC 13			
IP 65			
140 g			
chapter 12.1			

Inductive Proximity Switches, Non-ferrous Metal
Series IBD-40fv

	Design; length		□ **40 x 40 mm;** 114 mm
	Material of the sensing face / of the housing		PBT glass fibre reinforced / PBT glass fibre reinforced
	Rated operating distance, mounting (see page 1.0.4)		**20 mm, flush**
	Range assured operating distance		0 ... 16.2 mm
Type designation, Ref. no. (Wiring)	NO plus-switching	NOp	IBD-40fv114b20-12T1B, 13.22-02 (1)
	NC plus-switching	NCp	
	NO and NC plus-switching	NOp + NCp	
	NO plus-, NC minus-switching	NOp + NCn	
	NO minus-switching	NOn	
	NC minus-switching	NCn	
	Maximum switching frequency / Minimum damping period		**≥ 150 Hz / ≤ 2 ms**
	Wiring (connector or lead); number of wires		connector ø 28; 4 wires

Common Technical Data	
Reduction factor for all non-ferrous metals	**1.0**
Hysteresis of the switching point s	≤ 20 %
Repitition accuracy of the switching point s	≤ 10 %
- with permanent operating voltage	
... and ambient temperature	≤ 1 %
Permissible ripple voltage	≤ 30 %
Short-circuit-proof ?	yes, clocking
Reverse polarity protection ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C

Attainable switching distances (see table)

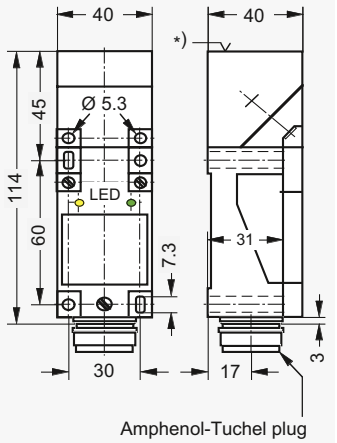
To ① : egde length of a solid rod with square cross-section.

To ② : width of a rail, 1 mm thick.

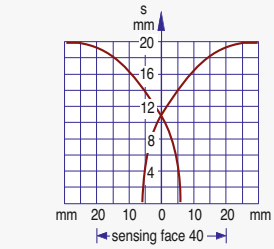
To ③ : egde length of a square, 1 mm thick.

To ④ : diameter of a solid rod with cylindrical cross-section.

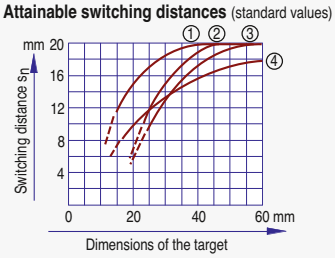
*) sensing face



Response characteristics (with nominal target)



Attainable switching distances (standard values)



Specific Technical Data	
Permissible operating voltage range	12 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA
Load current	≤ 400 mA
Ø sensing face	38 x 38 mm
Function indication ?	GN for operation, YE for actuated
Maximum lead length	300 m
Lead type / standard lead length / number of wires x lead cross section	
Utilization category according to IEC 60947-5-2	DC 13
Protection rating according to IEC 60529	IP 65
Protection class	
Permissible torque without / with toothed disc	
Weight	210 g
Recommended accessories	chapter 12.1

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

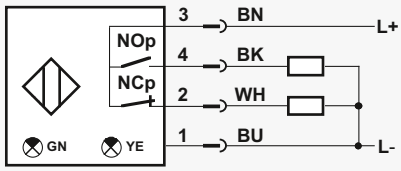
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

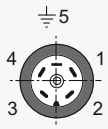
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

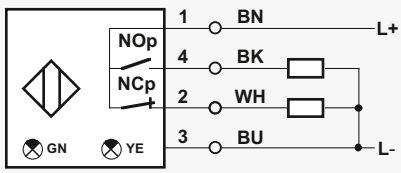
Wiring (1)
DC 4-pole, plug



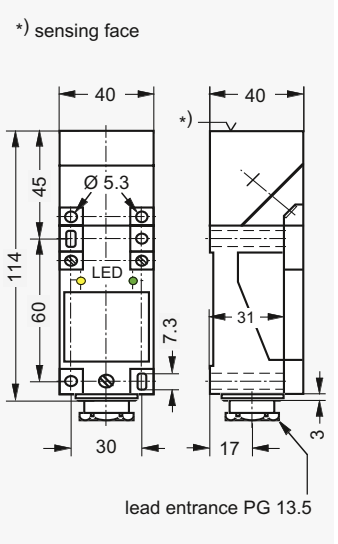
Plug
Amphenol, 5-pole

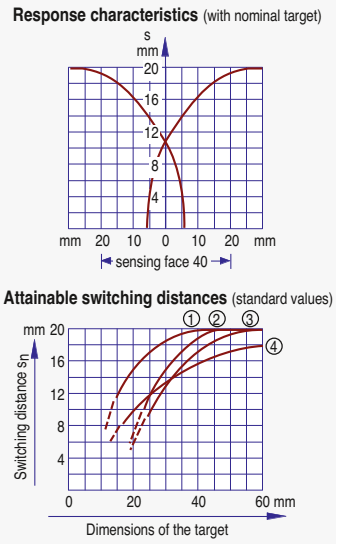


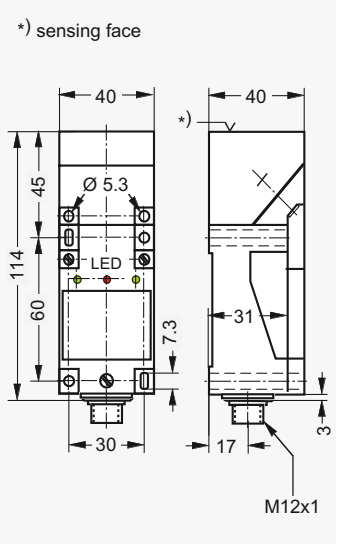
Wiring (2)
DC 4-pole, clamp terminal

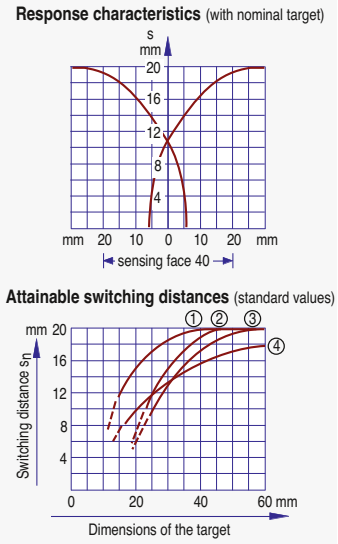


☐ **40 x 40 mm;** 114 mm	☐ **40 x 40 mm;** 114 mm
PBT glass fibre reinforced / PBT glass fibre reinforced	PBT glass fiber reinforced / PBT glass fiber reinforced
20 mm, flush	**20 mm, flush**
0 ... 16.2 mm	0 ... 16.2 mm
IBD-40fv114b20-12K2B, 13.22-05 (2)	IBD-40fv114b20-12S1B, 13.22-06 (3)
≥ 150 Hz / ≤ 2 ms	**≥ 150 Hz / ≤ 2 ms**
terminals; 4 wires	connector M12; 4 wires



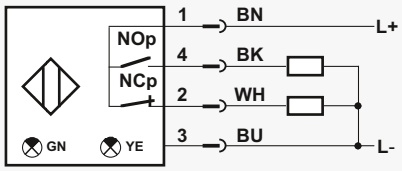




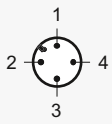


12 ... 24 ... 30 V DC	12 ... 24 ... 30 V DC
≤ 20 mA	≤ 20 mA
≤ 400 mA	≤ 400 mA
38 x 38 mm	38 x 38 mm
GN for operation, YE for actuated	GN for operation, YE for actuated
300 m	300 m
DC 13	DC 13
IP 65	IP 65
210 g	210 g
chapter 12.1	chapter 12.1

Wiring (3)
DC 4-pole, plug



Euro Plug M12



Distance Sensors
Series IGA

Task

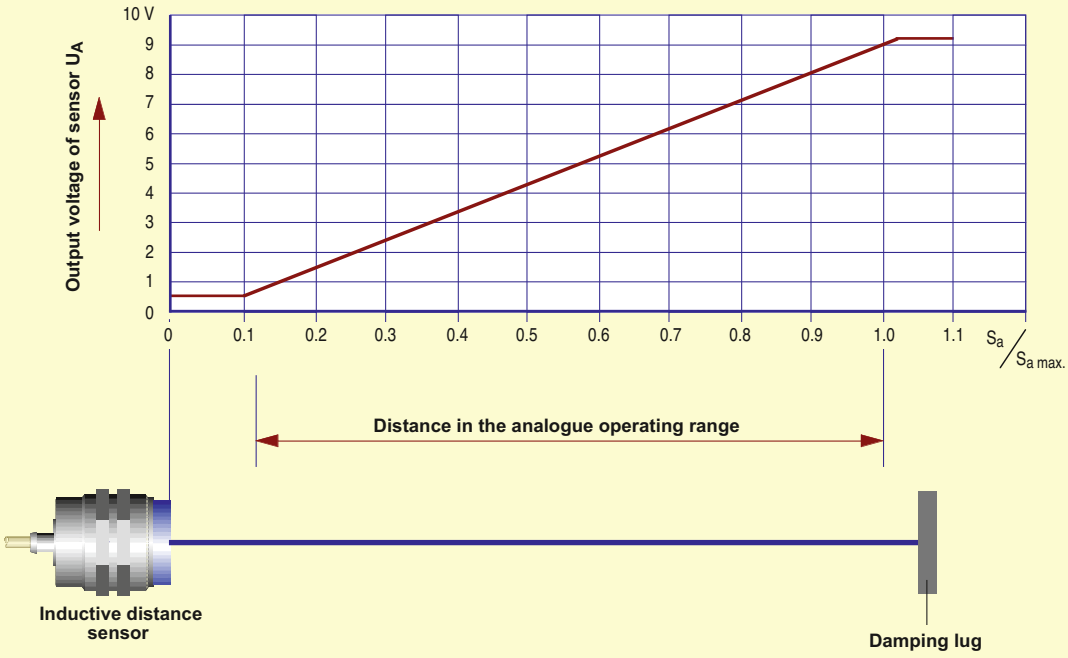
The task of a distance sensor is to convert the distance between its active surface and the damping lug into an analogue voltage or current. This signal voltage or current is available to the user at the output of the sensor.

Depending on the physical principle used, distances in the millimeter range (inductive sensors) and in the meter range (acoustic sensors) can be measured.

Application examples

Inductive Distance Sensors

- Measuring of the ripple of belt-shaped materials
- Classifying of objects of different sizes
- Routing transmitters for driverless transport systems
- Sheet metal thickness measurement or double sheet monitoring
- Measuring of belt center and belt width
- Position control and positioning of motions
- Orientation of tools, e.g. of robot grippers
- Hole radius measurement



Inductive Distance Sensor IGA

Tips for use:

- With non-ferrous metals material corretion factors have to be considered.
- Proximate distance sensors influence themselves reciprocally. The sensor distance should be ≥ 5 x maximum range.

Material correction factors for inductive distance sensors IGA

The actuation characteristic curve of the distance sensor IGA has been measured with the standard actuating element made of St 37 steel sheet. Often, however, other materials must be used. The following table lists correction factors of the upper limit of the actuating range for non-ferrous metals. These factors are approximate only, because they are also depending on the thickness of these materials and the osillation frequency. Use of foils of these materials results in values higher than those given in the table.

Material	Correction factor
St 37 iron	1.00
Aluminium foil	0.90 ... 0.95
Chrom - nickel - steel	0.82 ... 0.90
magnetizable brass	0.50 ... 0.61
Aluminium	0.45
Copper	0.42
Stainless steel, non-magnetizable	0.40

Inductive Distance Sensors IGA

Type	Ref.no.	Range in mm mounting *)	Page
cylindrical M12 x L			
IGA-12mg50b0,25/3-1ND1	13.02-14	0.25 ... 3.0 b	1.13.1.1
IGA-12mg60b0,25/3-1Sd1	13.02-15	0.25 ... 3.0 b	1.13.1.2
cylindrical M18 x L			
IGA-18mg50n1/8-1ND1	13.02-16	1.0 ... 8.0 n	1.13.1.3
IGA-18mg61n1/8-1Sd1	13.02-11	1.0 ... 9.0 n	1.13.1.4
IGA-18mg80b5-1S1	13.27-02	2.0 ... 5.0 b	1.13.1.4

Type	Ref.no.	Range in mm mounting *)	Page
cylindrical M30 x L			
IGA-30mg50b1/9-1Sd1	13.02-12	1.0 ... 9.0 b	1.13.1.5
IGA-30mg40b1/9-1ND1	13.02-13	1.0 ... 9.0 b	1.13.1.6
IGA-30mg50n3/15-1Sd1	13.02-17	3.0 ... 15.0 n	1.13.1.6

***)** b = flush mounting, n = non-flush mounting

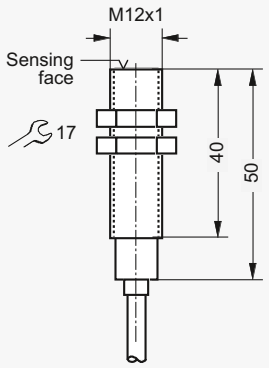
You will find ultrasonic distance sensors with cylindrical housings (18mm) for operating distances ranging from 30 to 2000 mm in the catalogue section “Ultrasonic sensors“.

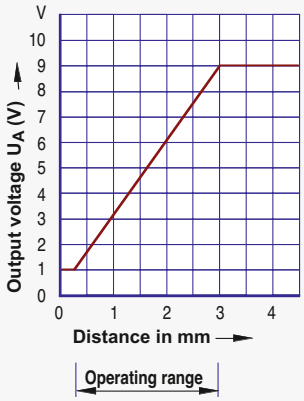
Inductive Distance Sensors
Series IGA-12mg

	Design; length	**O M12 x 1;** 50 mm
	Material of the sensing face / of the housing	PCP / CuZn
	Operating range (maximum operating range), mounting (see page1.0.4)	**0.25 ... 3 mm, flush**
	Maximum switching frequency	**500 Hz**
Type designation, Ref.no. (wiring)	Analogue output 4 ... 20 mA	
	Analogue output 1 ... 9 V	IGA-12mg50b0,25/3-1ND1, 13.02-14 (1)
	Analogue output 1 ... 10 V	
	Maximum actuation rate	
	Wiring (connector or lead); number of wires	lead; 3 wires

Common Technical Data

Reduction factor Fe / Al / V2A	**1.0 / 0.3 / 0.7**
Permissible ripple voltage	≤ 10 %
Reverse polarity protection ?	yes





Specific Technical Data

Permissible operating voltage range	11 ... 24 ... 35 V DC
Current consumption without load	≤ 5 mA
Output current	
Short-circuit-proof ?	yes
Protection against interferences ?	
Linearity	≤ 5 %
Reproducibility	≤ 1 %
Ambient temperature range	- 25 ... + 70 °C
Drift of temperature	± 5 %
Operating range / max. operating range	0.25 ... 3 mm
Linear range / max. linearity error	
Maximum lead length	100 m
Lead type / standard lead length / number of wires x lead cross section	ND / 2.0 m / 3 x 0.14 mm^2
Utiliz. category acc. to IEC 60947-5-2 / prot. rating acc.to IEC 60529	DC 13 / IP 67
Permissible torque without / with toothed disc	9 Nm / 30 Nm
Weight	30 g + weight of the lead
Recommended accessories	chapter 12.1

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

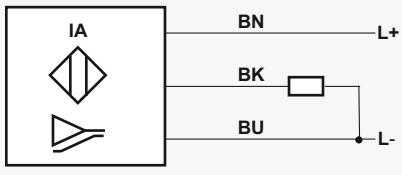
Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001.

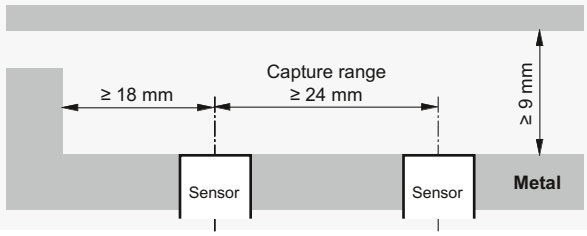
Safety Regulations
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

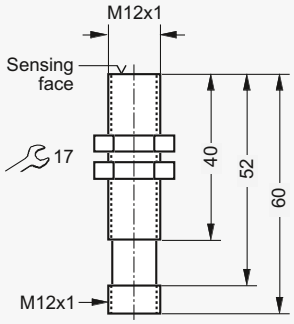
Wiring (1)
DC 3-pole, outgoing lead

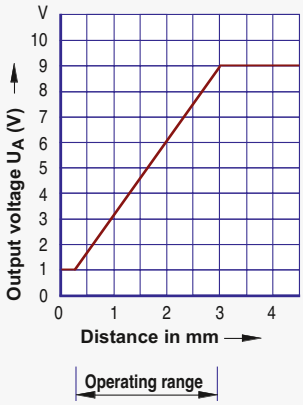


For installation instructions (flush), see also page 1.0.4



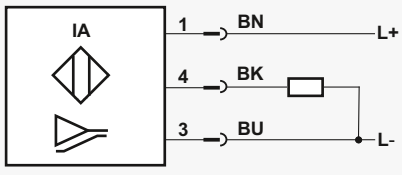
O M12 x 1; 60 mm	
PCP / CuZn	
0.25 ... 3 mm, flush	
500 Hz	
IGA-12mg60b0,25/3-1Sd1, 13.02-15 (2)	
connector M12, 3 wires	



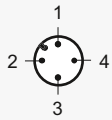


14 ... 24 ... 35 V DC	
≤ 5 mA	
yes	
≤ 5 %	
≤ 1 %	
- 25 ... + 70 °C	
± 5 %	
0.25 ... 3 mm	
100 m	
DC 13 / IP 67	
9 Nm / 30 Nm	
30 g	
chapter 12.1	

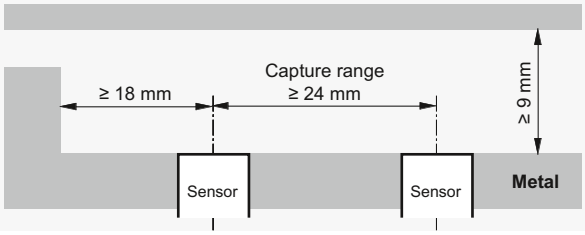
Wiring (2)
DC 3-pole, plug



Euro Plug M12



For installation instructions (flush), see also page 1.0.4

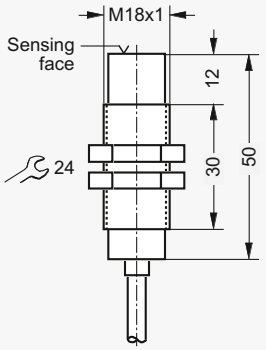


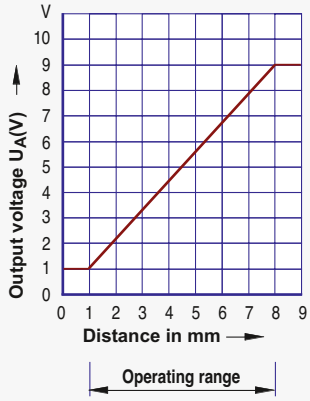
Inductive Distance Sensors
Series IGA-18mg

	Design; length	**O M18 x 1;** 50 mm
	Material of the sensing face / of the housing	PCP / CuZn
	Operating range, mounting (see page1.0.4)	**1 ... 8 mm, non-flush**
	Maximum switching frequency	**400 Hz**
Type designation, Ref.no. (wiring)	Analogue output 4 ... 20 mA	
	Analogue output 1 ... 9 V	IGA-18mg50n1/8-1ND1, 13.02-16 (1)
	Analogue output 1 ... 10 V	
	Maximum actuation rate	
	Wiring (connector or lead); number of wires	lead; 3 wires

Common Technical Data

Reduction factor Fe / Al / V2A	**1.0 / 0.3 / 0.7**
Permissible ripple voltage	≤ 10 %
Reverse polarity protection ?	yes





Specific Technical Data

Permissible operating voltage range	11 ... 24 ... 35 V DC
Current consumption without load	≤ 5 mA
Output current	
Short-circuit-proof ?	yes
Protection against interferences ?	
Maximum distance tolerance	± 0.1 mm
Blind zone	< 1 mm
Linearity	≤ 5 %
Reproducibility	≤ 1 %
Ambient temperature range	- 25 ... + 70 °C
Drift of temperature	± 5 %
Maximum lead length	100 m
Lead type / standard lead length / number of wires x lead cross section	ND / 2.0 m / 3 x 0.34 mm^2
Utiliz. category acc. to IEC 60947-5-2 / prot. rating acc. to IEC 60529	DC 13 / IP 67
Permissible torque without / with toothed disc	34 Nm / 70 Nm
Weight	50 g + weight of the lead
Recommended accessories	chapter 12.1

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

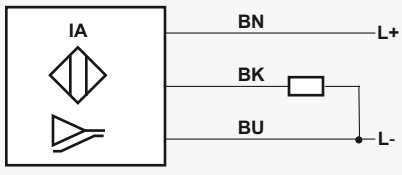
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001

Safety Regulations

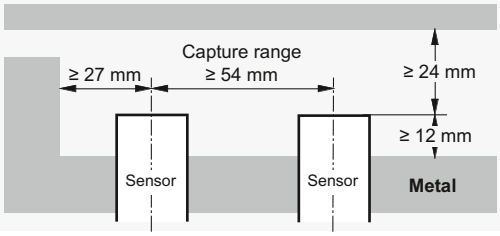
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

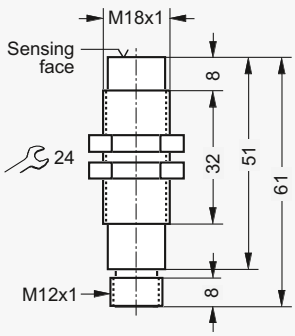
Wiring (1)
DC 3-pole, outgoing lead

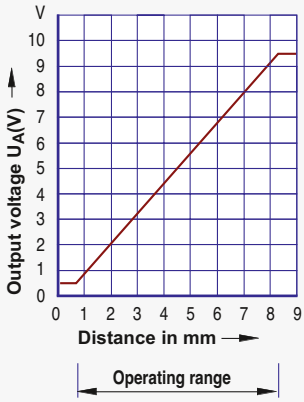


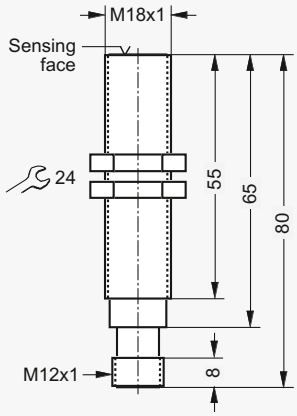
For installation instructions (non-flush), see also page 1.0.4

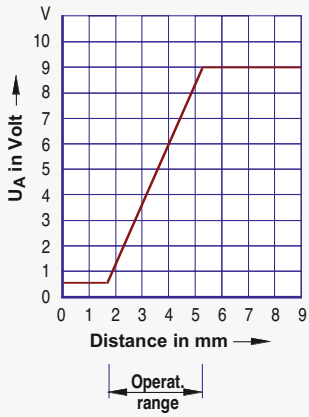


O M18 x 1; 61 mm	**O M18 x 1;** 80 mm
PCP / CuZn	CuZn / PBT
1 ... 8 mm, non-flush	**2 ... 5 mm, flush**
400 Hz	100 Hz
IGA-18mg61n1/8-1Sd1, 13.02-11 (2)	IGA-18mg80b5-1S1, 13.27-02 (3)
connector M12, 3 wires	connector M12, 3 wires





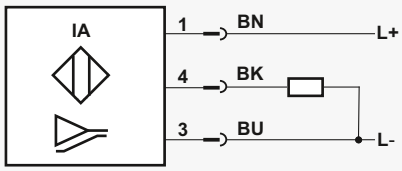


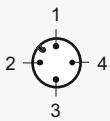


11 ... 24 ... 35 V DC	14 ... 24 ... 30 V DC
≤ 5 mA	≤ 10 mA
15 mA	15 mA
yes	yes
± 0.1 mm	± 0.1 mm
< 1 mm	< 2 mm
≤ 5 %	
≤ 1 %	
- 25 ... + 70 °C	0 ... + 60 °C
± 5 %	
100 m	300 m
DC 13 / IP 67	DC 13 / IP 67
34 Nm / 70 Nm	34 Nm / 70 Nm
50 g	150 g
chapter 12.1	chapter 12.1

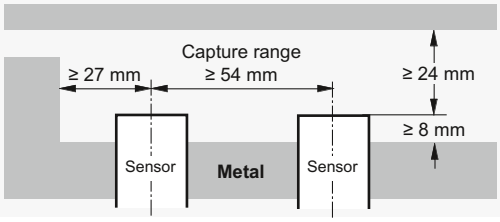
Wiring (2)
DC 3-pole, plug

Euro Plug M12



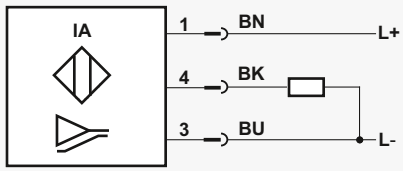


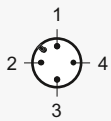
For installation instructions (non-flush), see also page 1.0.4



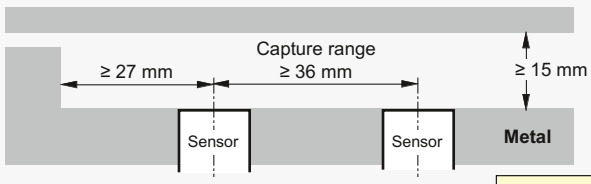
Wiring (3)
DC 3-pole, plug

Euro Plug M12





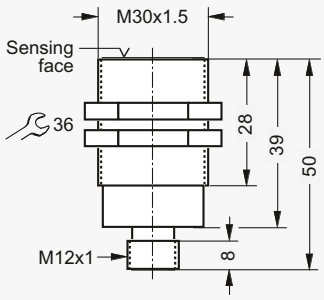
For installation instructions (flush), see also page 1.0.4

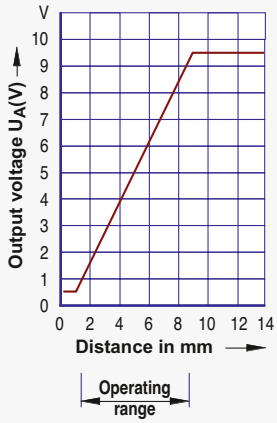


Inductive Distance Sensors
Series IGA-30mg

	Design; length	**O M30 x 1.5;** 50 mm
	Material of the sensing face / of the housing	PCP / CuZn
	Operating range, mounting (see page1.0.4)	**1 ... 9 mm, flush**
	Maximum switching frequency	**400 Hz**
Type designation, Ref.no. (wiring)	Analogue output 4 ... 20 mA	
	Analogue output 1 ... 9 V	IGA-30mg50b1/9-1Sd1, 13.02-12 (1)
	Analogue output 1 ... 10 V	
	Maximum actuation rate	
	Wiring (connector or lead); number of wires	connector M12, 3 wires

Common Technical Data	
Reduction factor Fe / Al / V2A	**1.0 / 0.3 / 0.7**
Permissible ripple voltage	≤ 10 %
Reverse polarity protection ?	yes





Specific Technical Data	
Permissible operating voltage range	11 ... 24 ... 35 V DC
Current consumption without load	≤ 5 mA
Output current	≤ 15 mA
Short-circuit-proof ?	yes
Protection against interferences ?	
Maximum distance tolerance	± 5 %
Blind zone	< 1 mm
Linearity	≤ 5 %
Reproducibility	≤ 1 %
Ambient temperature range	- 25 ... + 70 °C
Drift of temperature	± 5 %
Maximum lead length	100 m
Lead type / standard lead length / number of wires x lead cross section	
Utiliz. category acc. to IEC 60947-5-2 / prot. rating acc. to IEC 60529	DC 13 / IP 67
Permissible torque without / with toothed disc	150 Nm / < 200 Nm
Weight	84 g
Recommended accessories	chapter 12.1

For proximity switches with connector: Please choose the connector and lead you require in Chapter 12, “Accessories“. The connector with its lead must be ordered separately.

For proximity switches with connection leads: The standard lead length is 2 m, but on some types leads are 3 m long as standard, and on others 5 m.

Lead lengths are indicated by the digits at the end of the ref. no.
(-020 = 2 m, -030 = 3 m, -050 = 5 m).

Certifications

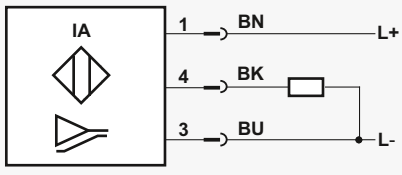
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
We are certified according to DIN EN ISO 9001.

Safety Regulations

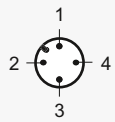
Connection, commissioning and maintenance may only be accomplished by specialists or instructed staff.

Subject to technical changes!

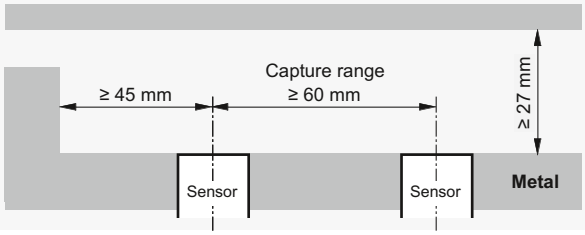
Wiring (1)
DC 3-pole, plug



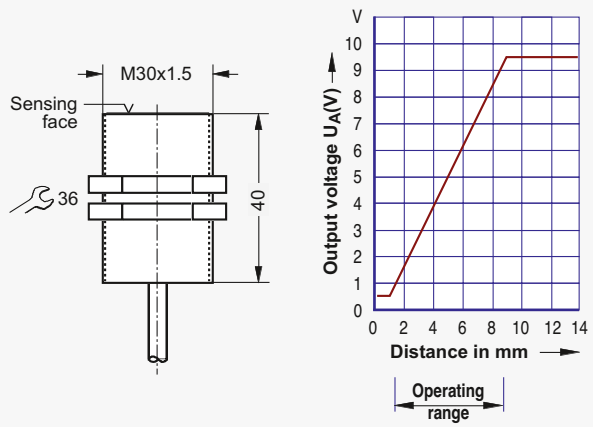
Euro Plug M12

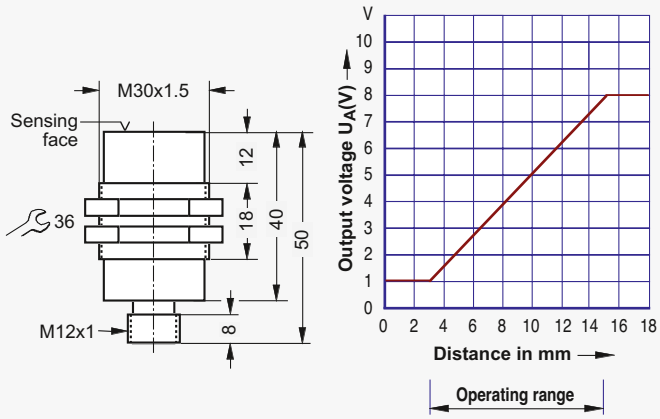


For installation instructions (flush), see also page 1.0.4



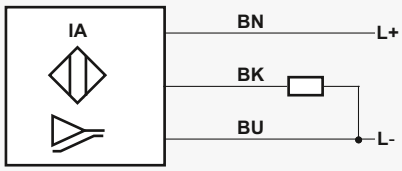
O M30 x 1.5; 40 mm	**O M30 x 1.5;** 50 mm
PCP / CuZn	PCP / CuZn
1 ... 9 mm, flush	**3 ... 15 mm, non-flush**
400 Hz	**300 Hz**
IGA-30mg40b1/9-1ND1, 13.02-13 (2)	IGA-30mg50n3/15-1Sd1, 13.02-17 (3)
lead; 3 wires	connector M12, 3 wires



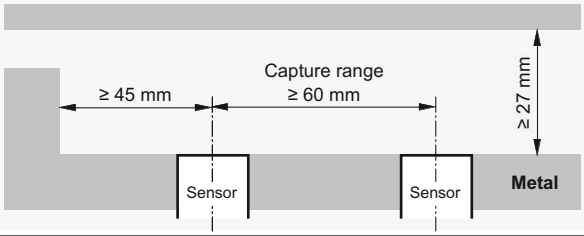


11 ... 24 ... 35 V DC	11 ... 24 ... 35 V DC
≤ 5 mA	≤ 5 mA
≤ 15 mA	
yes	yes
± 5 %	± 5 %
< 1 mm	< 1 mm
≤ 5 %	≤ 5 %
≤ 1 %	≤ 1 %
- 25 ... + 70 °C	- 25 ... + 70 °C
± 5 %	± 5 %
100 m	100 m
ND / 2.0 m / 3 x 0.34 mm^2	
DC 13 / IP 67	DC 13 / IP 67
150 Nm / < 200 Nm	150 Nm / < 200 Nm
90 g + weight of the lead	100 g
chapter 12.1	chapter 12.1

Wiring (2)
DC 3-pole, outgoing lead

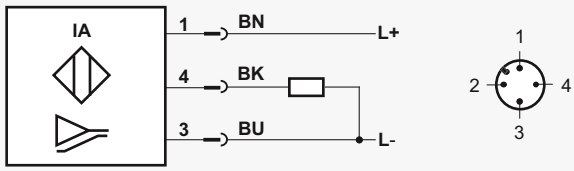


For installation instructions (flush), see also page 1.0.4

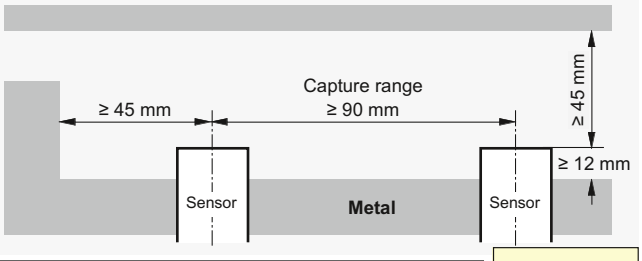


Wiring (3)
DC 3-pole, plug

Euro Plug M12



For installation instructions (non-flush), see also page 1.0.4



Notes

Cordsets with sockets

Field attachable connectors

Cordset with socket and plug

Accessories for Sensors

Cordsets with M8 and M12 connectors, ready-for-use

Connector	lead M8	lead socket M8
Version; pole number;	**straight; 3- and 4-pole**	**angled; 3- and 4-pole**
Material: Housing / insulating body / contact carrier	TPU; self-extinguishing	TPU; self-extinguishing
Flange	CuZn nickel-plated	CuZn nickel-plated
Contact material and surface	CuZn gold-plated	CuZn gold-plated
Connection type	lead firmly assembled, moulded	lead firmly assembled, moulded
Manufacture	Lumberg RKMV	Lumberg RKMWV

socket M8 straight

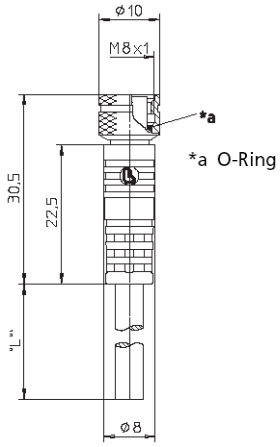
socket M8 angled

socket M8 angled with indicator

socket M12 straight

socket M12 straight with indicator

socket M12 angled with indicator

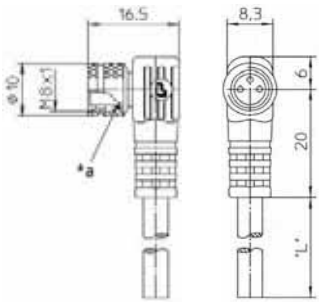


3-polig
3 poles

1 = braun / brown
3 = blau / blue
4 = schwarz / black

4-polig
4 poles

1 = braun / brown
2 = weiß / white
3 = blau / blue
4 = schwarz / black



3-polig
3 poles

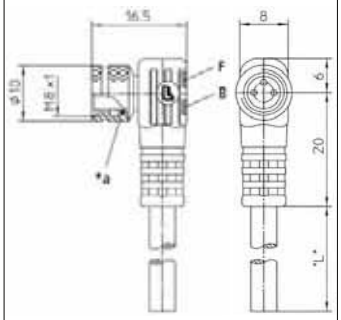
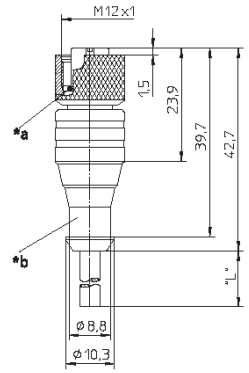
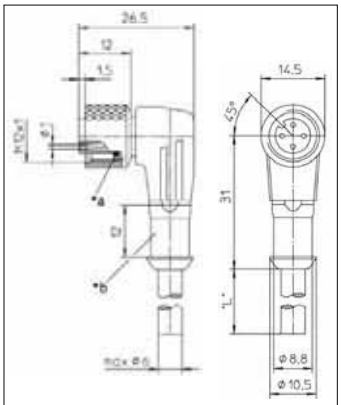
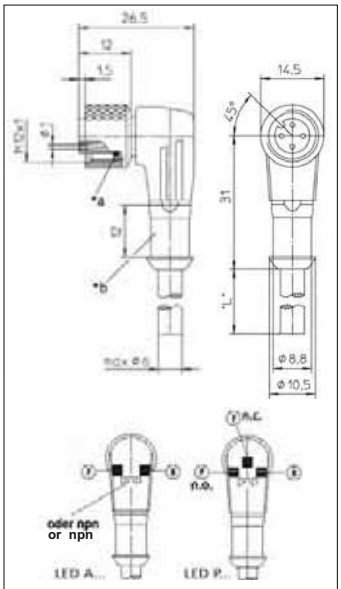
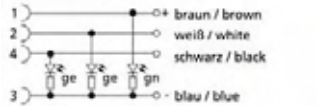
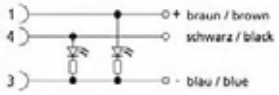
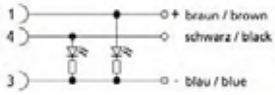
1 = braun / brown
3 = blau / blue
4 = schwarz / black

4-polig
4 poles

1 = braun / brown
2 = weiß / white
3 = blau / blue
4 = schwarz / black

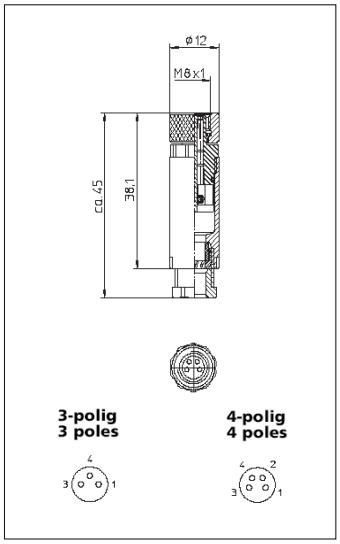
Type designation *)	JSM8U3 / LN3x0,34u5,0OG	JSM8V3 / LN3x0,34u5,0OG
Ref. no. for lead length 2 m; 5 m; 10 m; on request *)	**13.97-01-020; -050; -100; -xxx *)**	**13.97-05-020; -050; -100; -xxx *)**
Nominal voltage at 40 °C; contact resistance	60 V; 4 A; ≤ 5 mΩ	60 V; 4 A; ≤ 5 mΩ
Material of lead jacket; lead colour	PVC; OG	PVC; OG
Lead diameter; number of single cores x cross section	5.0 mm; 3 x 0.34 mm^2	5.0 mm; 3 x 0.34 mm^2
Number of LEDs and colour	0	0
Protection rating acc. to IEC 60529 (screw locked); shield	IP 67; unshielded	IP 67; unshielded
Ambient temperature range	- 25 ... + 80 °C	- 25 ... + 80 °C

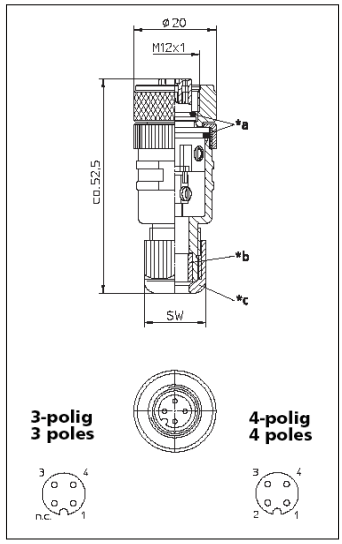
Type designation *)	JSM8U4 / LN4x0,25u5,0OG	JSM8V4 / LN4x0,25u5,0OG
Ref. no. for lead length 2 m; 5 m; 10 m; on request *)	**13.97-03-020; -050; -100; -xxx *)**	**13.97-07-020; -050; -100; -xxx *)**
Nominal voltage at 40 °C; contact resistance	30 V; 4 A; ≤ 5 mΩ	30 V; 4 A; ≤ 5 mΩ
Material of lead jacket; lead colour	PVC; OG	PVC; OG
Lead diameter; number of single cores x cross section	5.0 mm; 4 x 0.25 mm^2	5.0 mm; 4 x 0.25 mm^2
Number of LEDs and colour	0	0
Protection rating acc. to IEC 60529 (screw locked); shield	IP 67; unshielded	IP 67; unshielded
Ambient temperature range	- 25 ... + 80 °C	- 25 ... + 80 °C

lead socket M8 with indicator	lead socket M12	lead socket M12	lead socket M12 with indicator
angled; 3-pole	**straight; 3- and 4-pole**	**angled; 3- and 4-pole**	**angled; 3- and 4-pole**
TPU; self-extinguishing	TPU; self-extinguishing	TPU; self-extinguishing	TPU; self-extinguishing
CuZn nickel-plated	CuZn nickel-plated	CuZn nickel-plated	CuZn nickel-plated
CuZn gold-plated	CuSn gold-plated	CuSn nickel sublayer a. 0,3 µm gold-plat.	CuSn gold-plated
lead firmly assembled, moulded	lead firmly assembled, moulded	lead firmly assembled, moulded	lead firmly assembled, moulded
Lumberg RKMWV/LED	Binder, Lumberg RKT	Lumberg RKWT	Binder, Lumberg RKWT/LED
			
*a O-Ring O-ring B Betriebsanzeige grün operation indicator green F Funktionsanzeige gelb function indicator yellow		*a O-Ring *b Schutzschlauchmontage protective hose mounting	*a O-Ring *b Schutzschlauchmontage B Betriebsanzeige grün F Funktionsanzeige gelb
3-polig **3 poles**  1 = braun / brown 3 = blau / blue 4 = schwarz / black	**3-polig** **3 poles**  1 = braun / brown 2 = n.c. 3 = blau / blue 4 = schwarz / black	**3-polig** **3 poles**  1 = braun / brown 2 = n.c. 3 = blau / blue 4 = schwarz / black	P pnp-Öffner/-Schließer / pnp-Normally closed/open = gelb-gelb-grün (Antivalent) / yellow-yellow-green 
A pnp-Schließer / pnp Normally open = gelb-grün / yellow-green  	**4-polig** **4 poles**  1 = braun / brown 2 = weiß / white 3 = blau / blue 4 = schwarz / black	**4-polig** **4 poles**  1 = braun / brown 2 = weiß / white 3 = blau / blue 4 = schwarz / black	A pnp-Schließer / pnp Normally open = gelb-grün / yellow-green 
JSM8V3gy / LN3x0,34u5,0OG	**JSM12U3 / LN3x0,34u5,0OG**	**JSM12V3 / LN3x0,34u5,0OG**	**JSM12V3gy / LN3x0,34u5,0OG**
13.97-09-020; -050; -100; -xxx *)	**13.97-11-020; -050; -100; -xxx *)**	**13.97-24-020; -050; -100; -xxx *)**	**13.97-17-020; -050; -100; -xxx *)**
10 ... 30 V DC; 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ	10 ... 30 V DC; 4 A; ≤ 5 mΩ
PVC; OG	PVC; OG	PVC; OG	PVC; OG
5.0 mm; 3 x 0.34 mm^2	5.0 mm; 3 x 0.34 mm^2	5.0 mm; 3 x 0.34 mm^2	5.0 mm; 3 x 0.34 mm^2
1 LED GN + 1 LED YE	0	0	1 LED GN + 1 LED YE
IP 67; unshielded	IP 67; unshielded	IP 67; unshielded	IP 67; unshielded
- 25 ... + 80 °C	- 25 ... + 80 °C	- 25 ... + 80 °C	- 25 ... + 80 °C
	JSM12U4 / LN4x0,25u5,0OG	**JSM12V4 / LN4x0,25u5,0OG**	**JSM12V4gyy / LN4x0,25u5,0OG**
	13.97-13-020; -050; -100; -xxx *)	**13.97-21-020; -050; -100; -xxx *)**	**13.97-19-020; -050; -100; -xxx *)**
	240 V; 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ	10 ... 30 V DC; 4 A; ≤ 5 mΩ
	PVC; OG	PVC; OG	PVC; OG
	5.0 mm; 4 x 0.25 mm^2	5.0 mm; 4 x 0.25 mm^2	5.0 mm; 4 x 0.25 mm^2
	0	0	1 LED GN + 2 LED YE
	IP 67; unshielded	IP 67; unshielded	IP 67; unshielded
	- 25 ... + 80 °C	- 25 ... + 80 °C	- 25 ... + 80 °C

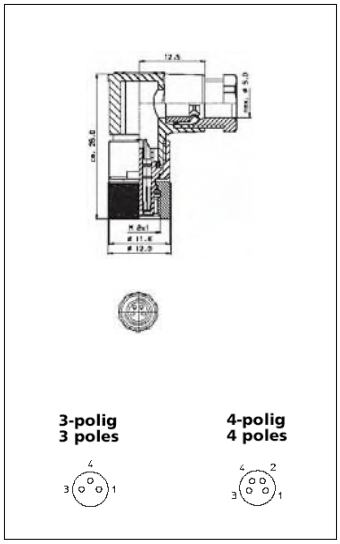
Accessories for Sensors
Field attachable sockets

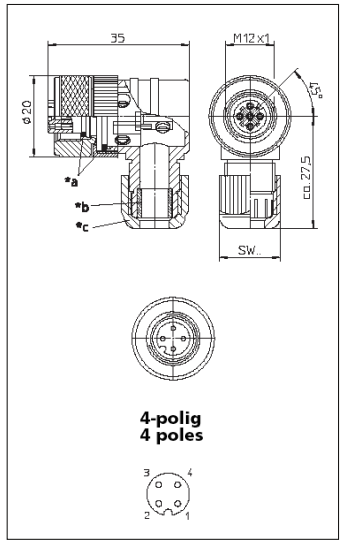
Connector; type of lead connection	lead socket M8; screwable	lead socket M12; screwable
Version	straight	straight
Pole number: Type designation; ref. no.	3-pole: JSM8U3; 13.98-01	4-pole: JSM12U4; 13.98-06
Pole number: Type designation; ref. no.	4-pole: JSM8U4; 13.98-02	
Material: Housing / insulating body / contact carrier	PA / PA / TPU; self-extinguishing	PA / PA / PA
Flange	CuZn nickel-plated	CuZn nickel-plated
Contact material and surface	CuZn gold-plated	CuZn gold-plated
Nominal voltage; nominal current at 40 °C; contact resistance	60 V (4-pol. 30 V); 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ
Number of LED's and colour	0	0
Lead diameter	3.5 ... 5.0 mm	3,0 ... 6.5 mm
Recommended: Number of single cores x cross section	3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
Protection rating acc. to IEC 60529 (screw locked)	IP 67	IP 67
Ambient temperature range	- 40 ... + 85 °C	- 25 ... + 90 °C
Manufacture	Lumberg RKMCK	Lumberg RKC



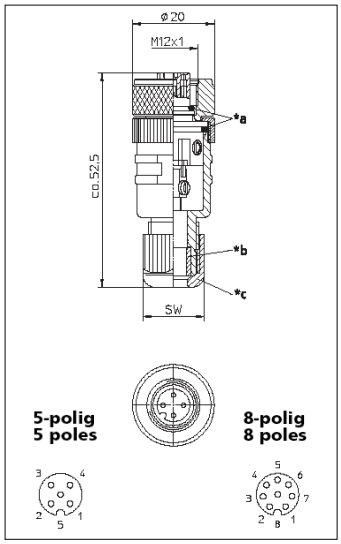


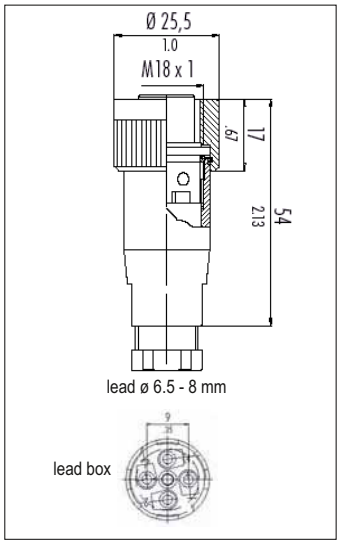
Connector; type of lead connection	socket M8; screwable	socket M12; screwable
Version	angled	angled
Pole number: Type designation; ref. no.	3-pole: JSM8V3; 13.98-03	4-pole: JSM12V4; 13.98-08
Pole number: Type designation; ref. no.	4-pole: JSM8V4; 13.98-04	
Material: Housing / insulating body / contact carrier	PBT / PBT / PA	PA / PA / PA
Flange	CuZn	CuZn nickel-plated
Contact material and surface	CuSn gold-plated	CuZn gold-plated
Nominal voltage; nominal current at 40 °C; contact resistance	60 V (4-pol. 30 V); 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ
Number of LED's and colour	0	0
Lead diameter / PG-thread	3.5 ... 5.0 mm	3.0 ... 6.5 mm
Recommended: Number of single cores x cross section	3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
Protection rating acc. to IEC 60529 (screw locked)	IP 67	IP 67
Ambient temperature range	- 40 ... + 85 °C	- 25 ... + 90 °C
Manufacture	Lumberg RKMCW	Lumberg RKCW

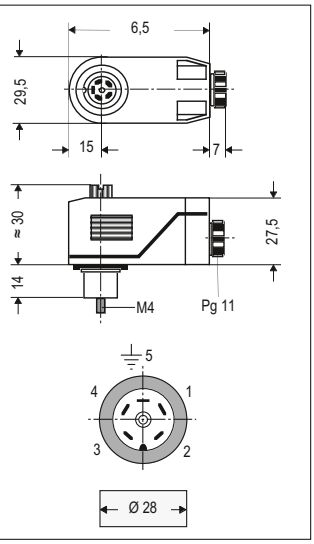




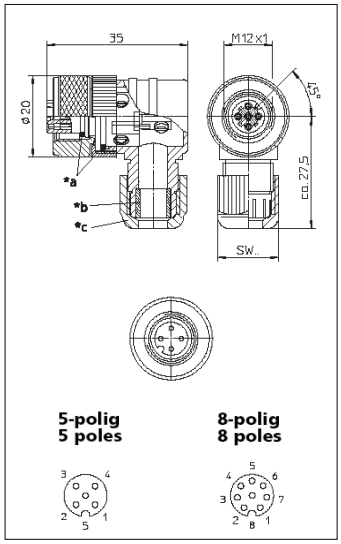
lead socket M12; screwable	lead socket M18; srewable	socket V28; screwable	
straight	straight	angled	
5-pole: JSM12U5; 13.98-09	4-pole: JSM18U4; 13.98-13	5-pole: JSV28V5; 13.98-19	
8-pole: JSM12U8; 13.98-10			
PA / PA / PA	PA / PA / PA		
CuZn nickel-plated	CuZn		
CuZn gold-plated	CuZn		
60 V (8-pol. 30 V); 4 A (8-pol. 2 A); ≤ 5 mΩ	250 V; 5 A; ≤ 8 mΩ		
0	0		
3.0 ... 6.5 mm	3.0 ... 6.5 mm		
5 / 8 x 0.34 mm^2	4 x 0.34 mm^2		
IP 67	IP 65		
- 25 ... + 90 °C	- 40 ... + 85 °C		
Lumberg RKC	Binder series 714	Binder	

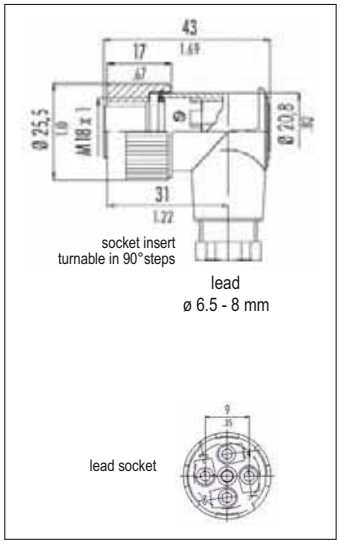






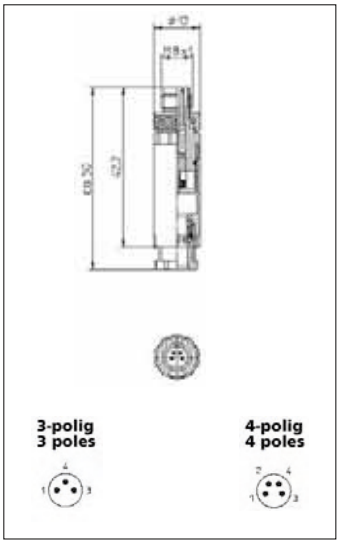
socket M12; screwable	socket M18; screwable		
angled	angled		
5-pole: JSM12V5; 13.98-11	4-pole: JSM18V4; 13.98-14		
8-pole: JSM12V8; 13.98-12			
PA	PBT / PA / PA		
CuZn nickel-plated	CuZn		
CuSn gold-plated	CuZn		
60 V (8-pol. 30 V); 4 A (8-pol. 2 A); ≤ 5 mΩ	250 V; 5 A; ≤ 8 mΩ		
0	0		
3.0 ... 6.5 mm (8-pol. 4.0 ... 8.0 mm)	3.0 ... 6.5 mm		
5 / 8 x 0.34 mm^2	4 x 0.34 mm^2		
IP 67	IP 65		
- 25 ... + 90 °C	- 40 ... + 85 °C		
Lumberg RKCW	Binder series 714		

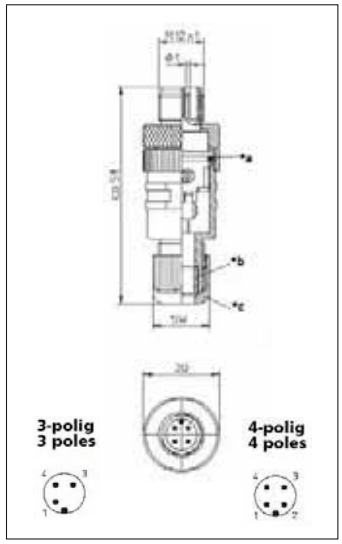




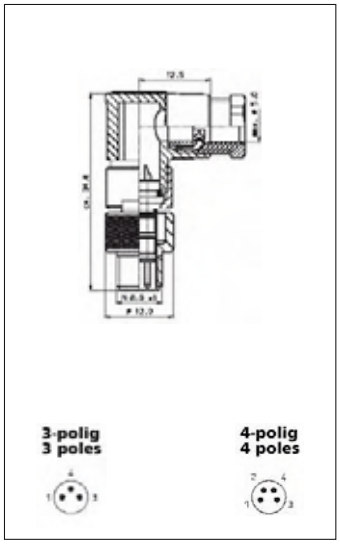
Accessories for Sensors
Field attachable plugs

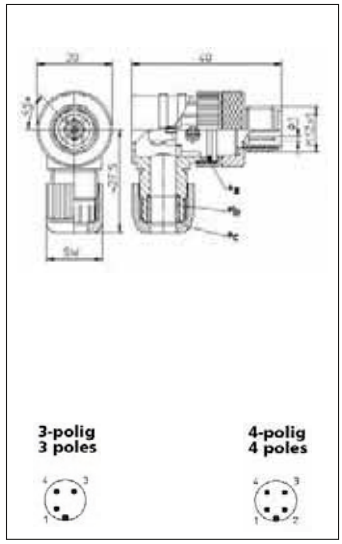
Connector; type of lead connection	plug M8, screwable	plug M12, screwable
Version	straight	straight
Pole number: Type designation; ref. no.	3-pole: JSM8S3; 13.98-30	3-pole: JSM12S3; 13.98-34
Pole number: Type designation; ref. no.	4-pole: JSM8S4; 13.98-31	4-pole JSM12S4; 13.98-35
Material: Housing / insulating body / contact carrier	PA / PA / TPU, self-quenching	PA / PA / PA
Flange	CuZn nickel-plated	CuZn nickel-plated
Contact material and surface	CuZn gold-plated	CuZn gold-plated
Nominal voltage; nominal current at 40 °C; contact resistance	60 V (4-pol. 30 V); 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ
Number of LED's and colour	0	0
Lead diameter	3.5 ... 5.0 mm	3.0 ... 6.5 mm
Recommended: Number of single cores x cross section	3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
Protection rating according to IEC 60529 (screw locked)	IP 67	IP 67
Ambient temperature range	- 40 ... + 85 °C	- 25 ... + 90 °C
Manufacture	Lumberg RSMCK	Lumberg RSC



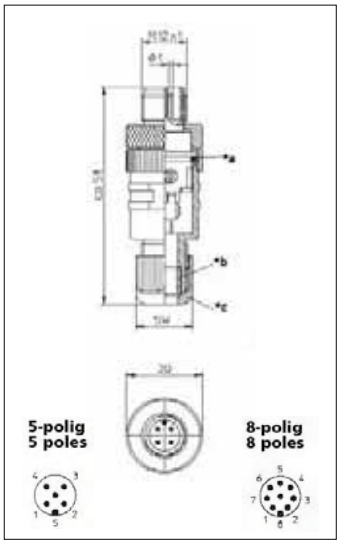


Connector; type of lead connection	plug M8; screwable	plug M12; screwable
Version	angled	angled
Pole number: Type designation; ref. no.	3-pole: JSM8T3; 13.98-32	3-pole: JSM12T3; 13.98-36
Pole number: Type designation; ref. no.	4-pole: JSM8T4; 13.98-33	4-pole: JSM12T4; 13.98-37
Material: Housing / insulating body / contact carrier	PBT / PBT / PA	PA / PA / PA
Flange	CuZn	CuZn nickel-plated
Contact material and surface	CuZn gold-plated	CuSn gold-plated
Nominal voltage; nominal current at 40 °C; contact resistance	60 V (4 pol. 30 V); 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ
Number of LED's and colour	0	0
Lead diameter	3.5 ... 5.0 mm	3.0 ... 6.5 mm
Recommended: Number of single cores x cross section	3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
Protection rating according to IEC 60529 (screw locked)	IP 67	IP 67
Ambient temperature range	- 40 ... + 85 °C	- 25 ... + 90 °C
Manufacture	Lumberg RSMCW	Lumberg RSCW

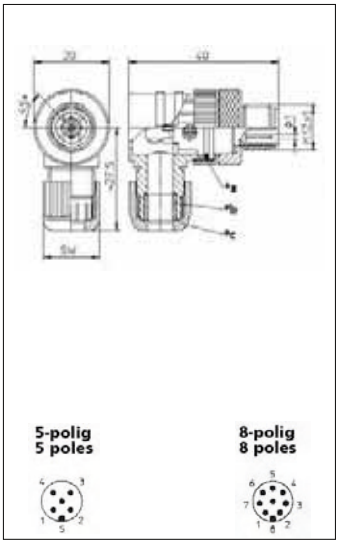




plug M12; screwable			
straight			
5-pole: JSM12S5; 13.98-38			
8-pole: JSM12S8; 13.98-39			
PA / PA / PA			
CuZn nickel-plated			
CuZn (8-pol. CuSnZn) gold-plated			
60 V (8-pol. 30 V); 4 A (8-pol. 2 A); ≤ 5 mΩ			
0			
3.0 ... 6.5 mm (8-pol. 4.0 ... 8.0 mm)			
5 / 8 x 0.34 mm^2			
IP 67			
- 25 ... + 90 °C			
Lumberg RSC			



plug M12; screwable			
angled			
5-pole: JSM12T5; 13.98-40			
8-pole: JSM12T8; 13.98-41			
PA / PA / PA			
CuZn nickel-plated			
CuZn (8-pol. CuSnZn) gold-plated			
60 V (8 pol. 30 V); 4 A (8 pol. 2 A); ≤ 5 mΩ			
0			
3.0 ... 6.5 mm (8-pol. 4.0 ... 8.0 mm)			
5 / 8 x 0.34 mm^2			
IP 67			
- 25 ... + 90 °C			
Lumberg RSCW			

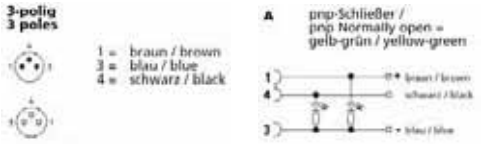


Accessories for Sensors
Cordsets with M8 or M12 connectors (adaptors)

Socket version; plug version	M8 straight; M8 straight	M8 angled; M8 straight
Connection type (screws or snap-ins)	both sockets and plugs: screws	both sockets and plugs: screws
Material: Housing / insulating body / contact carrier	TPU	TPU
Flange and surface / contact material and surface	CuZn nickel-plated / CuZn gold-plated	CuZn nickel-plated / CuZn gold-plated
Nominal voltage	60 V	10-30 V DC
Nominal current at 40 °C	4 A	4 A
LED indicator in the angled plug	0	1 x GN, 1 x YE
Lead jacket / colours	PUR / BK	PUR / BK
Protection rating according to IEC 60529 (screw locked)	IP 67	IP 67
Ambient temperature range	- 25 ... + 80 °C	- 25 ... + 80 °C
Manufacture	Lumberg RSMV-RKMV	Lumberg RSMV-RKMWV/LED
Pole no. socket / no. of cores x cross section / pole no. plug	**3 / 3 x 0.34 mm^2 / 3**	**3 / 3 x 0.34 mm^2 / 3**
Type designation	**JSM8U3 / LP3x0.34u4.3BK / SM8S3**	**JSM8V3gy / LP3x0.34u4.3BK / SM8S3**
Ref. no.	**13.97-50-xxx**	**13.97-51-xxx**
Pole no. socket/ no. of cores x cross section / pole no. plug		
Type designation		
Ref. no.		
Pole no. socket / no. of cores x cross section / pole no. plug		
Type designation		
Ref. no.		
Pole no. socket / no. of cores x cross section / pole no. plug		
Type designation		
Ref. no.		
Pole no. socket / no. of cores x cross section / pole no. plug		
Type designation		
Ref. no.		

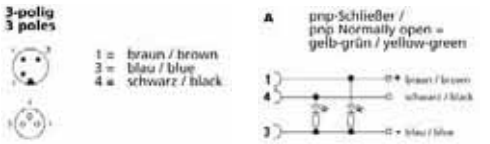
Socket M8 straight;
Plug M8 straight

Socket M8 angled;
Plug M8 straight

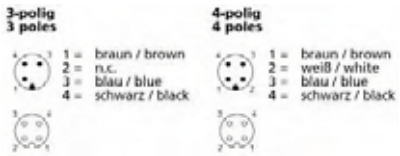


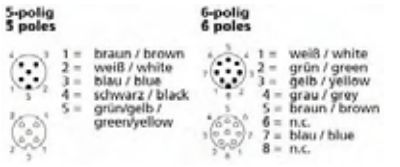
Socket M8 straight;
Plug M12 traight

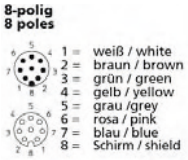
Socket M8 angled;
Plug M12straight



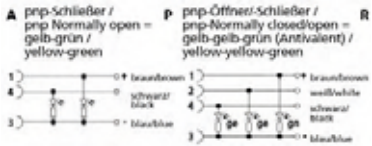
Socket M12 straight;
Plug M12 straight

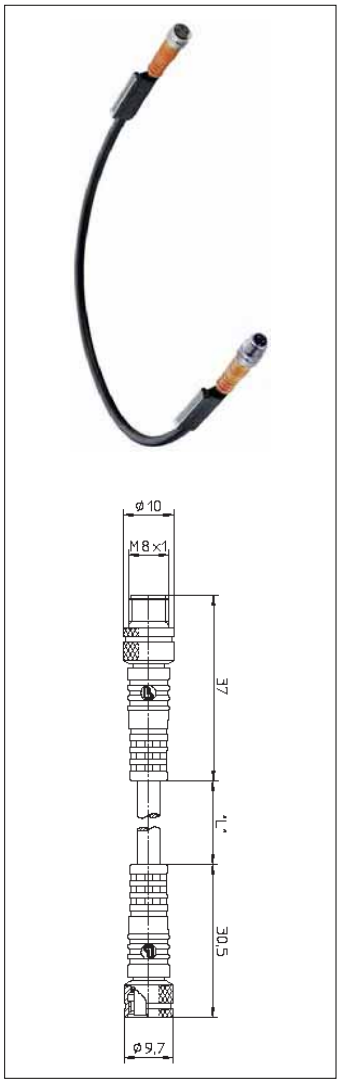


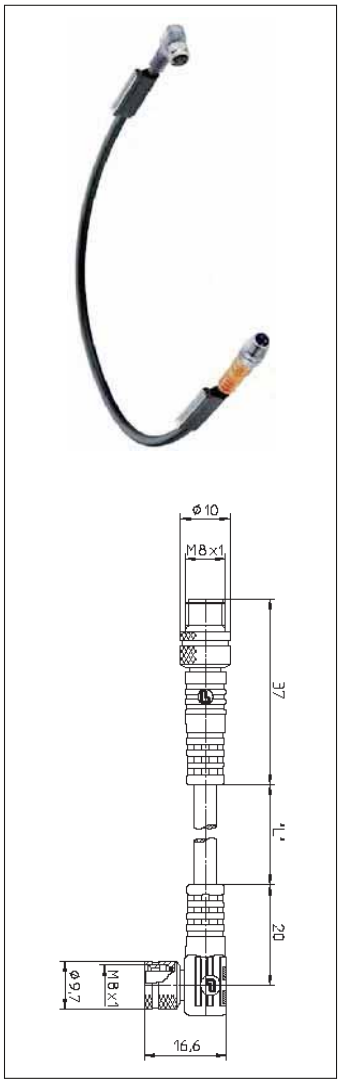




Socket M12 angled;
Plug M12 straight







M8 straight; M12 straight	M8 angled; M12 straight	M12 straight; M12 straight	M12 angled; M12 straight
both sockets and plugs: screws	**both sockets and plugs: screws**	**both sockets and plugs: screws**	**both sockets and plugs: screws**
TPU	TPU	TPU	TPU
CuZn nickel-plated / CuZn gold-plated	CuZn nickel-plated / CuZn gold-plated	CuZn nickel-plated / CuSn gold-plated	CuZn nickel-plated / CuSn gold-plated
60 V	10-30 V DC	3-4 pol. 240 V, 5 pol. 60 V, 6-8 pol. 30 V	10-30 V DC
4 A	4 A	3-5 pol. 4 A, 6-8 pol. 2 A	4 A
0	1 x GN, 1 x YE	0	1 x GN, 1 x YE
PUR / BK	PUR / BK	PUR / BK	PUR / BK
IP 67	IP 67	IP 67	IP 67
- 25 ... + 80 °C	- 25 ... + 80 °C	- 25 ... + 80 °C	- 25 ... + 80 °C
Lumberg RST-RKMV	Lumberg RST-RKMWV/LED	Lumberg RST-RKT	Lumberg RST-RKWT/LED
3 / 3 x 0.34 mm^2 / 3	**3 / 3 x 0.34 mm^2 / 3**	**3 / 3 x 0.34 mm^2 / 3**	**3 / 3 x 0.34 mm^2 / 3**
JSM8U3 / LP3x0.34u4.3BK / SM12S3	**JSM8V3gy / LP3x0.34u4.3BK / SM12S3**	**JSM12U3 / LP3x0.34u4.3BK / SM12S3**	**JSM12V3gy/LP3x0.34u4.3BK/SM12S3**
13.97-52-xxx	**13.97-53-xxx**	**13.97-54-xxx**	**13.97-55-xxx**
		4 / 4 x 0.34 mm^2 / 4	**4 / 4 x 0.34 mm^2 / 4**
		JSM12U4 / LP4x0.34u4.7BK / SM12S4	**JSM12V4gy/LP4x0.34u4.7BK/SM12S4**
		13.97-56-xxx	**13.97-57-xxx**