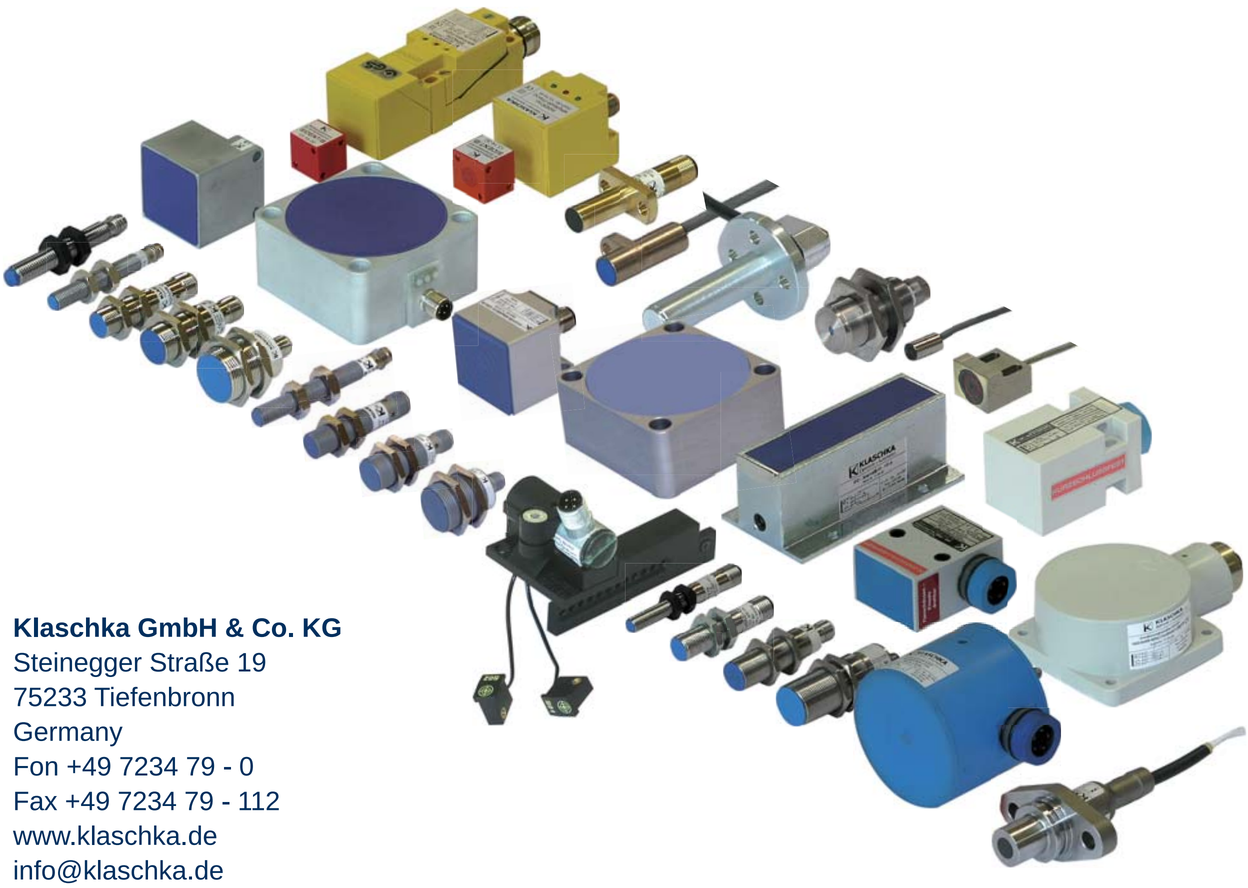
KLASCHKA
Elektronik + Automation

Sensors for Automation

ALSEN 1.08



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Sensors for Automation
Content

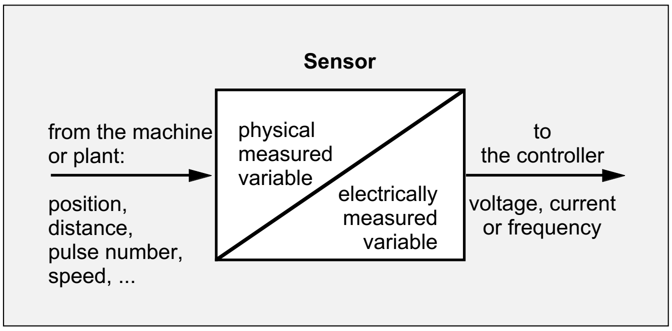
12 Accessories for Sensors

12.1 Connectors, Leads, Adaptors, Distributors

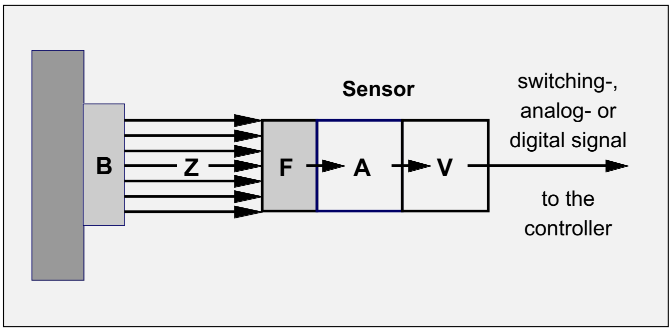
Principle and Function

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.

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 structure of a sensor shows the following schematic:



- 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-, analog 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 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 analog sensors.

They are employed in those areas where the customer has high requirements with regard to operating life, reliability, switching point accuracy, operating 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
- **B** rotation speed dependent
- **H** hall
- **I** inductive
- **K** capacitive
- **M** magneto-resistive
- **O** optical
- **R** rotary
- **T** temperature-dependent
- **Y** safety-oriented
- **SIDENT** safety sensor
- **WIDENT** tool recognition

2 Type Series: Properties

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

3 Type of the Output and Supply Voltage

- **A** analog voltage output, 10 ... 30 V DC
- **B** two-poles, 8 / 10 ... 30 / 60 V DC
- **C** analog current output 0 ... 20 mA, 10 ... 30 V DC
- **D** three-poles, four-poles, 8 / 10 ... 30 / 60 V DC
- **E** three-poles, four-poles, 5 V DC stabilized
- **F** frequency output (safety sensor)
- **N** NAMUR sensor
- **G** push-pull output GS three-poles, four-poles, 8 / 10 ... 30 / 60 V DC
- **H** analog current output 4 ... 20 mA, 10 ... 30 V DC
- **P** passive output (sensor)
- **U** two-poles, 20 ... 320 V DC and 20 ... 265 V AC
- **V** two-poles, 20 .... 70 V AC
- **W** two-poles, 20 / 90 ... 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
- **E** with fault detection and -display
- **F** ferrous sensor, with red. factor r
- **H** switch. frequency > 10 kHz
- **K** with coupling unit
- **M** magnetic field-resistant
- **N** radiation-proof
- **S** weld-proof

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

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-protectedd
- **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 Analog or Digital

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

Supply Voltages 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.

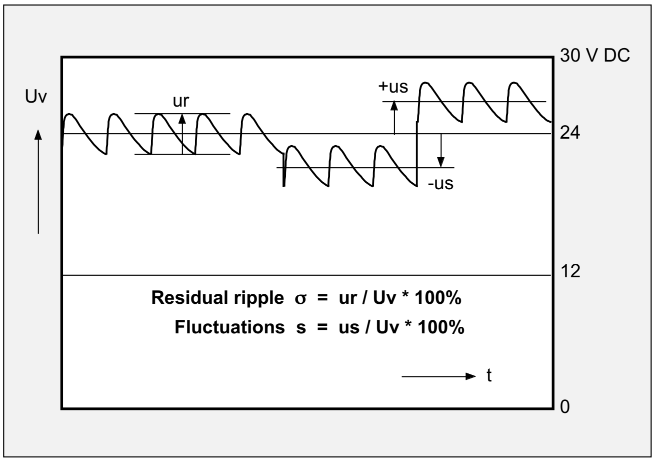
Each exit is protected against overloading by a clocking **short-circuit- protection**, which becomes effective from a **maximum load current I_{Lmax}**. For the verification of the short-circuit-resistance the standard EN 60947-5-2 requires for the type examination a power supply unit, which is capable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

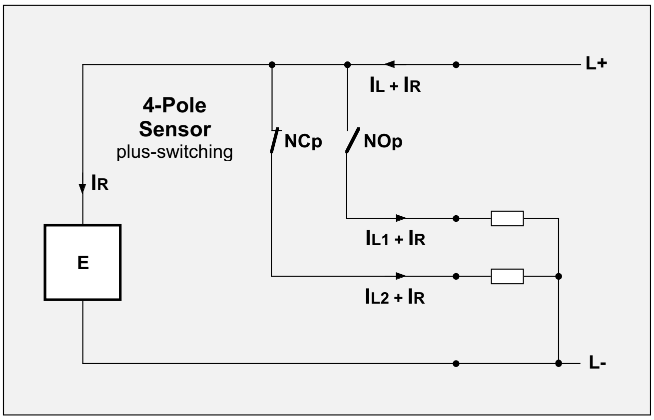
A **voltage drop** over the current-carrying output, whose extent depends to a certain degree on the magnitude of the load current, develops due to the short-circuit protection, pole protection, and a residual voltage.

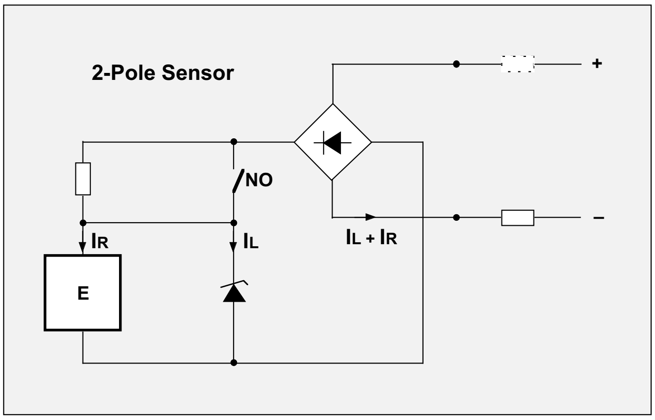
In the case of **3- and 4-pole sensors** a very small **residual current** of a few µA develops due to the load arising when the output is closed. In the Technical Data the residual current is usually not indicated because the voltage drop at the load resistance caused by it is negligibly small. The 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

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

Connector | **Outgoing Lead**

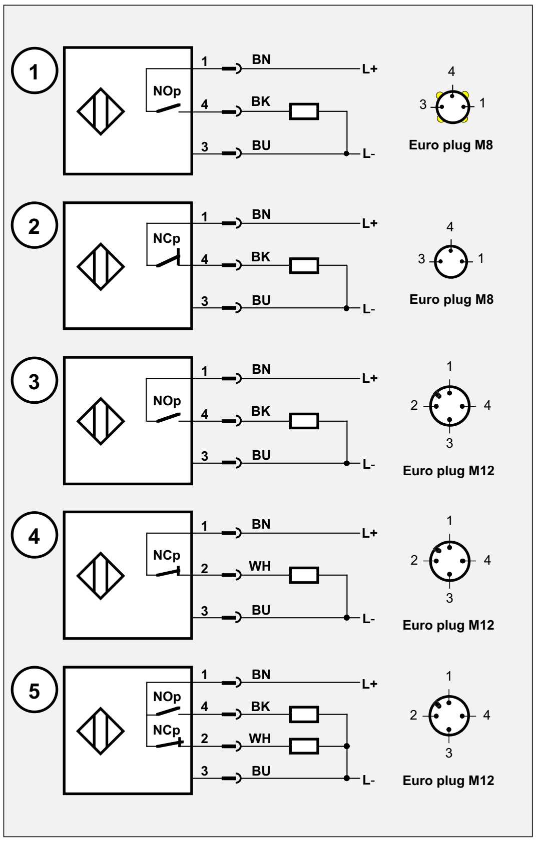
NO plus-switching NOp

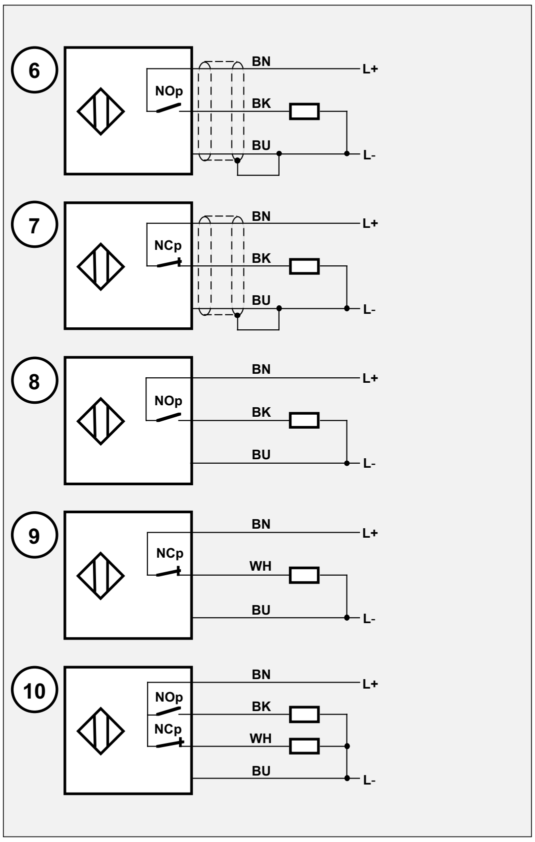
NC plus-switching NCp

NO plus-switching NOp

NC plus-switching NCp

NO and NC plus-switching NOp + NCp





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

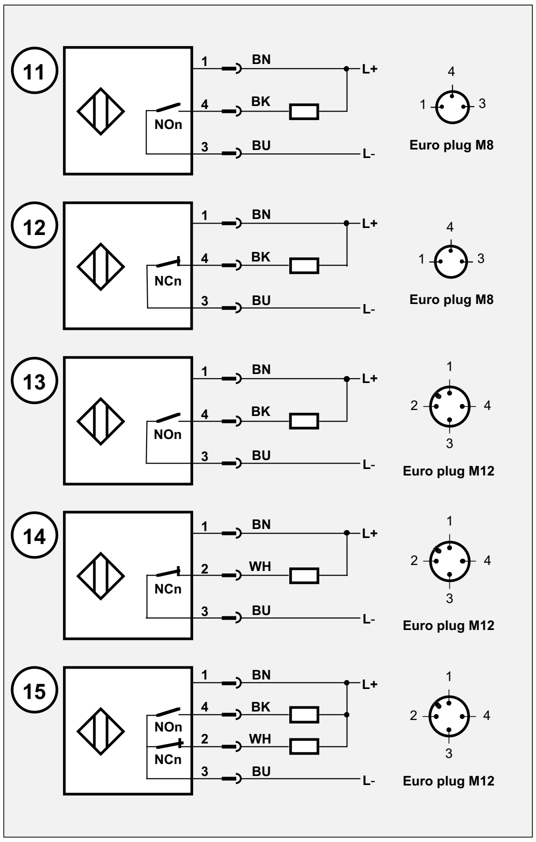
NO minus-switching NOn

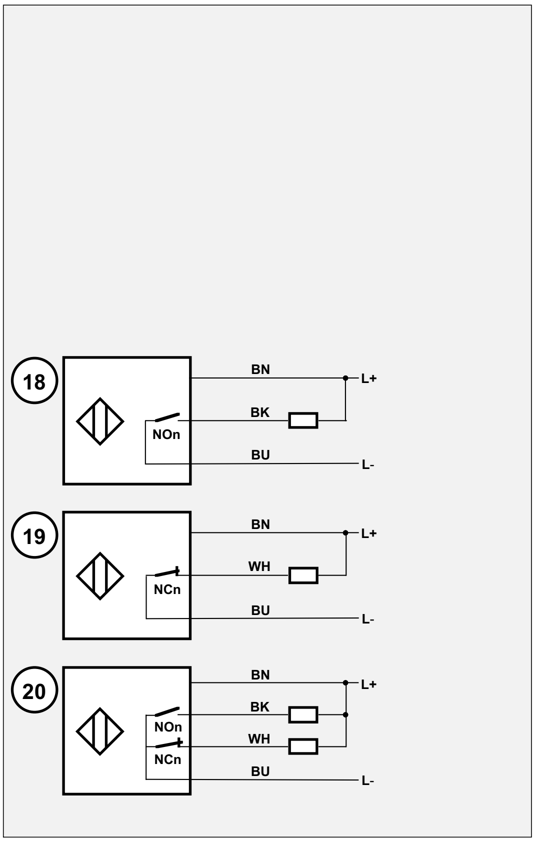
NC minus-switching NCn

NO minus-switching NOn

NC minus-switching NCn

NO and NC minus-switching NOn + NCn





Connection Diagrams DC and AC 2-Poles

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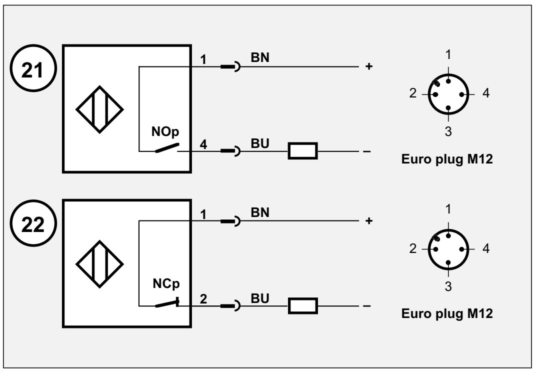
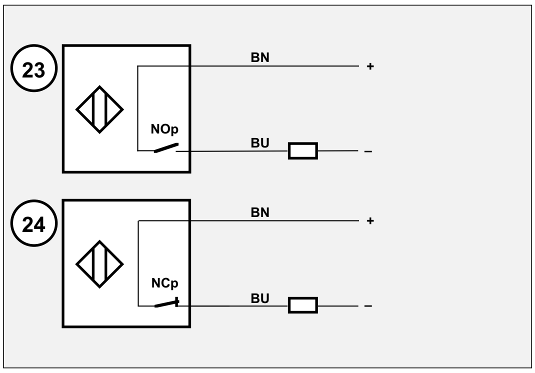
	Connector	Outgoing Lead

DC 2-poles polarized

NO plus-switching
NOp

NC plus-switching
NCp

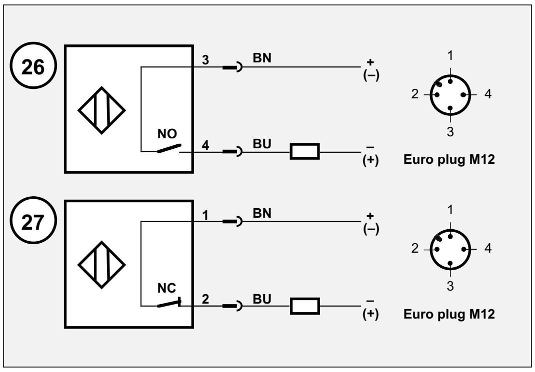


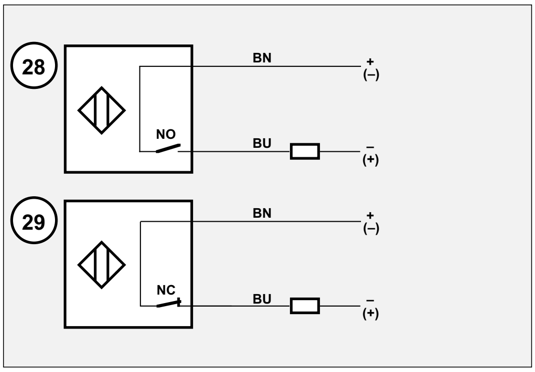


DC 2-poles non-polarized

NO non-polarized
NO

NC non-polarized
NC

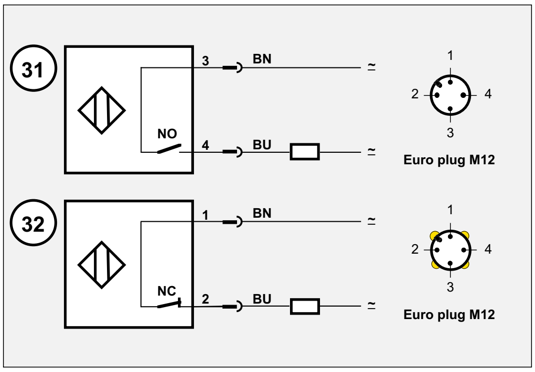


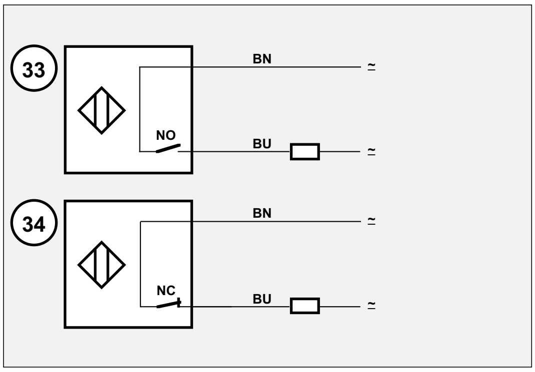


AC/DC 2-poles all-insualted

NO

NC

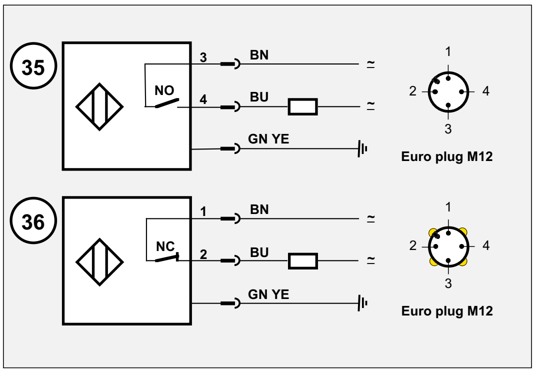


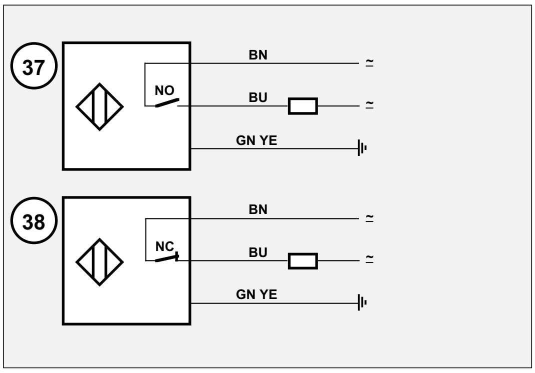


AC/DC 2-poles with protective wire

NO

NC





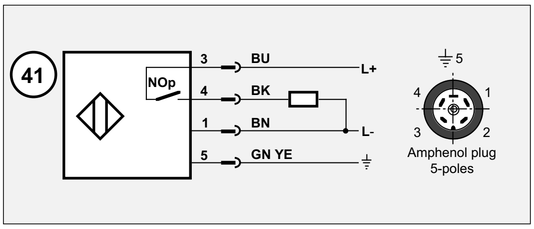
Colours of lines acc. to DIN IEC 60757

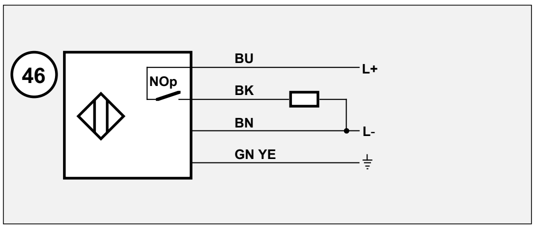
BN	BK	BU	WH	GN YE
brown	black	blue	white	green yellow

	Connector	Outgoing Lead

DC 4-poles with protective wire

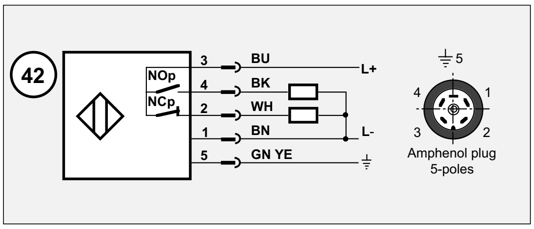
NO plus-switching
NOp

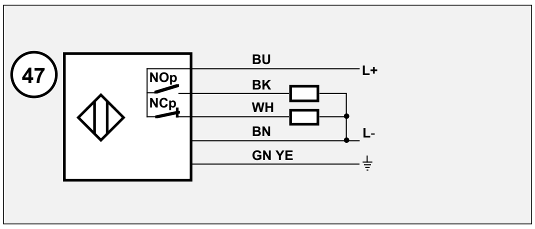




DC 5-poles with protective wire

NO and NC
plus-switching
NOp + NCp





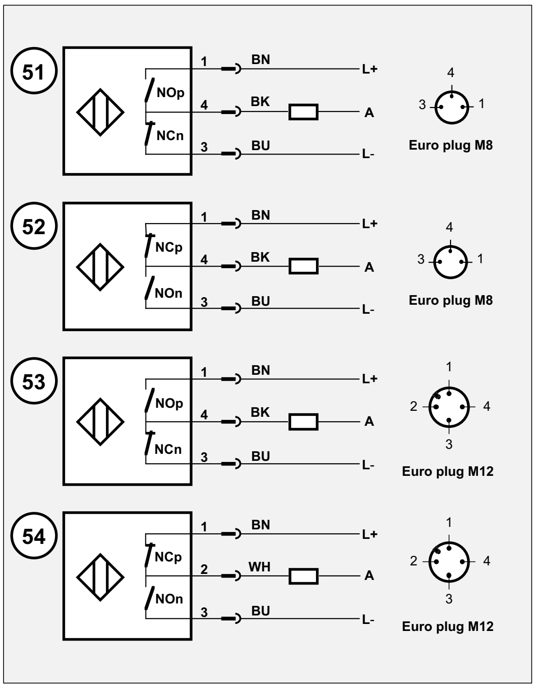
DC 3-poles push-pull

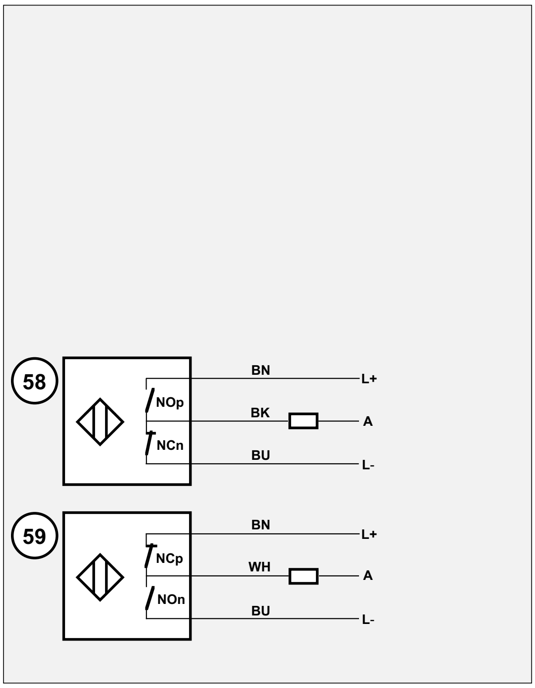
NO plus-switching
NC minus-switching
NOp + NCn

NO minus-switching
NC plus-switching
NOn + NCp

NO plus-switching
NC minus-switching
NOp + NCn

NO minus-switching
NC plus-switching
NOn + NCp

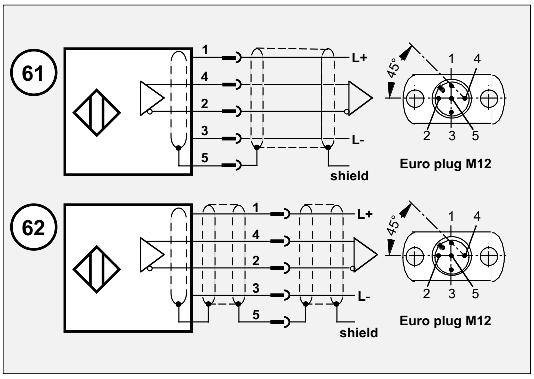


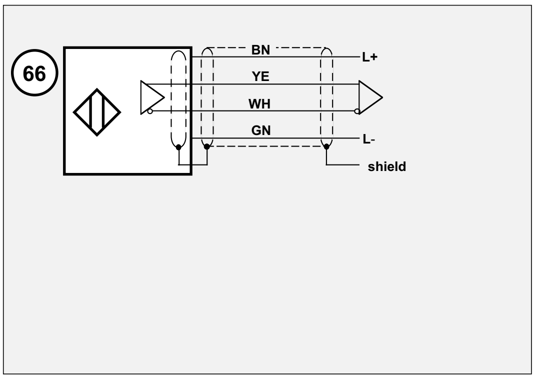


DC 5-poles push-pull shielded lead

with symmetrical output

with symmetrical output
with adapter plug





Colours of lines acc. to DIN IEC 60757

BN brown	BK black	BU blue	WH white	GN YE green yellow

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 agiangst 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

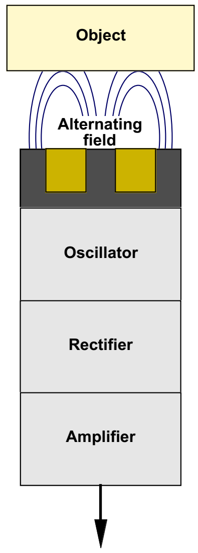
PVC-Leads		PUR-Leads		Temperature-Resistant Leads	
Number x lead cross section in mm^2	Outer diameter of the leads in mm	Number x lead cross section in mm^2	Outer diameter of the leads in mm	Number x lead cross section in mm^2	Outer diameter of the leads in mm
2x0.14	3.0				
2x0.19	3.5				
2x0.25	4.5				
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				

Method of Function 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.



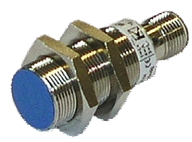
Inductive Proximity Switches for Machines and Plants

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 rotational 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 catalog, 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

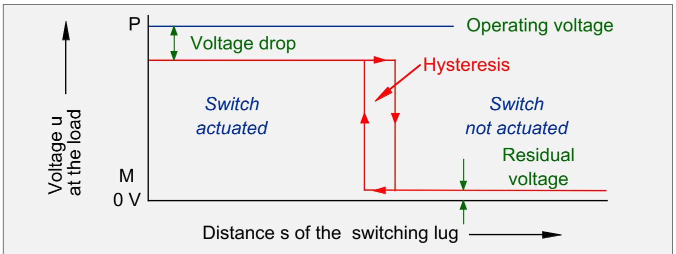
A. For the Application at PLCs and Field Bus Interface Connections
- Supply voltage range 8 ... 30 V DC
- Outputs are protected against polarity reversal and short-circuit-proof, with LED display,
  2-poles with 1 NO with 5 ... 60 mA or
  3-poles with 1 NOp ≤ 200 mA or
  4-poles with 1 NOp + 1 NCp ≤ 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 19 234 Applications
- in explosion-endangered areas, except in zone 0
- 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.

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 nominal switching distance sn, the real switching distance sr, and the operating distance sa, 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 alway 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 nominal switching 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.

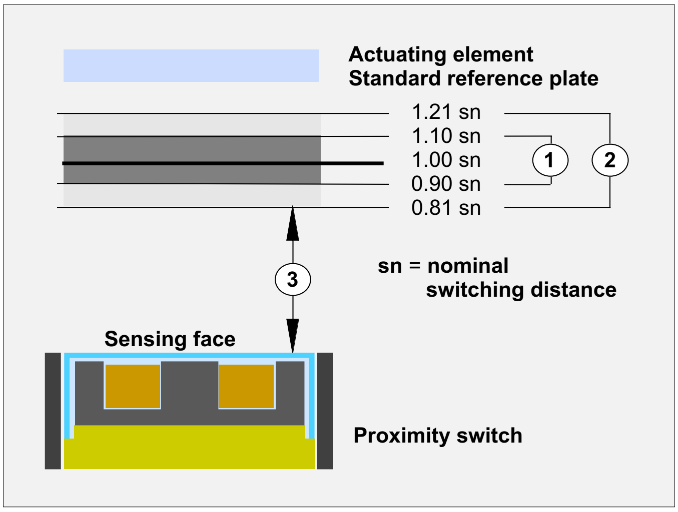
w = path axis, s = distance axis, sn = switching distance, r = switching radius, Aw, As = switching-on points, Bw, Bs, C = switching-off points, Ka, Kb = characteristic response curves,
Hw, Hs = switching hysteresis in w-direction and s-direction,
Ø = diameter of the proximity switch and the reference plate.

From the **starting direction** of the reference plate you can distinguish between

- **s-direction** the **distance switching points As and Bs** when entering und leaving the sensor field, and
- **w-direction** the **path-switching-points Aw and Bw** (actuation by front edge) and **Aw and Cw** (actuation by front edge when entering and by back edge when leaving the sensor field).

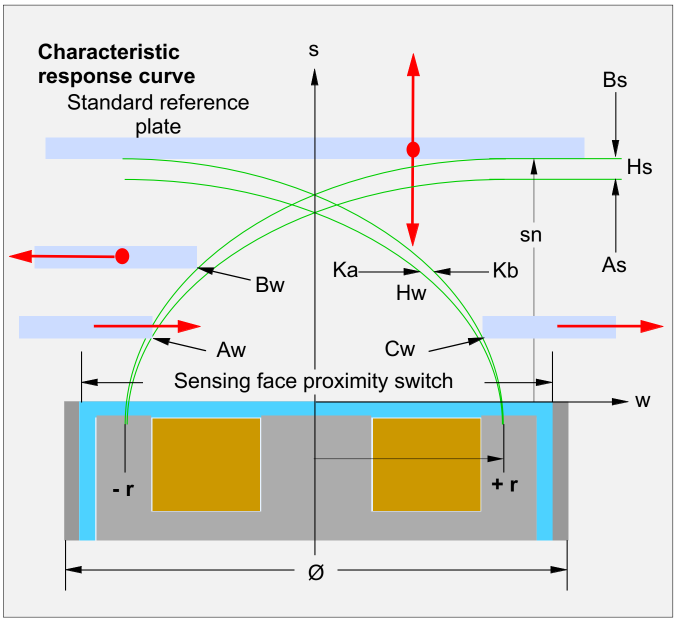
The differences between the switching-on- and switching-off points with an approaching and a receding reference plate are called **the switching hysteresis Hs, Hw** . For all proximity switches applies: 0.03 sn ≤ Hs ≤ 0.2 sn.

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 sr** is measured at a nominal voltage and ambient temperature: 0.9 sn ≤ sr ≤ 1.1 sn. 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 sn ≤ s ≤ 1.21 sn.
3. The **operating distance sa** = 0 ... 0.81 sn 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



Inductive Proximity Switches
Switching Frequency, External Influences

KLASCHKA Elektronik + Automation

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

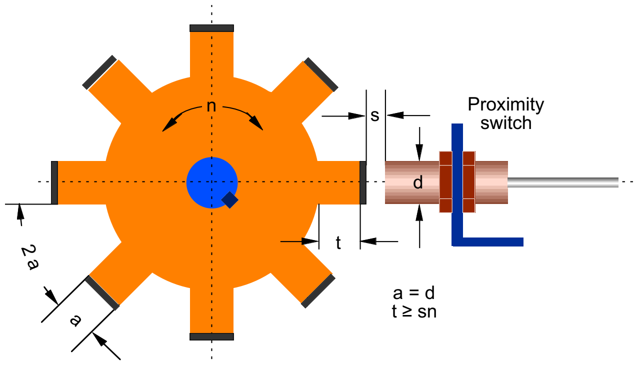
Disturbing **magnetic fields** are mainly produced in industrial plants by electrical welding and electrical drives. If an inductive proximity switch is within the magnetic interference field, fault signals may arise. Also see EN 60947-5-2 (1998) appendix E.

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.

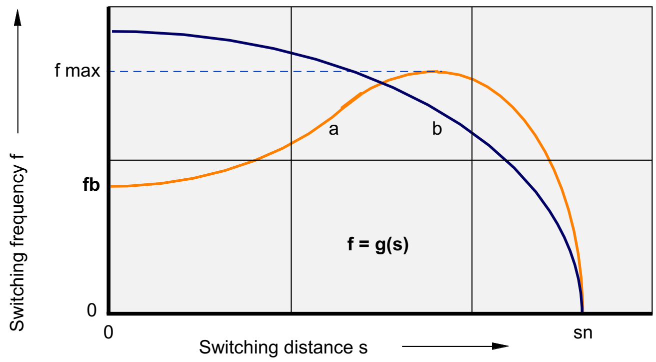
The **ambient temperature** also influences the switching behaviour.

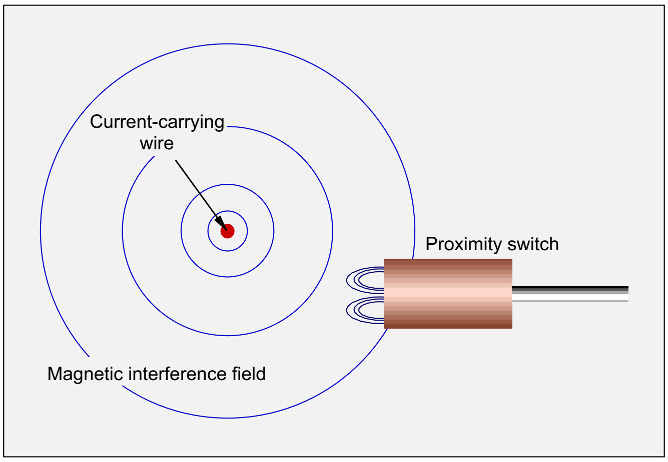
The **temperature dependency** of the switching distance s in the indicated ambient temperature range is described by a function s = f (T) which is to be determined empirically.

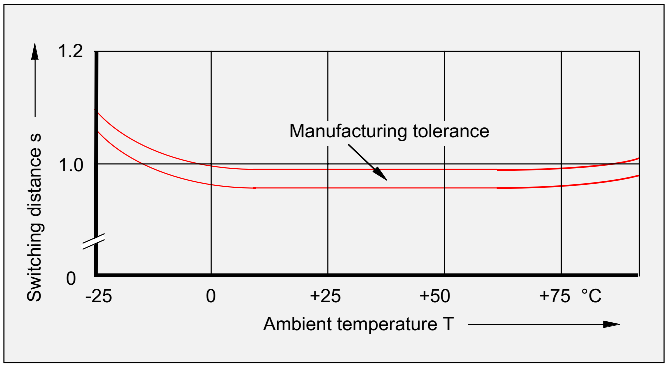
According to EN 60947-5-2 the permissible alternation or **drift of the switching distance** in the indicated ambient temperature range may not exceed a value of 10%.



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







Installation Requirements for Round Sensors

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

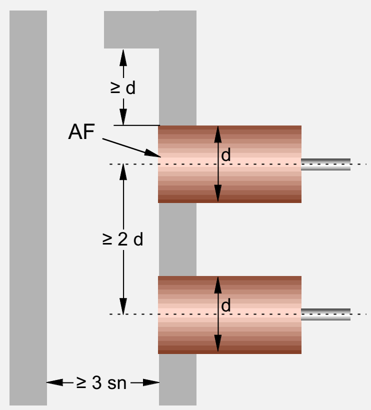
The flush mountable sensor with the diameter d and the nominal switching distance sn can be mounted into metal up to the sensing face. The following installation instructions apply:

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

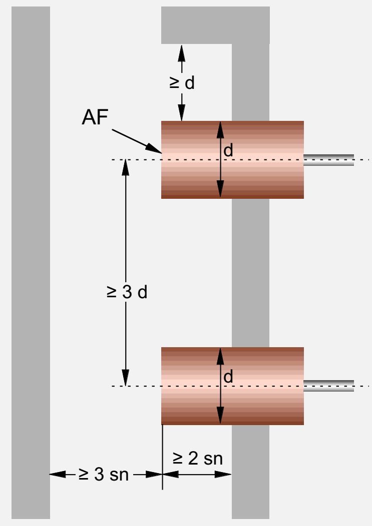
Non-flush mounting (n): An inductive sensor is non-flush mountable, if a certain free zone around its sensing face is required in order to preserve the characteristics.

The non-flush mountable sensor with the diameter d and the nominal switching distance sn has to stick out of the metal surface by at least 2 sn. The following installation requirements 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 sn
- Distance to a side face ≥ b



**Round inductive sensor:
Flush mounting (b)**



**Round inductive sensor:
Non-flush mounting (n)**

Mounting the sensor into a non-metallic material allows flush mounting.

Mounting Requirements 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 switching distance sn can be mounted onto metal up to its sensing face AF. The following mounting requirements apply:

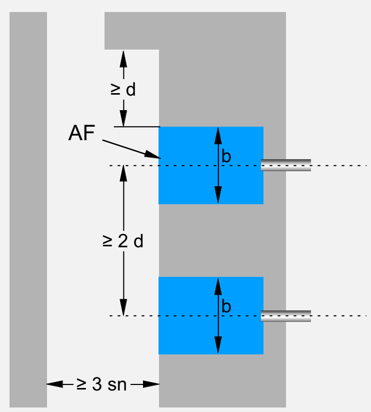
- Distance between the centre of two sensors when these are arranged in a row ≥ 2b
- Distance to an opposite metal face ≥ 3 sn
- Distance to a side face ≥ b

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

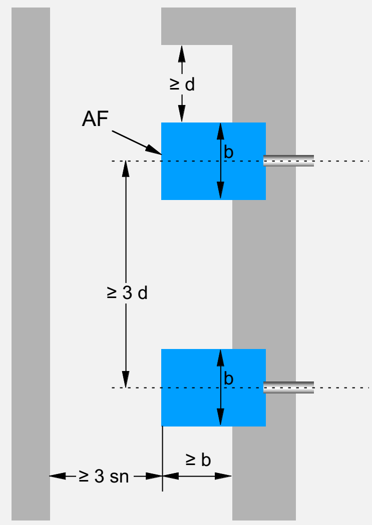
Non-flush mounting (n): A rectangular inductive sensor is non-flush mountable if a certain free zone around its sensing face is necessary in order to maintain its characteristics.

The non-flush mountable sensor with the width b and the nominal switching distance sn has to stick out of the metal at least by b. The following mounting requirements 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 sn
- Distance to a side face ≥ b

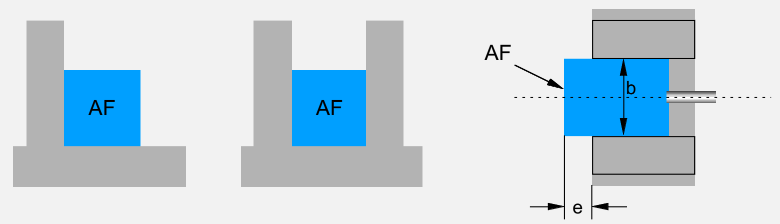


**Rectangular inductive sensor:
Flush mounting (b)**



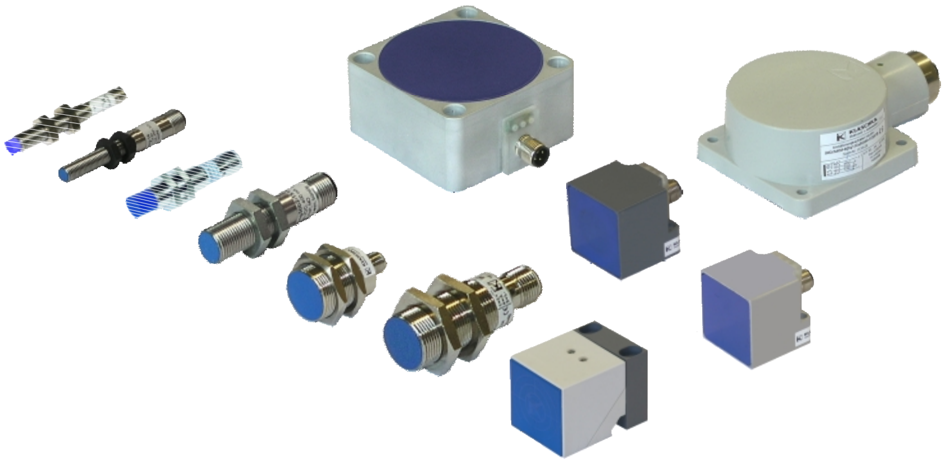
**Rectangular inductive sensor:
Non-flush mounting (n)**

Installing the sensor onto a non-metallic material with the thickness > 2sn allows a flush mounting.



Inductive Proximity Switches
Type All Metal Standard

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	11.37-22-000	1.5 b
IAD/AHM-8eg60b1.5-2Wc1A	11.37-24-000	1.5 b
IAD/AHM-8eg60b1.5-1Sd1A	11.37-23-000	1.5 b
IAD/AHM-8eg60b1.5-2Sd1A	11.37-25-000	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 **)	11.37-57-000	3.0 n
IAD/AHM-8eg60n3-1Sd1A **)	11.37-58-000	3.0 n
IAD/AHM-8eg60n3-2Wc1A **)	11.37-59-000	3.0 n
IAD/AHM-8eg60n3-2Sd1A **)	11.37-60-000	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	11.37-03-000	3.5 b
IAD/AHM-12mg50b3.5-2Sd1A	11.37-10-000	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	11.37-52-000	6.0 n
IAD/AHM-12mg60n6-2Sd1A	11.37-53-000	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	11.37-04-000	6.0 b
IAD/AHM-18mg50b6-12Sd1A	11.37-06-000	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-18eg50b6-1Sd1A	11.37-37-000	6.0 b
IAD/AHM-18eg50b6-12Sd1A	11.37-38-000	6.0 b
IAD/AHM-18eg50b6-1NDc1A	11.37-39-020	6.0 b
IAD/AHM-18eg50b6-12NDd1A	11.37-40-020	6.0 b
IAD/AHM-18mg60n10-1Sd1A	11.37-54-000	10.0 n
IAD/AHM-18mg60n10-12Sd1A	11.37-55-000	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	11.37-07-000	10.0 b
IAD/AHM-30mg50b10-12NDd1A **)	11.37-33-020	10.0 b
IAD/AHM-30mg85n20-12Sd1A	11.37-70-000	20.0 n
IAD/AHM-30mg65n20-12NDd1A **)	11.37-71-020	20.0 n
IAD/AHM-40aq40b15-12Sd1B **)	11.37-16-000	15.0 b
IAD/AHM-40fv54b15-12Sd1B **)	11.37-34-000	15.0 b
IAD/AHM-80aq40b40-12NKd1B **)	11.37-35-050	40.0 b
IAD/AHM-80aq40b40-12Sd1B	11.37-18-000	40.0 b
IAD/AHM-80fq40t40-12Sd1B	11.37-17-000	40.0 t

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

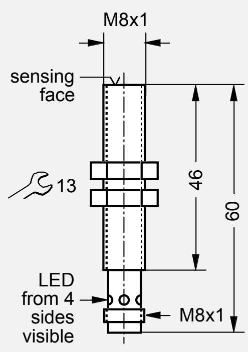
**) = supply on request

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

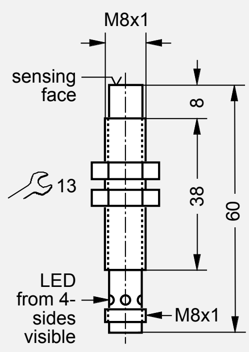
Design; length	**O M8 x 1;** 60 mm	**O M8 x 1;** 60 mm
Material of the sensing face / of the housing	PBT / stainless steel	PBT / stainless steel
Nominal switching distance, mounting (see page 1.0.4)	**1.5 mm, flush**	**3 mm, non-flush**
Range secured switching distance	0 ... 1.22 mm	0 ... 2.43 mm
Type 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%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	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 switching distance of the object 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
Degree of protection 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	1 0 g	10 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

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

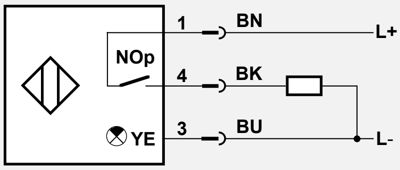
CE

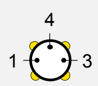
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Wiring (1)
DC 3-poles, plug

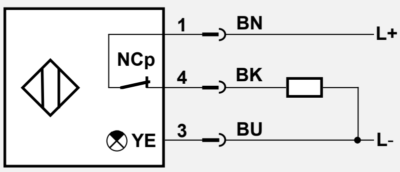
Euro Plug M8
with LED display YE
from 4 sides visible

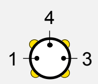




Wiring (2)
DC 3-poles, plug

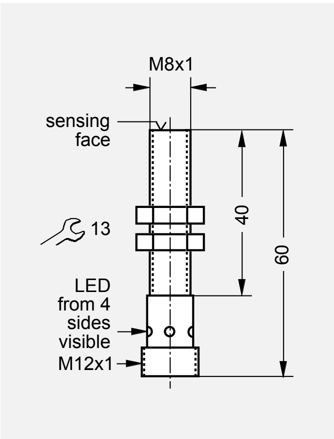
Euro Plug M8
with LED display YE
from 4 sides visible

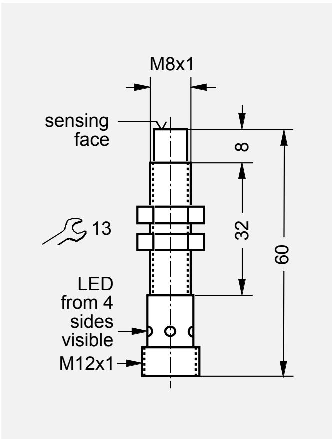


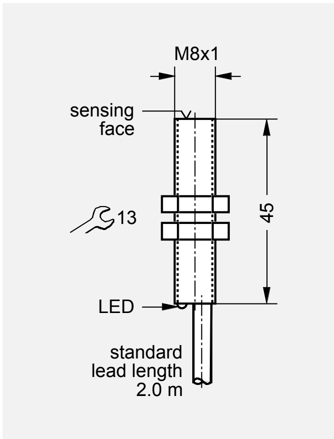


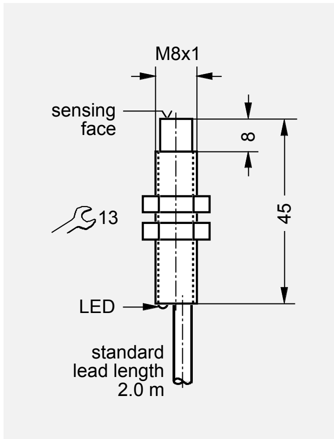
KLASCHKA
Elektronik + Automation

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



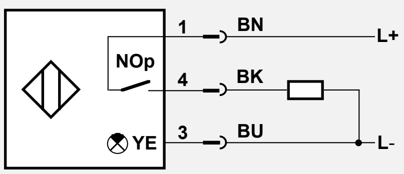




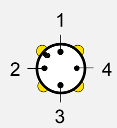


10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
6.4 mm	6.4 mm	6.4 mm	6.4 mm
1.0 mm	3.0 mm	1.0 mm	3.0 mm
yes, YE	yes, YE	yes, 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

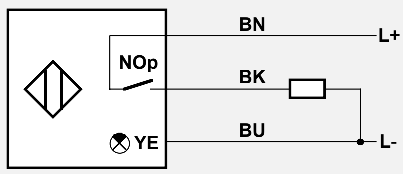
Wiring (3)
DC 3-poles, plug



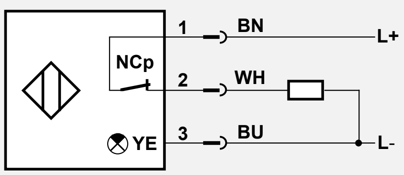
Euro Plug M12
with LED display YE
from 4 sides visible



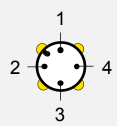
Wiring (5)
DC 3-poles, outgoing lead



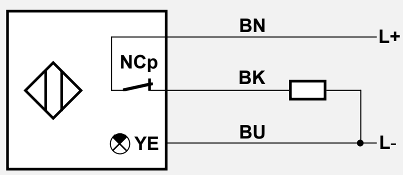
Wiring (4)
DC 3-poles, plug



Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (6)
DC 3-poles, outgoing lead

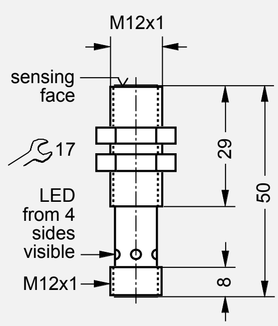


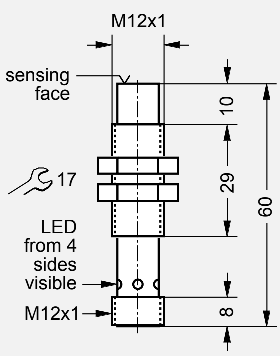
Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-12mg

Design; length	**O M12 x 1;** 50 mm	**O M12 x 1;** 60 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
Nominal switching distance, mounting (see page1.0.4)	**3,5 mm, flush**	**6 mm, non-flush**
Range secured switching distance	0 ... 2.83 mm	0 ... 4.86 mm
Type designation, Ref. no. (Wiring): NO plus-switching NOp	IAD/AHM-12mg50b3.5-1Sd1A, 11.37-03 (1)	IAD/AHM-12mg60n6-1Sd1A, 11.37-52 (1)
NC plus-switching NCp	IAD/AHM-12mg50b3.5-2Sd1A, 11.37-10 (2)	IAD/AHM-12mg60n6-2Sd1A, 11.37-53 (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 M12; 3 wires	connector M12; 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%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistant	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed output	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C





Specific Technical Data

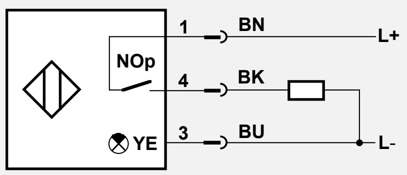
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	10.5 mm	10.5 mm
Switching radius r (at switching distance of the object 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		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection 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
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

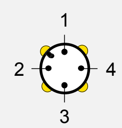
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

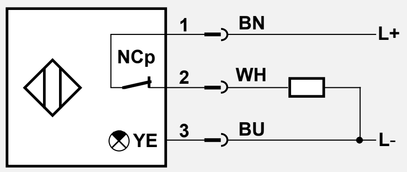
Wiring (1)
DC 3-poles, plug



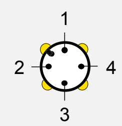
Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (2)
DC 3-poles, plug



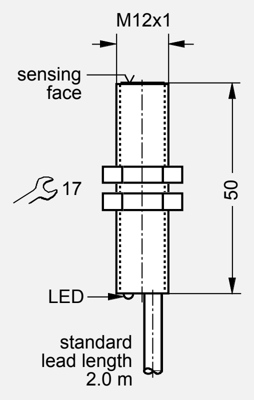
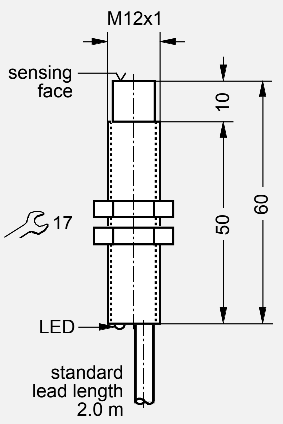
Euro Plug M12
with LED display YE
from 4 sides visible



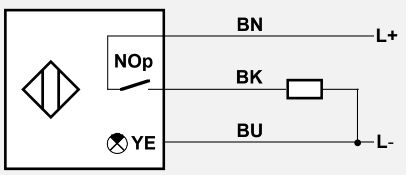
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

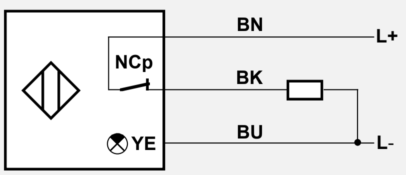
Subject to technical changes!

O M12 x 1; 50 mm	**O M12 x 1;** 60 mm		
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated		
3.5 mm, flush	**6 mm, non-flush**		
0 ... 2.83 mm	0 ... 4.86 mm		
IAD/AHM-12mg50b3.5-1NDc1A, 11.37-28-020 (3)	IAD/AHM-12mg60n6-1NDc1A, 11.37-63-020 (3)		
IAD/AHM-12mg50b3.5-2NDc1A, 11.37-29-020 (4)	IAD/AHM-12mg60n6-2NDc1A, 11.37-64-020 (4)		
20 kHz / 25 µs	**20 kHz / 25 µs**		
lead; 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	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 + weight of the lead	14 g + weight of the lead		

Wiring (3)
DC 3-poles, outgoing lead



Wiring (4)
DC 3-poles, outgoing lead

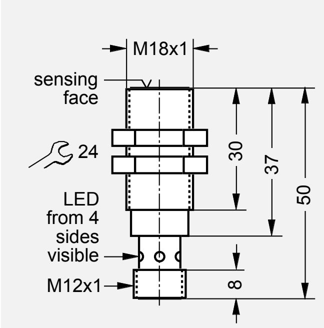


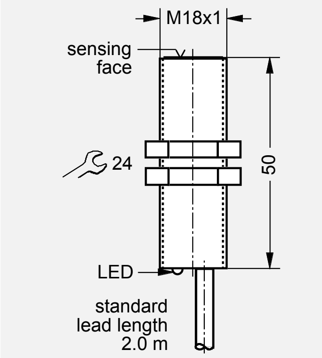
Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-18mg

	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
	Nominal switching distance, mounting (see page 1.0.4)	**6 mm, flush**	**6 mm, flush**
	Range secured switching distance	0 ... 4.86 mm	0 ... 4.86 mm
Type designation, Ref. no. (Wiring)	NO plus-switching NOp	IAD/AHM-18eg50b6-1Sd1A, 11.37-37 (1)	IAD/AHM-18eg50b6-1NDc1A, 11.37-39-020 (3)
	NC plus-switching NCp		
	NO and NC plus-switching NOp + NCp	IAD/AHM-18eg50b6-12Sd1A, 11.37-38 (2)	IAD/AHM-18eg50b6-12NDd1A, 11.37-40-020 (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%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed output	≤ 2.5 V DC





Specific Technical Data

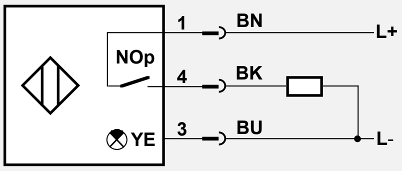
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at switching distance of the object) 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		PD / 2.0 m / 3 x 0.34 mm^2
Ambient temperature range	- 40 ... + 85 °C	- 40 ... + 85 °C
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc	45 Nm / 90 Nm	45 Nm / 90 Nm
Weight	28 g	28 g + weight of the lead
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 "Accessories". Order separately.

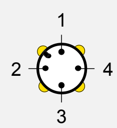
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

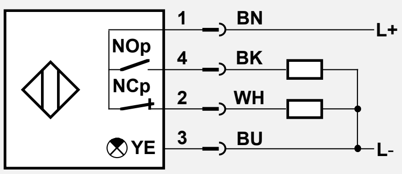
Wiring (1)
DC 3-poles, plug



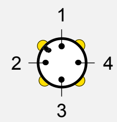
Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (2)
DC 4-poles, plug



Euro Plug M12
with LED display YE
from 4 sides visible

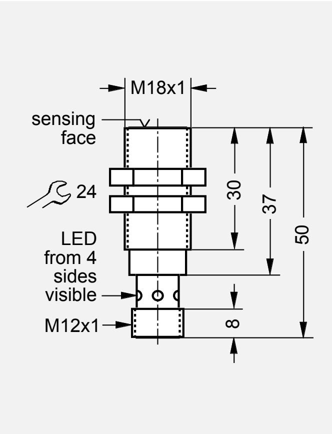
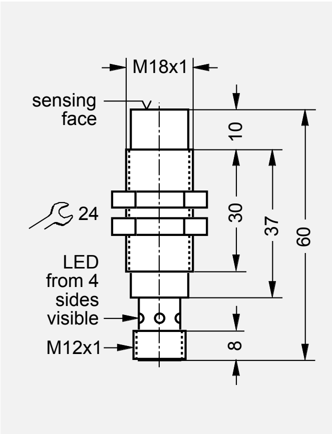
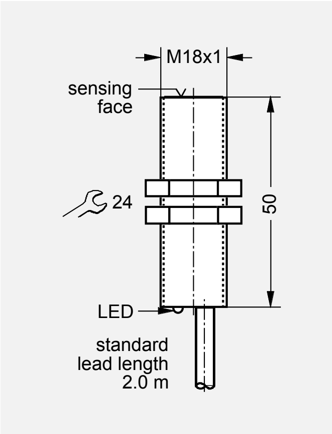
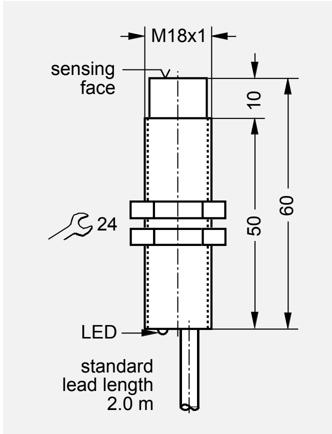


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

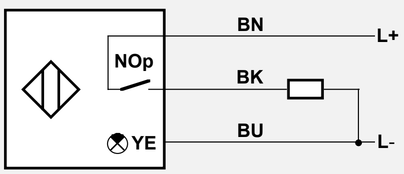
CE

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

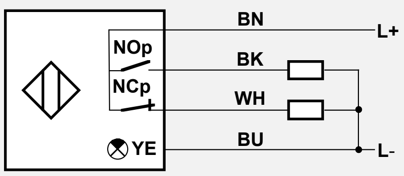
Subject to technical changes!

O M18 x 1; 50 mm	**O M18 x 1;** 60 mm	**O M18 x 1;** 50 mm	**O M18 x 1;** 60 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
6 mm, flush	**10 mm, non-flush**	**6 mm, flush**	**10 mm, non-flush**
0 ... 4.86 mm	0 ... 8.1 mm	0 ... 4.86 mm	0 ... 8.1 mm
IAD/AHM-18mg50b6-1Sd1A, 11.37-04 (1)	IAD/AHM-18mg60n10-1Sd1A, 11.37-54 (1)	IAD/AHM-18mg50b6-1NDc1A, 11.37-30-020 (3)	IAD/AHM-18mg60n10-1NDc1A, 11.37-67-020 (3)
IAD/AHM-18mg50b6-12Sd1A, 11.37-06 (2)	IAD/AHM-18mg60n10-12Sd1A, 11.37-55 (2)	IAD/AHM-18mg50b6-12NDd1A, 11.37-32-020 (4)	IAD/AHM-18mg60n10-12NDd1A, 11.37-69-020 (4)
20 kHz / 25 µs	**20 kHz / 25 µs**	**20 kHz / 25 µs**	**20 kHz / 25 µs**
connector M12; 3 / 4 wires	connector M12; 3 wires	lead; 3 / 4 wires	lead; 3 / 4 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
16.5 mm	16.5 mm	16.5 mm	16.5 mm
6.0 mm	7.0 mm	6.0 mm	7.0 mm
yes, YE	yes, YE	yes, YE	yes, YE
500 m	500 m	500 m	500 m
		ND / 2.0 m / 3 x 0.34 mm^2	ND / 2.0 m / 3 x 0.34 mm^2
- 25 ... + 85 °C	- 25 ... + 85 °C	- 25 ... + 85 °C	- 25 ... + 85 °C
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
28 g	28 g	28 g + weight of the lead	28 g + weight of the lead

Wiring (3)
DC 3-poles, outgoing lead



Wiring (4)
DC 4-poles, outgoing lead

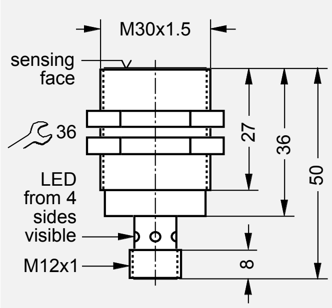


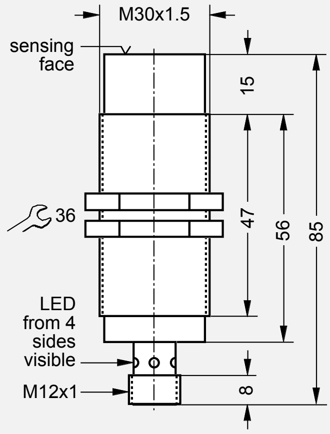
Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-30mg

Design; length	**O M30 x 1.5;** 50 mm	**O M30 x 1.5;** 85 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
Nominal switching distance, mounting (see page 1.0.4)	**10 mm, flush**	**20 mm, non-flush**
Range secured switching distance	0 ... 8.1 mm	0 ... 16.2 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-30mg85n20-12Sd1A, 11.37-70 (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%
Repetition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C





Specific Technical Data

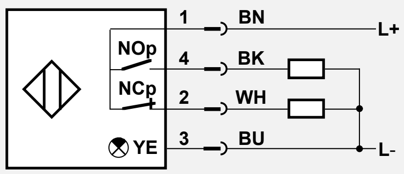
Permissible operating voltage range	10 ... <u>24</u> ... 30 V DC	10 ... <u>24</u> ... 30 V DC
Current consumption without load	≤ 25 mA	≤ 25 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	27.4 mm	27.4 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	11.0 mm	13.5 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		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection 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	130 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

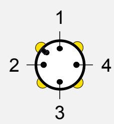
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

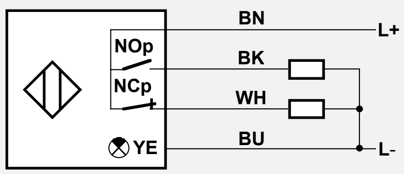
Wiring (1)
DC 4-poles, plug



Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (2)
DC 4-poles, outgoing lead

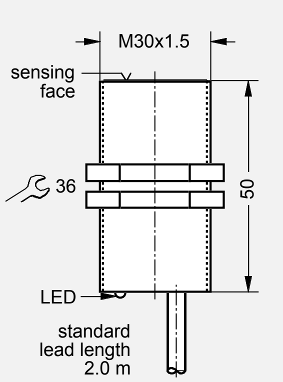
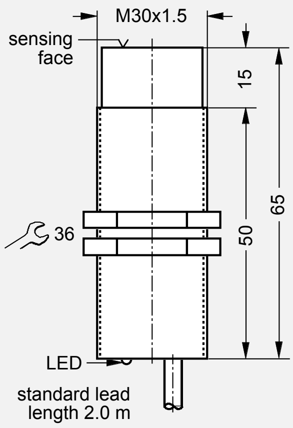


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

CE

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

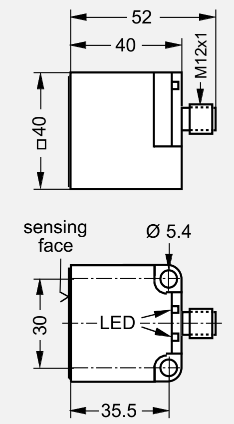
O M30 x 1.5; 50 mm	**O M30 x 1.5;** 75 mm		
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated		
10 mm, flush	**20 mm, non-flush**		
0 ... 8.1 mm	0 ... 16.2 mm		
IAD/AHM-30mg50b10-12NDd1A,11.37-33-020 (2)	IAD/AHM-30mg65n20-12NDd1A,11.37-71-020 (2)		
15 kHz / 33 µs	**15 kHz / 33 µs**		
lead; 4 wires	lead; 4 wires		
			
10 ... <u>24</u> ... 30 V DC	10 ... <u>24</u> ... 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		
11.0 mm	13.5 mm		
yes, YE	yes, YE		
500 m	500 m		
ND / 2.0 m / 4 x 0.34 mm^2	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		
75 g + weight of the lead	100 g + weight of the lead		

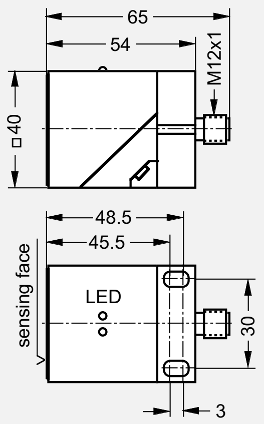
Inductive Proximity Switches, All Metal Standard
Series IAD/AHM-40aq, -40fv, -80aq, -80fq

Design; height; length	**☐ 40 mm**; 40 mm; 40 mm	**☐ 40 mm**; 40 mm; 54 mm
Material of the sensing face / of the housing	PBT / Al	PBT / PBT
Nominal switching distance, mounting (see page 1.0.4)	**15 mm, flush**	**15 mm, flush**
Range secured switching distance	0 ... 12.2 mm	0 ... 12.2 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-40fv54b15-12Sd1B, 11.37-34 (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%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C





Specific Technical Data

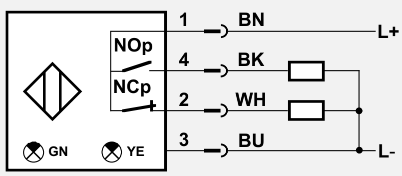
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 30 mA	≤ 30 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	38 x 38 mm	38 x 38 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	17.0 mm	17.0 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
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc		
Weight	110 g	130 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

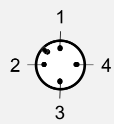
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, plug



Euro Plug M12

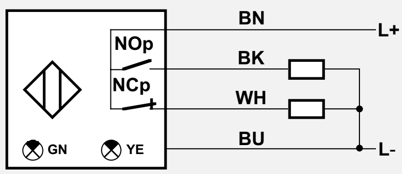


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

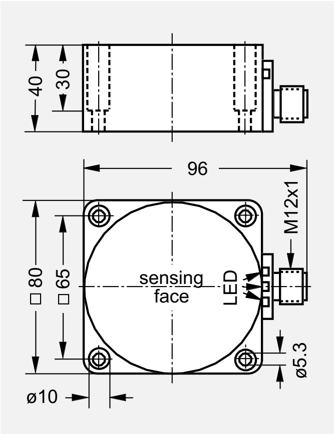
Subject to technical changes!

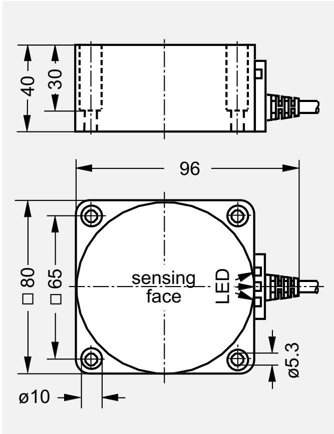
Wiring (2)
DC 4-poles, outgoing lead

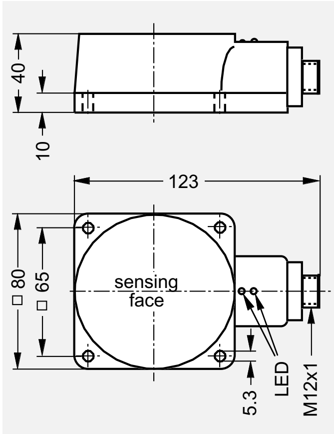


KLASCHKA
Elektronik + Automation

□ **80 mm;** 40 mm; 80 mm	□ **80 mm;** 40 mm; 80 mm	□ **80 mm;** 40 mm; 80 mm	
PBT / Al	PBT / Al	PBT / PBT	
40 mm, flush	**40 mm, flush**	**40 mm, partly flush**	
0 ... 32.4 mm	0 ... 32.4 mm	0 ... 32.4 mm	
IAD/AHM-80aq40b40-12Sd1B, 11.37-18 (1)	IAD/AHM-80aq40b40-12NKd1B, 11.37-35-050 (2)	IAD/AHM-80fq40t40-12Sd1B, 11.37-17 (1)	
15 kHz / 33 µs	**15 kHz / 33 µs**	**15 kHz / 33 µs**	
connector M12; 4 wires	lead; 4 wires	connector M12; 4 wires	

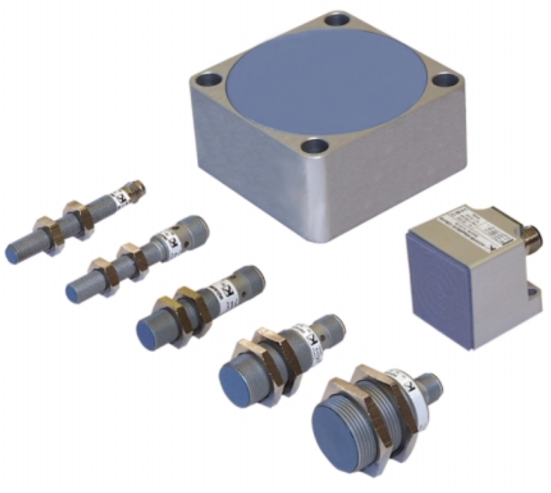






10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	
≤ 30 mA	≤ 30 mA	≤ 30 mA	
≤ 200 mA	≤ 200 mA	≤ 200 mA	
75 V DC	75 V DC	75 V DC	
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	
78 mm	78 mm	78 mm	
32.0 mm	32.0 mm	32.0 mm	
GN for operation, YE for actuated	GN for operation, YE for actuated	GN for operation, YE for actuated	
500 m	500 m	500 m	
	NK / 2.0 m / 4 x 0.34 mm^2		
DC 13	DC 13	DC 13	
IP 67	IP 67	IP 67	
II, ⧈	II, ⧈	II, ⧈	
450 g	450 g	350 g	

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 Automotive** 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	11.36-22-000	1.5 b
IAD/AHMS-8eg60b1.5-1Sd1A	11.36-23-000	1.5 b
IAD/AHMS-12mg50b3.5-1Sd1A	11.36-03-000	3.5 b
IAD/AHMS-18mg50b6-1Sd1A	11.36-04-000	6.0 b
IAD/AHMS-30mg50b10-12Sd1A	11.36-07-000	10.0 b
IAD/AHMS-40aq40b15-12Sd1B **)	11.36-16-000	15.0 b
IAD/AHMS-40fv54b15-12Sd1B **)	11.36-26-000	15.0 b
IAD/AHMS-80aq40b40-12Sd1B	11.36-18-000	40.0 b
IAD/AHMS-80aq40t40 -12Sd1B **)	11.36-17-000	40.0 t

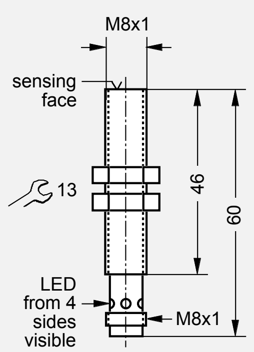
*) b = flush mounting
**) = supply on request

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

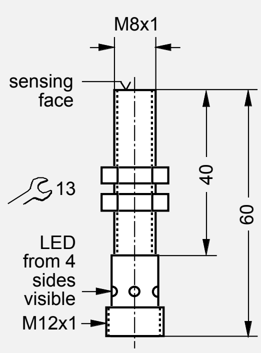
Design; length	**O M8 x 1;** 60 mm	**O M8 x 1;** 60 mm
Material of the sensing face / of the housing	PBT rad. cross-linked/V2A Tefl.-coated	PBT rad. cross-linked/V2A Tefl.-coated
Nominal switching distance, mounting (see page 1.0.4)	**1.5 mm, flush**	**1.5 mm, flush**
Range secured switching distance	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%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	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

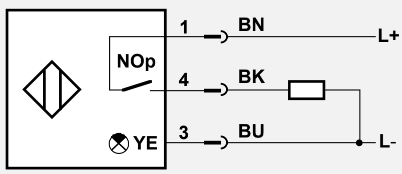
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.. µF	≤ 1.0 µF
Ø Sensing face	6.4 mm	6.4 mm
Switching radius r (at switching distance of the object) 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
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class		II, ⧈
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 connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

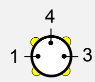
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

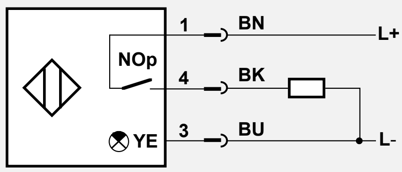
Wiring (1)
DC 3-poles, plug



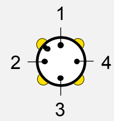
Euro Plug M8
with LED display YE
from 4 sides visible



Wiring (2)
DC 3-poles, plug



Euro Plug M12
with LED display YE
from 4 sides visible

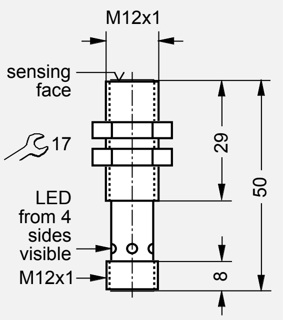


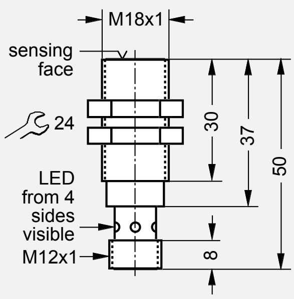
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

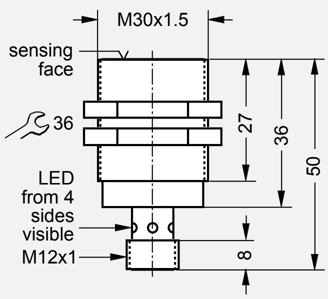
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

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	

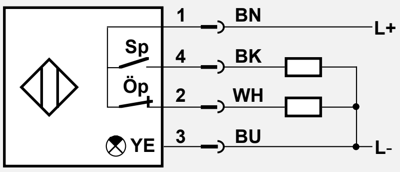




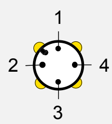


10 ... <u>24</u> ... 30 V DC	10 ... <u>24</u> ... 30 V DC	10 ... <u>24</u> ... 30 V DC	
≤ 20 mA	≤ 20 mA	≤ 25 mA	
≤ 200 mA	≤ 200 mA	≤ 200 mA	
75 V DC	75 V DC	75 V DC	
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	
12 mm	16.5 mm	27.4 mm	
4.5 mm	6.0 mm	11.0 mm	
yes, YE	yes, YE	yes, YE	
500 m	500 m	500 m	
DC 13	DC 13	DC 13	
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-poles, plug

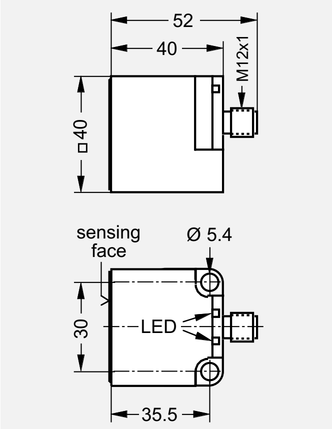


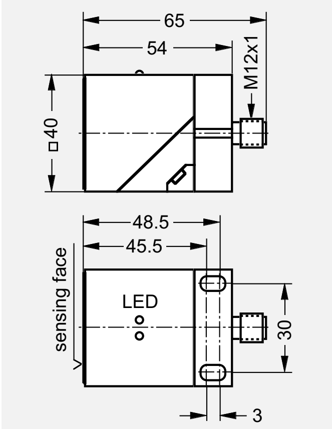
Euro Plug M12
with LED display YE
from 4 sides visible



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

Design; height; length		**□ 40 mm;** 40 mm; 40 mm	**□ 40 mm;** 40 mm; 54 mm
Material of the sensing face / of the housing		PBT ceramic-coated / Al	PBT ceramic-coated / PBT + PTFE
Nominal switching distance, mounting (see page 1.0.4)		**15 mm, flush**	**15 mm, flush**
Range secured switching distance		0 ... 12.2 mm	0 ... 12.2 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-40aq40b15-12Sd1B, 11.36-16 (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%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C

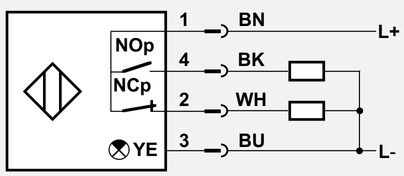
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 30 mA	≤ 30 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	38 x 38 mm	38 x 38 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	17.0 mm	17.0 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
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc		
Weight		90 g
	90 g	
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

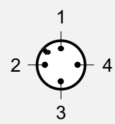
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, plug



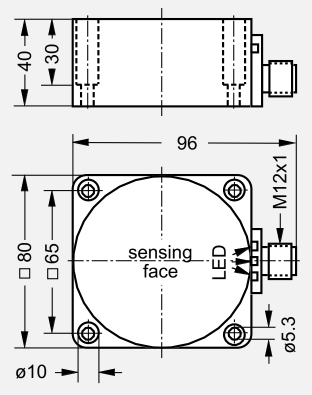
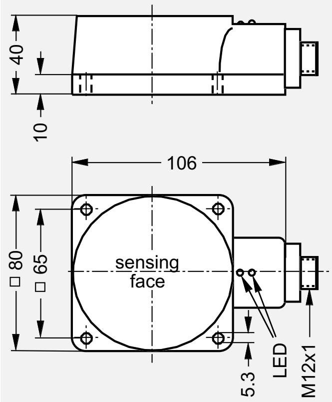
Euro Plug M12



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

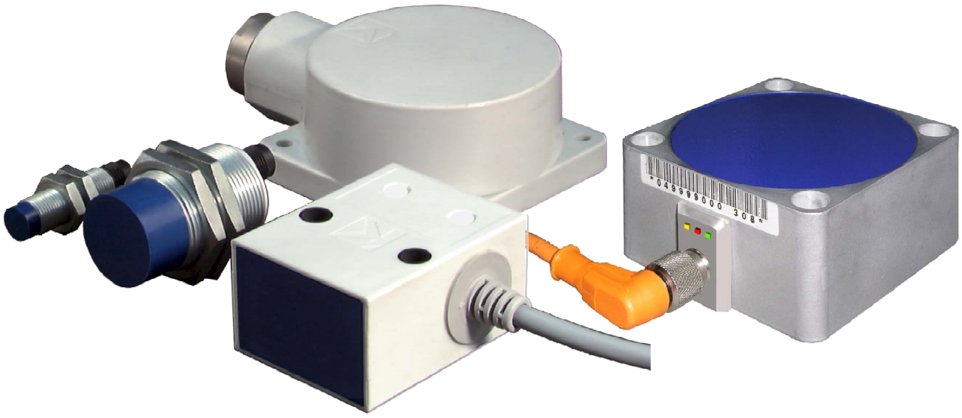
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

□ **80 mm;** 40 mm; 80 mm	□ **80 mm;** 40 mm; 80 mm		
PBT ceramic-coated / Al	PBT + PTFE / PBT + PTFE		
40 mm, flush	**40 mm, partly flush**		
0 ... 32.4 mm	0 ... 32.4 mm		
IAD/AHMS-80aq40b40-12Sd1B, 11.36-18 (1)	IAD/AHMS-80fq40t40-12Sd2B, 11.36-17 (1)		
15 kHz / 33 µs	**15 kHz / 33 µs**		
connector M12; 4 wires	connector M12; 4 wires		
			
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC		
≤ 30 mA	≤ 30 mA		
≤ 200 mA	≤ 200 mA		
75 V DC	75 V DC		
≤ 1.0 µF	≤ 1.0 µF		
78 mm	78 mm		
32.0 mm	32.0 mm		
GN for operation, YE for actuated	GN for operation, YE for actuated		
500 m	500 m		
DC 13	DC 13		
IP 67	IP 67		
II, ⧈	II, ⧈		
360 g	350 g		

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

Characteristics

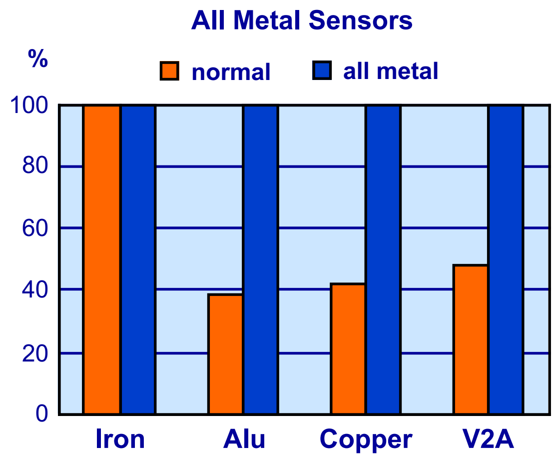


The **series ferrous 3- and 4-poles** comprises the „orthodox“ Inductive Proximity Switches, which have been developed in the last decades under consideration of the special requirements of our customers. This series is standardized according to EN 60947-5-2.

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-poles

Type	Ref. No.	Switching distance in mm Mounting *)
round M8 x L		
IAD-8eg45b1.5-1ND1A **)	11.32-53-020	1.5 b
IAD-8eg45n2.5-1ND1A **)	11.32-54-020	2.5 n
IAD-8eg60b1.5-1W1A **)	11.32-56-000	1.5 b
IAD-8eg60n2.5-1W1A **)	11.32-57-000	2.5 n
IAD-8mq40b1.5-1ND1A **)	11.32-55-020	1.5 b
IAD-8mq60b1.5-1W1 **)	11.32-58-000	1.5 b
round M12 x L		
IAD-12eg60b2-12S2A	11.24-89-000	2 b
IAD-12eg60b2-12S3A	11.32-85-000	2 b
IAD-12fg50b2-1NK1A	11.32-61-020	2 b
IAD-12fg50n5-1NK1A	11.32-62-020	5 n
IAD-12mg35m4-1PD1A	11.33-05-020	4 m
IAD-12mg35m4-2PD1A	11.33-20-020	4 m
IAD-12mg35m4-6ND1A	11.33-10-020	4 m
IAD-12mg40b2-1NK1A	11.20-67-030	2 b
IAD-12mg45b2-1NK1A	11.32-17-020	2 b
IAD-12mg45b2-1TK1A	11.32-18-020	2 b
IAD-12mg45b2-7NK1A	11.32-19-050	2 b
IAD-12mg45b2-7TK1A	11.32-20-020	2 b
IAD-12mg50b2-1PK1A	11.22-42-020	2 b
IAD-12mg50b2-1S1A	11.20-73-000	2 b
IAD-12mg60b2-12NK1A	11.22-11-020	2 b
IAD-12mg60b2-12S1A	11.22-12-000	2 b
IAD-12mg60b2-1NT1A	11.20-01-020	2 b
IAD-12mg60b2-1S2A	11.25-85-000	2 b
IAD-12mg60m4-1NT1A	11.24-09-020	4 m
IAD-12mg60m4-1PD1A	11.25-81-020	4 m
IAD-12mg60m4-1S1A	11.25-03-000	4 m
IAD-12mg60n5-12S1A	11.22-23-000	5 n
IAD-12mg60n5-1NK1A	11.20-15-020	5 n
IAD-12mg60n5-1S1A	11.25-04-000	5 n
IAD-12ms35m5-1Y1	11.33-03-021	5 m
round M18 x L		
IAD-18fg80b5-1NK1A	11.17-12-020	5 b
IAD-18fg80n10-1NK1A	11.20-95-020	10 n
IAD-18mg35b5-1NK1A	11.20-30-020	5 b
IAD-18mg40m8-1ND1A	11.33-22-020	8 m
IAD-18mg40m8-6ND1A	11.33-11-020	8 m
IAD-18mg50b5-1S1A	11.22-06-000	5 b
IAD-18mg50m8-1S1A	11.33-18-000	8 m
IAD-18mg50n10-1S1A	11.22-16-000	10 n
IAD-18mg60b5-12S1A	11.22-03-000	5 b
IAD-18mg60n10-12S1A **)	11.22-17-000	10 n
IAD-18mg70b5-1S1A	11.25-86-000	5 b
IAD-18mg70m8-1PD1A	11.25-82-020	8 m
IAD-18mg70m8-1S1A	11.25-97-000	8 m
IAD-18mg70n10-12V1A	11.32-91-000	10 n
IAD-18mg80b5-1S1A	11.22-85-000	5 b
IAD-18mg80n10-1S1A	11.22-91-000	10 n
IAD-18mg85b5-1NT1A	11.20-02-020	5 b
IAD-18mg85b5-12NK1A	11.18-32-020	5 b
IAD-18mg85n10-1NT1A	11.20-75-020	10 n
IAD-18mg100b5-1T1A	11.17-89-000	5 b
IAD-18mg100b5-12T1A	11.18-33-000	5 b
IAD-18mg100b5-1T2A	11.21-02-000	5 b
IAD-18mg100n10-1T1A	11.18-37-000	10 n

Type	Ref. No.	Switching distance in mm Mounting *)
round M30 x L		
IAD-30fg80b10-12NK1A	11.16-50-020	10 b
IAD-30fg80n20-12NK1A	11.17-62-020	20 n
IAD-30mg50b10-1S1A	11.22-19-000	10 b
IAD-30mg65n20-1S1A	11.32-36-000	20 n
IAD-30mg70b10-1S1A	11.25-88-000	10 b
IAD-30mg80b10-1NT1A	11.20-03-020	10 b
IAD-30mg80n20-12S1A	11.22-05-000	20 n
IAD-30mg95b10-12T2A	11.18-45-000	10 b
IAD-30mg95b10-1S1A	11.22-86-000	10 b
IAD-30mg95b10-1T2A	11.18-19-000	10 b
IAD-30sg80b10-12S1A	11.22-04-000	10 b
IAD-30sg80b10-12NT1A	11.18-71-020	10 b
IAD-30sg80n20-1NT1A	11.22-10-020	20 n
rectangular 34 x 50 x 65		
IAD-34aq65b12-1NKe3A	11.35-24-020	12 b
IAD-34aq65b12-12NKe3A	11.35-25-020	12 b
IAD-34zq65b12-1S1A	11.25-90-000	12 b
IAD-34aq65b12-1T3A	11.03-15-000	12 b
rectangular 40 x 40 x L		
IAD-40aq40b15-12NKd1B **)	11.35-27-020	15 b
IAD-40aq40b15-12Sd1B **)	11.35-26-000	15 b
IAD-40fq54b15-12NKd1B **)	11.35-29-020	15 b
IAD-40fq54b15-12Sd1B **)	11.35-28-000	15 b
IAD-40fq75b15-1T1A	11.16-12-000	15 b
IAD-40fv114b15-12L1B	11.25-52-000	15 b
IAD-40fv114n25-12L1B	11.25-53-000	25 n
IAD-40fv114b15-12S1B	11.25-66-000	15 b
IAD-40fv114n25-12S1B	11.32-98-000	25 n
IAD-40fv114n25-12T1B	11.24-08-000	25 n
rectangular 80 x 80 x L		
IAD-80aq40b40-12NKd1B **)	11.35-31-050	40 b
IAD-80aq40b40-12Sd1B **)	11.35-30-000	40 b
IAD-80fq40t40-12Sd2B **)	11.35-32-000	40 t
IAD-80fq40n40-1T1A	11.16-30-000	40 n
IAD-80fr70e80-1T3A	11.03-21-000	80 n
IAD-80fr70n35-12T1A	11.33-21-000	35 n
IAD-80fr70n50-1T1A	11.03-98-000	50 n
IAD-80fr70n50-1S1A	11.25-92-000	50 n
IAD-80fr70n50-1NT1A	11.03-94-050	50 n

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

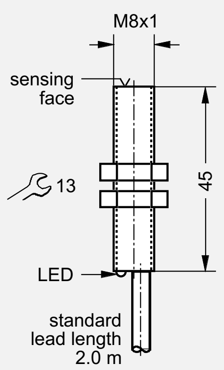
**) = supply on request

Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-8eg, -8mq

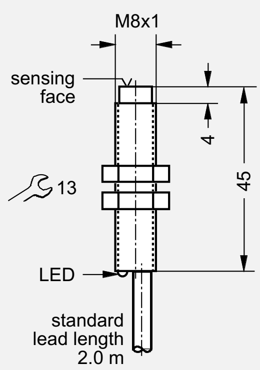
	Design; length	**O M8 x 1;** 45 mm	**O M8 x 1;** 45 mm
	Material of the sensing face / of the housing	PBT / stainless steel	PBT / stainless steel
	Nominal switching distance, mounting (see page 1.0.4)	**1.5 mm, flush**	**2.5 mm, non-flush**
	Range secured switching distance	0 ... 1.22 mm	0 ... 2.03 mm
Type designation, Ref. no. (Wiring)	NO plus-switching NOp	IAD-8eg45b1.5-1ND1A, 11.32-53-020 (1)	IAD-8eg45n2.5-1ND1A, 11.32-54-020 (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	**2 kHz / ≥ 0.1ms**	**2 kHz / ≥ 0.1ms**
	Wiring (connector or lead); number of wires	lead; 3 wires	lead; 3 wires

Common Technical Data

Reduction factor Fe / Al	**1 / 0.35**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 1.5 V DC
Ambient temperature range	- 25 ... + 75 °C



Dimensions subject to change!



Dimensions subject to change!

Specific Technical Data

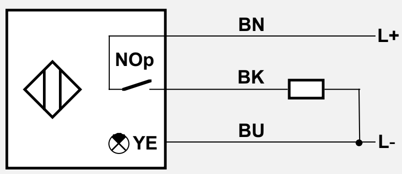
Permissible operating voltage range	10 ... 24 ... 36 V DC	10 ... 24 ... 36 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	6.4 mm	6.4 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	2.0 mm	2.3 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	ND / 2.0 m / 3 x 0.14 mm^2	ND / 2.0 m / 3 x 0.14 mm^2
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection 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 + weight of the lead	10 g + weight of the lead
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, outgoing lead

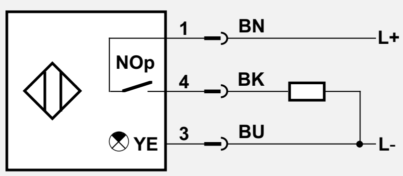


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

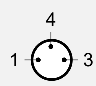
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Wiring (2)
DC 3-poles, plug

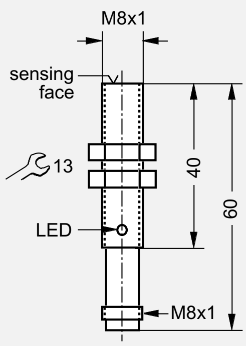


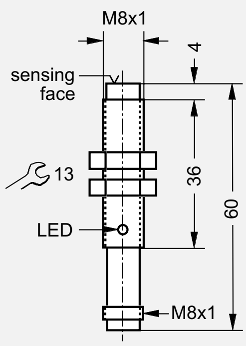
Euro Plug M8

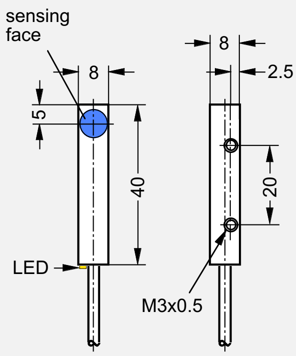


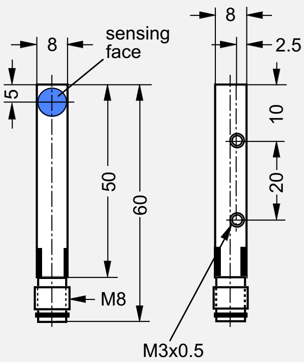
KLASCHKA
Elektronik + Automation

O M8 x 1; 60 mm	**O M8 x 1;** 60 mm	□ **8 x 8 mm;** 40 mm	□ **8 x 8 mm;** 60 mm
PBT / stainless steel	PBT / stainless steel	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
1.5 mm, flush	**2.5 mm, non-flush**	**1.5 mm, flush**	**1.5 mm, flush**
0 ... 1.22 mm	0 ... 2.03 mm	0 ... 1.22 mm	0 ... 1.22 mm
IAD-8eg60b1.5-1W1A, 11.32-56 (2)	IAD-8eg60n2.5-1W1A, 11.32-57 (2)	IAD-8mq40b1.5-1ND1A, 11.32-55-020 (1)	IAD-8mq60b1.5-1W1 11.32-58 (2)
2 kHz / ≥ 0.1ms	**2 kHz / ≥ 0.1ms**	**2 kHz / ≥ 0.1ms**	**2 kHz / ≥ 0.1ms**
connector M8; 3 wires	connector M8; 3 wires	lead; 3 wires	connector M8; 3 wires







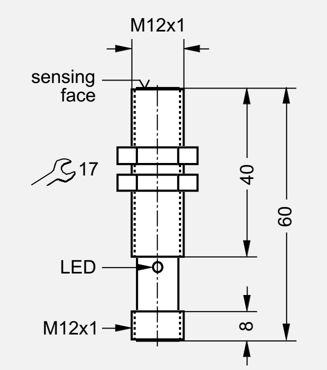


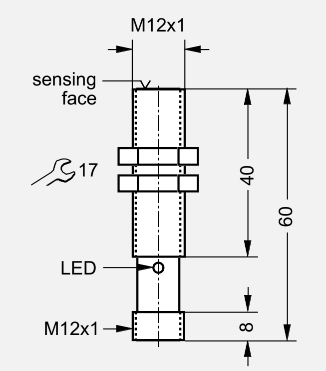
10 ... 24 ... 36 V DC	10 ... 24 ... 36 V DC	10 ... 24 ... 36 V DC	10 ... 24 ... 36 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
6.4 mm	6.4 mm	6.4 mm	6.4 mm
2.0 mm	2.3 mm	2.0 mm	2.0 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
		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
8 Nm / 20 Nm	8 Nm / 20 Nm		
15 g	15 g	10 g + weight of the lead	19 g

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

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
Nominal switching distance, mounting (see page 1.0.4)	**2 mm, flush**	**2 mm, flush**
Range secured switching distance	0 ... 1.62 mm	0 ... 1.62 mm
Type designation, Ref. no. (Wiring): NO plus-switching NOp		
Type designation, Ref. no. (Wiring): NC plus-switching NCp		
Type designation, Ref. no. (Wiring): NO and NC plus-switching NOp + NCp	IAD-12eg60b2-12S2A, 11.24-89 (1)	IAD-12eg60b2-12S3A, 11.32-85 (1)
Type designation, Ref. no. (Wiring): NO plus-, NC minus-switching NOp + NCn		
Type designation, Ref. no. (Wiring): NO minus-switching NOn		
Type designation, Ref. no. (Wiring): 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 factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible voltage ripple	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 1.5 V DC
	11.32-61, -62: ≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





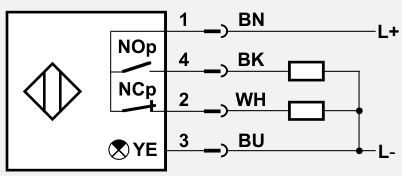
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	10.5 mm	10.5 mm
Switching radius r (at switching distance of the object 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
Degree of protection 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		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

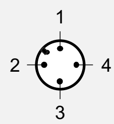
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

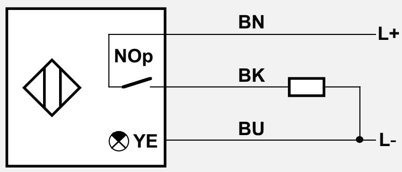
Wiring (1)
DC 4-poles, plug



Euro Plug M12



Wiring (2)
DC 3-poles, outgoing lead

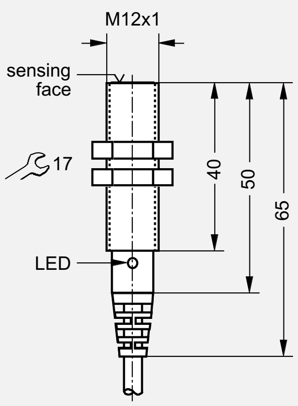


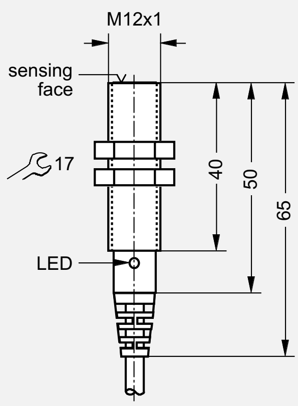
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

O M12 x 1; 50 mm	**O M12 x 1;** 50 mm		
PBT / PBT	PBT / PBT		
2 mm, flush	**5 mm, non-flush**		
0 ... 1.62 mm	0 ... 4.05 mm		
IAD-12fg50b2-1NK1A, 11.32-61-020 (2)	IAD-12fg50n5-1NK1A, 11.32-62-020 (2)		
2 kHz / ≥ 0.2 ms	**1 kHz / ≥ 0.3 ms**		
lead; 3 wires	lead; 3 wires		



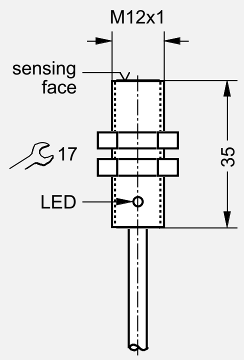


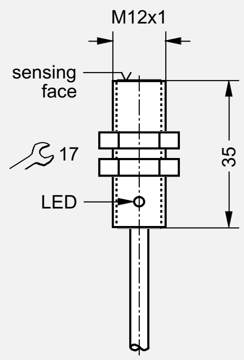
8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC		
≤ 10 mA	≤ 10 mA		
≤ 400 mA	≤ 400 mA		
75 V DC	75 V DC		
≤ 1.0 µF	≤ 0.47 µF		
10.5 mm	10.7 mm		
1.85 mm	3.5 mm		
yes, YE	yes, YE		
300 m	300 m		
NK / 2.0 m / 3 x 0.34 mm^2	NK / 2.0 m / 3 x 0.34 mm^2		
DC13	DC13		
IP 67	IP 67		
1.5 Nm / 2 Nm	1.5 Nm / 2 Nm		
30 g + weight of lead	30 g + weight of lead		

Inductive Proximity Switches, Ferrous DC 3- and 4-poles
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
Nominal switching distance, mounting (see page 1.0.4)	**4 mm, flush, maximized**	**4 mm, flush, maximized**
Range secured switching distance	0 ... 3.24 mm	0 ... 3.24 mm
Type designation, Ref. no. (Wiring) — NO plus-switching NOp	IAD-12mg35m4-1PD1A, 11.33-05-020 (1)	
NC plus-switching NCp		IAD-12mg35m4-2PD1A, 11.33-20-020 (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 kHz / ≥ 0.3 ms**	**0.8 kHz / ≥ 0.3 ms**
Wiring (connector or lead); number of wires	lead; 3 wires	lead; 3 wires

Common Technical Data	
Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible voltage ripple	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC,
	11.32-18, -20: ≤ 3.5 V DC
Ambient temperature range	- 25 ... + 75 °C





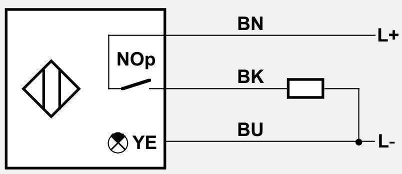
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	10.5 mm	10.5 mm
Switching radius r (at switching distance of the object) 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	PD / 2.0 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
Degree of protection 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	20 g + weight of the lead	20 g + weight of the lead
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, outgoing lead

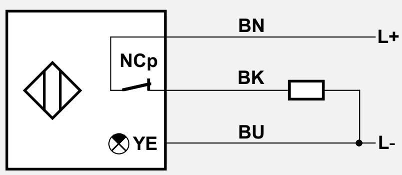


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

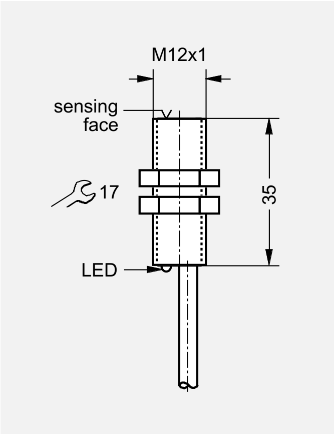
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

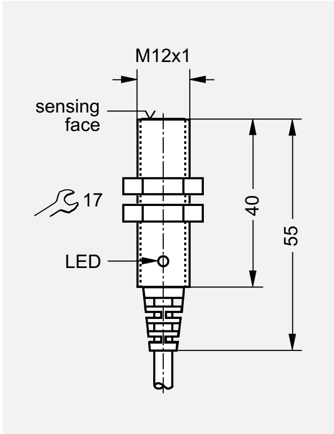
Subject to technical changes!

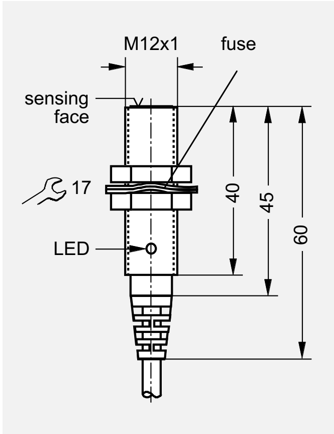
Wiring (2)
DC 3-poles, outgoing lead

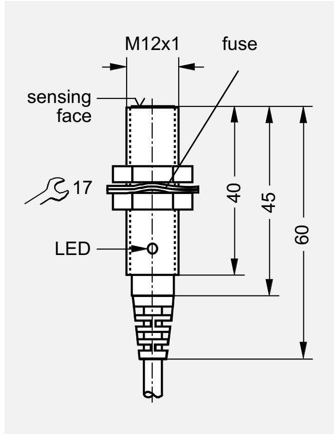


O M12 x 1; 35 mm	**O M12 x 1;** 40 mm	**O M12 x 1;** 45 mm	**O M12 x 1;** 45 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
4 mm, flush, maximized	**2 mm, flush**	**2 mm, flush**	**2 mm, flush**
0 ... 3.24 mm	0 ... 1.62 mm	0 ... 1.62 mm	0 ... 1.62 mm
	IAD-12mg40b2-1NK1A, 11.20-67-020 (1)	IAD-12mg45b2-1NK1A, 11.32-17-020 (1)	
IAD-12mg35m4-2PD1A, 11.33-20-020 (2)			
			IAD-12mg45b2-7NK1A, 11.32-19-020 (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



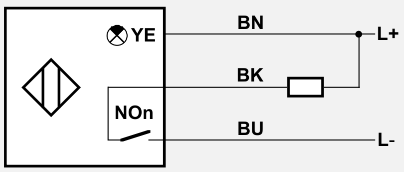




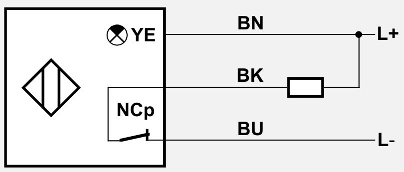


10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
10.5 mm	10.5 mm	10.5 mm	10.5 mm
3.6 mm	1.85 mm	1.85 mm	1.85 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
PD / 2.0 m / 3 x 0.34 mm^2	NK / 2.0 m / 3 x 0.34 mm^2	NK / 2.0 m / 3 x 0.34 mm^2	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 ⧈		
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

Wiring (3)
DC 3-poles, outoging lead



Wiring (4)
DC 3-poles, outgoing lead



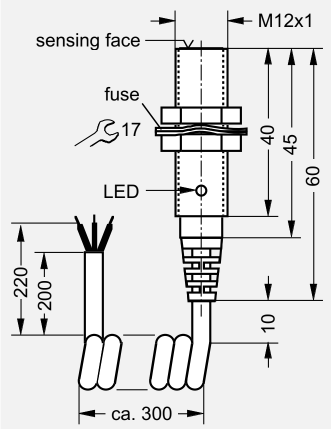
Inductive Proximity Switches, Ferrous DC 3- and 4-poles

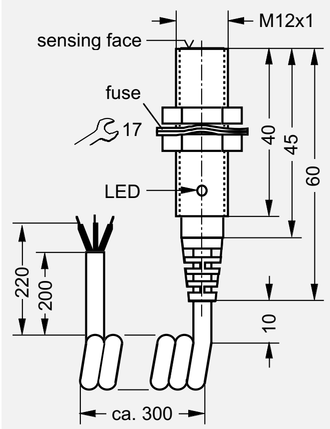
Series IAD-12mg

Design; length	**O M12 x 1;** 45 mm	**O M12 x 1;** 45 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
Nominal switching distance, mounting (see page 1.0.4)	**2 mm, flush**	**2 mm, flush**
Range secured switching distance	0 ... 1.62 mm	0 ... 1.62 mm
Type designation, Ref. no. (Wiring) — NO plus-switching NOp	IAD-12mg45b2-1TK1A, 11.32-18-020 (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		IAD-12mg45b2-7TK1A, 11.32-20-020 (2)
Maximum switching frequency / Minimum damping period	**3 kHz / ≥ 0.1 ms**	**3 kHz / ≥ 0.1 ms**
Wiring (connector or lead); number of wires	lead; 3 wires	lead; 3 wires

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible voltage ripple	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 1.5 V DC,
	11.32-18, -20: ≤ 3.5 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	≤ 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 switching distance of the object) s = 0; see page 1.0.2)	1.85 mm	1.85 mm
Function indicator ?	yes, YE	yes, YE
Maximum lead length	300 m	300 m
Lead type / standard lead length / number of wires x lead cross section	TK / 2.0 m / 3 x 0.1 mm^2, spiralled	TK / 2.0 m / 3 x 0.1 mm^2, spiralled
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection 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	40 g + weight of the lead	40 g + weight of the lead
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 "Accessories". Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

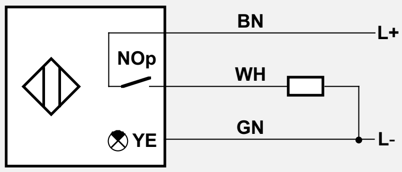
Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

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

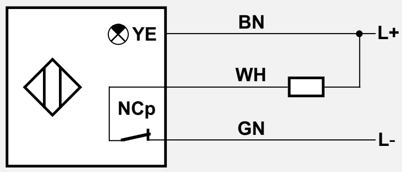
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

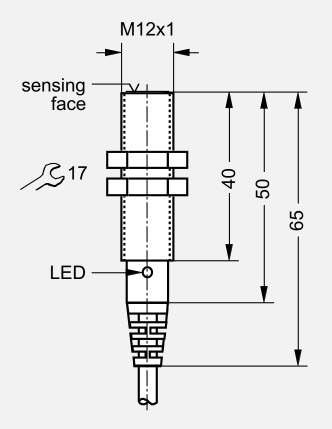
Wiring (1)
DC 3-poles, outgoing lead

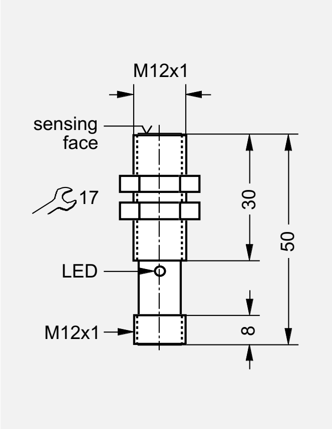


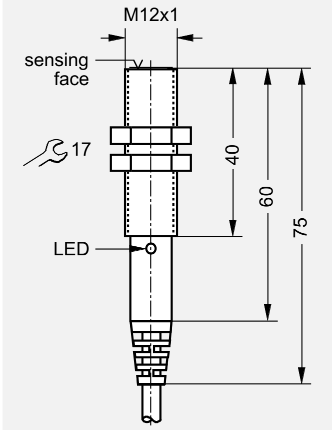
Wiring (2)
DC 3-poles, outgoing lead

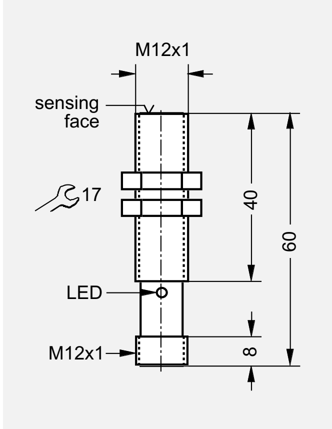


O M12 x 1; 50 mm	**O M12 x 1;** 50 mm	**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
2 mm, flush	**2 mm, flush**	**2 mm, flush**	**2 mm, flush**
0 ... 1.62 mm	0 ... 1.62 mm	0 ... 1.62 mm	0 ... 1.62 mm
IAD-12mg50b2-1PK1A, 11.22-42-020 (3)	IAD-12mg50b2-1S1A, 11.20-73 (4)		
		IAD-12mg60b2-12NK1A, 11.22-11-020 (5)	IAD-12mg60b2-12S1A, 11.22-12 (6)
2 kHz / ≥ 0.2 ms	**2 kHz / ≥ 0.2 ms**	**3 kHz / ≥ 0.1 ms**	**3 kHz / ≥ 0.1 ms**
lead; 3 wires	connector M12; 3 wires	lead; 4 wires	connector M12; 4 wires



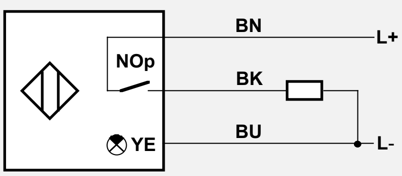






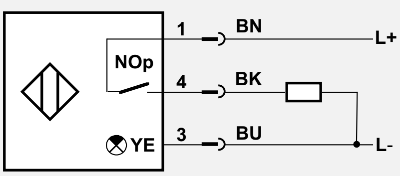
8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 200 mA	≤ 200 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
10.5 mm	10.5 mm	10.5 mm	10.5 mm
1.85 mm	1.85 mm	1.85 mm	1.85 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
PK / 2.0 m / 3 x 0.34 mm^2		NK / 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
9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm
45 g + weight of the lead	30 g	40 g + weight of the lead	30 g

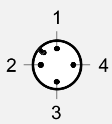
Wiring (3)
DC 3-poles, outgoing lead



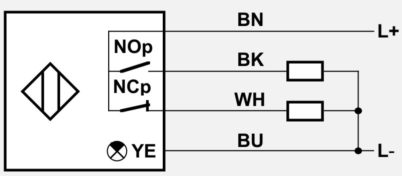
Wiring (4)
DC 3-poles, plug

Euro Plug M12



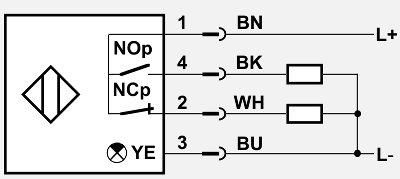


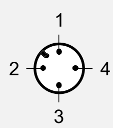
Wiring (5)
DC 4-poles, outgoing lead



Wiring (6)
DC 4-poles, plug

Euro Plug M12



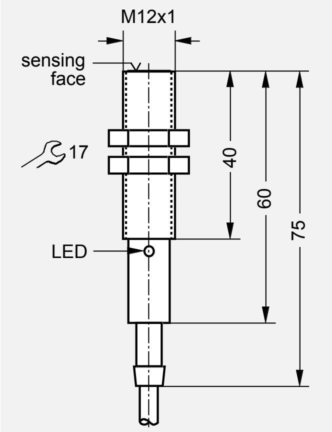


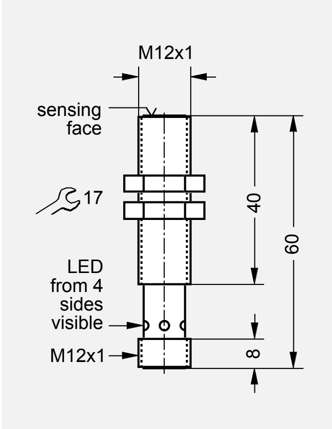
Inductive Proximity Swtiches, Ferrous DC 3- and 4-poles

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
Nominal switching distance, mounting (see page 1.0.4)	**2 mm, flush**	**2 mm, flush**
Range secured switching distance	0 ... 1.62 mm	0 ... 1.62 mm
Type designation, Ref. no. (Wiring) — NO plus-switching NOp	IAD-12mg60b2-1NT1A, 11.20-01-020 (1)	IAD-12mg60b2-1S2A, 11.25-85 (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 factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repititon accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient terperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 1.5 V DC
	11.20-01: ≤ 1.5 V DC
	11.22-23: ≤ 1.5 V DC
Ambient temperature range	- 25 ... + 75 °C





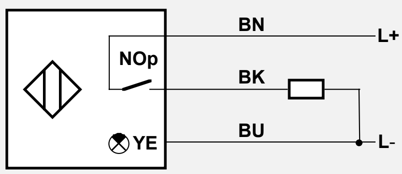
Specific Technical data		
Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 200 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	10.5 mm	10.5 mm
Switching radius r (at switching distance of the object) 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	NT / 2.0 m / 3 x 0.34 mm^2	
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class		II,▣
Permissible torque without / with toothed disc	9 Nm / 30 Nm	9 Nm / 30 Nm
Weight	40 g + weight of the lead	30 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, outgoing lead

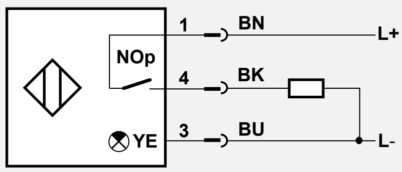


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

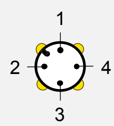
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

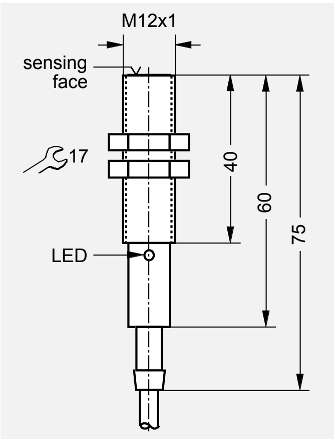
Wiring (2)
DC 3-poles, plug

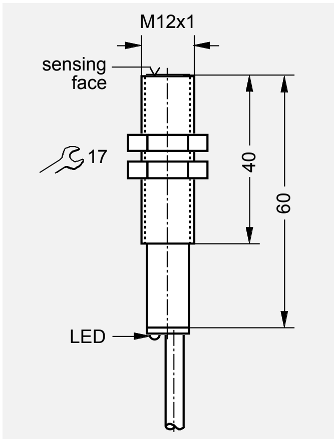


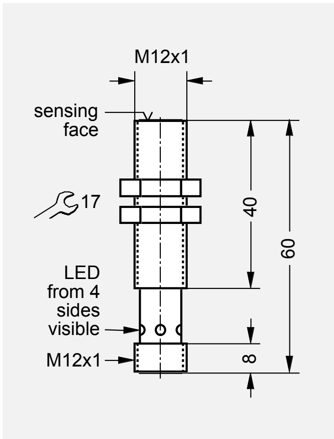
Euro Plug M12
with LED YE
from 4 sides visible

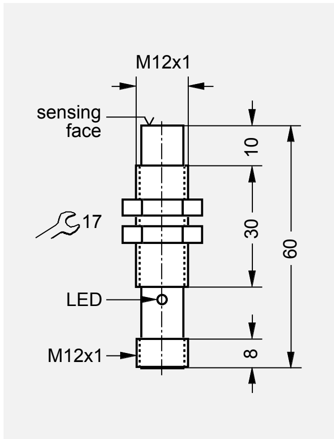


O M12 x 1; 60 mm	**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
4 mm, flush, maximized	**4 mm, flush, maximized**	**4 mm, flush, maximized**	**5 mm, non-flush**
0 ... 3.24 mm	0 ... 3.24 mm	0 ... 3.24 mm	0 ... 4.05 mm
IAD-12mg60m4-1NT1A, 11.24-09-020 (1)	IAD-12mg60m4-1PD1A, 11.25-81-020 (1)	AD-12mg60m4-1S1A, 11.25-03 (2)	
			IAD-12mg60n5-12S1A, 11.22-23 (3)
1 kHz / ≥ 0.3 ms	**1 kHz / ≥ 01 ms**	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 0.3 ms**
lead; 3 wires	lead; 3 wires	connector M12; 3 wires	connector M12; 4 wires



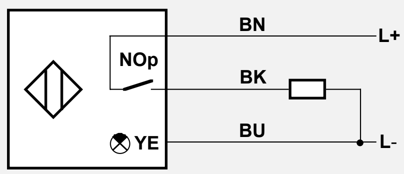




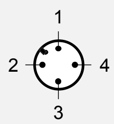


10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 200 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 0.47 µF
10.5 mm	10.5 mm	10.5 mm	10.7 mm
3.6 mm	3.6 mm	3.6 mm	3.5 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
NT / 2.0 m / 3 x 0.34 mm^2	PD / 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,⧈	
9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm
40 g + weight of the lead	40 g + weight of the lead	30 g	30 g

Wiring (3)
DC 3-poles, outgoing lead

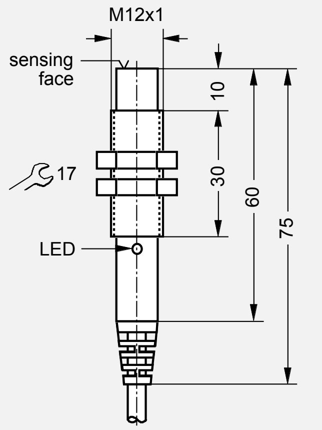


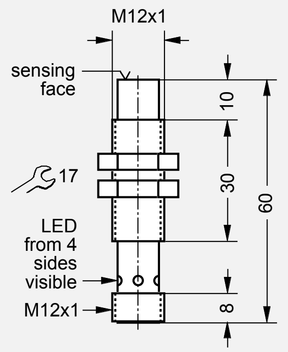
Euro Plug M12



Inductive Proximity Switches, Ferrous DC 3- and 4-poles
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	PBT / CuZn nickel-plated
	Nominal switching distance, mounting (see page 1.0.4)	**5 mm, non-flush**	**5 mm, non-flush**
	Range secured switching distance	0 ... 4.05 mm	0 ... 4.05 mm
Type designation, Ref. no. (Wiring)	NO plus-switching NOp	IAD-12mg60n5-1NK1A, 11.20-15-020 (1)	IAD-12mg60n5-1S1A, 11.25-04 (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 / ≥ 0.3 ms**
	Wiring (connector or lead); number of wires	lead; 3 wires	connector M12; 3 wires





Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal?	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

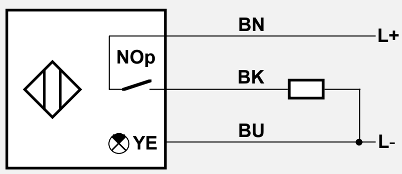
Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 0.47 µF	≤ 0.47 µF
Ø Sensing face	10.7 mm	10.7 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	3.5 mm	3.5 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	
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection 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	40 g + weight of the lead	30 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, outgoing lead

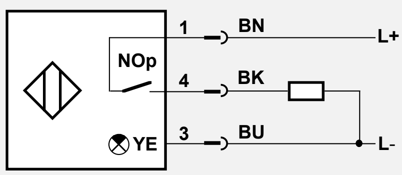


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

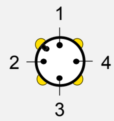
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

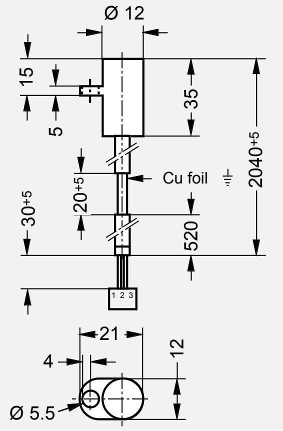
Subject to technical changes!

Wiring (2)
DC 3-poles, plug



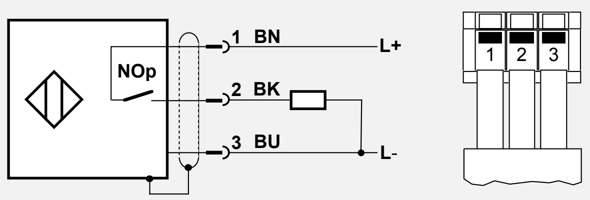
Euro Plug M12
with LED display YE
from 4 sides visible



Ø 12; 35 mm			
PBT / CuZn			
5 mm, flush, maximized			
0 ... 4.05 mm			
IAD-12ms35m5-1Y1, 11.33-03-021 (3)			
1 kHz / ≥ 0.3 ms			
lead with connector; 3 wires			
			
10 ... <u>24</u> ... 30 V DC			
≤ 10 mA			
≤ 400 mA			
75 V DC			
≤ 0.47 µF			
10.7 mm			
3.5 mm			
300 m			
Y / 2.1 m / 3 x 0.34 mm^2			
DC 13			
IP 65			
95 g			

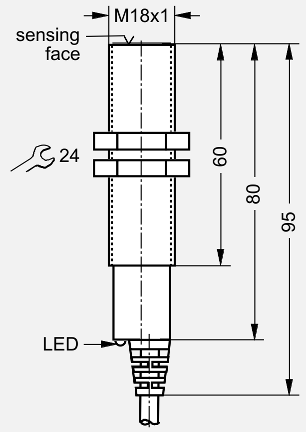
Wiring (3)
DC 3-poles, plug

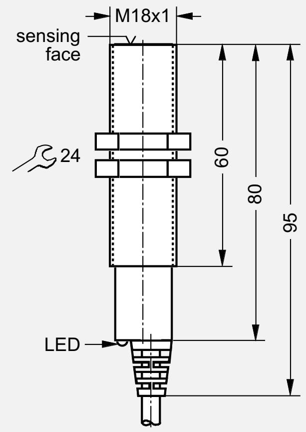
Plug
Panduit



Inductive Proximity Switches, Ferrous DC 3- and 4-poles
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
	Nominal switching distance, mounting (see page 1.0.4)	**5 mm, flush**	**10 mm, non-flush**
	Range secured switching 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 factors Fe / Al / V2A	**1,0 / 0,4 / 0,5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C

Specific Technical Data

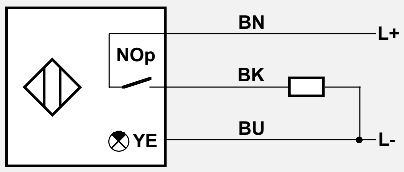
Permissible operating voltage range	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Rated insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at switching distance of the object) 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 conductors 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
Degree of protection 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
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

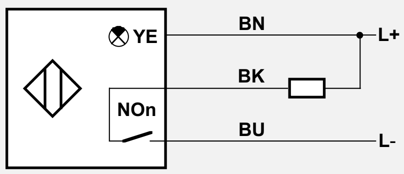
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, outgoing lead



Wiring (2)
DC 3-poles, outgoing lead

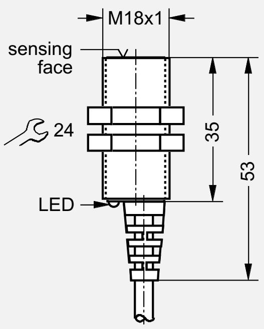
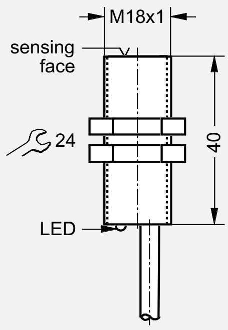
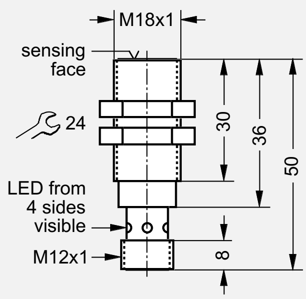
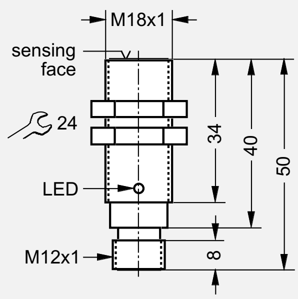


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

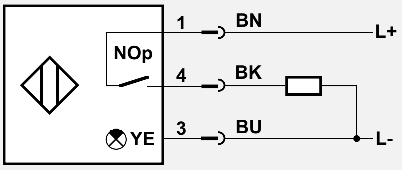
CE

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

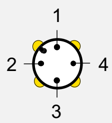
Subject to technical changes!

O M18 x 1; 35 mm	**O M18 x 1;** 40 mm	**O M18 x 1;** 50 mm	**O M18 x 1;** 50 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
5 mm, flush	**8 mm, flush, maximized**	**5 mm, flush**	**8 mm, flush, maximized**
0 ... 4.05 mm	0 ... 6.48 mm	0 ... 4.05 mm	0 ... 6.48 mm
IAD-18mg35b5-1NK1A, 11.20-30-020 (1)	IAD-18mg40m8-1ND1A, 11.33-22-020 (1)	IAD-18mg50b5-1S1A, 11.22-06 (3)	IAD-18mg50m8-1S1A, 11.33-18 (4)
1 kHz / ≥ 03 ms	**1 kHz / ≥ 1 ms**	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 1 ms**
lead; 3 wires	lead; 3 wires	connector M12; 3 wires	connector M12; 3 wires
			
8 ... 24 ... 30 V DC	10 ... 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
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		
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
			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	50 g	50 g

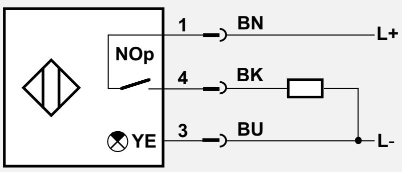
Wiring (3)
DC 3-poles, plug



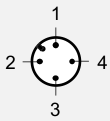
Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (4)
DC 3-poles, plug



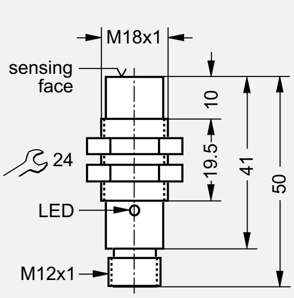
Euro Plug M12

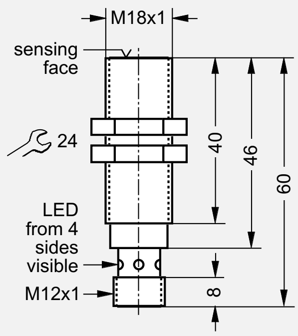


Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-18mg

	Design; length	**O M18 x 1;** 50 mm	**O M18 x 1;** 60 mm
	Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Nominal switching distance, mounting (see page 1.0.4)	**10 mm, non-flush**	**5 mm, flush**
	Range secured switching distance	0 ... 8.1 mm	0 ... 4.05 mm
Type designation, Ref. no. (Wiring)	NO plus-switching NOp	IAD-18mg50n10-1S1A, 11.22-16 (1)	
	NC plus-switching NCp		
	NO and NC plus-switching NOp + NCp		IAD-18mg60b5-12S1A, 11.22-03 (2)
	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**	**1 kHz / ≥ 0.3 ms**
	Wiring (connector or lead); number of wires	connector M12; 3 wires	connector M12; 4 wires

Common Technical Data	
Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





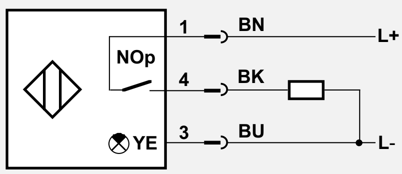
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	6.0 mm	4.8 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 type according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc	34 Nm / 70 Nm	34 Nm / 70 Nm
Weight	45 g	60 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

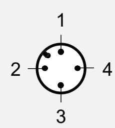
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, plug



Euro Plug M12

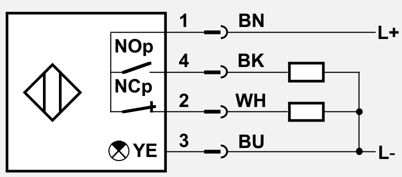


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

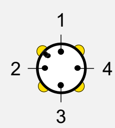
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

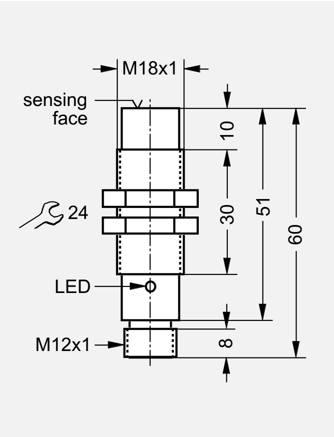
Wiring (2)
DC 4-poles, plug

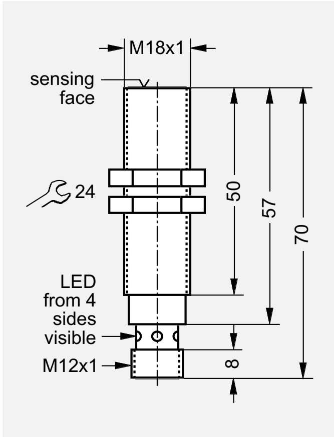


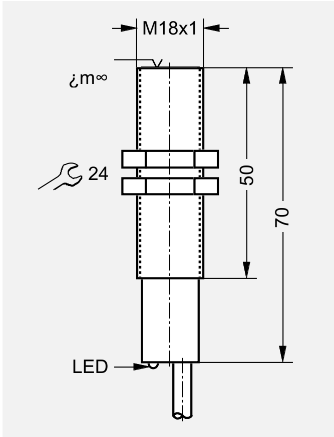
Euro Plug M12
with LED display YE
from 4 sides visible

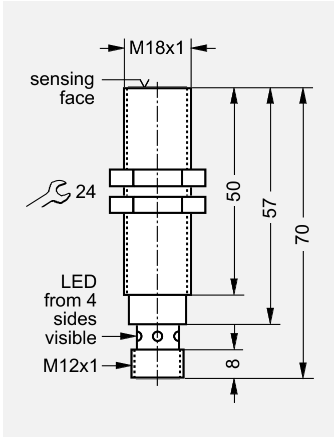


O M18 x 1; 60 mm	**O M18 x 1;** 70 mm	**O M18 x 1;** 70 mm	**O M18 x 1;** 70 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
10 mm, non-flush	**5 mm, flush**	**8 mm, flush, maximized**	**8 mm, flush, maximized**
0 ... 8.1 mm	0 ... 4.05 mm	0 ... 6.48 mm	0 ... 6.48 mm
	IAD-18mg70b5-1S1A, 11.25-86 (4)	IAD-18mg70m8-1PD1A, 11.25-82-020 (5)	IAD-18mg70m8-1S1A, 11.25-97 (4)
IAD-18mg60n10-12S1A, 11.22-17 (3)			
200 Hz / ≥ 1 ms	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 1 ms**	**1 kHz / ≥ 1 ms**
connector M12; 4 wires	connector M12; 3 wires	lead; 3 wires	connector M12; 3 wires



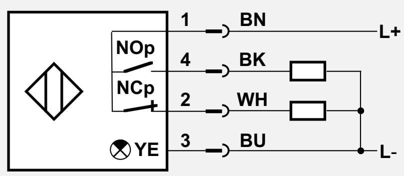




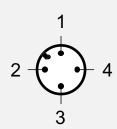


8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
16.5 mm	16.5 mm	16.5 mm	16.5 mm
6.0 mm	4.8 mm	6.5 mm	6.5 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
		PD / 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⧈		
34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm
60 g	70 g	70 g + weight of the lead	70 g

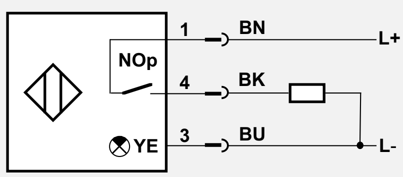
Wiring (3)
DC 4-poles, plug



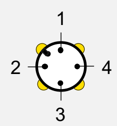
Euro Plug M12



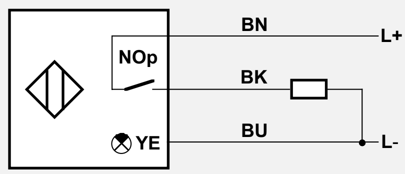
Wiring (4)
DC 3-poles, plug



Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (5)
DC 3-poles, outgoing lead

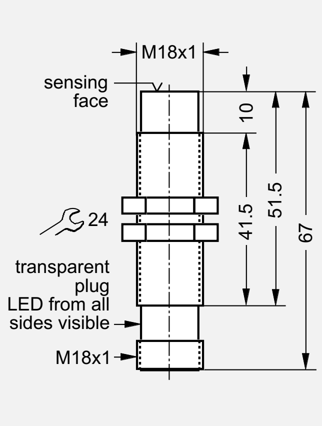


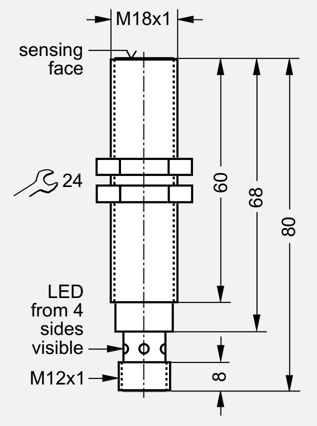
Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-18mg

	Design; length	**O M18 x 1;** 67 mm	**O M18 x 1;** 80 mm
	Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Nominal switching distance, mounting (see page 1.0.4)	**10 mm, non-flush**	**5 mm, flush**
	Range secured switching distance	0 ... 8.1 mm	0 ... 4.05 mm
Type designation, Ref. no. (Wiring)	NO plus-switching NOp		IAD-18mg80b5-1S1A, 11.22-85 (2)
	NC plus-switching NCp		
	NO and NC plus-switching NOp + NCp	IAD-18mg70n10-12V1A, 11.32-91 (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 ms**	**1 kHz / ≥ 0.3 ms**
	Wiring (connector or lead); number of wires	connector M18; 4 wires	connector M12; 3 wires

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible voltage ripple	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	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	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	6.0 mm	4.8 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
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc	34 Nm / 70 Nm	34 Nm / 70 Nm
Weight	60 g	80 g
Recommended accessories		

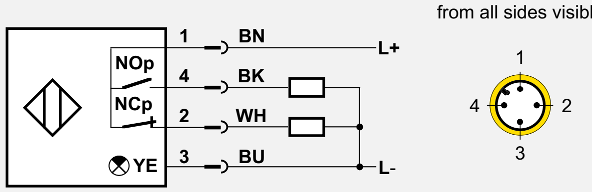
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, plug

Euro Plug M18
with LED display YE
from all sides visible



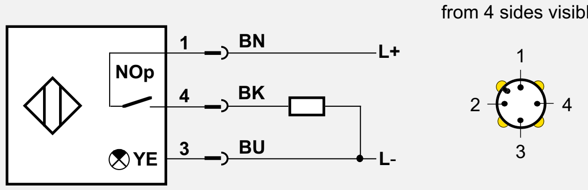
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

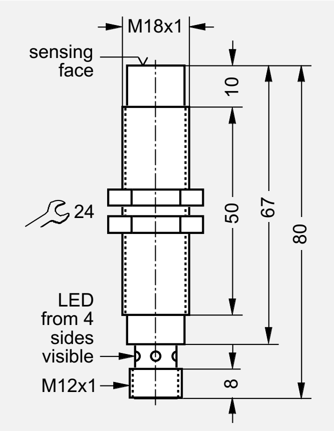
Wiring (2)
DC 3-poles, plug

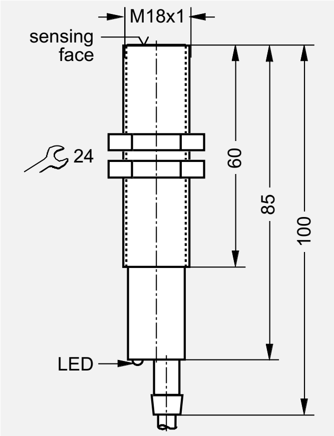
Euro Plug M12
with LED display YE
from 4 sides visible

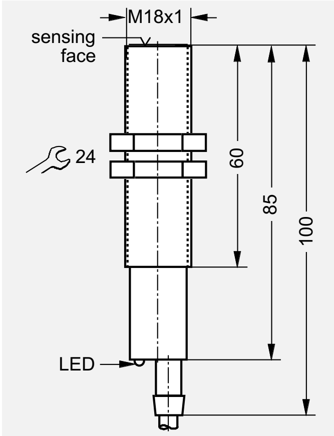


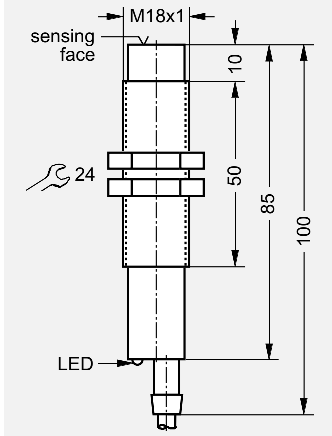
KLASCHKA
Elektronik + Automation

O M18 x 1; 80 mm	**O M18 x 1;** 85 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
10 mm, non-flush	**5 mm, flush**	**10 mm, non-flush**	**10 mm, non-flush**
0 ... 8.1 mm	0 ... 4.05 mm	0 ... 8.1 mm	0 ... 8.1 mm
IAD-18mg80n10-1S1A, 11.22-91 (2)	IAD-18mg85b5-1NT1A, 11.20-02-020 (3)		IAD-18mg85n10-1NT1A, 11.20-75-020 (3)
		IAD-18mg85b5-12NK1A, 11.18-32-020 (4)	
800 Hz / ≥ 1 ms	**1 kHz / ≥ 0.3 ms**	**1 kHz / ≥ 0.3 ms**	**800 Hz / ≥ 1 ms**
connector M12; 3 wires	lead; 3 wires	lead; 4 wires	lead; 3 wires



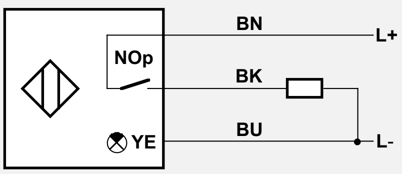




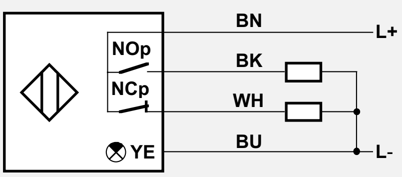


10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF
16.5 mm	16.5 mm	16.5 mm	16.5 mm
6.0 mm	4.8 mm	4.8 mm	6.0 mm
yes, YE	yes, YE	yes, 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	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
34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm	34 Nm / 70 Nm
80 g	100 g + weight of the lead	100 g + weight of the lead	90 g + weight of the lead

Wiring (3)
DC 3-poles, outgoing lead

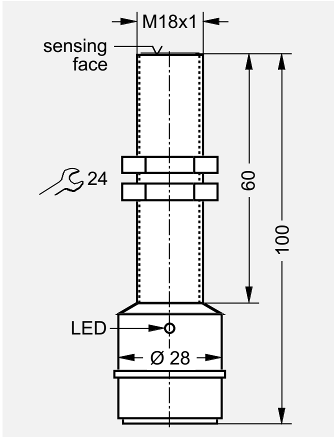


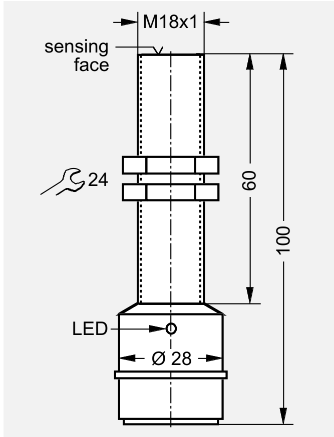
Wiring (4)
DC 4-poles, outgoing lead



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

	Design; length	**O M18 x 1;** 100 mm	**O M18 x 1;** 100 mm
	Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Nominal switching distance, mounting (see page 1.0.4)	**5 mm, flush**	**5 mm, flush**
	Range secured switching distance	0 ... 4.05 mm	0 ... 4.05 mm
Type designation, Ref. no. (Wiring)	NO plus-switching NOp	IAD-18mg100b5-1T1A, 11.17-89 (1)	
	NC plus-switching NCp		
	NO and NC plus-switching NOp + NCp		IAD-18mg100b5-12T1A, 11.18-33 (2)
	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 / ≥ 0.3 ms**
	Wiring (connector or lead); number of wires	connector Ø 28; 4 wires	connector Ø 28; 5 wires





Common Technical Data	
Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching points s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C

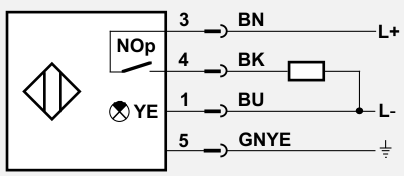
Specific Technical Data		
Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	4.8 mm	4.8 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
Degree of protection according to IEC 60529	IP 65	IP 65
Protection class		
Permissible torque without / with toothed disc	34 Nm / 70 Nm	34 Nm / 70 Nm
Weight	135 g	135 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

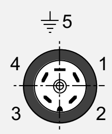
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, plug



Plug
Amphenol, 5-poles

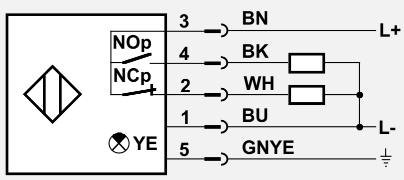


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

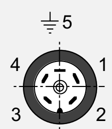
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

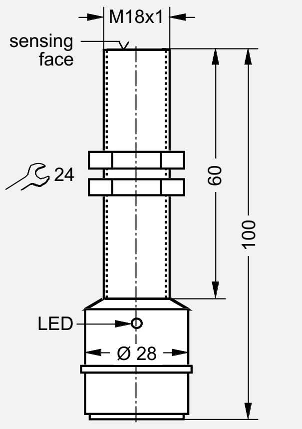
Wiring (2)
DC 5-poles, plug

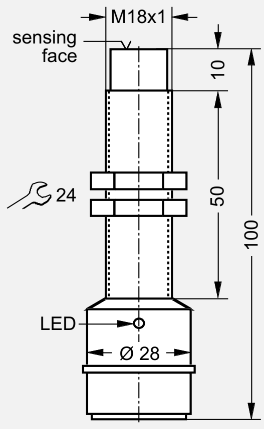


Plug
Amphenol, 5-poles



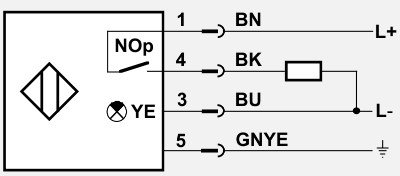
O M18 x 1; 100 mm	**O M18 x 1;** 100 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
5 mm, flush	**10 mm, non-flush**
0 ... 4.05 mm	0 ... 8.1 mm
IAD-18mg100b5-1T2A, 11.21-02 (3)	IAD-18mg100n10-1T1A, 11.18-37 (4)
1 kHz / ≥ 0.3 ms	**200 Hz / ≥ 1 ms**
connector Ø 28; 4 wires	connector Ø 28; 4 wires



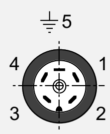


8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA
75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF
16.5 mm	16.5 mm
4.8 mm	6.0 mm
yes, YE	yes, YE
300 m	300 m
DC 13	DC 13
IP 65	IP 65
34 Nm / 70 Nm	34 Nm / 70 Nm
135 g	120 g

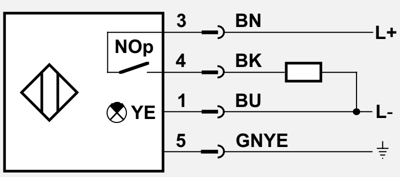
Wiring (3)
DC 4-poles, plug



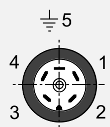
Plug
Amphenol, 5-poles



Wiring (4)
DC 4-poles, plug



Plug
Amphenol, 5-poles

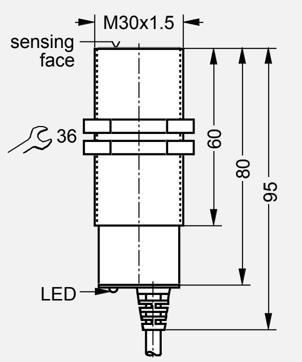


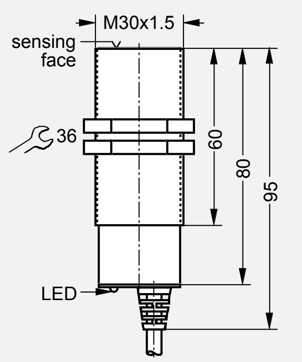
Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-30fg, -30mg

Design; length	**O M30 x 1.5;** 80 mm	**O M30 x 1.5;** 80 mm
Material of the sensing face / of the housing	PBT / PBT	PBT / PBT
Nominal switching distance, mounting (see page 1.0.4)	**10 mm, flush**	**20 mm, non-flush**
Range secured switching distance	0 ... 8.1 mm	0 ... 16.2 mm
Type designation, Ref. no. (Wiring) – NO plus-switching NOp		
NC plus-switching NCp		
NO and NC plus-switching NOp + NCp	IAD-30fg80b10-12NK1A, 11.16-50-020 (1)	IAD-30fg80n20-12NK1A, 11.17-62-020 (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**	**150 Hz / ≥ 2 ms**
Wiring (connector or lead); number of wires	lead; 4 wires	lead; 4 wires

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data

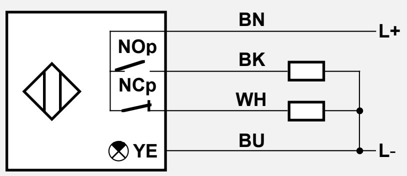
Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 0.47 µF	≤ 1.0 µF
Ø Sensing face	27.4 mm	27.4 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	9.4 mm	12.2 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	NK / 2.0 m / 4 x 0.34 mm^2
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc	8 Nm / 10 Nm	8 Nm / 10 Nm
Weight	90 g + weight of the lead	90 g + weight of the lead
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, outgoing lead

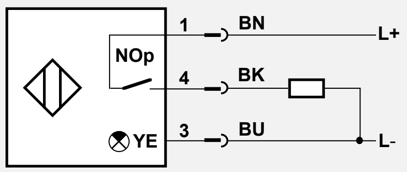


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

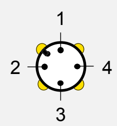
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

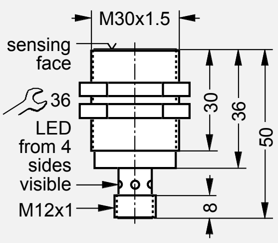
Wiring (2)
DC 3-poles, plug

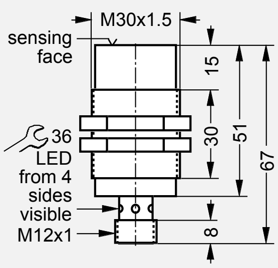


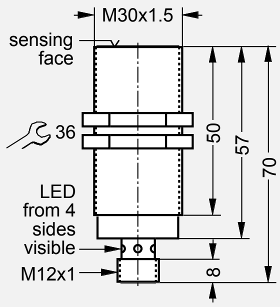
Euro Plug M12
with LED-display YE
from 4 sides visible

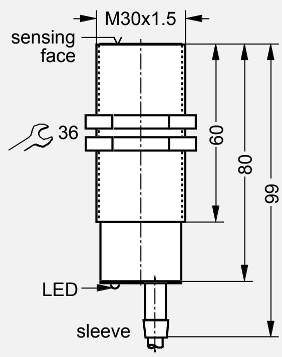


O M30 x 1.5; 50 mm	**O M30 x 1.5;** 67 mm	**O M30 x 1.5;** 70 mm	**O M30 x 1.5;** 80 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
10 mm, flush	**20 mm, non-flush**	**10 mm, flush**	**10 mm, flush**
0 ... 8.1 mm	0 ... 16.2 mm	0 ... 8.1 mm	0 ... 8.1 mm
IAD-30mg50b10-1S1A, 11.22-19 (2)	IAD-30mg65n20-1S1A, 11.32-36 (2)	IAD-30mg70b10-1S1A, 11.25-88 (2)	IAD-30mg80b10-1NT1A, 11.20-03-020 (3)
300 Hz / ≥ 1 ms	**150 Hz / ≥ 2 ms**	**300 Hz / ≥ 1 ms**	**300 Hz / ≥ 1 ms**
connector M12; 3 wires	connector M12; 3 wires	connector M12; 3 wires	lead; 3 wires / lead; 4 wires



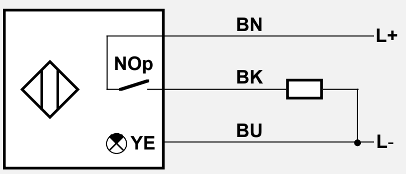






8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 0.47 µF	≤ 1.0 µF	≤ 0.47 µF	≤ 0.47 µF
27.4 mm	27.4 mm	27.4 mm	27.4 mm
9.4 mm	12.2 mm	9.4 mm	9.4 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
			NT / 2.0 m / 3 x 0.34 mm^2
			11.18-71: 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,⧈	
150 Nm / < 200 Nm	150 Nm / < 200 Nm	150 Nm / < 200 Nm	150 Nm / < 200 Nm
100 g	100 g	150 g	190 g + weight of the lead

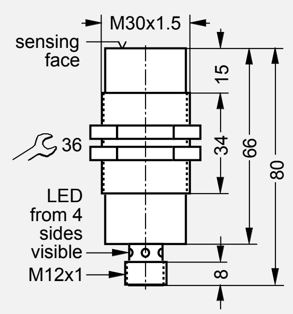
Wiring (3)
DC 3-poles, outgoing lead

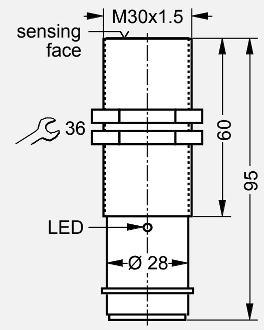


Inductive Proximity Switches Ferrous, DC 3- and 4-poles
Series IAD-30mg, -30sg

Design; length	**O M30 x 1.5;** 80 mm	**O M30 x 1.5;** 95 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
Nominal switching distance, mounting (see page 1.0.4)	**20 mm, non-flush**	**10 mm, flush**
Range secured switching distance	0 ... 16.2 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-30mg80n20-12S1A, 11.22-05 (1)	IAD-30mg95b10-12T2A, 11.18-45 (2)
NP plus-, NC minus-switching NOp + NCn		
NO minus-switching NOn		
NC minus-switching NCn		
Maximum switching frequency / Minimim damping period	**150 Hz / ≥ 2 ms**	**300 Hz / ≥ 1 ms**
Wiring (connector or lead); number of wires	connector M12; 4 conductors	connector Ø 28; 5 conductors

Common Technical Data	
Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperere	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





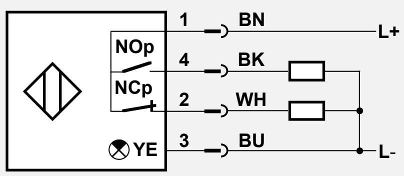
Specific Technical Data		
Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 0.47 µF
Ø Sensing face	27.4 mm	27.4 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	12.2 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
Degree of protection according to IEC 60529	IP 67	IP 65
Protection class		
Permissible torque without/ with toothed disc	150 Nm / < 200 Nm	150 Nm / < 200 Nm
Weight	100 g	150 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

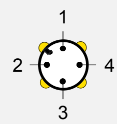
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, plug



Euro Plug M12
with LED display YE
from 4 sides visible

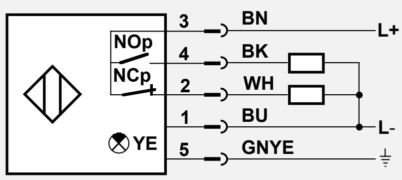


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

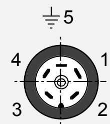
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

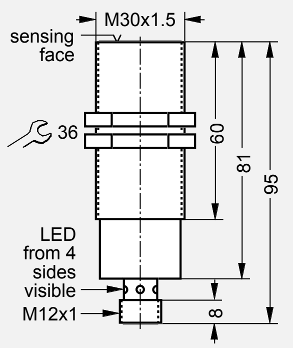
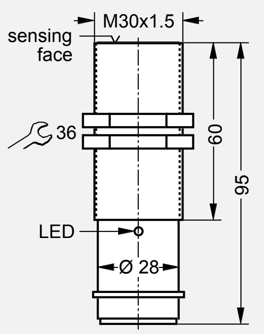
Subject to technical changes!

Wiring (2)
DC 5-poles, plug

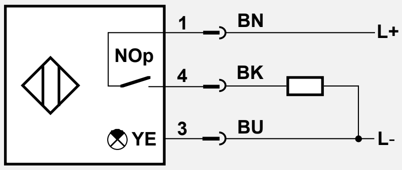


Plug
Amphenol, 5-poles

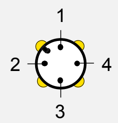


O M30 x 1.5; 95 mm	**O M30 x 1,5;** 95 mm		
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated		
10 mm, flush	**10 mm, flush**		
0 ... 8.1 mm	0 ... 8.1 mm		
	IAD-30mg95b10-1T2A, 11.18-19 (4)		
IAD-30mg95b10-1S1A, 11.22-86 (3)			
300 Hz / ≥ **1 ms**	**300 Hz** / ≥ **1 ms**		
connector M12; 3 conductors	connector Ø 28; 4 conductors		
			
8 ... <u>24</u> ... 30 V DC	8 ... <u>24</u> ... 30 V DC		
≤ 10 mA	≤ 10 mA		
≤ 400 mA	≤ 400 mA		
75 V DC	75 V DC		
≤ 0.47 µF	≤ 0.47 µF		
27.4 mm	27.4 mm		
9.4 mm	9.4 mm		
yes, YE	yes, YE		
300 m	300 m		
DC 13	DC 13		
IP 67	IP 65		
150 Nm / < 200 Nm	150 Nm / < 200 Nm		
180 g	190 g		

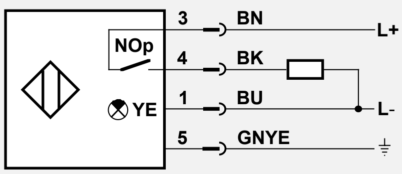
Wiring (3)
DC 3-poles, plug



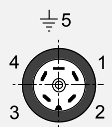
Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (4)
DC 4-poles, plug



Plug
Amphenol, 5-poles

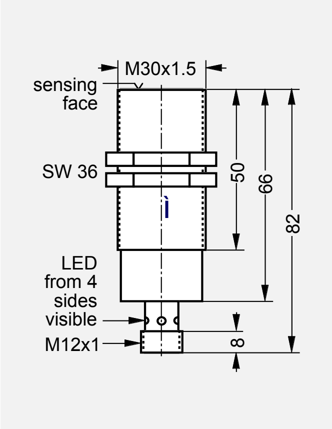


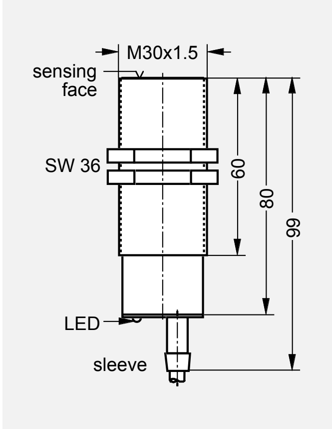
Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-30sg

Design; length	**O M30 x 1.5;** 82 mm	**O M30 x 1.5;** 80 mm
Material of the sensing face / of the housing	PBT / steel nickel-plated	PBT / steel nickel-plated
Nominal switching distance, mounting (see page 1.0.4)	**10 mm, flush**	**10 mm, flush**
Range secured switching 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-30sg80b10-12S1A, 11.22-04 (1)	IAD-30sg80b10-12NT1A, 11.18-71-020 (2)
NP plus-, NC minus-switching NOp + NCn		
NO minus-switching NOn		
NC minus-switching NCn		
Maximum switching frequency / Minimim damping period	**300 Hz / ≥ 1 ms**	**300 Hz / ≥ 1 ms**
Wiring (connector or lead); number of wires	connector M12; 4 wires	lead; 4 wires

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperare	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data

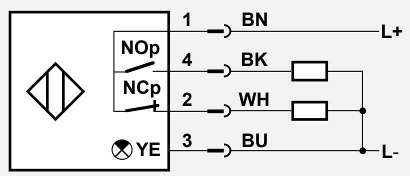
Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 0.47 µF	≤ 0.47 µF
Ø Sensing face	27.4 mm	27.4 mm
Switching radius r (at switching distance of the object) 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		NT / 2.0 m / 4 x 0.34 mm^2
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc	170 Nm / < 200 Nm	170 Nm / < 200 Nm
Weight	175 g	190 g + weight of the lead
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

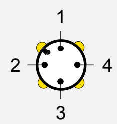
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

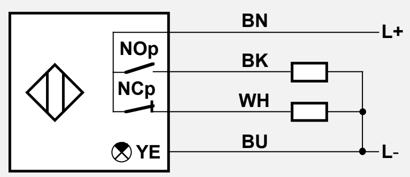
Wiring (1)
DC 4-poles, plug



Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (2)
DC 4-poles, outgoing lead



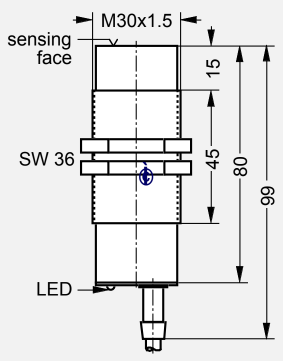
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

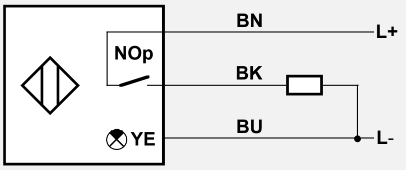
KLASCHKA
Elektronik + Automation

O M30 x 1.5; 80 mm			
PBT / steel nickel-plated			
20 mm, non-flush			
0 ... 16.2 mm			
IAD-30sg80n20-1NT1A, 11.22-10-020 (3)			
150 Hz / ≥ 2 ms			
lead; 3 wires			



8 ... 24 ... 30 V DC			
≤ 10 mA			
≤ 400 mA			
75 V DC			
≤ 1.0 µF			
27.4 mm			
12.2 mm			
yes, YE			
300 m			
NT / 2.0 m / 3 x 0.34 mm^2			
DC 13			
IP 67			
170 Nm / < 200 Nm			
180 g + weight of the lead			

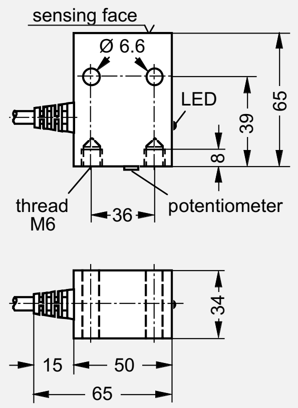
Wiring (3)
DC 3-poles, outgoing lead

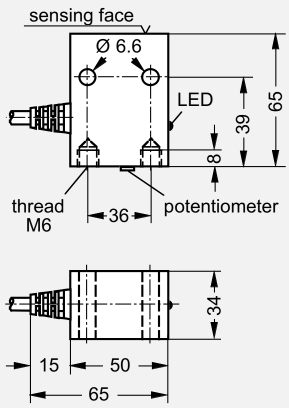


Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-34aq

Design; length	☐ **50 x 34 mm;** 65 mm	☐ **50 x 34 mm;** 65 mm
Material of the sensing face / of the housing	PBT / Al	PBT / Al
Nominal switching distance, mounting (see page 1.0.4)	**12 mm, flush**	**12 mm, flush**
Range secured switching distance	0 ... 9.72 mm	0 ... 9.72 mm
Type designation, Ref. no. (Wiring) – NO plus-switching NOp	IAD-34aq65b12-1NKc3A, 11.35-24-020 (1)	
NC plus-switching NCp		
NO and NC plus-switching NOp + NCp		IAD-34aq65b12-12NKd3A, 11.35-25-020 (2)
NO plus-, NC minus-switching NOp + NCn		
NO minus-switching NOn		
NC minus-switching NCn		
Maximum switching distance / Minimum damping period	**300 Hz / ≥ 1 ms**	**300 Hz / ≥ 1 ms**
Wiring (connector or lead); number of wires	lead; 4 / 5 wires	lead; 4 / 5 wires

Common Technical Data	
Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





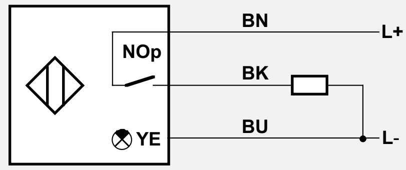
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 0.47 µF	≤ 0.47 µF
Ø Sensing face	48 mm x 32 mm	48 mm x 32 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2	11.8 mm	11.8 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 / 4 x 0.34 mm^2
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc		
Weight	300 g + weight of the lead	300 g + weight of the lead
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, outgoing lead

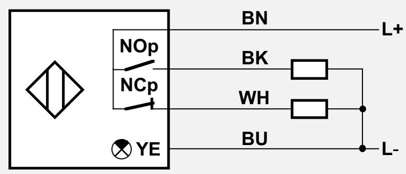


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Wiring (2)
DC 4-poles, outgoing lead



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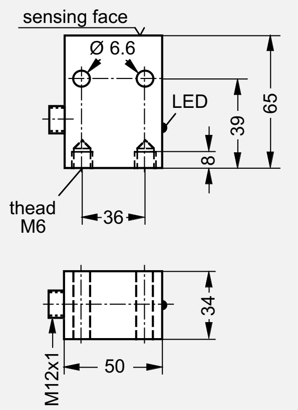
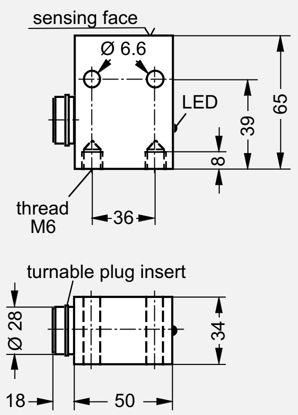
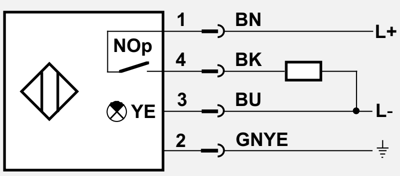
☐ **50 x 34 mm**; 65 mm	☐ **50 x 34 mm**; 65 mm		
PBT / Al	PBT / Al		
12 mm, flush	**12 mm, flush**		
0 ... 9.72 mm	0 ... 9.72 mm		
IAD-34aq65b12-1S1A, 11.25-90 (3)	IAD-34aq65b12-1T3A, 11.03-15 (4)		
300 Hz / ≥ 1 ms	**300 Hz / ≥ 1 ms**		
connector M12; 4 wires	connector Ø 28; 4 wires		



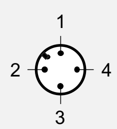


10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC		
≤ 10 mA	≤ 10 mA		
≤ 400 mA	≤ 400 mA		
75 V DC	75 V DC		
≤ 0.47 µF	≤ 0.47 µF		
48 mm x 32 mm	48 mm x 32 mm		
11.8 mm	11.8 mm		
yes, YE	yes, YE		
300 m	300 m		
DC 13	DC 13		
IP 67	IP 65		
300 g	300 g		

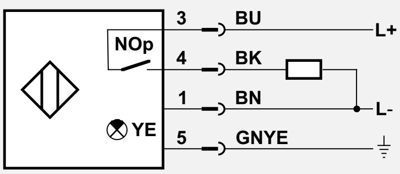
Wiring (3)
DC 5-poles, plug



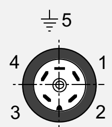
Euro Plug M12



Wiring (4)
DC 4-poles, plug

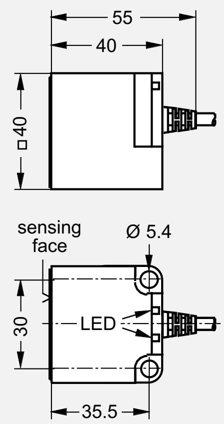


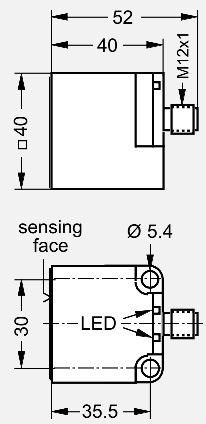
Plug
Amphenol, 5-poles



Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-40aq, -40fq

	Design; height; length	☐ **40 mm;** 40 mm; 40 mm	☐ **40mm;** 40 mm; 40 mm
	Material of the sensing face / of the housing	PBT / aluminium	PBT / aluminium
	Nominal switching distance, mounting (see page1.0.4)	**15 mm, flush**	**15 mm, flush**
	Range secured switching distance	0 ... 12.2 mm	0 ... 12,2 mm
Type designation, Ref. no. (Wiring)	NO plus-switching NOp		
	NC plus-switching NCp		
	NO and NC plus-switching NOp + NCp	IAD-40aq40b15-12NKd1B, 11.35-27-020 (1)	IAD-40aq40b15-12Sd1B, 11.35-26 (2)
	NO plus-, NC minus-switching NOp + NCn		
	NO minus-switching NOn		
	NC minus-switching NCn		
	Maximum switching frequency / Minimum damping period	**1 kHz / ≥ 0.5 ms**	**1 kHz / ≥ 0.5 ms**
	Wiring (connector or lead); number of wires	lead; 4 wires	connector M12; 4 wires





Common Technical Data	
Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching points s	3 ... 20%
Repititon accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C

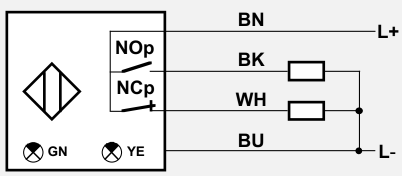
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	38 x 38 mm	38 x 38 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	17.0 mm	17.0 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	NK / 2.0 m / 4 x 0.34 mm^2	
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class	II, ⧈	II, ⧈
Permissible torque without / with toothed disc		
Weight	90 g	90 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, outgoing lead

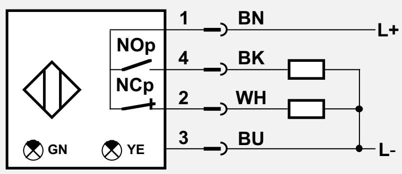


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

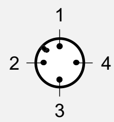
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Wiring (2)
DC 4-poles, plug



Euro Plug M12



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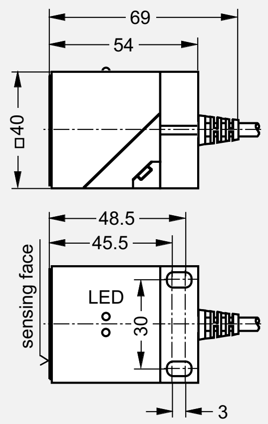
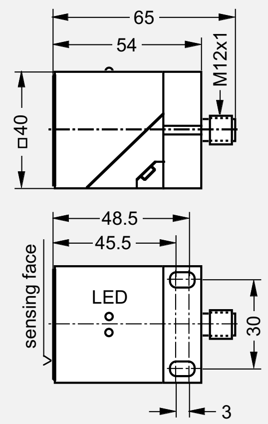
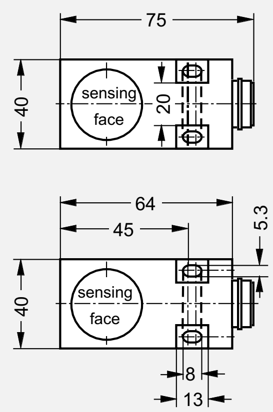
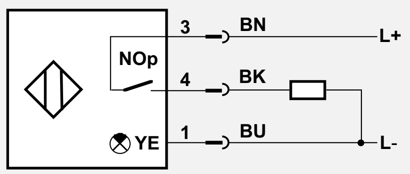
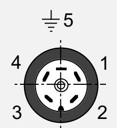
☐ **40mm;** 40 mm; 54 mm	☐ **40mm;** 40 mm; 54 mm	☐ **40mm;** 40 mm; 64 mm	
PBT / PBT	PBT / PBT	PBT / PBT	
15 mm, flush	**15 mm, flush**	**15 mm, flush**	
0 ... 12.2 mm	0 ... 12.2 mm	0 ... 12.2 mm	
		IAD-40fq75b15-1T1A, 11.16-12 (3)	
IAD-40fq54b15-12NKd1B, 11.35-29-020 (1)	IAD-40fq54b15-12Sd1B, 11.35-28 (2)		
1 kHz / ≥ 0.5 ms	**1 kHz / ≥ 0.5 ms**	**200 Hz / ≥ 1.5 ms**	
lead; 4 wires	connector M12; 4 wires	connector M30; 3 wires	
			
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	
≤ 20 mA	≤ 20 mA	≤ 10 mA	
≤ 200 mA	≤ 200 mA	≤ 400 mA	
75 V DC	75 V DC	75 V DC	
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	
38 x 38 mm	38 x 38 mm	38 x 38 mm	
17.0 mm	17.0 mm	13.0 mm	
GN for operation, YE for actuated	GN for operation, YE for actuated	yes, YE	
500 m	500 m	300 m	
NK / 2.0 m / 4 x 0.34 mm^2			
DC 13	DC 13	DC 13	
IP 67	IP 67	IP 65	
II ⧈	II ⧈		
90 g	90 g	150 g	

Wiring (3)
DC 3-poles, plug



Plug
Amphenol, 5-poles

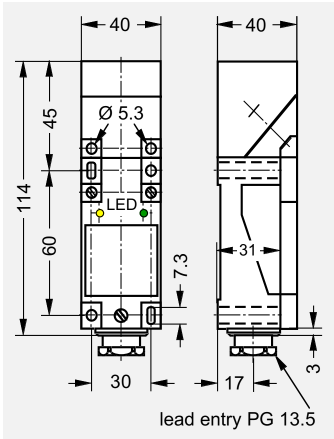


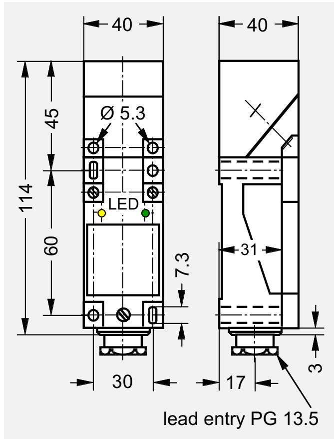
Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-40fv

	Design; height; 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
	Nominal switching distance, mounting (see page 1.0.4)	**15 mm, flush**	**25 mm, non-flush**
	Range secured switching 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 factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data

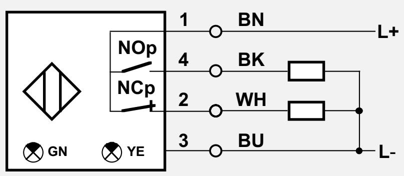
Permissible operating voltage range	10 ... 24 ... 45 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA	≤ 15 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	38 x 38 mm	38 x 38 mm
Switching radius r (at switching distance of the object) 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
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc		
Weight	220 g	220 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, clamp terminal



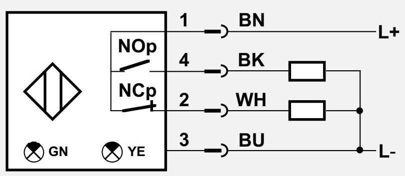
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

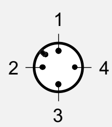
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

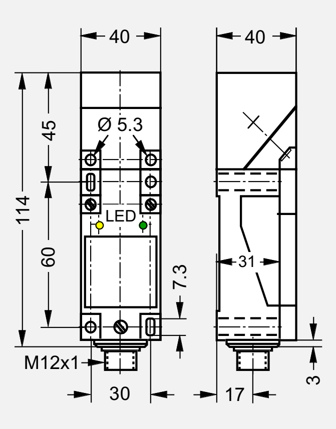
Wiring (2)
DC 4-poles, plug

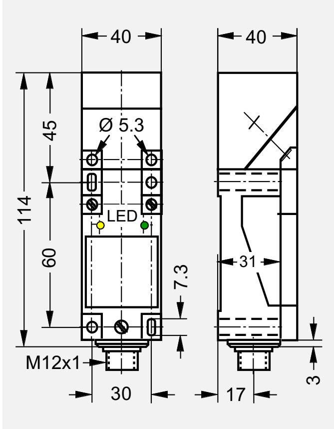
Euro Plug M12

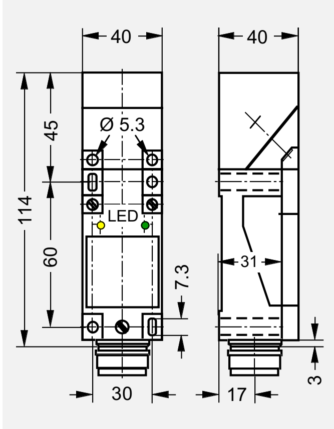




☐ **40 mm;** 40 mm; 114 mm	☐ **40 mm;** 40 mm; 114 mm	☐ **40 mm;** 40 mm; 114 mm	
PBT / PBT	PBT / PBT	PBT / PBT	
15 mm, flush	**25 mm, non-flush**	**25 mm, non-flush**	
0 ... 12.2 mm	0 ... 20.25 mm	0 ... 20.25 mm	
IAD-40fv114b15-12S1B, 11.25-66 (2)	IAD-40fv114n25-12S1B, 11.32-98 (2)	IAD-40fv114n25-12T1B, 11.24-08 (3)	
200 Hz / ≥ 1.5 ms	**100 Hz / ≥ 3 ms**	**100 Hz / ≥ 3 ms**	
connector M12; 4 wires	connector M12; 4 wires	connector M30; 4 wires	

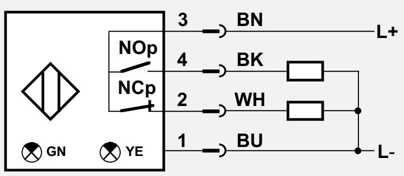




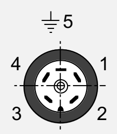


10 ... 24 ... 45 V DC	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC	
≤ 20 mA	≤ 15 mA	≤ 15 mA	
≤ 400 mA	≤ 400 mA	≤ 400 mA	
75 V DC	75 V DC	75 V DC	
≤ 1.0 µF	≤ 1.0 µF	≤ 1.0 µF	
38 x 38 mm	38 x 38 mm	38 x 38 mm	
13.0 mm	15.0 mm	15.0 mm	
GN for operation, YE for actuated	GN for operation, YE for actuated	GN for operation, YE for actuated	
300 m	300 m	300 m	
DC 13	DC 13	DC 13	
IP 67	IP 67	IP 65	
230 g	2230 g	240 g	

Wiring (3)
DC 4-poles, plug

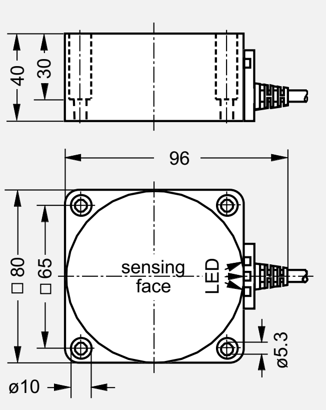


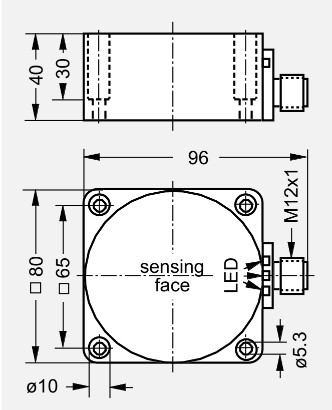
Plug
Amphenol, 5-poles



Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-80aq, -80fq

Design; height; length	☐ **80 mm**; 40 mm; 80 mm	☐ **80 mm**; 40 mm; 80 mm
Material of the sensing face / of the housing	PBT / Al	PBT / Al
Nominal switching distance, mounting (see page 1.0.4)	**40 mm, flush**	**40 mm, flush**
Range secured switching distance	0 ... 32.4 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-80aq40b40-12NKd1B, 11.35-31-050 (1)	IAD-80aq40b40-12Sd1B, 11.35-30 (2)
NO plus-, NC minus-switching NOp + NCn		
NO minus-switching NOn		
NC minus-switching NCn		
Maximum switching frequency / Minimum damping period	**1 kHz / ≥ 0.5 ms**	**1 kHz / ≥ 0.5 ms**
Wiring (connector or lead); number of wires	lead; 4 wires	connector M12; 4 wires





Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition accuracy of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C

Specific Technical Data

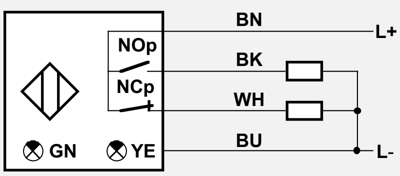
Permissible operating voltage range	8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	78 mm	78 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	27.0 mm	27.0 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	NK / 5.0 m / 4 x 0.34 mm^2	
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc		
Weight	450 g + weight of the lead	450 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 "Accessories". Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, outgoing lead

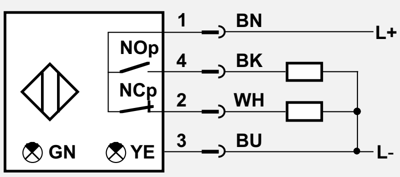


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

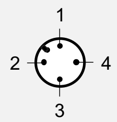
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Wiring (2)
DC 4-poles, plug



Euro Plug M12



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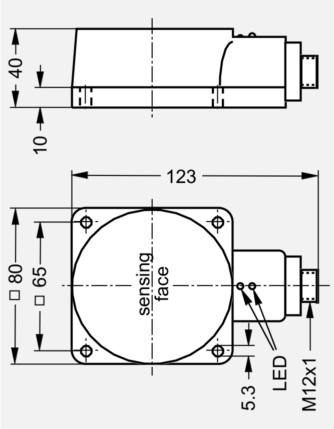
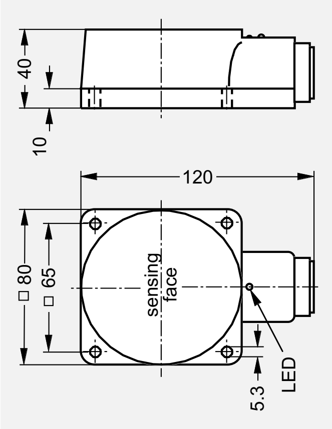
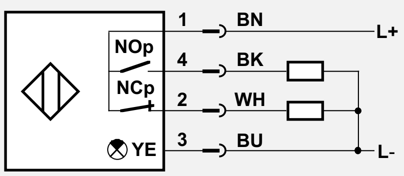
☐ **80 mm;** 40 mm; 80 mm	☐ **80 mm;** 40 mm; 80 mm		
PBT / PBT	PBT / PBT		
40 mm, partly flush	**40 mm, non-flush**		
0 ... 32.4 mm	0 ... 32.4 mm		
	IAD-80fq40n40-1T1A, 11.16-30 (4)		
IAD-80fq40t40-12Sd2B, 11.35-32 (3)			
100 Hz / ≥ 5 ms	**100 Hz / ≥ 5 ms**		
connector M12; 4 wires	connector Ø 28; 3 wires		



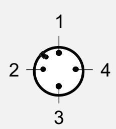


8 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC		
≤ 10 mA	≤ 10 mA		
≤ 400 mA	≤ 400 mA		
75 V DC	75 V DC		
≤ 1.0 µF	≤ 1.0 µF		
78 mm	78 mm		
27.0 mm	27.0 mm		
GN for operation, YE for actuated	yes, YE		
	300 m		
300 m			
	DC 13		
DC 13	IP 65		
IP 67			
	450 g		
450 g			

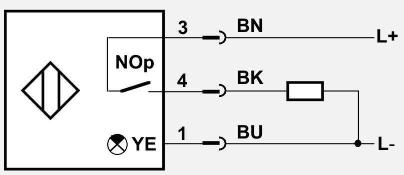
Wiring (3)
DC 4-poles, plug



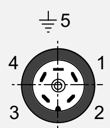
Euro Plug M12



Wiring (4)
DC 3-poles, plug



Plug
Amphenol, 5-poles

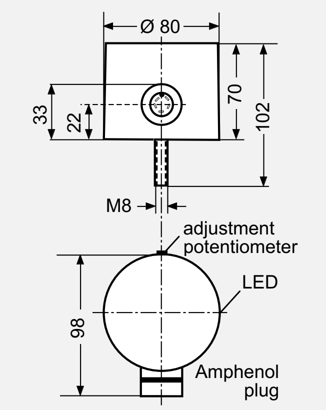


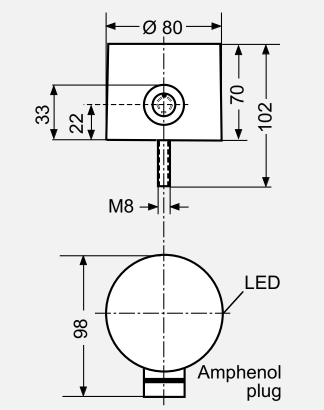
Inductive Proximity Switches, Ferrous DC 3- and 4-poles
Series IAD-80fr

Design; height	**Ø 80 mm;** 70 mm	**Ø 80 mm;** 70 mm
Material of the sensing face / of the housing	PBT / PBT	PBT / PBT
Nominal switching distance, mounting (see page 1.0.3)	**80 mm, non-flush, adjustable**	**35 mm, non-flush**
Range secured switching distance	0 ... 64.8 mm	0 ... 28.35 mm
Type designation, Ref. no. (Wiring) — NO plus-switching NOp	IAD-80fr70e80-1T3A, 11.03-21 (1)	
NC plus-switching NCp		
NO and NC plus-switching NOp + NCp		IAD-80fr70n35-12T1A, 11.33-21 (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**
Connector (connector or lead); number of wires	connector ø 28; 3 wires	connecotr ø 28; 4 wires

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- at permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data

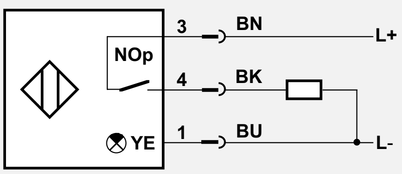
Permissible operating voltage range	8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA	≤ 10 mA
Load current	≤ 400 mA	≤ 400 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	80 mm	80 mm
Switching radius r (at switching distance of the object) 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
Degree of protection according to IEC 60529	IP 65	IP 65
Protection class		
Permissible torque without / with toothed disc		
Weight	600 g	600 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

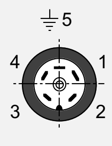
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, plug



Plug
Amphenol, 5-poles

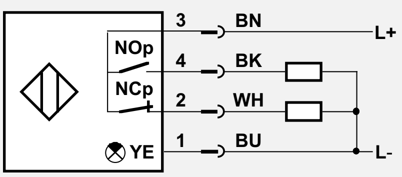


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

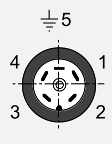
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

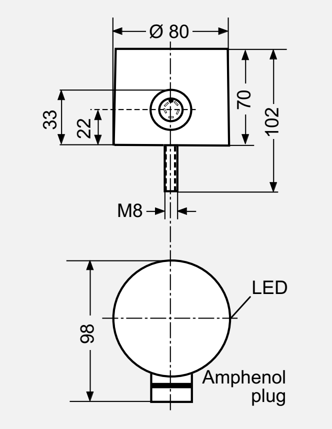
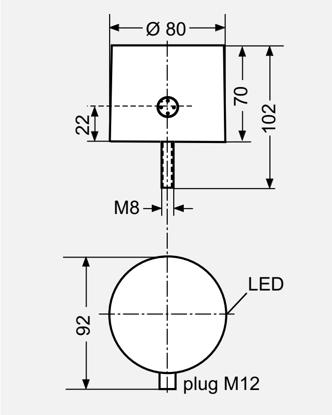
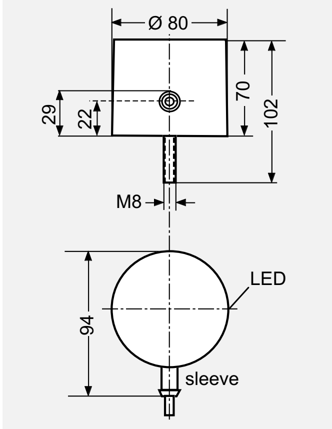
Subject to technical changes!

Wiring (2)
DC 4-poles, plug

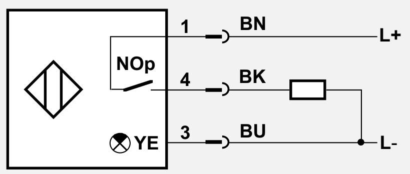


Plug
Amphenol, 5-poles

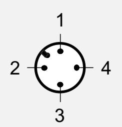


Ø 80 mm; 70 mm	**Ø 80 mm**; 70 mm	**Ø 80 mm**; 70 mm	
PBT / PBT	PBT / PBT	PBT / PBT	
50 mm, non-flush	**50 mm, non-flush**	**50 mm, non-flush**	
0 ... 40.5 mm	0 ... 40.5 mm	0 ... 40.5 mm	
IAD-80fr70n50-1T1A, 11.03-98 (1)	IAD-80fr70n50-1S1A, 11.25-92 (3)	IAD-80fr70n50-1NT1A, 11.03-94-050 (4)	
100 Hz / ≥ 4 ms	**100 Hz / ≥ 3 ms**	**100 Hz / ≥ 4 ms**	
connector ø 28; 3 wires	connector M12; 3 wires	lead; 3 wires	
			
8 ... <u>24</u> ... 30 V DC	8 ... <u>24</u> ... 30 V DC	8 ... <u>24</u> ... 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	≤ 1.0 µF	≤ 1.0 µF	
80 mm	80 mm	80 mm	
30.6 mm	31.0 mm	31.0 mm	
yes, YE	yes, YE	yes, YE	
300 m	300 m	300 m	
		NT / 5.0 m / 3 x 0.75 mm^2	
DC 13	DC 13	DC 13	
IP 65	IP 67	IP 67	
600 g	600 g	600 g + weight of the cable	

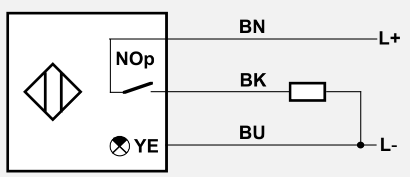
Wiring (3)
DC 3-poles, plug



Euro plug M12



Wiring (4)
DC 3-poles, out going lead



Inductive Proximity Switches
Type Ferrous AC- and DC 2-poles

Characteristics

The **Series Ferrous AC and DC 2-poles** comprises „classical“ Inductive Proximity Switches. Due to the multiple requirements of our customers, we developed numerous different construction designs and versions for AC- and DC-voltage, which deviate from the dimensions stipulated in the standards.

Due to the disappearance of contactor controls and the currently mainly employed PLCs the importance of the two-pole AC-voltage switches has decreased. Nevertheless we included some of these types for spare part reasons..

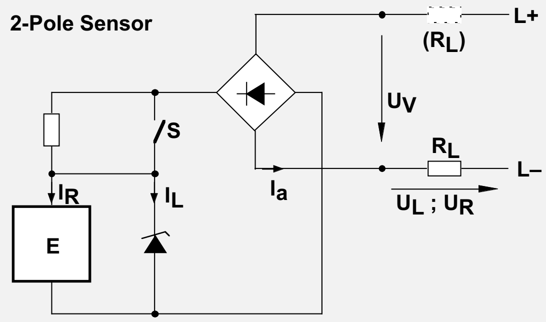
The same applies for AC- and / or DC-voltage sensors. These so-called **All Voltage Sensors** can be operated with an **alternating voltage in the range from 50 to 60 Hz** or with **direct voltage**.

Please note: The switching frequency (maximum operating frequency) of AC-and DC-voltage sensors is limited to the frequency of the supply voltage and the time delay before availability of the sensor rises up to over 20 ms.

The same applies with regard to ripple voltage and voltage fluctuations when all voltage sensors are operated with DC-voltage.

For supply of the electronic part the idle current IR of a two-pole sensor flows via the load resistance Rl, as long as the switch S is not being actuated, and generates at the load resistance a voltage drop, which can ben neglected.

After a switch has been closed the voltage Uv of the two-pole switch drops by approx. 5 Volt. This voltage serves for the supply of the sensor electronics and reduces the voltage UL at the load resistance RL.



Switch S	Current I_a	Voltage U_L
opened	$I_L + I_R$	$L+ - U_V$
closed	I_R	$I_R * R_L$

When switches of the ferrous series are used it has to be considered that only metals containing iron have the indicated switching distance. Using other metals the reduction factor R (see table) has to be considered.

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

Design Ferrous AC- and DC 2-poles

Type	Ref. No.	Switching distance in mm Mounting *)
round M8 x L		
IAB-8eg40b1-3ND1 ***)	11.02-81-020	1.0 b
round M12 x L		
IAB-12mg60b2-3S1A ***)	11.26-18-000	2.0 b
IAB-12mg40b2-3NT1A ***)	11.26-12-030	2.0 b
IAB-12mg60n5-3S1A ***)	11.26-01-000	5.0 n
IAB-12mg50n5-3NT1A ***)	11.26-13-030	5.0 n
round M18 x L		
IAB-18mg60b5-3S1A	11.26-17-000	5 b
IAW-18mg100b5-1T1A ***)	11.15-66-000	5 b
ISW-18mg100b5-3T1A ***)	11.15-93-000	5 b
IAB-18mg50b5-3NT1A	11.26-07-030	5 b
ISW-18mg85b5-3NT1A ***)	11.19-10-030	5 b
IAB-18mg60n10-3S1A	11.26-02-000	10 n
round M30 x L		
IAB-30mg80b10-3S1A **)	11.26-05-000	10 b
ISW-30mg95b10-3T1A ***)	11.19-11-000	10 b
IAB-30sg70b10-3NK1A **)	11.26-06-030	10 b
ISW-30mg80b10-3NT1A ***)	11.19-12-020	10 b
rectangular 40 x 40 x L		
IAB-40fq75b15-1T1 ***)	11.26-20-000	15 b
IAB-40fv114b15-3S1A ***)	11.26-03-000	15 b
IAB-40fv114b15-3K1A ***)	11.26-04-000	15 b
rectangular 80 x 80 x L		
IAB-80fq120n40-3S1A ***)	11.26-19-000	40 n

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

**) = supply on request

***) = for replacement purposes only

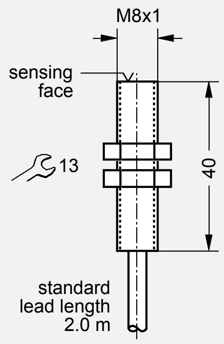
Inductive Proximity Switches, Ferrous DC 2-poles

Series IAB-8eg, -12mg

	Design; length	**O M8 x 1;** 40 mm	
	Material of the sensing face / of the housing	PBT / stainless steel	
	Nominal switching distance, (see page 1.0.4)	**1 mm, flush**	
	Range secured switching distance	0 ... 0.81 mm	
Type designation, Ref. no. (Wiring)	NO plus- or minus-switching NOp	IAB-8eg40b1-3ND1, 11.02-81-020 (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	**3 kHz / 0.1 ms**	
	Wiring (connector or lead); number of wires	lead; 2 wires	

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- at permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	
Permissible ripple voltage	≤ 15 %
Short-circuit-prrof ?	
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 5 V DC
Ambient temperature range	- 25 ... + 75 °C



Dimensions subject to technical changes!

Specific Technical Data

Permissible operating voltage range	10 ... 24 ... 30 V DC	
Current consumption without load	≤ 1.5 mA	
Load current	5 ... 60 mA	
Nominal insulation voltage	75 V DC	
Permissible capacity at output	≤ 1 µF	
Ø Sensing face	6.4 mm	
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	2.0 mm	
Function inidication ?		
Maximum lead length	300 m	
Lead type / standard lead length / number of wires x lead cross section	ND / 2.0 m / 2 x 0.14mm^2	
Utilization category according to IEC 60947-5-2	DC 13	
Degree of protection according to IEC 60529	IP 67	
Protection class		
Permissible torque without / with toothed disc	8 Nm / 20 Nm	
Weight	7 g + weight of the lead	
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Certifications

Manufactured according to DIN EN ISO 9001

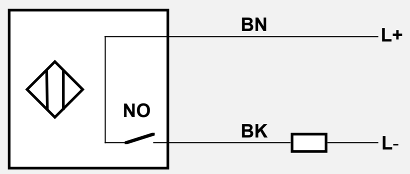
Safety Regulations

Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

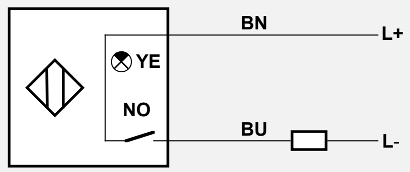
Wiring (1)

DC 2-poles, outgoing lead

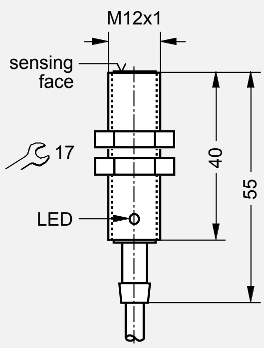


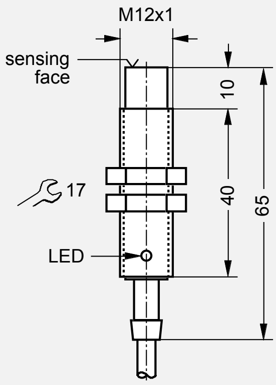
Wiring (2)

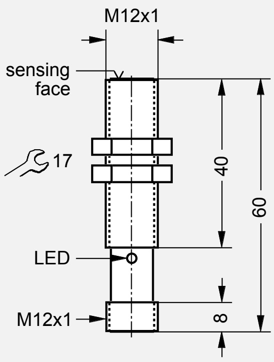
DC 2-poles, outgoing lead

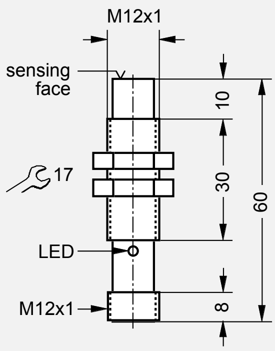


O M12 x 1; 40 mm	**O M12 x 1;** 50 mm	**O M12 x 1;** 60 mm	**O M12 x 1;** 60 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
2 mm, flush	**5 mm, non-flush**	**2 mm, flush**	**5 mm, non-flush**
0 ... 1.62 mm	0 ... 4.05 mm	0 ... 1.62 mm	0 ... 4.05 mm
IAB-12mg40b2-3NT1A, 11.26-12-020 (2)	IAB-12mg50n5-3NT1A, 11.26-13-020 (2)	IAB-12mg60b2-3S1A, 11.26-18 (3)	IAB-12mg60n5-3S1A, 11.26-01 (3)
1.5 kHz / 0.2 ms	**1.5 kHz / 0.2 ms**	**1.5 kHz / 0.2 ms**	**1.5 kHz / 0.2 ms**
lead; 2 wires	lead; 2 wires	connector M12; 2 wires	connector M12; 2 wires



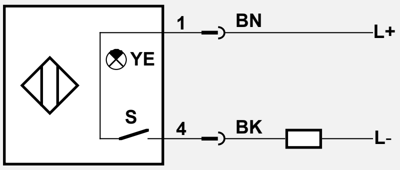




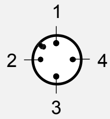


10 ... 24 ... 60 V DC	10 ... 24 ... 60 V DC	10 ... 24 ... 60 V DC	10 ... 24 ... 60 V DC
≤ 1 mA	≤ 1.5 mA	≤ 1 mA	≤ 1.5 mA
4 ... 200 mA	4 ... 200 mA	4 ... 200 mA	4 ... 200 mA
75 V DC	75 V DC	75 V DC	75 V DC
≤ 1.0 µF	≤ 0.47 µF	≤ 1.0 µF	≤ 1.0 µF
10.5 mm	10.5 mm	10.5 mm	10.5 mm
1.85 mm	3.5 mm	1.85 mm	3.5 mm
yes, YE	yes, YE	yes, YE	yes, YE
300 m	300 m	300 m	300 m
NT / 2.0 m / 2 x 0.5mm^2	NT / 2.0 m / 2 x 0.5mm^2		
DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67
9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm	9 Nm / 30 Nm
12 g + weight of the lead	15 g + weight of the lead	17 g	17 g

Wiring (3)
DC 2-poles, plug



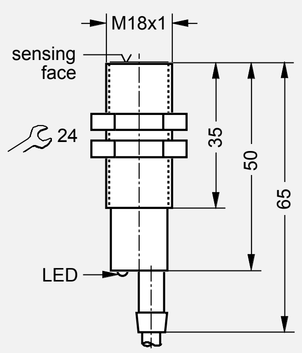
Euro Plug M12

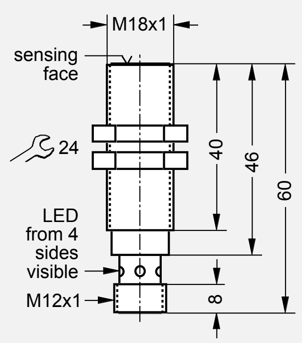


Inductive Proximity Switches, Ferrous DC 2-poles
Series IAB-18mg, -30sg, -30mg

Design; length	**O M18 x 1;** 50 mm	**O M18 x 1;** 60 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
Nominal switching distance, mounting (see page 1.0.4)	**5 mm, flush**	**5 mm, flush**
Range secured switching distance	0 ... 4.05 mm	0 ... 4.05 mm
Type designation, Ref. no. (Wiring) — NO plus- or minus-switching NOp	IAB-18mg50b5-3NT1A, 11.26-07-020 (1)	IAB-18mg60b5-3S1A, 11.26-17 (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	**500 Hz / 1 ms**	**500 Hz / 1 ms**
Wiring (connector or lead); number of wires	lead; 2 wires	connector M12; 2 wires

Common Technical Data	
Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition of the switching accuracy s	≤ 10 %
- at permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	
Protected against polarity reversal ?	ja
Voltage drop over a closed contact	≤ 5 V DC
Ambient temperature range	- 25 ... + 75 °C





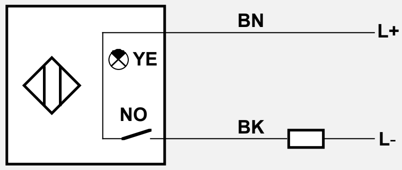
Specific Technical Data		
Permissible operating voltage range	10 ... 24 ... 60 V DC	10 ... 24 ... 60 V DC
Current consumption without load	≤ 1 mA	≤ 1 mA
Load current	4 ... 200 mA	4 ... 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	4.8 mm	4.8 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 / 2.0 m / 2 x 0.34mm^2	
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection type according to IEC 60529	IP 67	IP 67
Protection class		
Permissible torque without / with toothed disc	34 Nm / 70 Nm	34 Nm / 70 Nm
Weight	40 g + weight of the lead	50 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 2-poles, outgoing lead

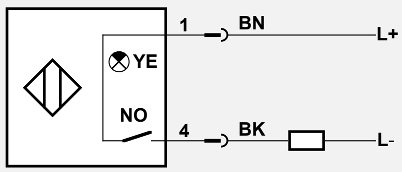


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

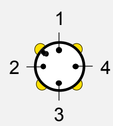
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

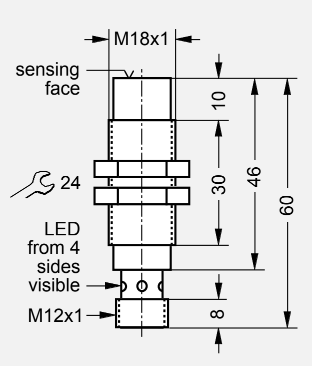
Wiring (2)
DC 2-poles, plug

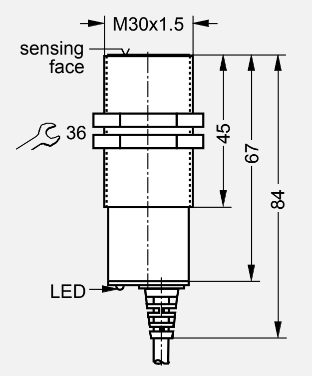


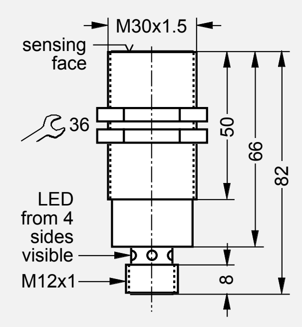
Euro Plug M12
with LED display YE
from 4 sides visible



O M18 x 1; 60 mm	**O M30 x 1.5**; 67 mm	**O M30 x 1.5**; 82 mm	
PBT / CuZn nickel-plated	PBT / steel nickel-plated	PBT / CuZn nickel-plated	
10 mm, non-flush	**10 mm, flush**	**10 mm, flush**	
0 ... 8.1 mm	0 ... 8.1 mm	0 ... 8.1 mm	
IAB-18mg60n10-3S1A, 11.26-02 (2)	IAB-30sg70b10-3NK1A, 11.26-06-020 (1)	IAB-30mg80b10-3S1A, 11.26-05 (2)	
200 Hz / 1 ms	**300 Hz / 1 ms**	**300 Hz / 1 ms**	
connector M12; 2 wires	lead; 2 wires	connector M12; 2 wires	







10 ... 24 ... 60 V DC	10 ... 24 ... 60 V DC	10 ... 24 ... 60 V DC	
≤ 1 mA	≤ 1 mA	≤ 1 mA	
4 ... 200 mA	4 ... 200 mA	4 ... 200 mA	
75 V DC	75 V DC	75 V DC	
≤ 1.0 µF	≤ 0.47 µF	≤ 0.47 µF	
16.5 mm	27.4 mm	27.4 mm	
6.0 mm	9.4 mm	9.4 mm	
yes, YE	yes, YE	yes, YE	
300 m	300 m	300 m	
	NK / 2.0 m / 2 x 0.75mm^2		
DC 13	DC 13	DC 13	
IP 67	IP 67	IP 67	
34 Nm / 70 Nm	170 Nm / < 200 Nm	150 Nm / < 200 Nm	
50 g	100 g + weight of the lead	175 g	

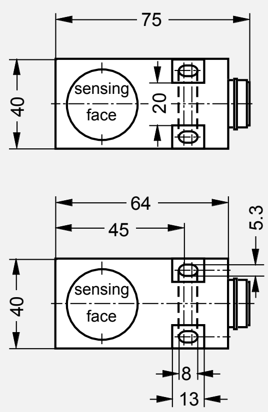
Inductive Proximity Switches, Ferrous DC 2-poles

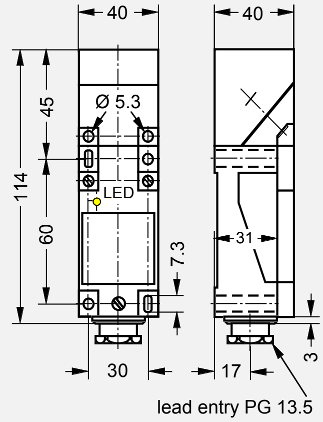
Series IAB-40fq, -40fv, -80fq

Design; height, length	☐ **40 mm;** 40 mm; 64 mm	☐ **40 mm;** 40 mm, 114 mm
Material of the sensing face / of the housing	PBT / PBT	PBT / PBT
Nominal switching distance, mounting (see page 1.0.4)	**15 mm, flush**	**15 mm, flush**
Range secured switching distance	0 ... 12.2 mm	0 ... 12.2 mm
Type designation, Ref. no. (Wiring) — NO plus- or minus-switching NOp	IAB-40fq75b15-1T1, 11.26-20 (1)	IAB-40fv114b15-3K1A, 11.26-04 (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 distance / Minimum damping period	**200 Hz / ≥ 1.5 ms**	**200 Hz / ≥ 1.5 ms**
Wiring (connector or lead); number of wires	connector Ø 28; 2 wires	terminals; 2 wires

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repititon accuracy of the switching point s	≤ 10 %
- at permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	11.26-20: yes
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 5 V DC
	11.26-20: ≤ 8 V DC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data

Permissible operating voltage range	18 ... 24 ... 60 V DC	10 ... 24 ... 60 V DC
Current consumption without load	≤ 1.5 mA	≤ 1 mA
Load current	5 ... 60 mA	4 ... 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	38 x 38 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	13.0 mm	13.0 mm
Function indication ?		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
Degree of protection according to IEC 60529	IP 65	IP 67
Protection class		
Permissible torque without / with toothed disc		
Weight	150 g	220 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 "Accessories". Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Certifications

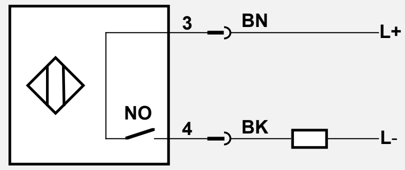
Manufactured according to DIN EN ISO 9001

Safety Regulations

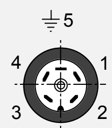
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

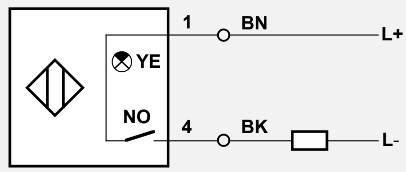
Wiring (1)
DC 2-poles, plug



Plug
Amphenol, 5-poles



Wiring (2)
DC 2-poles, clamp terminal



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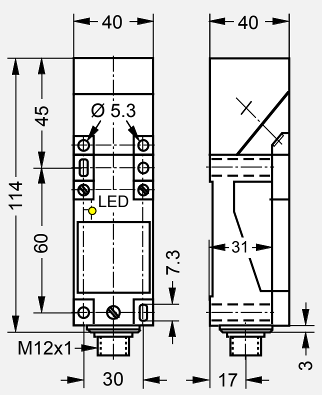
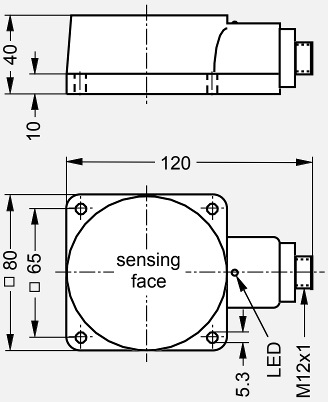
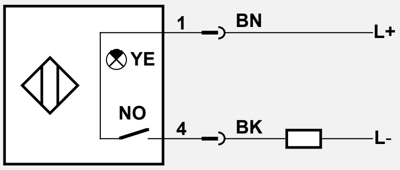
☐ **40 mm;** 40 mm, 114 mm	☐ **80 mm;** 40 mm, 80 mm		
PBT / PBT	PBT / PBT		
15 mm, flush	**40 mm, non-flush**		
0 ... 12.2 mm	**0 ... 32 mm**		
IAB-40fv114b15-3S1A, 11.26-03 (3)	IAB-80fq120n40-3S1A, 11.26-19 (3)		
200 Hz / ≥ 1.5 ms	**100 Hz / ≥ 2 ms**		
connector M12; 2 wires	connector M12; 2 wires		



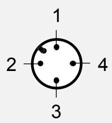


10 ... <u>24</u> ... 60 V DC	10 ... <u>24</u> ... 60 V DC		
≤ 1 mA	≤ 1 mA		
4 ... 200 mA	4 ... 200 mA		
75 V DC	75 V DC		
≤ 1.0 µF	≤ 1.0 µF		
38 x 38 mm	70 mm		
13.0 mm	31.0 mm		
yes, YE	yes, YE		
300 m	300 m		
DC 13	DC 13		
IP 67	IP 65		
220 g	450 g		

Wiring (3)
DC 2-poles, plug



Euro Plug M12

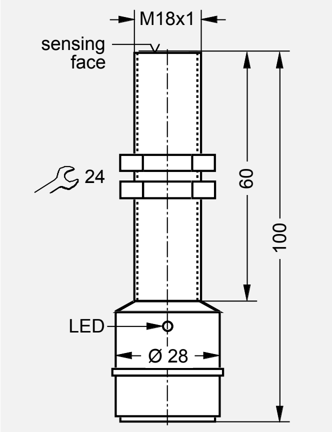


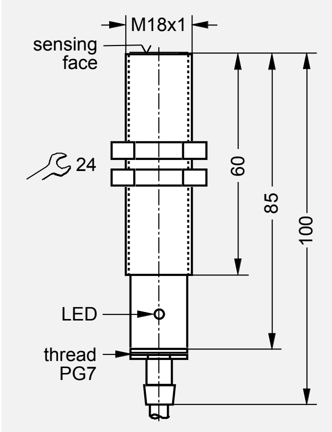
Inductive Proximity Switches, Ferrous AC 2-poles
Series IAW-18mg, ISW-18mg, ISW-30mg

	Design; length	**O M18 x 1**; 100 mm	**O M18 x 1**; 85 mm
	Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
	Nominal switching distance, mounting (see page 1.0.4)	**5 mm, flush**	**5 mm, flush**
	Range secured switching distance	0 ... 4.05 mm	0 ... 4.05 mm
Type designation, Ref. no. (Wiring)	NO plus- or minus-switching NOp	IAW-18mg100b5-1T1A, 11.15-66 (1)	ISW-18mg85b5-3NT1A, 11.19-10-020 (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	**25 Hz / 20 ms**	**10 Hz / 30 ms**
	Wiring (connector or lead); number of wires	connector ø 28; 3 wires	lead; 3 wires

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20 %
Repitition accuracy of the switching point s	≤ 10 %
- at permanent operating voltage	
... and ambient temperature	≤ 2 %
Magnetic field-resistance	
Permissible ripple voltage	≤ 15 %
Short-circuit-proof ?	
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 10 V AC
	11.15-66: ≤ 5 V AC
Ambient temperature range	- 25 ... + 75 °C





Specific Technical Data

Permissible operating voltage range	20 ... 230 ... 265 V AC	90 ... 230 ... 280 V AC
Current consumption without load	≤ 2 mA	≤ 4 mA
Load current	3 ... 500 mA	10 ... 240 mA
Nominal insulation voltage		
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	16.5 mm	16.5 mm
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)	4.8 mm	4.8 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 / 2.0 m / 3 x 0.75 mm^2
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection according to IEC 60529	IP 65	IP 67
Protection class		
Permissible torque without / with toothed disc	34 Nm / 70 Nm	34 Nm / 70 Nm
Weight	145 g	100 g + weight of the lead
		electrically isolated coil
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index -020 or -050. In case that deviated lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Certifications

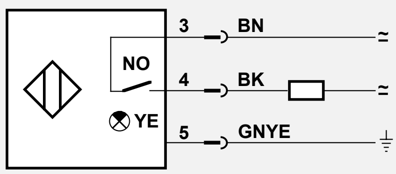
Manufactured according to DIN EN ISO 9001

Safety Regulations

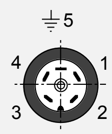
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

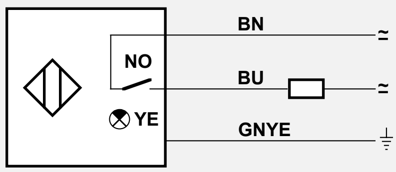
Wiring (1)
AC 2-poles, plug



Plug
Amphenol, 5-poles



Wiring (2)
AC 2-poles, outgoing lead



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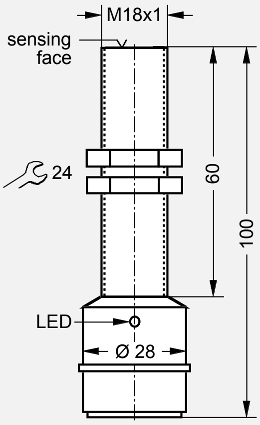
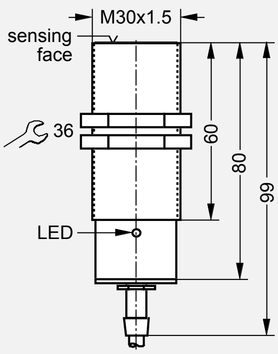
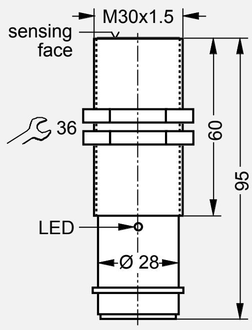
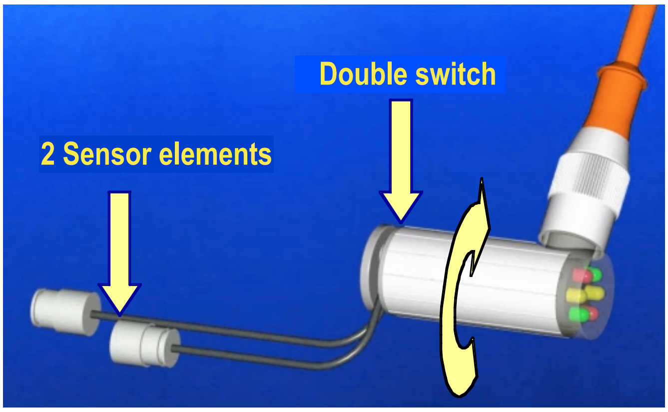
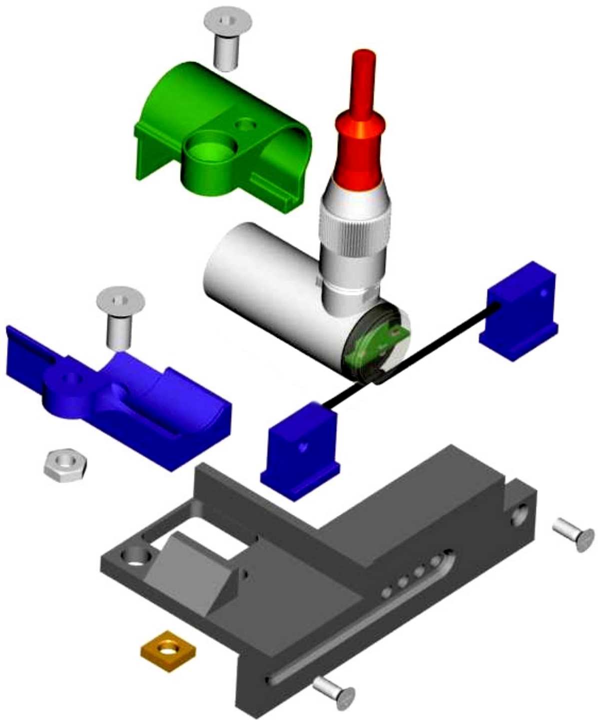
O M18 x 1; 100 mm	**O M30 x 1,5;** 80 mm	**O M30 x 1.5;** 95 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
5 mm, flush	**10 mm, flush**	**10 mm, flush**
0 ... 4.05 mm	0 ... 8.1 mm	0 ... 8.1 mm
ISW-18mg100b5-3T1A, 11.15-93 (1)	ISW-30mg80b10-3NT1A, 11.19-12-020 (2)	ISW-30mg95b10-3T1A, 11.19-11 (1)
10 Hz / 30 ms	**10 Hz / 30 ms**	**10 Hz / 30 ms**
connector ø 28; 3 wires	lead; 3 wires	connector ø 28; 3 wires
		
90 ... <u>230</u> ... 280 V AC	90 ... <u>230</u> ... 280 V AC	90 ... <u>230</u> ... 280 V AC
≤ 4 mA	≤ 4 mA	≤ 4 mA
10 ... 240 mA	10 ... 240 mA	10 ... 240 mA
		75 V DC
≤ 1.0 µF	≤ 0.47 µF	≤ 0.47 µF
16.5 mm	27.4 mm	27.4 mm
4.8 mm	9.4 mm	9.4 mm
yes, YE	yes, YE	yes, YE
300 m	300 m	300 m
	NT / 2.0 m / 3 x 0.75 mm^2	
DC 13	DC 13	DC 13
IP 65	IP 67	IP 65
34 Nm / 70 Nm	150 Nm / < 200 Nm	150 Nm / < 200 Nm
145 g	190 g + weight of the lead	150 g
electrically isolated coil	electrically isolated coil	electrically isolated coil

Double Switch

Inductive double switches are proximity switches with two separate sensor elements (sensing faces) for the non-contacting and contactless interrogation of two different positions in order to detect travel paths (position sensor) or directions of movement (backwards-forwards identification) of an actuator. These positions may, for example, be two end positions or specific positions.



Double switches along with feeding devices are also used in what are known as clamping and gripping systems. These systems serve to clamp, hold and stop when welding or joining components such as steel sheets and mouldings. The clamping systems consist, amongst other things, of so-called toggle clamps which may be operated electrically or pneumatically. The two end positions of the clamp lever are interrogated by means of a double switch. While in the example (see adjacent figure) the right sensor is firmly arranged, the angular position of the opened gripper can be modified by a different placement of the left sensor element. The two sensor elements interrogate the end positions, clamp "open" and "closed". The cylindrical evaluator is located on a special plastic holder. A large all-round inspection window clearly shows the switching status in each case.



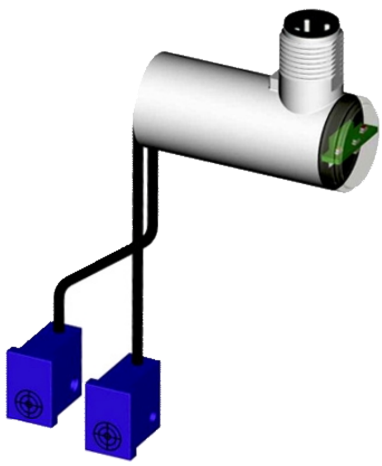
Applications

The sensor elements can be provided with supply leads of up to 1 m in length for end positions lying further apart (> 100 mm). This allows the detection of even large travel paths in machines. The sensor elements can be accommodated in a ceramic envelope with heat resisting supply lead where increased temperatures of up to 300 °C are present at the measuring location. The sensor element can also be designed with a high degree of protection (IP68).

The two-channel evaluator allows an operating frequency of up to 20 kHz and sits in a metal housing with a large all-round inspection window on the end face to display the switching status. The switch is insensitive to magnetic fields up to 100 mT and non-welding. The holder for the evaluator is made of injection moulded plastic and must be structurally adapted to each application.

The inductive double switch has the following significant advantages:

- Smallest design of the sensor elements having a sensing face with a 6 mm diameter
- Operating frequencies of up to 20 kHz
- Evaluator and sensor elements are easy to install



Type Double Switch

Type	Ref. No.	Switching distance in mm Mounting *)
IAD2/H-18zr42n2-11Sd1C	15.14-08-000	2 n

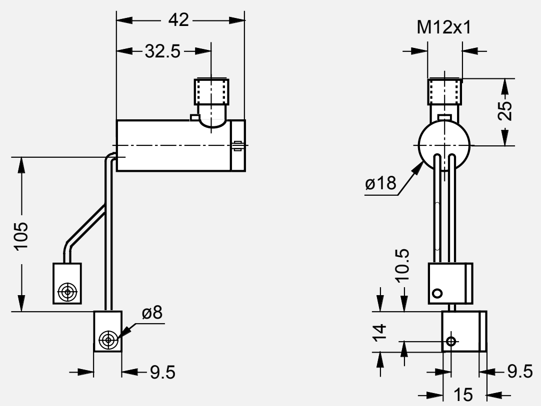
*) b = flush mounting, n = non-flush mounting, t = partially flush mounting

Inductive Proximity Switches, Double- and Multiple
Series IAD2/H-18zr

Design; length	**O 18 mm;** 42 mm
Material of the sensing face (sensor) / of the housing (evaluation device)	PBT / die-cast zinc
Nominal switching distance s, mounting	**2 mm, non-flush**
Range secured switching distance	0 ... 1.62 mm
Type designation Ref. no.	IAD2/H-18zr42n2-11Sd1C 15.14-08-001 (1)
Maximum switching frequency / Minimum damping period	**20 kHz / 25 µs**
Wiring (connector or lead); number of wires	connector M12; 4 wires

Common Technical Data

Reduction factors Fe / Al / V2A	**1.0 / 0.4 / 0.5**
Hysteresis of the switching point s	3 ... 20%
Repitition of the switching point s	≤ 10%
- at permanent operating voltage	
... and ambient temperature	≤ 0.5%
Magnetic field-resistance	up to 100 mT for DC and C
Permissible ripple voltage	≤ 10%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 1.4 V DC



Specific Technical Data

Permissible operating voltage range	10 ... 24 ...30 V DC
Current consumption without load	≤ 20 mA
Load current	≤ 200 mA
Nominal insulation voltage	75 V DC
Permissible capacity at the output	≤ 1.0 µF
Ø Sensing face	8 mm
Switching radius r (at switching distance of the objects s = 0; see page 1.0.2)	3.3 mm
Function indication:	
On / operating voltage	2 LED, GN
Clamp open / not actuated	2 LED, YE (sensor S 01, A1)
Clamp closed / actuated	2 LED, RD (sensor S 02, A2)
Ambient temperature range	- 10 ... + 70 °C
Maximum lead length	300 m
Lead length between sensor elements and evaluation device	105 ... 108 mm
Utilization category according to IEC 60947-5-2	DC 13
Degree of protection according to IEC 60529	IP 67
Protection class	II,⧈
Shocks and oscillations	according to IEC 60947-5-2 / 7.4
Weight evaluation device and sensor	max. 40 g
Recommended accessories	

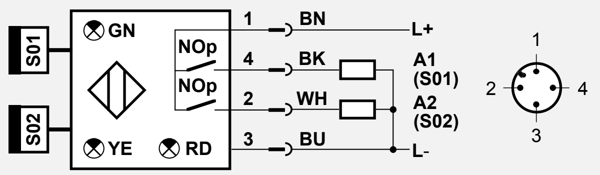
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12.2 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
2 sensor elements (2 channels),
DC 3-poles, plug

Euro Plug M12



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

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

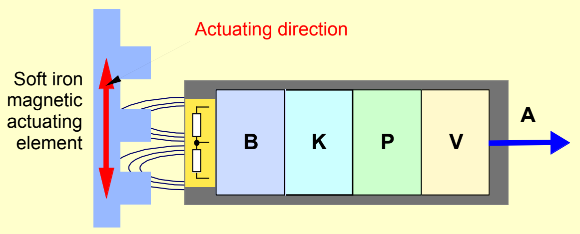
Pulse Sensors, Magentic Field
Pulse Sensors, Magnetic Field Plate and Hall Element

Task

Hall element (HAD) and Magnetic Field Plate Switches (MAD) are especially suitable for detecting the **rotation speed** and **direction** of shafts using gear wheels from module 0.3 or larger. Thus these sensors can be used as increment generators, for counting tasks, and position control. For example, rack rails can be scanned in order to detect the **speed and direction** of linear motions.

Method of Operation

The active element in the HAD and MAD sensors is a differential feeler, made of two magnetic field dependent sensors (Hall element or field plate) mounted on axially poled permanent magnets. The two sensors are connected in series with a lead connected to the center. Thus the differential sensor is half of the measuring bridge.



Principle of the magnetic field pulse generator

If the switch is not externally influenced, the field lines of the permanent magnet extend symmetrically outwards. Both sensors, permeated by magnetic flux of equal strength, produce equal Hall voltages or resistances respectively.

If a soft iron actuating element approaches the sensing face laterally, the magnetic field is distorted; the field lines become asymmetrical. The resulting unequal Hall voltages or resistances unbalance the bridge B, causing the comparator K to generate a switching signal, which is fed to the push-pull output amplifier V via the level converter P.

Characteristics

Compared to inductive proximity switches, HAD and MAD have an entirely different behaviour, which makes them suitable for special applications. The most important characteristics are the following:

- High switching frequency (up to 25 kHz)
- High geometrical resolution (down to approx. module 1)
- For registering soft iron edges which are approaching or passing by, unsuitable, however for axially approaching or non-ferrous objects.
- Push-pull output

The magnetic field pulse sensors have generally a preferential actuating direction. During the lateral actuation with a steel lug the status at the sensor output changes depending on the direction from "High" to "Low" and/or from "Low" to "High". After the removal of the flag the status at the output remains the same (self-holding sensor).

In general, the load resistance must be connected in the same way as with an open collector output: To the negative (**or** positive) terminal. When so connected, the push-pull output quickly discharges the lead capacities, ensuring output pulses with precise edges even with long output lines and high switching frequency. Connecting the load resistances to both positive and negative terminals results in a simple arrangement for monitoring lead breaks.

Notes

For trouble-free operation of magnetic field plate and Hall element switches, the strict observation of the following points is imperative:

- Instructions and sketches concerning material, distances, and mounting
- Mount so that groove on housing is exactly perpendicular to tooth edges
- Keep metal filings away from the sensing surface
- The distance from the connecting leads to inductive laods has to be ≥ 30 cm
- Whenever lead lengths are > 10 m, a shielded lead must be used. The shield must be connected to L - (0 V) at the device end only
- The tooth length should not exceed 3 mm; magnetic field plate switches are thus unsuitable for the detection of grooves.

Versions

Static magnetic field plate proximity switches for the arbitrarily slow motions from 0Hz, for counting functions, and for positioning.

Magnetic field plate proximity switches with self-regulating circuit for higher sensivity (greater switching distance) and stability of the output signals, switching frequency from down to 1 Hz.

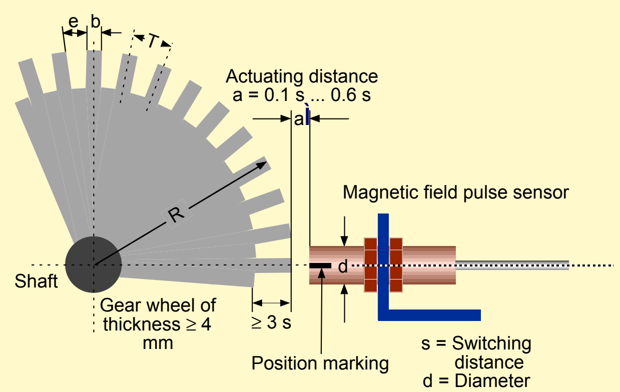
Special versions, e.g. for extended temperature range (e.g. - 40 ... + 100 °C), with LED etc. as well as special designs on request.

Principle of magnetic field pulse sensor	Typical switching distance	Actuating frequency
static dynamic	1 mm 2.5 mm	0 ... 25 kHz 1 Hz ... 25 kHz

Mounting

When mounting the pulse generator the right mounting position has to be considered. The pulse sensor has a position marking which allows an alignment parallel to the tooth flank and vertical to the actuating dirction.

The air gap a (=actuating distance) is calculated from the indicated rated switching distance s minus the sum of all tolerances t (radial play of the gear wheel, bearings, adjustment tolerance): $a = s - \sum t = 0.1\ s \ldots 0.6\ s$.



The pulse generation with magnetic pulse sensors allows a maximum working frequency up to 25 kHz

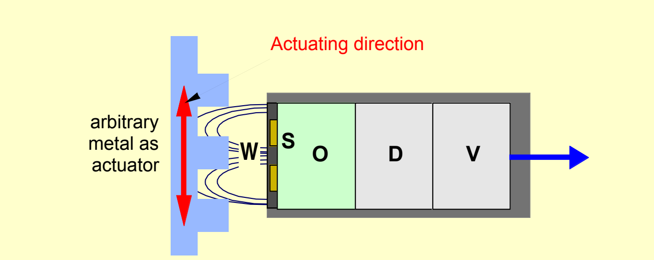
Accessories and Evaluation Devices

- Gear wheels with module 1 with different diameters and numbers of teeth, mounting parts etc.
  Therefore see chapter 12 “Accessories“
- ISN rotation speed measuring relay, IWA frequency-current converter, MID rotation speed indicators, LWK running monitors (see also the catalogues ALMOD Electronic Modules and ALUN Technology-oriented Products).

Method of Operation of Inductive All Metal - Pulse Sensors

An inductive all metal pulse sensor consists of an oscillator with oscillating circuit S, a discriminator D and an output output switching amplifier V.

The coil of the oscillating circuit determines the size and shape of the „sensing face“ of the proximity switch. The oscillator generates a highly frequent oscillation, whose alterning field W emerges from the open side of the inductivity.



Principle of the inductive all metal pulse sensor

If a metallic object immerses into this field, energy is removed from the oscillating circuit by eddy current- and unmagnetization losses in the metal object. Thus the oscillator amplitude is being reduced by sufficient approximation of the metal piece; the switch is being „damped“. As a consequence the threshold of the discriminator is fallen below and the switching amplifier changes the switching condition at its output. An internal feedback provides for sweep behaviour and hysteresis of the switch-over process.

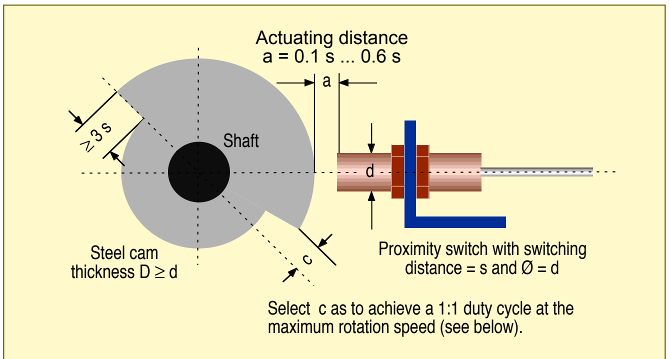
When operated as pulse sensor, the metal object, e.g. the tooth of a gear wheel, immerses laterally into the field.

Advantages of Inductive All Metal Pulse Sensors:

- Objects made of light metal, e.g. of aluminium- or magnesium alloy, can be used as actuator. Thus gear wheels and pulse disks for higher rotation speeds can be produced than with ferrous metals.
- Switching frequencies maximally attainable by our all metal pulse sensors are far above 25 kHz. With the push-pull output levels used pulse frequencies of 100 kHz and more can be attained.
- All metal pulse sensors are magnetically interference-resistant and cannot be influenced by interference fields, which may arise from engine coils- and collectors.

Pulse Generation using All Metal Pulse Sensors and Cams

The rotating shaft is scanned by an inductive proximity switch with help of a cam, which is of an arbitrary metal. The scanning is accomplished without contact to the shaft nor influence on its motion. The switch generates rectangular pulses with the pulse frequency f = n / 60 (n = rotation speed rpm). A groove, wedge, or switching lug can serve in place of a cam. With non-metallic shafts, an adhesive metal strip can be used.



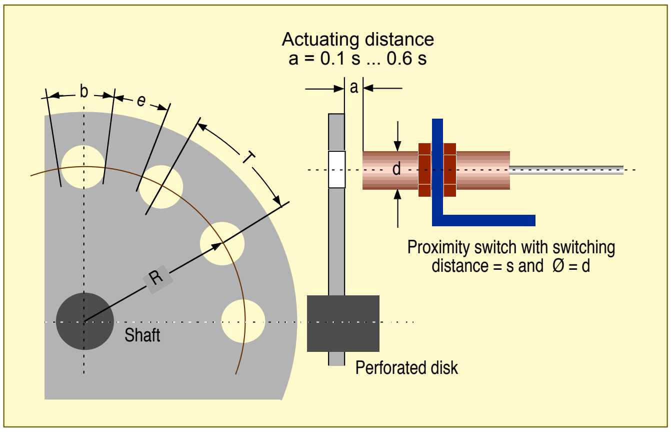
When several all metal pulse sensor are located side by side a minium distance of three times the outer diameter between the pulse sensors has to be observed.

Pulse Generation using All Metal Pulse Sensor and Perforated Disk

The perforations have to be arranged so that, at a maximum rotation speed and pulse frequency, the ratio of pulse duration to pause is 1: (0.7 ... 1.3).

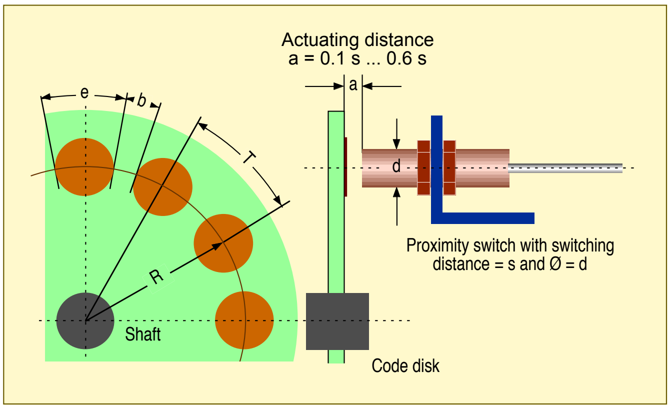
Recommended Values:

Distance disk / switch:	a = 0.6 s (0.5 … 0.7 s)
Diameter of holes:	b = ca. 2 d
Distance between holes:	e = ca. d
Pitch:	T = b + e
Radius of disk:	$R = z\,T / (2\,\pi)$



Pulse Generation with All Metal Pulse Sensor and Code Disk

A pulse disk made of copper plated fibreglass reinforced plastic (such as the material used for printed circuit boards) is used. If e is the width of the copper surface under the proximity switch and b is the distance between the copper surfaces, the values recommended for the perforated disk are also valid for the code disk.



Pulse Generation using All Metal Pulse Sensor and Toothed Disk

The toothed disk can be of any suitable non-magnetic material, e.g. an aluminium- or magnesium alloy. The values given under “Pulse generation using a magnetic field pulse sensor“ can serve as a guide for designing the arrangement. The toothed disk, however, needs to have the same width as the diameter of the sensing face.

The duty cycle can be adjusted to 50% at maximum rotation speed by using a rotating coil instrument and changing the distance a.

Finally, the amount of variation in the duty cycle must be monitored using an oscilloscope. If the variation does not remain within the 44 … 59% range, either the mechanical tolerances must be reduced or a less critical arrangement or construction must be selected.

Pulse Sensors
Type Magnetic Field

Characteristics

Pulse sensors of the type **magnetic field** are suitable for the generation of rotation speed-proportional pulse numbers and are equipped with either a Hall- or a magneto-resistance sensor element.

For the pulse generation either a **gear wheel** or a **rack rail made of steel**,e.g. St37 are used, for whose width B applies:

4 mm < B < Ø sensor.

With the **mounting** the right **mounting position** has to be considered. The axis of the pulse sensor has to in line with the center of the gear wheel / of the rack rail. A lateral position marking allows an alignment parallel to the tooth flank and/or vertical to the actuating direction.

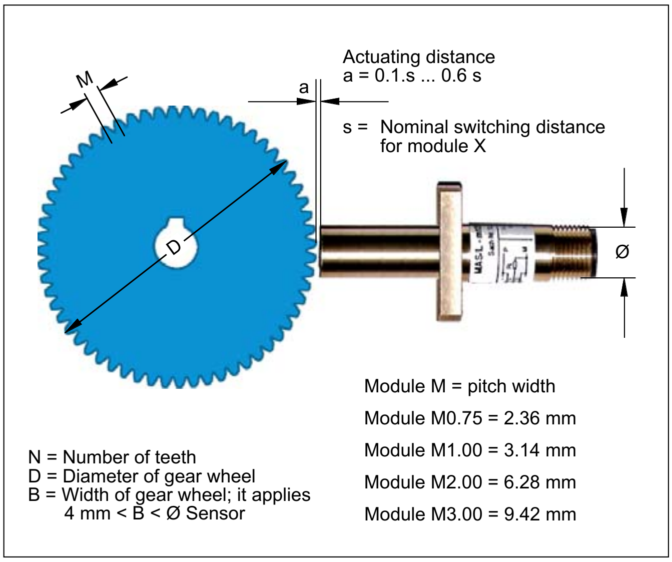
The **lateral displacement** of the gear wheel / of the rack rail may not exceed 0.2 mm at the smallest width. The run-out should be < 0.2 mm.

The **fixing** has to avoid reliably a vibration of the pulse sensor against the gear wheel / the rack rail.

The pulse sensors produce a **rectangular output signal**. There are two different types:

- **dynamic pulse sensors** for an actuating frequency range of some Hertz up to approx. 25 kHz
- **static pulse sensors** for an actuating frequency range from 0 to approx. 20 kHz.

Please take precise values from the Technal Data.



Pulse Sensors Type Magnetic Field

Type	Ref. No.	Switching distance in mm Mounting *)
HALL round 10 Ø x L		
HAD-10er59b2-6TK1 **)	13.26-29-020	2.0 b
HALL round 10.8 Ø x L		
HAD-11ms45b2.5-5S1	13.26-01-000	2.5 b
HAD-11ms60b1-5Sd1	13.26-66-000	1.0 b
HAD-11ms60b2.5-50NK1	13.26-03-000	2.5 b
HAD-11ms60b2.5-50Y1	13.26-07-000	2.5 b
HAD-11ms60b2.5-50Y2	13.26-08-000	2.5 b
HAD-11ms60b2.5-50Y3	13.26-10-000	2.5 b
HAD-11ms60b2.5-50Y4	13.26-12-000	2.5 b
HAD-11ms60b2.5-50Y5	13.26-27-000	2.5 b
HAD-11ms60b2.5-50Y6	13.26-28-000	2.5 b
HAD-11ms60b2.5-50Z1	13.26-02-000	2.5 b
HAD-11ms60b2.5-5S1	13.26-13-000	2.5 b
HAD-11ms60b2.5-5S4	13.26-56-000	2.5 b
HAD-11ms60b2.5-5Y2	13.26-53-000	2.5 b
HAD-11ms60b2.5-5Y3	13.26-54-000	2.5 b
HAD-11ms60b2.5-5Y4	13.26-57-000	2.5 b
HALL round 12 Ø x L		
HAD-12aq50b1-5NK1	13.26-63-020	1.0 b
HAD-12er55b1-5PK1	13.26-70-020	1.0 b
HAD-12er55b2.4-5NK2	13.26-72-000	2.4 b
HAD-12er55b2.5-5NK1	13.26-38-020	2.5 b
HAD-12mg50b2.5-5ND1	13.26-06-020	2.5 b
HAD-12mg70b2.5-5S2	13.26-55-000	2.5 b
HAD-12mg70b2.5-5S3	13.26-74-000	2.5 b
HAD-12ms41b2.5-5NK1	13.26-51-000	2.5 b
HAD-12ms41b2.5-5Y1	13.26-52-000	2.5 b

Type	Ref. No.	Switching distance in mm Mounting *)
HALL round 14 Ø x L		
HAD-14eg50b1-5ND1	13.26-77-025	1.0 b
HAD-14er120b1-5TT3	13.26-79-030	1.0 b
HALL round 16 Ø x L		
HAD-16ss96b1-5Yd1	13.26-73-000	1.0 b
HALL round 18 Ø x L		
HAD-18eg82b1-5NT1	13.26-71-020	1.0 b
HAD-18mg82b1-5NT1	13.26-69-020	1.0 b
HAD-18mg93b1-5Sd1	13.26-68-000	1.0 b
HAD-18mg98b1-5Vd1	13.26-67-000	1.0 b
HAD-18sg80b2.5-5TK1	13.26-50-020	2.5 b
HAD-18ss100b1.6-5NT1	13.26-65-005	1.6 b
HAD-18ss85b1-5NT1	13.26-64-060	1.0 b
magneto-resistant round 12 Ø x L		
MAD-12aq50b0.4-5NK1	13.21-59-020	0.4 b

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

**) = supply on request

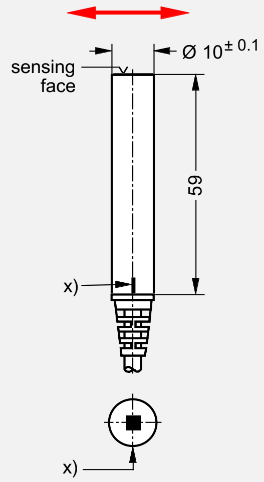
Pulse Sensors, Magnetic Field
Series HAD-10er, -11ms

Design; length	**O 10 mm;** 59 mm
Material of the sensing face / of the housing	stainless steel / stainless steel
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**2 mm with blind hole wheel; flush**
Air gap = actuating distance a	**1 mm**
Type designation, Ref. no. — NO plus-switching NOp	
Type designation, Ref. no. — NO plus-, NC minus-switching NOp + NCn	HAD-10er59b2-6TK1, 13.26-29-020 (1)
Switching frequency range	**1 ... 500 Hz**
Wiring (connector or lead); number of wires	lead; 3 wires

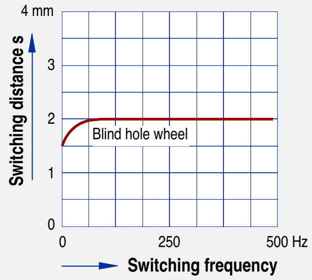
Common Technical Data

Reduction factors Fe / Non-ferroes metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-curcuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes

Actuating direction



x) position marking



Specific Technical Data

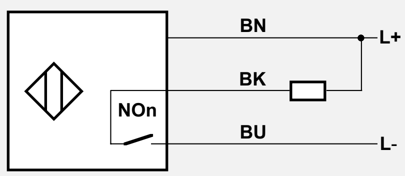
Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 110 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	TK / 2.0 m / 3 x 0.5 mm^2
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 67
Protection class	
Permissible torque without / with toothed disc	
Weight	30 g + weight of the lead
Recommended accessories	

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, push-pull, outgoing lead

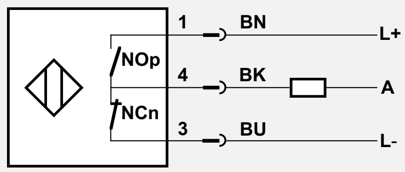


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

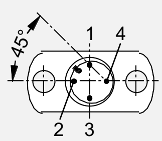
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

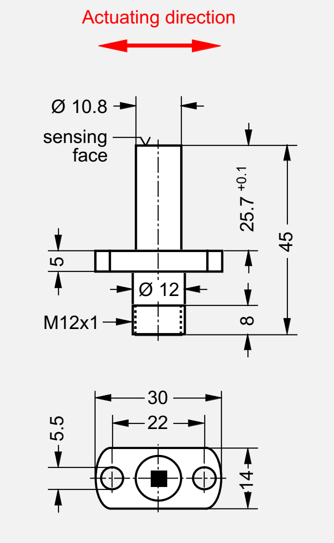
Wiring (2)
DC 3-poles, push-pull, plug

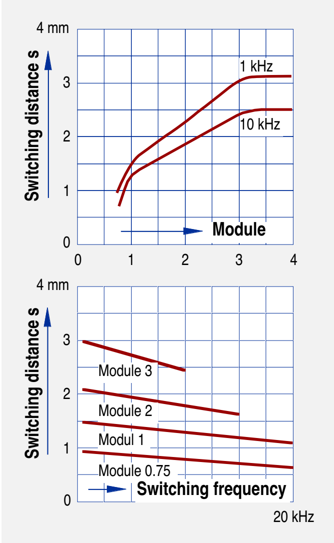


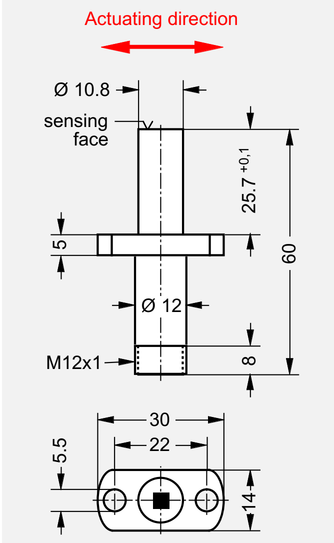
Euro Plug M12

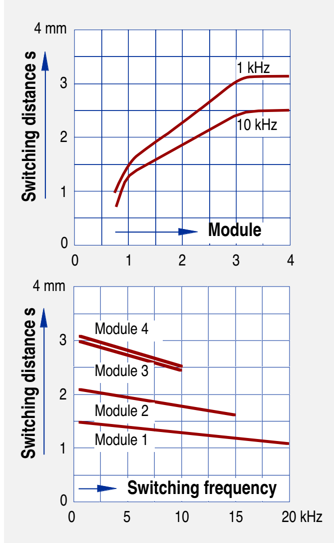


O 10.8 mm; 45 mm	**O 10.8 mm;** 60 mm
PBT / CuZn	PBT / CuZn
0.7/1.3/1.8/2.4/2.4 mm; flush	**0.7/1.3/1.8/2.4/2.5 mm; flush**
0.35/0.65/0.9/1.2/1.2 mm	**0.35/0.65/0.9/1.2/1.2 mm**
HAD-11ms45b2.5-5S1, 13.26-01 (2)	HAD-11ms60b1-5Sd1, 13.26-66 (2)
5 Hz ... 20 kHz	**5 Hz ... 20 kHz**
connector M12; 4 wires	connector M12; 4 wires









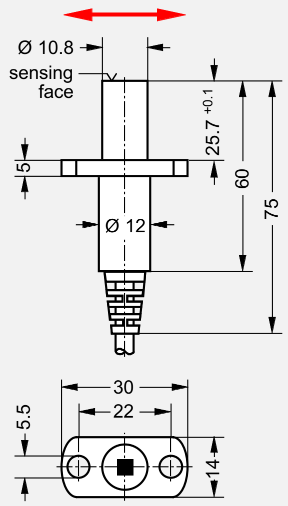
6 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA
≤ 25 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 100 °C	- 25 ... + 80 °C
≤ 150 m	≤ 150 m
DC 12	DC 12
IP 65	IP 65
30 g	30 g

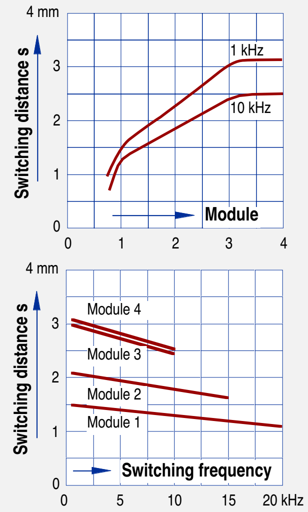
Pulse Sensors, Magnetic Field
Series HAD-11ms

	Design; length	**O 10.8 mm;** 60 mm
	Material of the sensing face / of the housing	PBT / CuZn
	Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**0.7/1.3/1.8/2.4/2.5 mm; flush**
	Air gap = actuating distance a	**0.35/0.65/0.9/1.2/1.2 mm**
Type designation, Ref. no.	NO plus-switching NOp	
	NO plus-, NC minus-switching NOp + NCn	HAD-11ms60b2.5-50NK1, 13.26-03-020 (1)
	Switching frequency range	**5 Hz ... 20 kHz**
	Wiring (connector or lead); number of wires	lead; 4 wires

Common Technical Data

Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cicuruit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes





Specific Technical Data

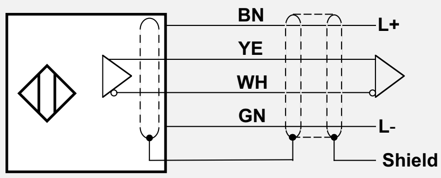
Permissible operating voltage range	10 ... <u>24</u> ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 50 mA
Voltage drop over the switched output	
- at load current 0	≤ 5 V between the outputs
- at load current 25mA	
- at load current 50mA	≤ 2 V between the outputs
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 80 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	NK / 2.0 m / 4 x 0.25 mm^2
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 67
Protection class	
Permissible torque without / with toothed disc	
Weight	30 g + weight of the lead
Recommended accessories	

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or - 050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, outgoing lead



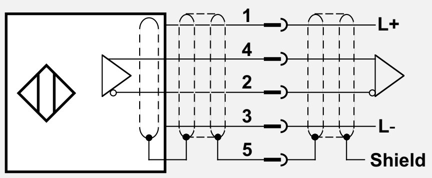
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

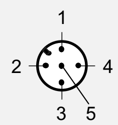
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

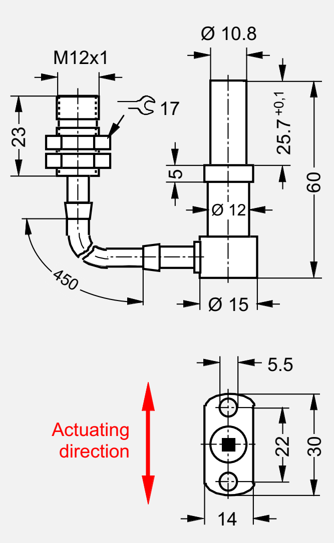
Wiring (2)
DC 5-poles, plug

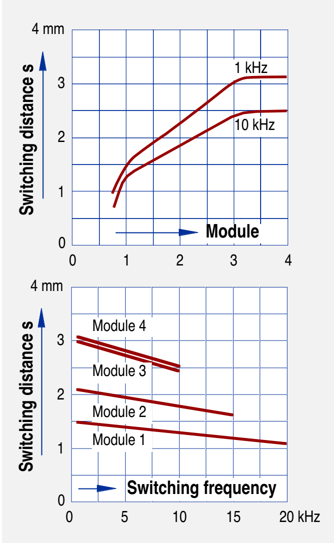
Euro Plug M12

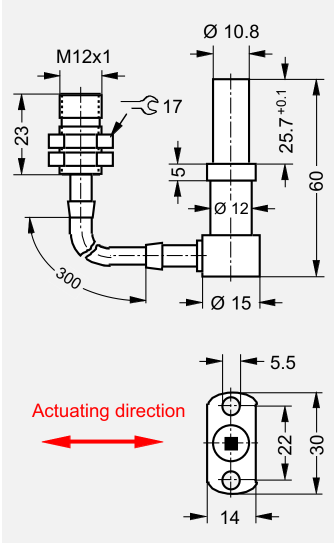


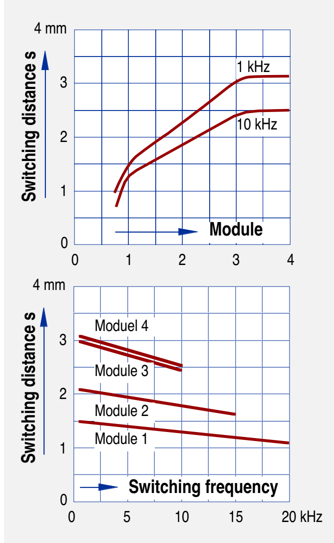


O 10.8 mm; 60 mm	**O 10.8 mm;** 60 mm
PBT / CuZn	PBT / CuZn
0.7/1.3/1.8/2.4/2.4 mm; flush	**0.7/1.3/1.8/2.4/2.4 mm; flush**
0.35/0.65/0.9/1.2/1.2 mm	**0.35/0.65/0.9/1.2/1.2 mm**
HAD-11ms60b2.5-50Y1, 13.26-07 (2)	HAD-11ms60b2.5-50Y2, 13.26-08 (2)
5 Hz ... 20 kHz	**5 Hz ... 20 kHz**
connector with lead; 5 wires	connector with lead; 5 wires









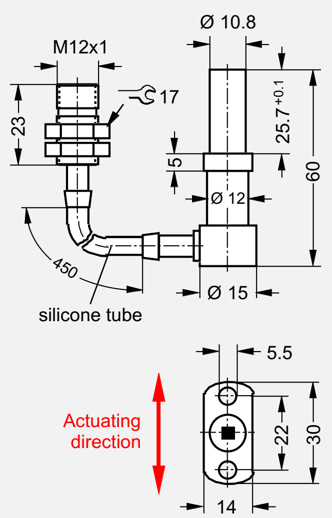
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA
≤ 50 mA	≤ 50 mA
≤ 5 V between the outputs	≤ 5 V between the outputs
≤ 2 V between the outputs	≤ 2 V between the outputs
75 V DC	75 V DC
- 25 ... + 80 °C	- 25 ... + 80 °C
≤ 150 m	≤ 150 m
/ 0.45 m / 4 x 0.34 mm^2	/ 0.3 m / 4 x 0.34 mm^2
shielded lead with 5-pole plug M12	shielded lead with 5-pole plug M12
DC 12	DC 12
IP 65	IP 65
80 g	70 g

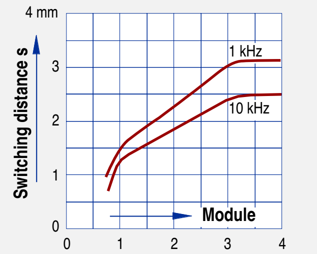
Pulse Sensors, Magnetic Field
Series HAD-11ms

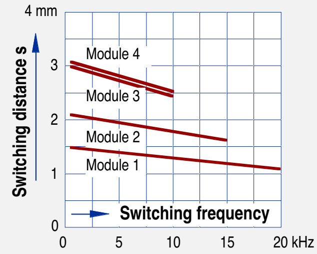
Design; length		**O 10.8 mm;** 60 mm
Material of the sensing face / of the housing		PBT / CuZn
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting		**0.7/1.3/1.8/2.4/2.5 mm; flush**
Air gap = actuating distance a		**0.35/0.65/0.9/1.2/1.2 mm**
Type designation, Ref. no.	NO plus-switching NOp	
	NO plus-, NC minus-switching NOp + NCn	HAD-11ms60b2.5-50Y3, 13.26-10 (1)
Switching frequency range		**5 Hz ... 20 kHz**
Wiring (connector or lead); number of wires		connector with lead; 5 wires

Common Technical Data

Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cirucuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes







Specific Technical Data

Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 50 mA
Voltage drop over the switched output	
- at load current 0	≤ 5 V between the outputs
-at load current 25 mA	
- at load current 50mA	≤ 2 V between the outputs
	75 V DC
Nominal insulation voltage	- 25 ... + 80 °C
Ambient temperature range	
	≤ 150 m
Max. lead length	/ 0.45 m / 4 x 0.34 mm^2
Lead type / standard lead length / number of wires x lead cross section	shielded lead with 5-pole plug M12
	DC 12
Utilization category according to IEC 60947-5-2	IP 65
Degree of protection according to 60529	
Protection class	
Permissible torque without / with toothed disc	80 g
Weight	
Recommended accessories	

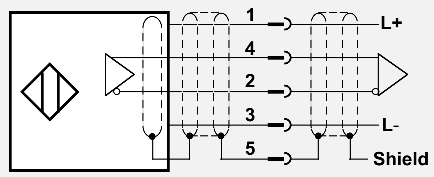
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

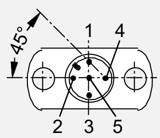
For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 5-poles, plug

Euro Plug M12



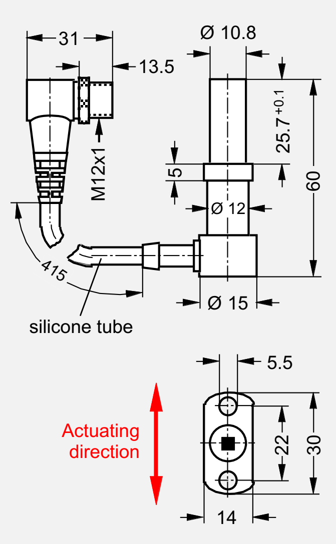


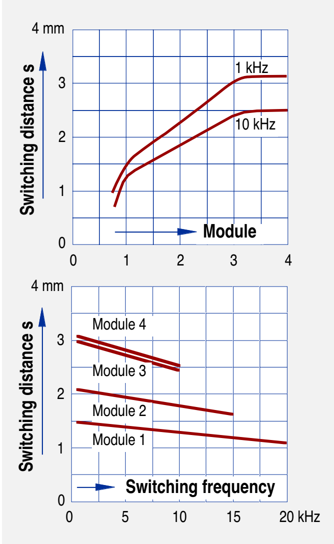
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

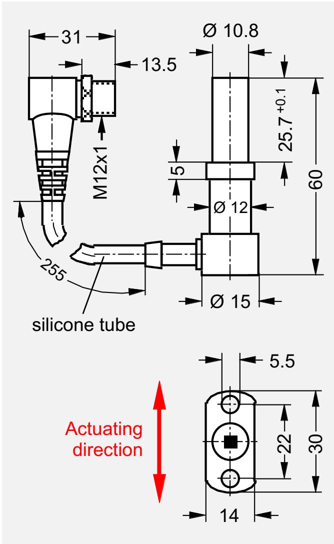
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

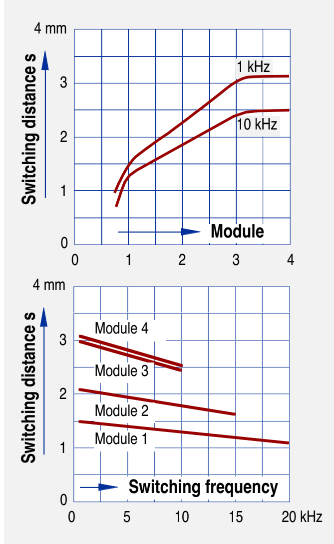
Subject to technical changes!

O 10.8 mm; 60 mm	**O 10.8 mm;** 60 mm
PBT / CuZn	PBT / CuZn
0.7/1.3/1.8/2.4/2.5 mm; flush	**0.7/1.3/1.8/2.4/2.5 mm; flush**
0.35/0.65/0.9/1.2/1.2 mm	**0.35/0.65/0.9/1.2/1.2 mm**
HAD-11ms60b2.5-50Y4, 13.26-12 (1)	HAD-11ms60b2.5-50Y5, 13.26-27 (1)
5 Hz ... 20 kHz	**5 Hz ... 20 kHz**
connector with lead; 5 wires	connector with lead; 5 wires









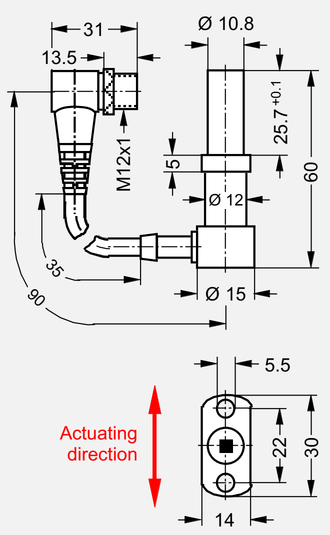
10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA
≤ 50 mA	≤ 50 mA
≤ 5 V between the outputs	≤ 5 V between the outputs
≤ 2 V between the outputs	≤ 2 V between the outputs
75 V DC	75 V DC
- 25 ... + 80 °C	- 25 ... + 80 °C
≤ 150 m	≤ 150 m
/ 0.41 m / 4 x 0.34 mm^2	/ 0.25 m / 4 x 0.34 mm^2
shielded lead with 5-pole plug M12	shielded PUR-lead with 5-pole plug M12
DC 12	DC 12
IP 65	IP 65
80 g	70 g

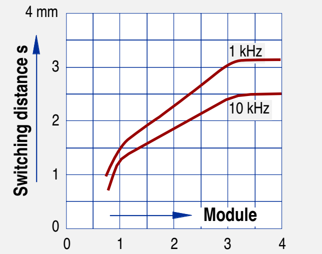
Pulse Sensors, Magnetic Field
Series HAD-11ms

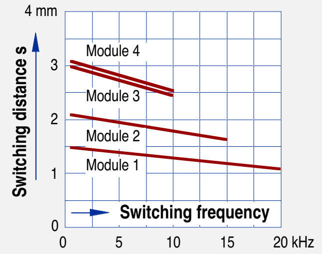
Design; length	**O 10.8 mm;** 60 mm
Material of the sensing face / of the housing	PBT / CuZn
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**0.7/1.3/1.8/2.4/2.4 mm; flush**
Air gap = actuating distance a	**0.35/0.65/0.9/1.2/1.2 mm**
Type designation, Ref. no. — NO plus-switching NOp	HAD-11ms60b2.5-50Y6, 13.26-28 (1)
Type designation, Ref. no. — NO plus-, NC minus-switching NOp + NCn	
Switching frequency range	**5 Hz ... 20 kHz**
Wiring (connector or lead); number of wires	connector with lead; 5 wires

Common Technical Data

Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cirucuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes







Specific Technical Data

Permissible operating voltage range	10 ... <u>24</u> ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 50 mA
Voltage drop over the switched output	
- at load current 0	≤ 5 V between the outputs
- at load current 25mA	
- at load current 50 mA	≤ 2 V between the outputs
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 80 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	/ 0.03 m / 4 x 0.34 mm^2
	shielded PUR-lead with 5-pole plug M12
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 65
Protection class	
Permissible torque without / with toothed disc	
Weight	60 g
Recommended accessories	

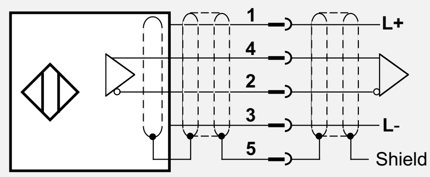
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

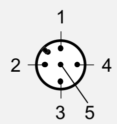
For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 5-poles, plug

Euro Plug M12





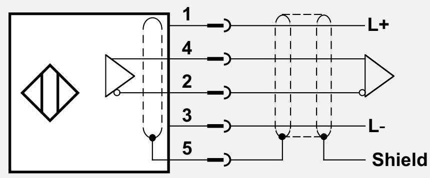
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

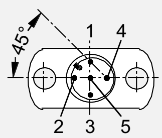
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Wiring (2)
DC 5-poles, plug

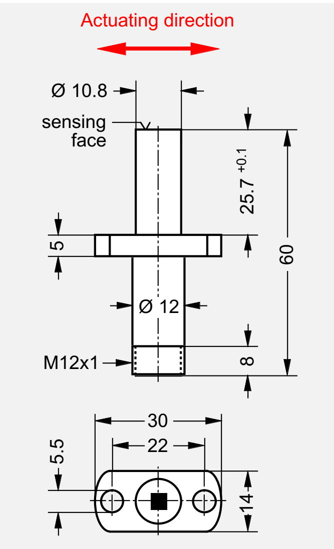
Euro Plug M12

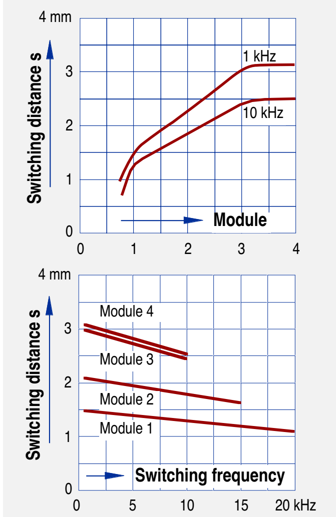


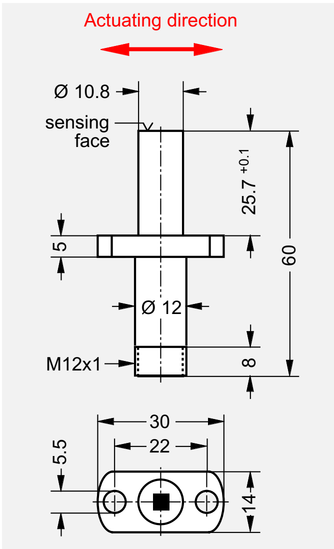


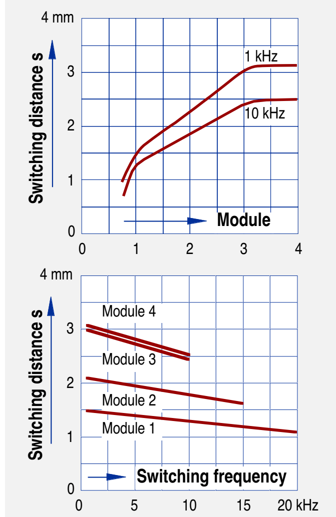
KLASCHKA
Elektronik + Automation

O 10.8 mm; 60 mm	**O 10.8 mm;** 60 mm
PBT / CuZn	PBT / CuZn
0.7/1.3/1.8/2.4/2.4 mm; flush	**0.7/1.3/1.8/2.4/2.4 mm; flush**
0.35/0.65/0.9/1.2/1.2 mm	**0.35/0.65/0.9/1.2/1.2 mm**
HAD-11ms60b2.5-50Z1, 13.26-02 (2)	HAD-11ms60b2.5-5S1, 13.26-13 (3)
5 Hz ... 20 kHz	**5 Hz ... 20 kHz**
connector with lead M12; 5 wires	connector M12; 4 wires



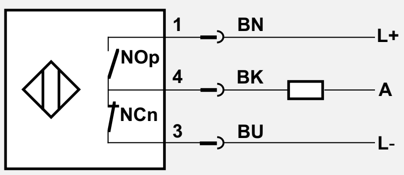




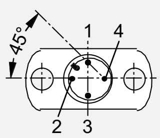


10 ... <u>24</u> ... 30 V DC	6 ... <u>24</u> ... 30 V DC
≤ 10 mA	≤ 10 mA
≤ 50 mA	≤ 25 mA
≤ 5 V between the outputs	≤ 1.5 V
	≤ 10 V
≤ 2 V between the outputs	
75 V DC	75 V DC
- 25 ... + 100 °C	- 25 ... + 100 °C
≤ 150 m	≤ 150 m
DC 12	DC 12
IP 65	IP 65
30 g	30 g

Wiring (3)
DC 3-poles, plug



Euro Plug M12

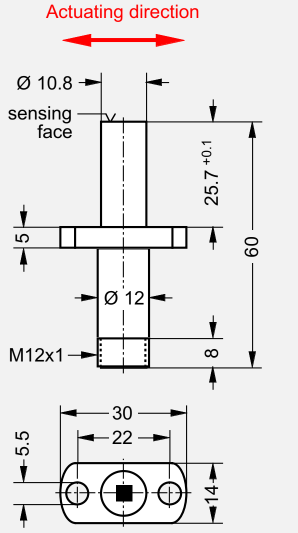


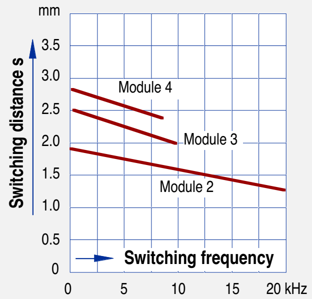
Pulse Sensors, Magnetic Field
Series HAD-11ms

Design; length	**O 10.8 mm;** 60 mm
Material of the sensing face / of the housing	PBT / CuZn
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**-/-/1.3/2.0/2.4 mm; flush**
Air gap = actuating distance a	**-/-/1.65/1.1/1.2 mm**
Type designation, Ref. no. — NO plus-switching NOp	
Type designation, Ref. no. — NO plus-, NC minus-switching NOp + NCn	HAD-11ms60b2.5-5S4, 13.26-56 (1)
Switching frequency range	**1 Hz ... 20 kHz**
Wiring (connector or lead); number of wires	connector M12; 4 wires

Common Technical Data

Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cirucuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes





Specific Technical Data

Permissible operating voltage range	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 100 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 67
Protection class	
Permissible torque without / with toothed disc	
Weight	30 g
Recommended accessories	

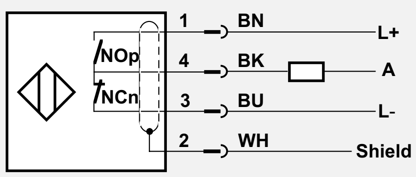
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

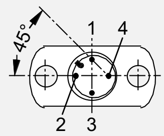
For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, push-pull, plug

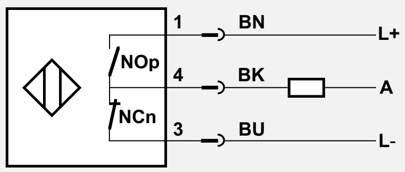
Euro Plug M12

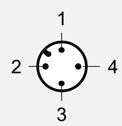




Wiring (2)
DC 3-poles, push-pull, plug

Euro Plug M12



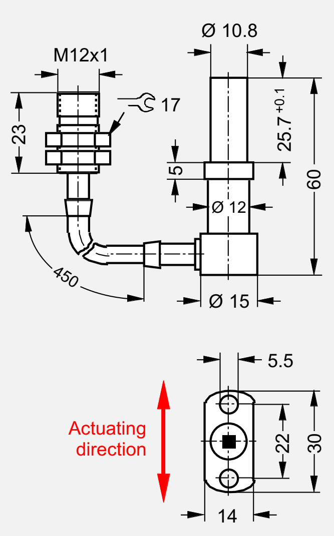


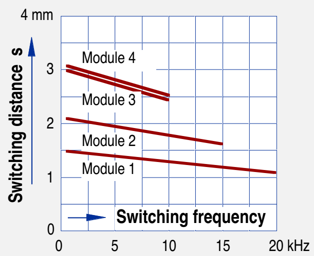
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

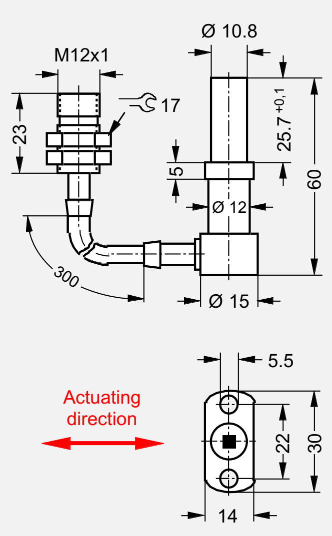
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

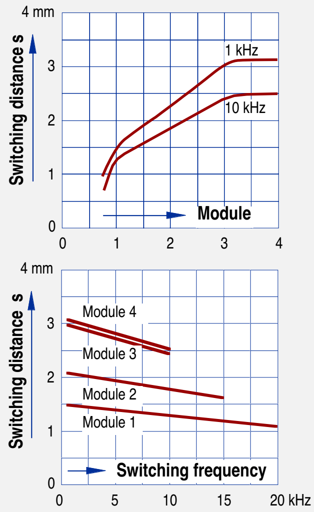
Subject to technical changes!

O 10.8 mm; 60 mm	**O 10.8 mm;** 60 mm
PBT / CuZn	PBT / CuZn
-/-/1.3/2.0/2.5 mm; flush	**0.7/1.3/1.8/2.4/2.5 mm; flush**
-/-/1.65/1.0/1.2 mm	**0.35/0.65/0.9/1.2/1.2 mm**
HAD-11ms60b2.5-5Y2, 13.26-53 (2)	HAD-11ms60b2.5-5Y3, 13.26-54 (3)
1 Hz ... 20 kHz	**1 Hz ... 20 kHz**
connector with lead; 4 wires	connector with lead; 4 wires



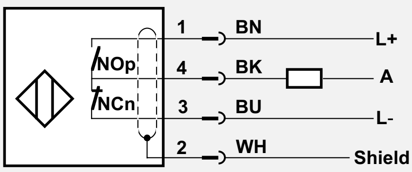




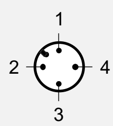


8 ... <u>24</u> ... 30 V DC	8 ... <u>24</u> ... 30 V DC
≤ 10 mA	≤ 10 mA
≤ 25 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 75 °C	- 25 ... + 75 °C
≤ 150 m	≤ 150 m
/ 0.45 m / 3 x 0.34 mm^2	/ 0.3 m / 3 x 0.34 mm^2
shielded lead with male plug 4-poles M12	shielded lead with 4-pole plug M12
DC 12	DC 12
IP 65	IP 65
80 g + weight of the lead	60 g

Wiring (3)
DC 3-poles, push-pull, male plug

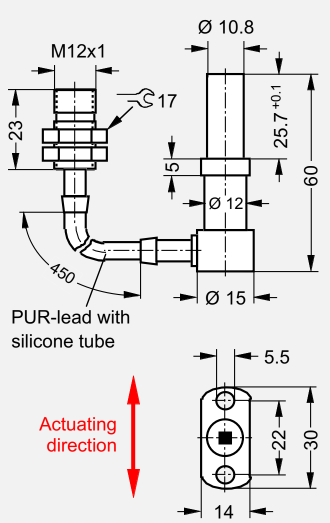


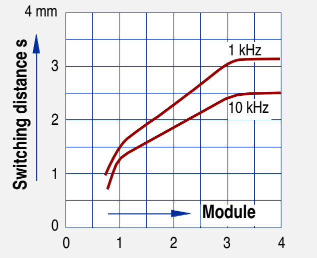
Euro Plug M12

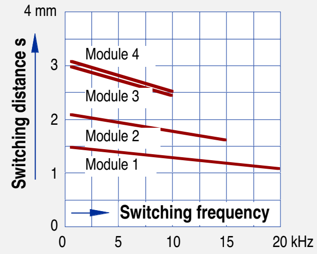


Pulse Sensors, Magnetic Field
Series HAD-11ms, -12aq, -12er

	Design; length	**O 10,8 mm;** 60 mm
	Material of the sensing face / of the housing	PBT / CuZn
	Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**0.7/1.3/1.8/2.4/2.5 mm; flush**
	Air gap = actuating distance a	**0.35/0.65/0.9/1.2/1.2 mm**
Type designation, Ref. no.	NO plus-switching NOp	
	NO plus-, NC minus-switching NOp + NCn	HAD-11ms60b2.5-5Y4, 13.26-57 (1)
	Switching frequency range	**1 Hz ... 20 kHz**
	Wiring (connector or lead); number of wires	connector with lead; 3 wires







Common Technical Data	
Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cirucuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes

Specific Technical Data	
Permissible operating voltage range	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 80 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	/ 0.45 m / 3 x 0.34 mm^2
	shielded PUR-lead with male plug 4-poles M12
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 65
Protection class	
Permissible torque without / with toothed disc	
Weight	80 g
Recommended accessories	

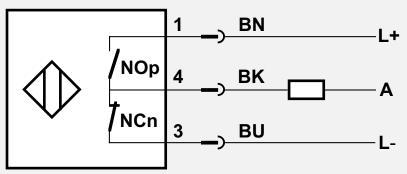
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

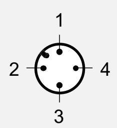
For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

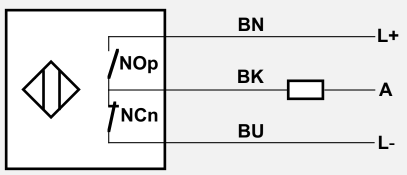
Wiring (1)
DC 3-poles, push-pull, plug

Euro Plug M12





Wiring (2)
DC 3-poles, push-pull, outgoing lead



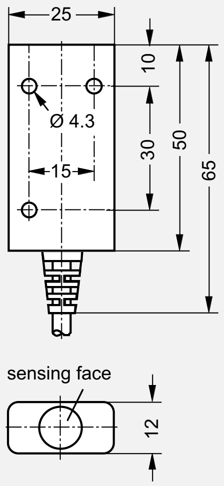
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

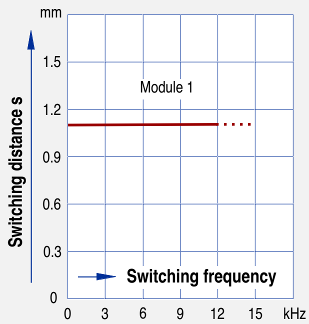
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

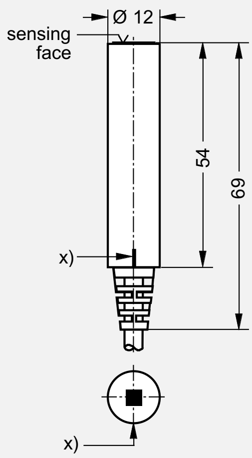
25 mm x 12 mm; 50 mm	**O 12 mm;** 55 mm
PBT / aluminium	PBT / stainless steel
-/1.0/-/-/- mm; flush	**-/1.0/-/-/- mm; flush**
-/0.5/-/-/- mm	**-/0.5/-/-/- mm**
HAD-12aq50b1-5NK1, 13.26-63-020 (2)	HAD-12er55b1-5PK1, 13.26-70-020 (2)
0 ... 12 kHz	**0 ... 12 kHz**
lead; 3 wires	lead; 3 wires

Actuating direction

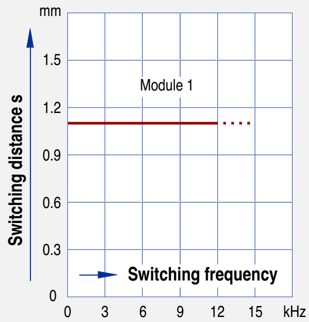




Actuating direction



x) position marking



10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 25 mA	≤ 25 mA
≤ 25 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 80 °C	- 25 ... + 80 °C
≤ 150 m	≤ 150 m
NK / 2.0 m / 3 x 0.34 mm^2	PK / 2.0 m / 3 x 0.34 mm^2
DC 12	DC 12
IP 67	IP 67
40 g + weight of the lead	25 g + weight of the lead

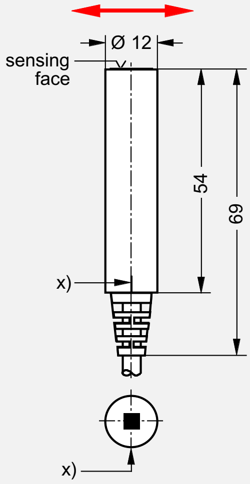
Pulse Sensors, Magnetic Field
Series HAD-12er, -12mg

Design; length	**O 12 mm;** 55 mm
Material of the sensing face / of the housing	PBT / stainless steel
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**0.7/1.3/1.8/2.4/- mm; flush**
Air gap = actuating distance a	**0.35/1.65/0.9/1.2/- mm**
Type designation, Ref. no. — NO plus-switching NOp	HAD-12er55b2.4-5NK2, 13.26-72-020 (1)
Type designation, Ref. no. — NO plus-, NC minus-switching NOp + NCn	
Switching frequency range	**5 Hz ... 20 kHz**
Wiring (connector or lead); number of wires	lead; 3 wires

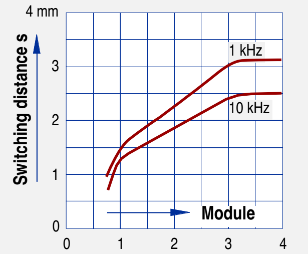
Common Technical Data

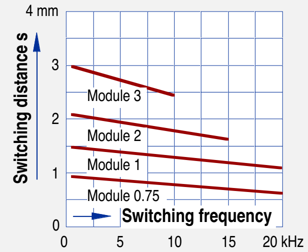
Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cirucuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes

Actuating direction



x) position marking





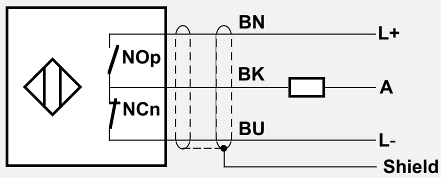
Specific Technical Data

Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 80 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	NK / 2.0 m / 3 x 0.34 mm^2
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 67
Protection class	
Permissible torque without / with toothed disc	
Weight	25 g + weight of the lead
Recommended accessories	

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Wiring (1)
DC 3-poles, push-pull, outgoing lead

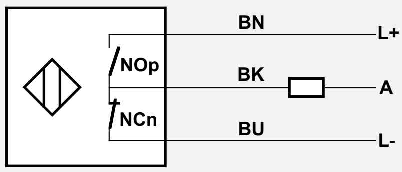


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

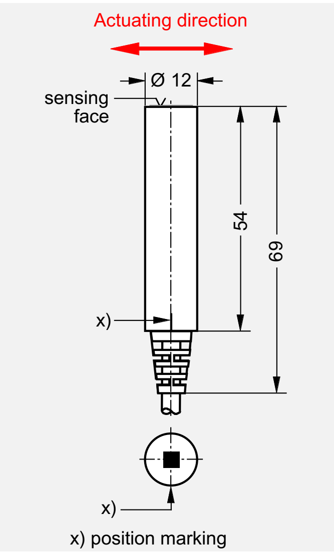
Subject to technical changes!

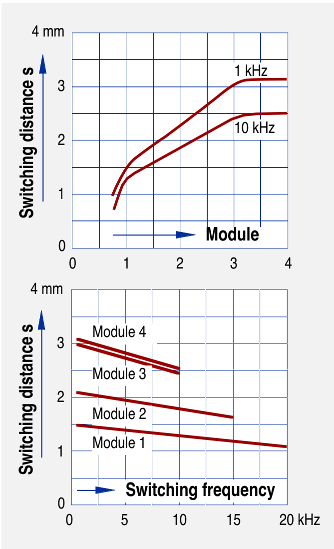
Wiring (2)
DC 3-poles, push-pull, outgoing lead

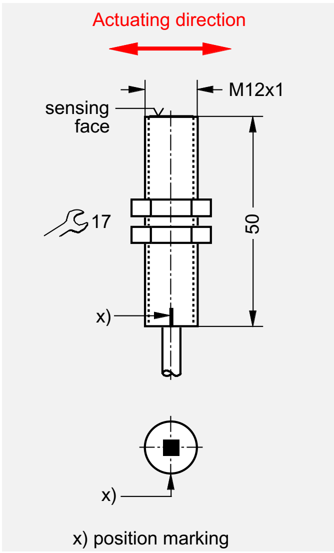


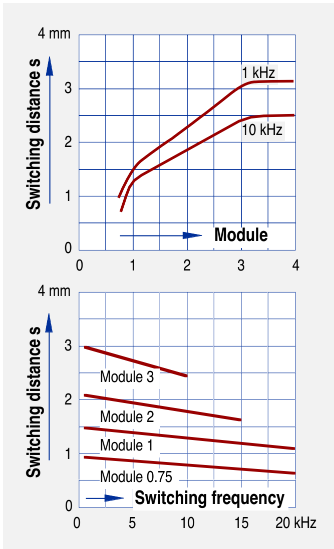
KLASCHKA
Elektronik + Automation

O 12 mm; 55 mm	**O M12 x 1**; 70 mm
PBT / stainless steel	PBT / CuZn nickel-plated
-/1.3/1.8/2.4/2.5 mm; flush	**0.7/1.3/1.8/2.4/- mm; flush**
-/0.65/0.9/1.2/1.2 mm	**0.35/0.65/0.9/1.2/- mm**
HAD-12er55b2.5-5NK1, 13.26-38-020 (1)	
	HAD-12mg50b2.5-5ND1, 13.26-06-020 (2)
1 Hz ... 20 kHz	**5 Hz ... 20 kHz**
lead; 3 wires	lead; 3 wires









10 ... 24 ... 30 V DC	6 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA
≤ 50 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 80 °C	- 25 ... + 80 °C
≤ 150 m	≤ 150 m
NK / 2.0 m / 3 x 0.34 mm^2	ND / 2.0 m / 3 x 0.34 mm^2
DC 12	DC 12
IP 67	IP 67
	9 Nm / 30 Nm
25 g + weight of the lead	25 g + weight of the lead

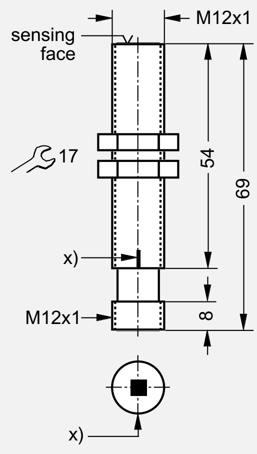
Pulse Sensors, Magnetic Field
Series HAD-12mg, -12ms

	Design; length	**O M12 x 1;** 70 mm
	Material of the sensing face / of the housing	PBT / CuZn nickel-plated
	Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**-/-/1.3/2.0/2.4 mm; flush**
	Air gap = actuating distance a	**-/-/0.65/1/1.2 mm**
Type designation, Ref. no.	NO plus-switching NOp	HAD-12mg70b2.5-5S2, 13.26-55 (1)
	NO plus-, NC minus-switching NOp + NCn	
	Switching frequency range	**1 Hz ... 20 kHz**
	Wiring (connector or lead); number of wires	connector M12; 4 wires

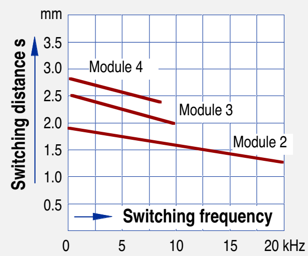
Common Technical Data

Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cicuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes

Actuating direction



x) position marking



Specific Technical Data

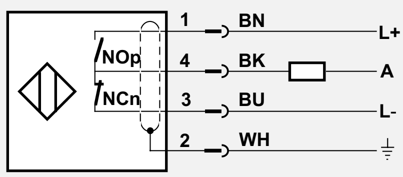
Permissible operating voltage range	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 80 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 65
Protection class	
Permissible torque without / with toothed disc	9 Nm / 30 Nm
Weight	50 g
Recommended accessories	

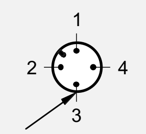
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Wiring (1)
DC 4-poles, push-pull, plug

Euro Plug M12

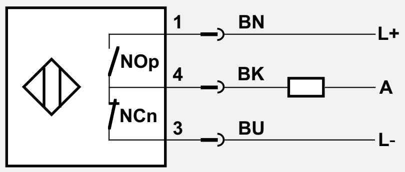


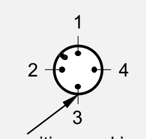


position marking

Wiring (2)
DC 3-poles, push-pull, plug

Euro Plug M12





position marking

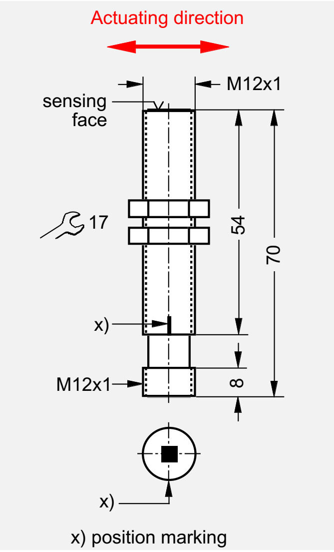
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

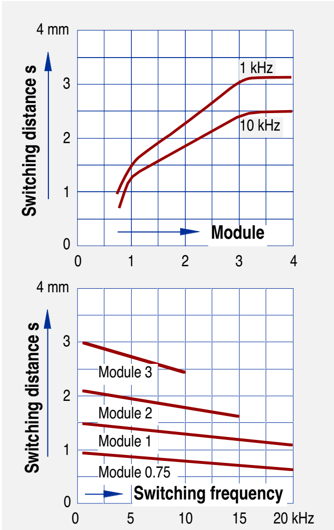
CE

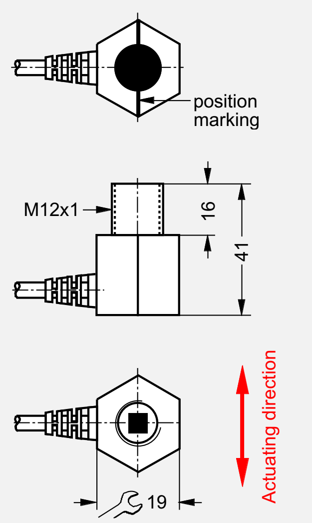
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

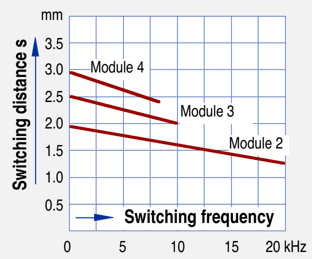
Subject to technical changes!

O M12 x 1; 70 mm	**O M12 x 1;** 41 mm
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
0.7/1.3/1.8/2.4/- mm; flush	**-/-/1.3/2.0/2.4 mm; flush**
0.35/0.65/0.9/1.2/- mm	**-/-/0.65/1.0/1.2 mm**
HAD-12mg70b2.5-5S3, 13.26-74 (2)	HAD-12ms41b2.5-5NK1, 13.26-51 (3)
1 Hz ... 20 kHz	**1 Hz ... 20 kHz**
connector M12; 4 wires	lead; 3 wires



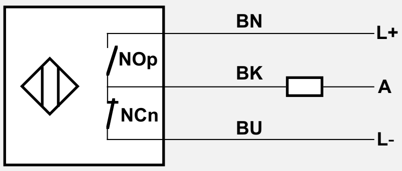






6 ... 24 ... 30 V DC	8 ... 24 ... 30 V DC
≤ 10 mA	≤ 10 mA
≤ 25 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 80 °C	- 25 ... + 80 °C
≤ 150 m	≤ 150 m
	NK / 2.0 m / 3 x 0.34 mm^2
DC 12	DC 12
IP 67	IP 67
9 Nm / 30 Nm	9 Nm / 30 Nm
30 g	40 g + weight of the lead

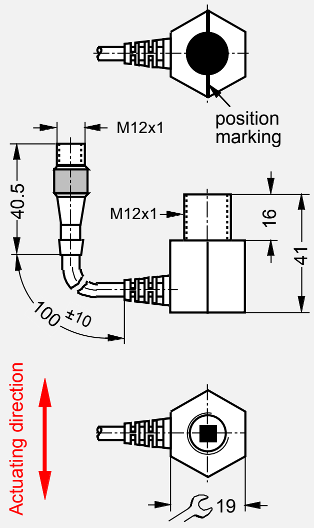
Wiring (3)
DC 3-poles, push-pull, outgoing lead

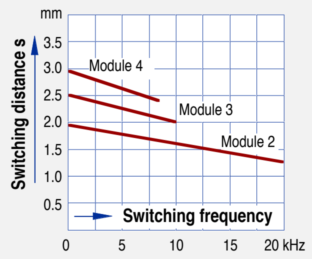


Pulse Sensors, Magnetic Field
Series HAD-12ms, -14eg, -14er

Design; length		**O M12 x 1;** 41 mm
Material of the sensing face / of the housing		PBT / CuZn
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting		**-/-/1.3/2.0/2.4 mm; flush**
Air gap = actuating distance a		**-/-/0.65/1.0/1.2 mm**
Type designation, Ref. no.	NO plus-switching NOp	
	NO plus-, NC minus-switching NOp + NCn	HAD-12ms41b2.5-5Y1, 13.26-52 (1)
Switching frequency range		**1 Hz ... 20 kHz**
Wiring (connector or lead); number of wires		connector with lead; 4 wires

Common Technical Data	
Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-curcuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes





Specific Technical Data	
Permissible operating voltage range	8 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 75 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	/ 0.1 m / 3 x 0.34 mm^2
	PUR-lead with 4-pole plug2
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 65
Protection class	
Permissible torque without / with toothed disc	9 Nm / 30 Nm
Weight	80 g
Recommended accessories	

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

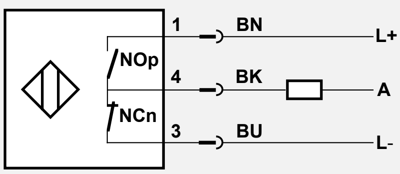
For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

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

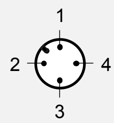
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

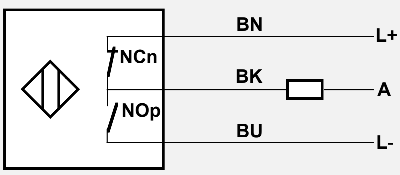
Wiring (1)
DC 3-poles, push-pull, plug



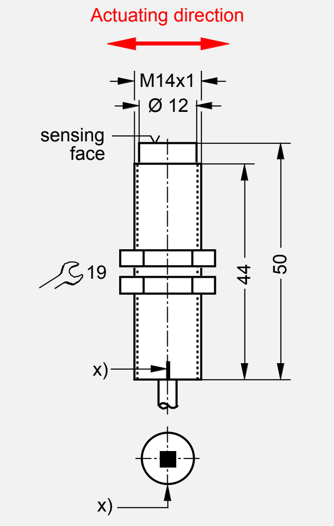
Euro Plug M12



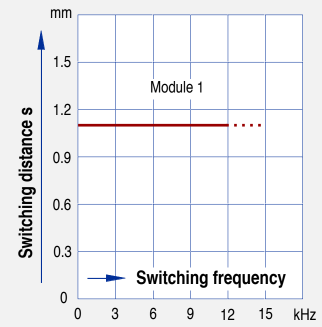
Wiring (2)
DC 3-poles, push-pull, outgoing lead

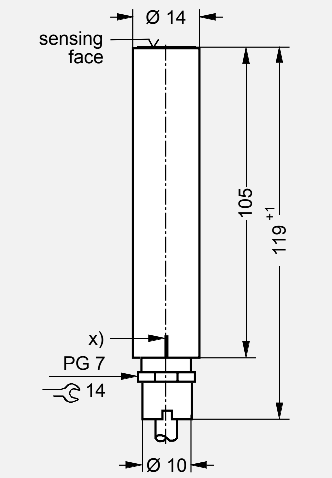


O M14 x 1; 50 mm	**O 14 mm;** 120 mm
PBT / stainless steel	PBT / stainless steel
-/1.0/-/-/- mm; flush	**-/1.0/-/-/- mm; flush**
-/0.5/-/-/- mm	**-/0.5/-/-/- mm**
HAD-14eg50b1-5ND1, 13.26-77-025 (2)	HAD-14er120b1-5TT3, 13.26-79-030 (3)
0 ... 12 kHz	**0 ... 12 kHz**
lead; 3 wires	lead; 3 wires

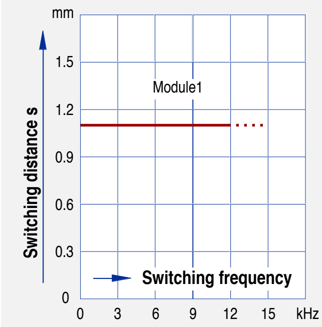


x) position marking



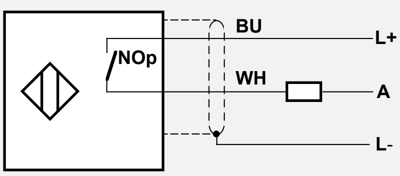


x) position marking



10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 25 mA	≤ 25 mA
≤ 25 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 80 °C	- 25 ... + 100 °C
≤ 150 m	≤ 150 m
ND / 2.5 m / 3 x 0.34 mm^2	TT / 3,0 m / 2 x 0,34 mm^2
	shielded Teflon lead
DC 12	DC 12
IP 67	IP 67
12 Nm / 45 Nm	
55 g + weight of the lead	160 g + weight of the lead

Wiring (3)
DC 3-poles, push-pull, outgoing lead

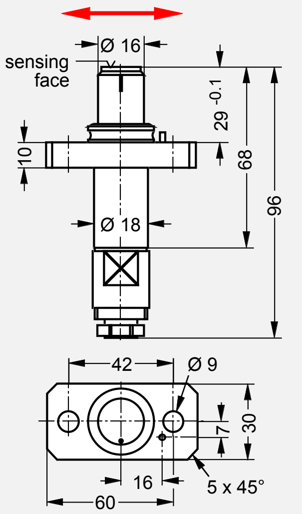


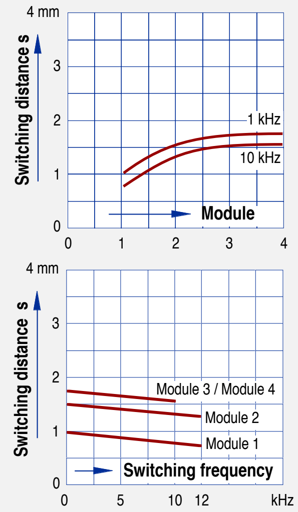
Pulse Sensors, Magnetic Field

Series HAD-16ss, -18eg, -18mg

Design; length		**O 16 mm;** 96 mm	
Material of the sensing face / of the housing		PBT / steel	
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting		**-/0.8/1.3/1.6/1.6 mm; flush**	
Air gap = actuating distance a		**-/0.4/0.65/0.8/0.8 mm**	
Type designation, Ref. no	NO plus-switching NOp		
	NO plus-, NC minus-switching NOp + NCn	HAD-16ss96b1-5Yd1, 13.26-73	(1)
Switching frequency range		**0 ... 12 kHz**	
Wiring (connector or lead); number of wires		Euchner SD-4 connector; 4 wires	

Common Technical Data	
Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-curcuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes





Specific Technical Data

Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 25 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 100 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 65
Protection class	
Permissible torque without / with toothed disc	
Weight	210 g
Recommended accessories	

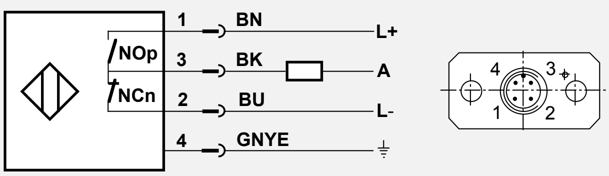
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

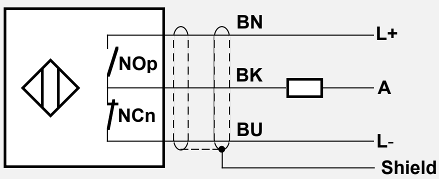
Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, push-pull, plug

Euro Plug M12



Wiring (2)
DC 3-poles, push-pull, outgoing lead



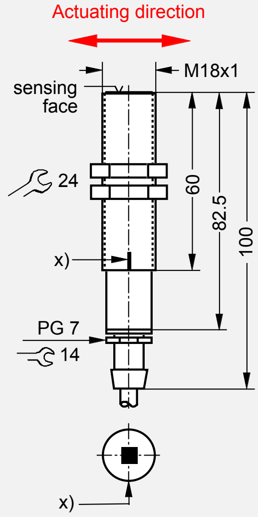
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

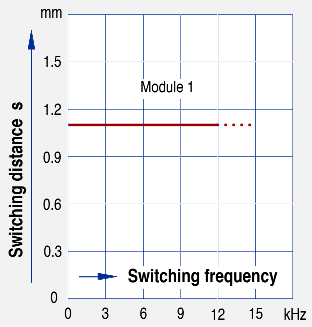
Subject to technical changes!

O M18 x 1; 82 mm	**O M18 x 1;** 82 mm
PBT / stainless steel	PBT / CuZn nickel-plated
-/1/-/-/- mm; flush	**-/1/-/-/- mm; flush**
-/0.5/-/-/- mm	**-/0.5/-/-/- mm**
HAD-18eg82b1-5NT1, 13.26-71-020 (2)	HAD-18mg82b1-5NT1, 13.26-69-020 (3)
0 ... 12 kHz	**0 Hz ... 12 kHz**
lead; 3 wires	lead; 3 wires

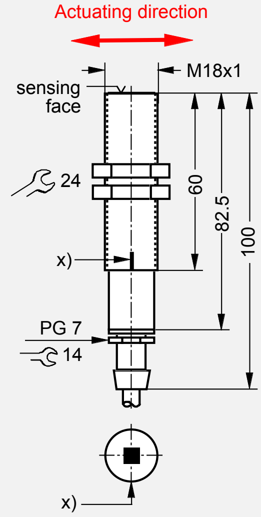
Actuating direction



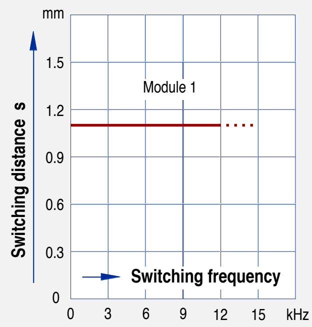
x) position marking



Actuating direction

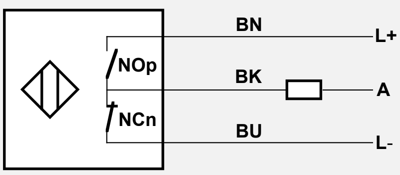


x) position marking



10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 25 mA	≤ 25 mA
≤ 25 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 80 °C	- 25 ... + 100 °C
≤ 150 m	≤ 150 m
NT / 2.0 m / 3 x 0.34 mm^2	NT / 2.0 m / 3 x 0.75 mm^2
DC 12	DC 12
IP 67	IP 67
45 Nm / 90 Nm	34 Nm / 70 Nm
150 g + weight of the lead	150 g + weight of the lead

Wiring (3)
DC 3-poles, push-pull, outgoing lead



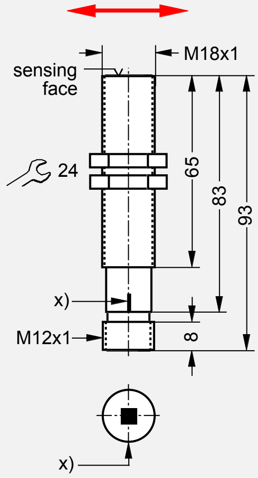
Pulse Sensors, Magnetic Field
Series HAD-18mg, -18sg

Design; length	**O M18 x 1;** 93 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**-/1/-/-/- mm; flush**
Air gap = actuating distance a	**-/0.5/-/-/- mm**
Type designation, Ref. no. — NO plus-switching NOp	HAD-18mg93b1-5Sd1, 13.26-68 (1)
Type designation, Ref. no. — NO plus-, NC minus-switching NOp + NCn	
Switching frequency range	**0 ... 12 kHz**
Wiring (connector or lead); number of wires	connector M12; 4 wires

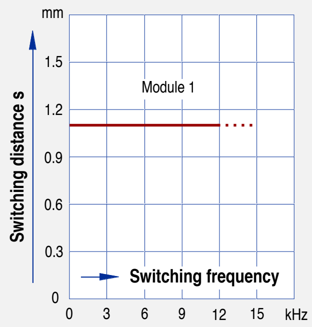
Common Technical Data

Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cirucuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes

Actuating direction



x) position marking



Specific Technical Data

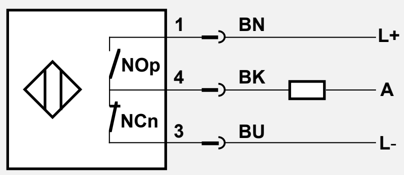
Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 25 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 80 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 65
Protection class	
Permissible torque without / with toothed disc	34 Nm / 70 Nm
Weight	160 g
Recommended accessories	

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ef. no..

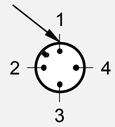
Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, push-pull, plug

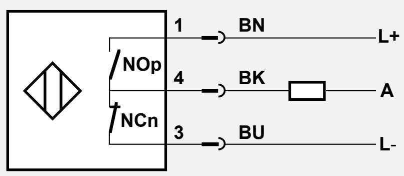


Euro Plug M12

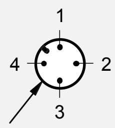
position marking



Wiring (2)
DC 3-poles, push-pull, plug



Euro Plug M18



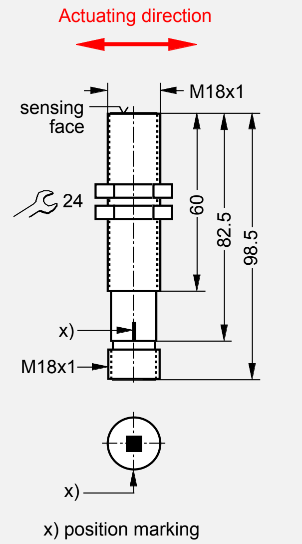
position marking

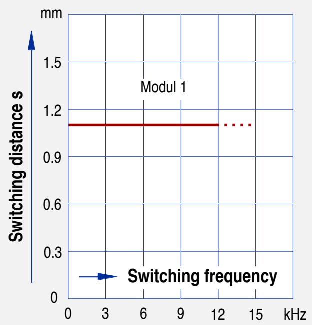
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

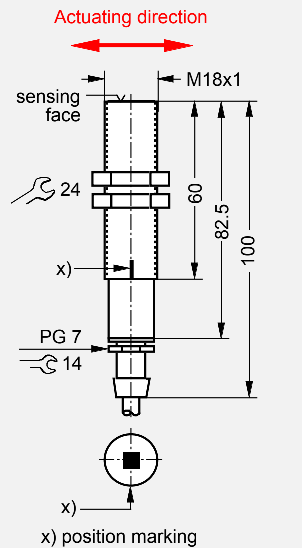
Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

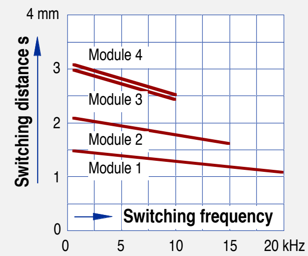
Subject to technical changes!

O M18 x 1; 98 mm	**O M18 x 1;** 80 mm
PBT / steel nickel-plated	PBT / steel
-/1.0/-/-/- mm; flush	**-/1.3/1.8/2.4/2.5 mm; flush**
-/0.5/-/-/- mm	**-/0.65/0.9/1.2/1.2 mm**
HAD-18sg98b1-5Vd1, 13.26-67 (2)	HAD-18sg80b2.5-5TK1, 13.26-50-020 (3)
0 ... 12 kHz	**1 Hz ... 20 kHz**
connector M18; 4 wires	lead; 3 wires





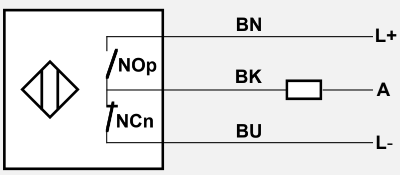




10 ... <u>24</u> ... 30 V DC	8 ... <u>24</u> ... 30 V DC
≤ 25 mA	≤ 10 mA
≤ 25 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 80 °C	- 40 ... + 100 °C
≤ 150 m	≤ 150 m
	TK / 2.0 m / 3 x 0.75 mm^2
DC 12	DC 12
IP 65	IP 67
40 Nm / 80 Nm	40 Nm / 80 Nm
150 g	110 g + weight of the lead

Wiring (3)

DC 3-poles, push-pull, outgoing lead

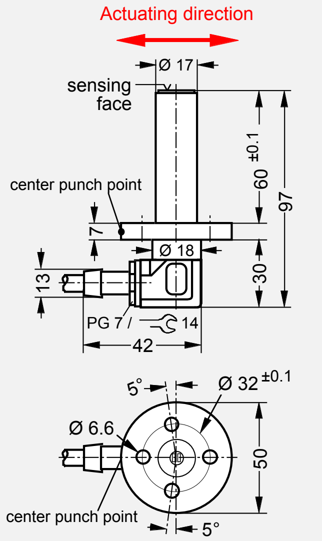


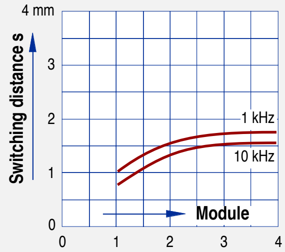
Pulse Sensors, Magnetic Field
Series HAD-18ss, MAD-12aq

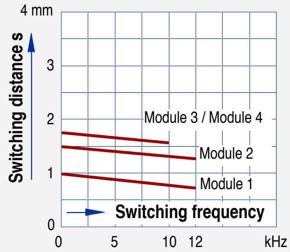
	Design; length	**O 17 mm;** 100 mm
	Material of the sensing face / of the housing	PBT / steel
	Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**-/0.8/1.3/1.6/1.6 mm; flush**
	Air gap = actuating distance a	**-/0.4/0.65/0.8/0.8 mm**
Type designation, Ref. no.	NO plus-switching NOp	
	NO plus-, NC minus-switching NOp + NCn	HAD-18ss100b1.6-5NT1, 13.26-65-005 (1)
	Switching frequency range	**0 ... 12 kHz**
	Wiring (connector or lead); number of wires	lead; 3 wires

Common Technical Data

Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-cirucuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes







Specific Technical Data

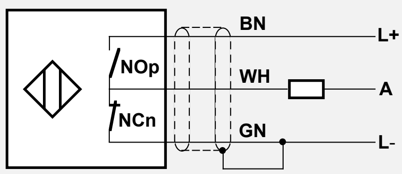
Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 25 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 100 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	NT / 0.5 m / 3 x 0.5 mm^2
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 67
Protection class	
Permissible torque without / with toothed disc	
Weight	170 g + weight of the lead
Recommended accessories	

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 "Accessories". Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, push-pull, outgoing lead

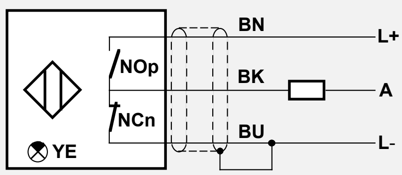


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

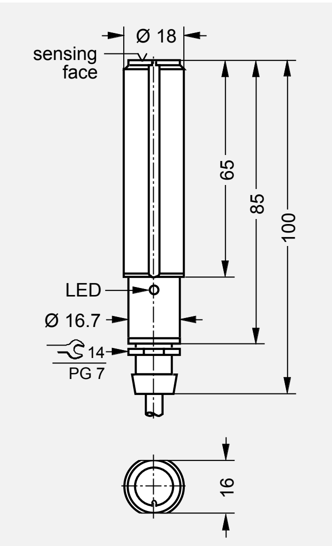
Subject to technical changes!

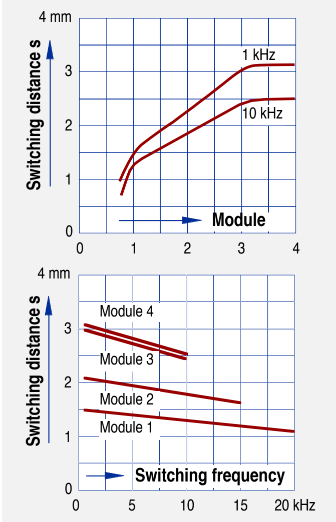
Wiring (2)
DC 3-poles, push-pull, outgoing lead

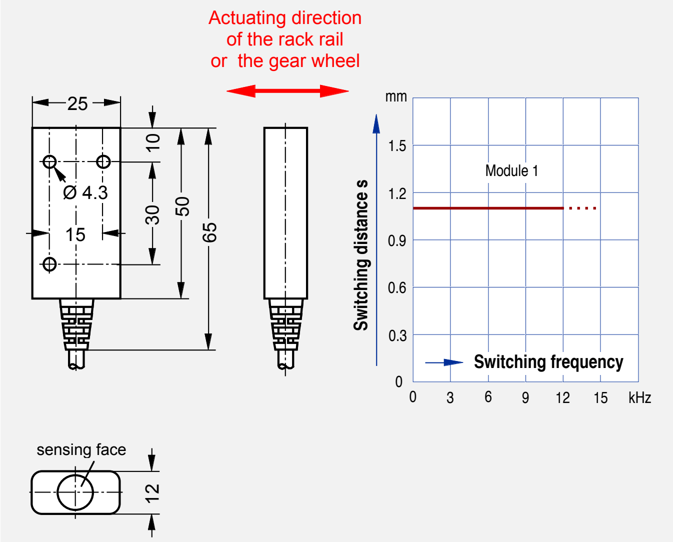


KLASCHKA
Elektronik + Automation

O 18 mm; 85 mm	**25 mm x 12 mm;** 50 mm
PBT / steel	CuZn / aluminium
-/1.3/1.8/2.4/2.5 mm; flush	**-/1.0/-/-/- mm; flush**
-/0.65/0.9/1.2/1.2 mm	**-/0.5/-/-/- mm**
HAD-18ss85b1-5NT1, 13.26-64-060 (2)	MAD-12aq50b0.4-5NK1, 13.21-59-020 (3)
5 Hz ... 20 kHz	**0 ... 10 kHz**
lead; 3 wires	lead; 3 wires

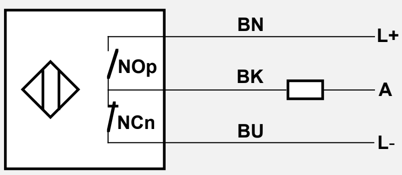






8 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 10 mA	≤ 25 mA
≤ 25 mA	≤ 25 mA
≤ 1.5 V	≤ 1.5 V
≤ 10 V	≤ 10 V
75 V DC	75 V DC
- 25 ... + 80 °C	- 25 ... + 75 °C
≤ 150 m	≤ 150 m
NT / 6.0 m / 3 x 0.34 mm^2	NK / 2.0 m / 3 x 0.34 mm^2
DC 12	DC 12
IP 67	IP 67
150 g + weight of the lead	40 g + weight of the lead

Wiring (3)
DC 3-poles, push-pull, outgoing lead



Pulse Sensors
Type Inductive

Characteristics

Here principally all Inductive Proximity Switches of the **Type All Metal Standard** IAD / AHM are applicable, as they have short response times and thus high operating frequencies.

They 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 switching distances as a function of frequency and modules of the following inductive pulse sensors can be provided on request.

Pulse Sensors, Type Inductive

Type	Ref. No.	Switching distance in mm mounting *)	Type	Ref. No.	Switching distance in mm mounting *)
IAD/AHM-8eg60b1.5-1Wc1A	11.37-22-000	1.5 b	IAD/AHM-12mg50b3.5-1Sd1A	11.37-03-000	3.5 b
IAD/AHM-8eg60b1.5-2Wc1A	11.37-24-000	1.5 b	IAD/AHM-12mg50b3.5-2Sd1A	11.37-10-000	3.5 b
IAD/AHM-8eg60b1.5-1Sd1A	11.37-23-000	1.5 b	IAD/AHM-12mg50b3.5-1NDc1A	11.37-28-020	3.5 b
IAD/AHM-8eg60b1.5-2Sd1A	11.37-25-000	1.5 b	IAD/AHM-12mg50b3.5-2NDc1A	11.37-29-020	3.5 b
IAD/AHM-8eg45b1.5-1NDc1A	11.37-26-020	1.5 b	IAD/AHM-12mg60n6-1Sd1A	11.37-52-000	6.0 n
IAD/AHM-8eg45b1.5-2NDc1A	11.37-27-020	1.5 b	IAD/AHM-12mg60n6-2Sd1A	11.37-53-000	6.0 n
IAD/AHM-8eg60n3-1Wc1A **)	11.37-57-000	3.0 n	IAD/AHM-12mg60n6-1NDc1A	11.37-63-020	6.0 n
IAD/AHM-8eg60n3-1Sd1A **)	11.37-58-000	3.0 n	IAD/AHM-12mg60n6-2NDc1A	11.37-64-020	6.0 n
IAD/AHM-8eg60n3-2Wc1A **)	11.37-59-000	3.0 n			
IAD/AHM-8eg60n3-2Sd1A **)	11.37-60-000	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			

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

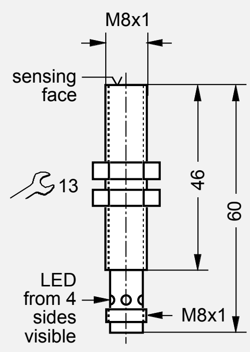
****)** = supply on request

Pulse Sensors, Inductive
Series IAD/AHM-8eg

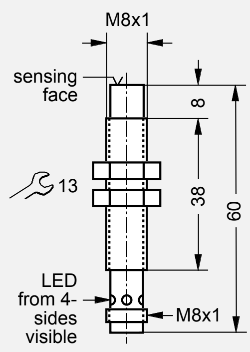
Design; length	**O M8 x 1;** 60 mm	**O M8 x 1;** 60 mm
Material of the sensing face / of the housing	PBT / stainless steel	PBT / stainless steel
Nominal switching distance, mounting (see page 1.0.4)	**1.5 mm, flush**	**3 mm, non-flush**
Range secured switching distance	0 ... 1.22 mm	0 ... 2.43 mm
Type 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%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistance	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	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

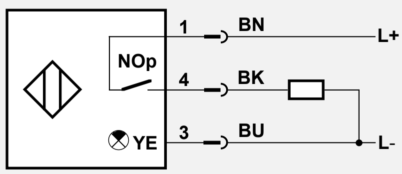
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	6.4 mm	6.4 mm
Switching radius r (at switching distance of the object 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
Degree of protection 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	1 0 g	10 g
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

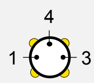
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

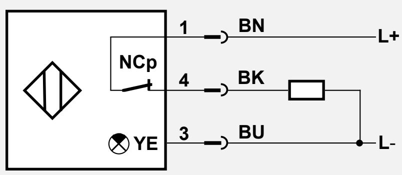
Wiring (1)
DC 3-poles, plug



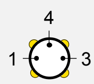
Euro Plug M8
with LED display YE
from 4 sides visible



Wiring (2)
DC 3-poles, plug



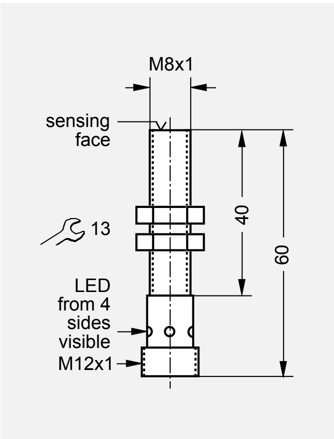
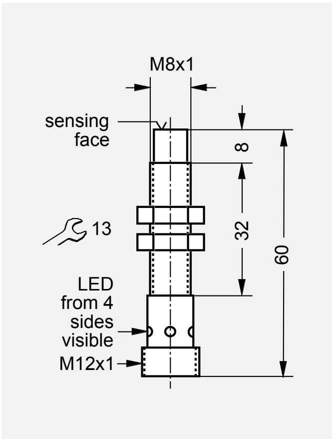
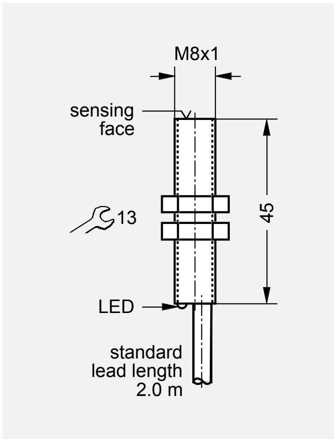
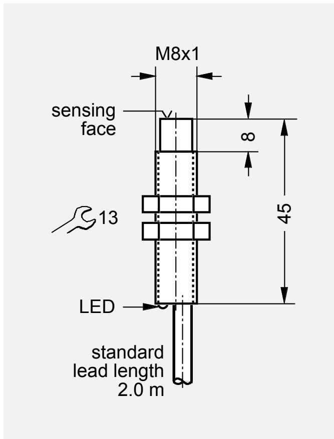
Euro Plug M8
with LED display YE
from 4 sides visible



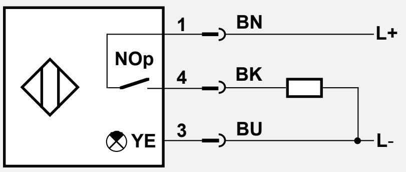
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

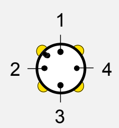
Subject to technical changes!

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
3. mm	3.0 mm	3.0 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

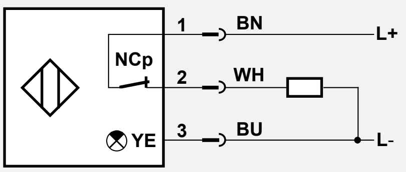
Wiring (3)
DC 3-poles, plug



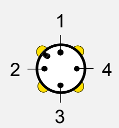
Euro Plug M12
with LED display YE
from 4 sides visible



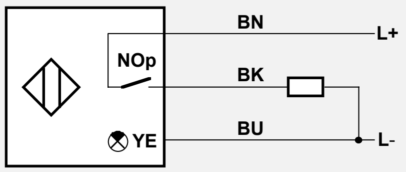
Wiring (4)
DC 3-poles, plug



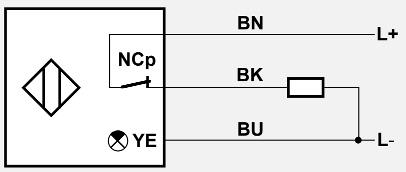
Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (5)
DC 3-poles, outgoing lead



Wiring (6)
DC 3-poles, outgoing lead

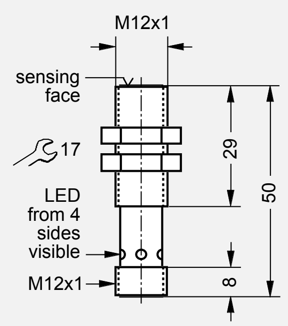


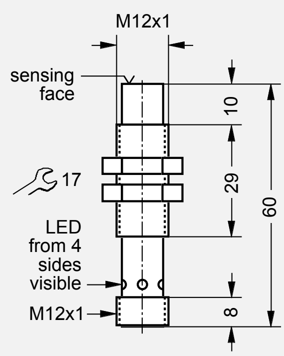
Inductive Proximity Switches, Inductive
Series IAD/AHM-12mg

Design; length	**O M12 x 1;** 50 mm	**O M12 x 1;** 60 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated
Nominal switching distance, mounting (see page1.0.4)	**3,5 mm, flush**	**6 mm, non-flush**
Range secured switching distance	0 ... 2.83 mm	0 ... 4.86 mm
Type designation, Ref. no. (Wiring): NO plus-switching NOp	IAD/AHM-12mg50b3.5-1Sd1A, 11.37-03 (1)	IAD/AHM-12mg60n6-1Sd1A, 11.37-52 (1)
NC plus-switching NCp	IAD/AHM-12mg50b3.5-2Sd1A, 11.37-10 (2)	IAD/AHM-12mg60n6-2Sd1A, 11.37-53 (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 M12; 3 wires	connector M12; 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%
- at permanent operating voltage	
... and ambient temperature	≤ 2%
Magnetic field-resistant	≤ 150 mT
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed output	≤ 2.5 V DC
Ambient temperature range	- 25 ... + 85 °C





Specific Technical Data

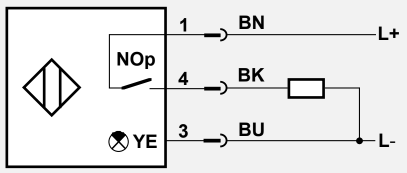
Permissible operating voltage range	10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
Current consumption without load	≤ 20 mA	≤ 20 mA
Load current	≤ 200 mA	≤ 200 mA
Nominal insulation voltage	75 V DC	75 V DC
Permissible capacity at output	≤ 1.0 µF	≤ 1.0 µF
Ø Sensing face	10.5 mm	10.5 mm
Switching radius r (at switching distance of the object 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		
Utilization category according to IEC 60947-5-2	DC 13	DC 13
Degree of protection 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
Recommended accessories		

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

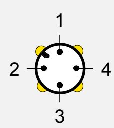
For proximity switches with outgoing lead: The standard length is 2.0 m or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

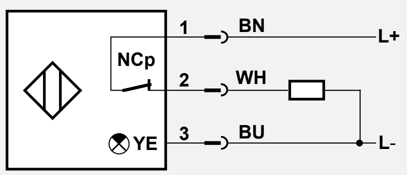
Wiring (1)
DC 3-poles, plug



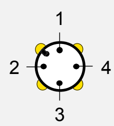
Euro Plug M12
with LED display YE
from 4 sides visible



Wiring (2)
DC 3-poles, plug



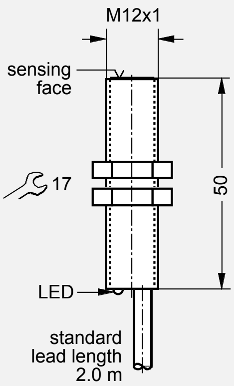
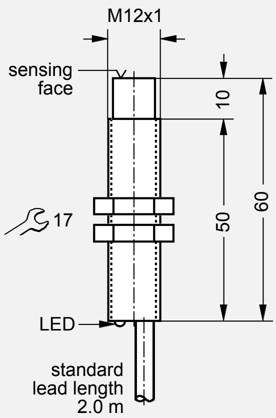
Euro Plug M12
with LED display YE
from 4 sides visible



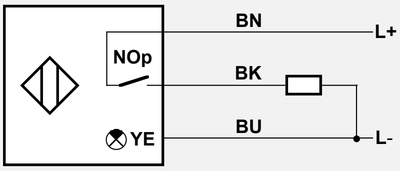
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

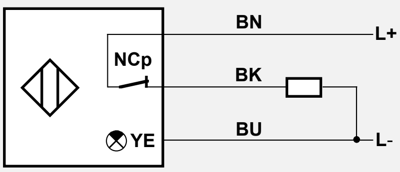
Subject to technical changes!

O M12 x 1; 50 mm	**O M12 x 1;** 60 mm		
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated		
3.5 mm, flush	**6 mm, non-flush**		
0 ... 2.83 mm	0 ... 4.86 mm		
IAD/AHM-12mg50b3.5-1NDc1A, 11.37-28-020 (3)	IAD/AHM-12mg60n6-1NDc1A, 11.37-63-020 (3)		
IAD/AHM-12mg50b3.5-2NDc1A, 11.37-29-020 (4)	IAD/AHM-12mg60n6-2NDc1A, 11.37-64-020 (4)		
20 kHz / 25 µs	**20 kHz / 25 µs**		
lead; 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	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 + weight of the lead	14 g + weight of the lead		

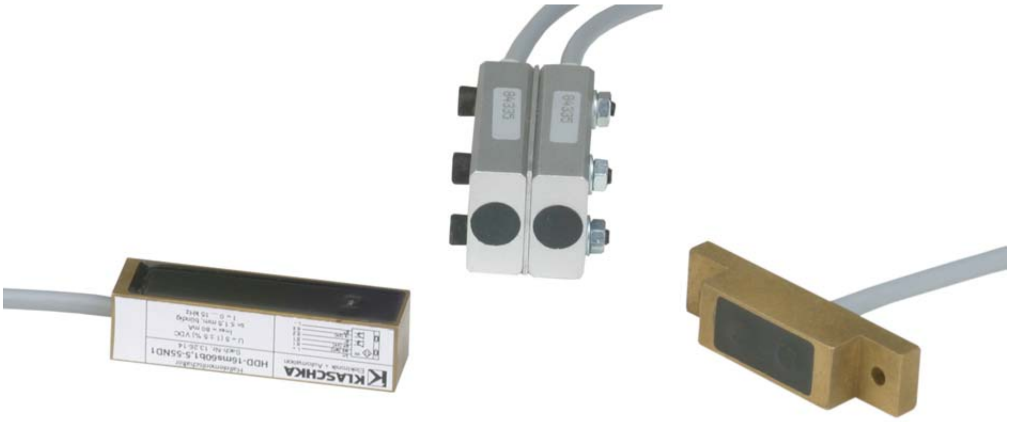
Wiring (3)
DC 3-poles, outgoing lead



Wiring (4)
DC 3-poles, outgoing lead



Characteristics



Double pulse sensors of the type **magnetic field** are suitable for the generation of speed-proportional, phase-shifted pulse sequences. Thus the user can detect the rotational direction and/or direction of motion. For these sensors static Hall- or magneto-resistive elements can be used as sensing elements.

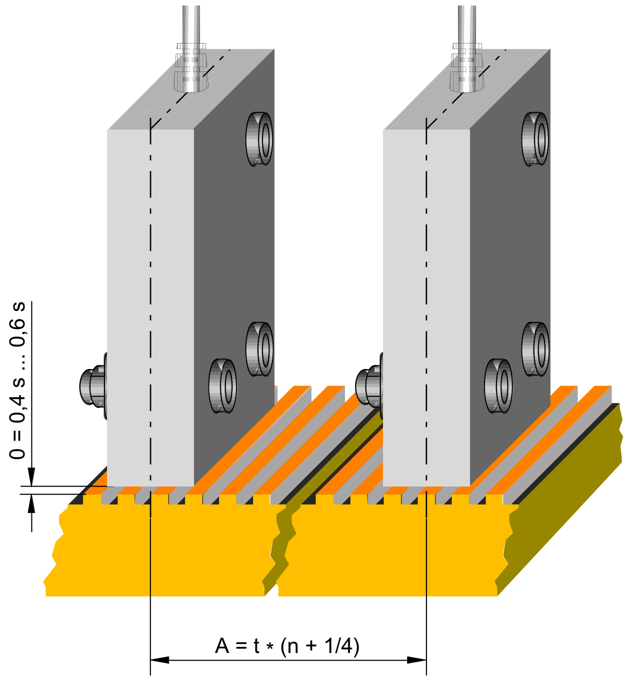
The double pulse sensors described here have been optimized for the scanning of specific racks and magnet wheels. We also manufacture and develop an individual system solution for your specific requirements.

Gearwheels or racks made of ferromagnetic steel (e.g. St 37) or magnetised belts, bars and wheels may be used as actuating elements.

When mounting the double pulse sensor the mounting position has to be considered. Please take the minimum width of the actuating element and information regarding the assembly of the sensor from the respective data sheets.

Mounting has to be accomplished in such a way that a vibration of the double pulse sensor and/or the actuating element is reliably prevented.

Positioning for phase shift 90°



n = Number of teeth between the integrated sensor parts
s = Nominal switching distance

Pulse Sensors Type Double Pulse

Type	Ref. No.	Switching distance in mm Mounting *)
HALL		
rectangular 16 x 16 x L		
HDD-16ms60b1.5-5050ND1 **)	13.26-47-020	3.0 b
rectangular 25 x 12 x L		
HDD-12aq50b0.4-55NK1	13.26-58-020	1.0 b

Type	Ref. No.	Switching distance in mm Mounting*)
magneto-resistive		
rectangular		
MDD-12aq50b0.4-55NK2 **)	13.21-51-020	1.0 b
MDD-12aq50b0.4-55NK3 **)	13.21-58-020	1.0 b

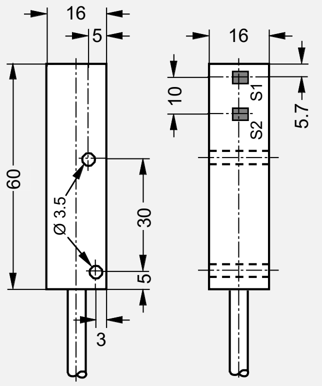
***)** b = flush mounting, n = non-flush mounting, t = partly flush mounting

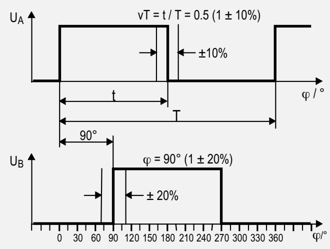
****)** = supply on request

Pulse Sensors, Double Pulse
Series HDD-16ms, -12aq

Design; length	**16 mm x 16 mm;** 60 mm
Material of the sensing face / of the housing	PBT / CuZn
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting	**(only for magnet ruler with pole length 3.06 mm) s= 1.5 mm; flush**
Air gap = actuating distance a	**0.75 mm**
Type designation, Ref. no. — NO plus-switching NOp	
Type designation, Ref. no. — NO plus-, NC minus-switching NOp + NCn	HDD-16ms60b1.5-5050ND1, 13.26-47-020 (1)
Switching frequency range	**0 ... 15 kHz**
Wiring (connector or lead); number of wires	lead; 6 wires

Common Technical Data	
Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-ciruit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes





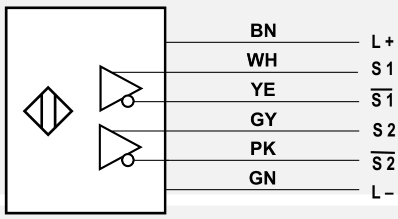
Specific Technical Data	
Permissible operating voltage range	5 (1 ± 5 %) V DC
Current consumption without load	≤ 10 mA
Load current	≤ 50 mA
Voltage drop over the switched output	
- at load current 0	≤ 5 V between the outputs
- at load current 25mA	≤ 3 V between the outputs
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 75 °C
Max. lead length	≤ 10 m
Lead type / standard lead length / number of wires x lead cross section	ND / 2.0 m / 6 x 0.25 mm^2
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 67
Protection class	
Permissible torque without / with toothed disc	
Weight	90 g + weight of the lead
Recommended accessories	magnetic rulers with pole length 3.06 m

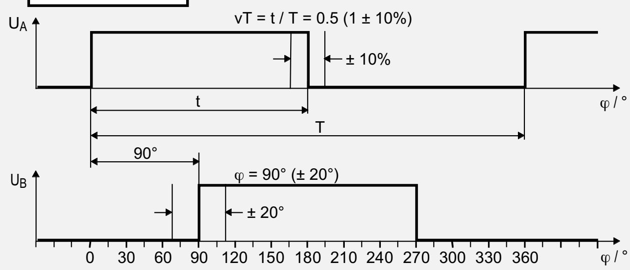
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 "Accessories". Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 6-poles, RS-422 (26LS31), outgoing lead





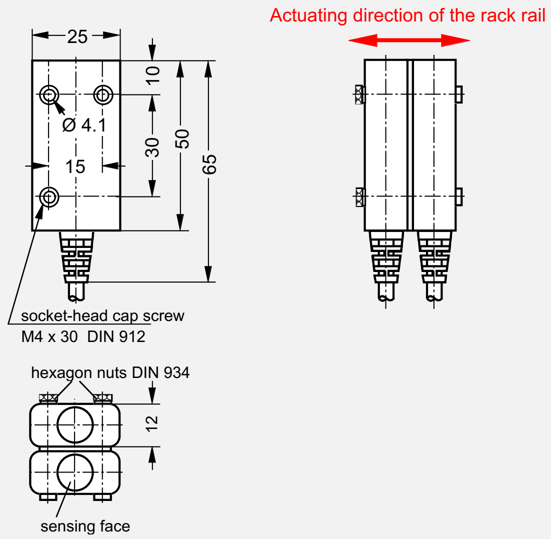
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

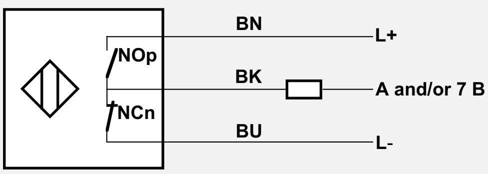
KLASCHKA Elektronik + Automation

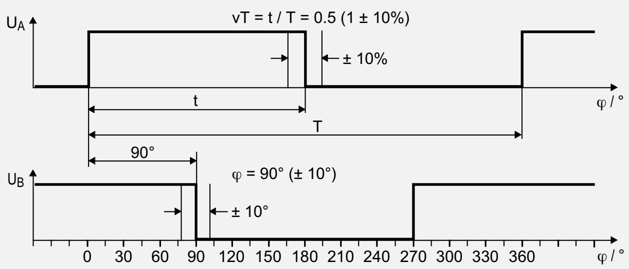
▭ **25 mm x 12 mm;** 50 mm	
PBT / Al	
1.0 mm; flush	
0.4 mm	
HDD-12aq50b0.4-55NK1, 13.26-58-020 (2)	
0 ... 12 kHz	
lead; 3 wires	



10 ... 24 ... 30 V DC	
≤ 25 mA per sensor part	
≤ 25 mA per sensor part	
≤ 1.5 V	
≤ 10 V	
75 V DC	
- 25 ... + 75 °C	
≤ 150 m	
NK / 2.0 m / 3 x 0.34 mm^2	
DC 12	
IP 67	
90 g + weight of the lead	

Wiring (2)
For each sensor: DC 3-poles, push-pull, outgoing lead

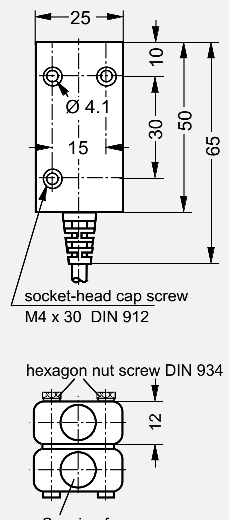


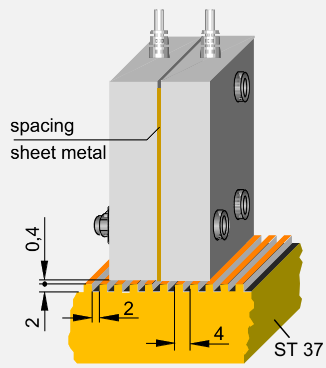


Pulse Sensors, Double Pulse
Series MDD-12aq

Design; length		▭ **25 mm x 12 mm**; 50 mm
Material of the sensing face / of the housing		CuZn / aluminium
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting		**1.0 mm; flush**
Air gap = actuating distance a		**0.4 mm**
Type designation, Ref. no.	NO plus-switching NOp	
	NO plus-, NC minus-switching NOp + NCn	MDD-12aq50b0.4-55NK2, 13.21-51-020 (1)
Switching frequency range		**0 ... 10 kHz**
Connection (connector or lead); number of wires		lead; 3 wires

Common Technical Data	
Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-curcuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes





Actuating direction of the rack rail

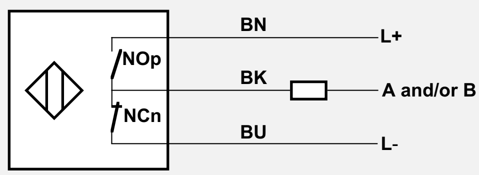
Specific Technical Data	
Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 25 mA per sensor part
Load current	≤ 25 mA per sensor part
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V;
- at load current 25mA	≤ 10 V
	75 V DC
Nominal insulation voltage	- 25 ... + 75 °C
Ambient temperature range	
	≤ 150 m
Max. lead length	NK / 2.0 m / 3 x 0.34 mm^2
Lead type / standard lead length / number of wires x lead cross section	
	DC 12
Utilization category according to IEC 60947-5-2	IP 67
Degree of protection according to 60529	
Protection class	
Permissible torque without / with toothed disc	90 g + weight of the lead
Weight	
Recommended accessories	

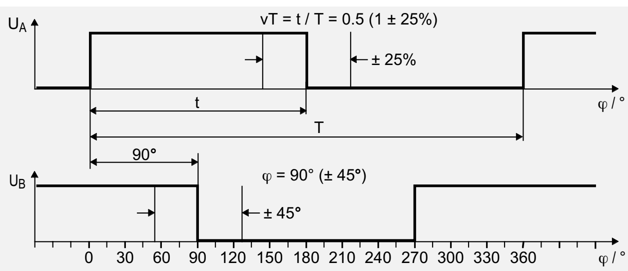
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
For each sensor: DC 3-poles, push-pull, outgoing lead



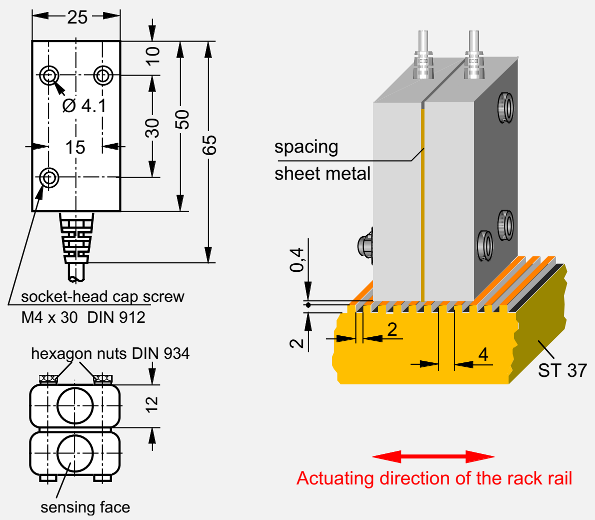


Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

25 mm x 12 mm; 50 mm	
CuZn / Aluminium	
1.0 mm; flush	
0.4 mm	
MDD-12aq50b0.4-55NK3, 13.21-58-020 (1)	
0 ... 10 kHz	
lead; 3 wires	



10 ... 24 ... 30 V DC	
≤ 25 mA per sensor part	
≤ 25 mA per sensor part	
≤ 1.5 V	
≤ 10 V	
75 V DC	
- 25 ... + 75 °C	
≤ 150 m	
NK / 2.0 m / 3 x 0.34 mm^2	
DC 12	
IP 67	
90 g + weight of the lead	

Characteristics

Heat-resistant pulse sensors of the type **magnetic field** were developed for applications in the extended temperature range (e. g. - 25 °C to + 120 °C).

For customer-specific versions special coatings were used to allow the application under onerous conditions.

If you require special versions, please contact us in order to find a suitable solution.

When selecting the actuating element, please consider the same criteria as indicated for pulse sensors of the type magentic field (see page 2.1.0.1)

Type	Ref. No.	Switching distance in mm Mounting*)	Temperature range in °C
HALL round 10.8 Ø x L			
HTD-11ms65b1.5-1Y2	13.26-61-000	1.0 b	- 25 ... + 120
HALL round 18 Ø x L			
HAD-18mg82b1-5GT1	13.26-80-050	1.0 b	- 40 ... + 100

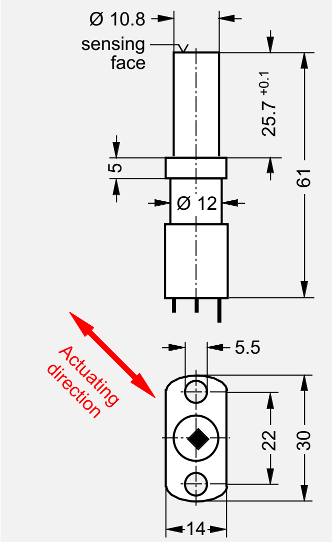
***)** b = flush mounting, n = non-flush mounting, t = partly flush mounting

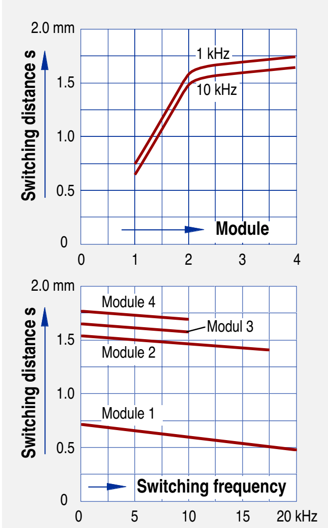
Pulse Sensors, Heat-Resistant
Series HTD-11ms, HAD-18mg

Design; length		**O 10.8 mm**; 65 mm
Material of the sensing face / of the housing		CuZn Teflon-coated / CuZn Teflon-coated
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting		**-/0.6/1.5/1.6/1.7 mm; flush**
Air gap = actuating distance a		**-/0.3/0.7/0.8/0.8 mm**
Type designation, Ref. no.	NO plus-switching NOp	
	NO plus-, NC minus-switching NOp + NCn	HTD-11ms65b1.5-1Y2, 13.26-61 (1)
Switching frequency range		**0 ... 12 kHz**
Wiring (connector or lead); number of wires		connector Ø 16; 3 wires

Common Technical Data

Reduction factors Fe / Non-ferrous metals	**1.0 / 0**
Hysteresis of the switching distances s	3 ... 20%
Permissible ripple voltage	≤ 10%
Short-curcuit-proof ?	yes, for ≤ 20 s
Protected against polarity reversal ?	yes





Specific Technical Data

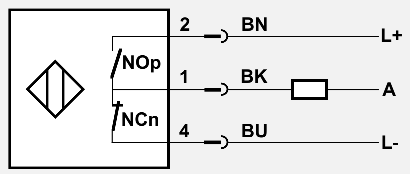
Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 10 mA
Load current	≤ 25 mA
Voltage drop over the switched output	
- at load current 0	≤ 1.5 V
- at load current 25mA	≤ 10 V
Nominal insulation voltage	75 V DC
Ambient temperature range	- 25 ... + 120 °C
Max. lead length	≤ 150 m
Lead type / standard lead length / number of wires x lead cross section	
Utilization category according to IEC 60947-5-2	DC 12
Degree of protection according to 60529	IP 67
Protection class	
Permissible torque without / with toothed disc	
Weight	50 g
Recommended accessories	

For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 “Accessories“. Order separately.

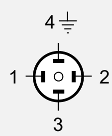
For proximity switches with outgoing lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by the index 020 or -050. In case that deviating lengths are required, please indicate this in the re. no..

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC, 3-poles, push-pull, plug

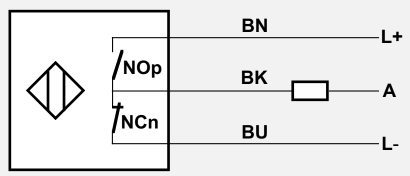


Plug



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

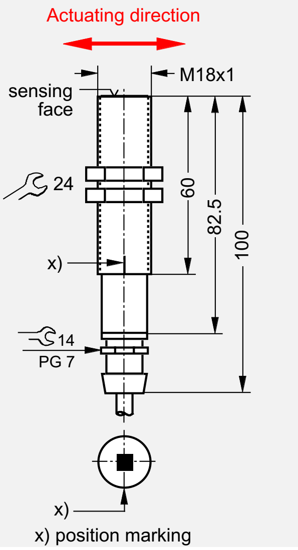
Wiring (2)
DC 3-poles, push-pull, outgoing lead

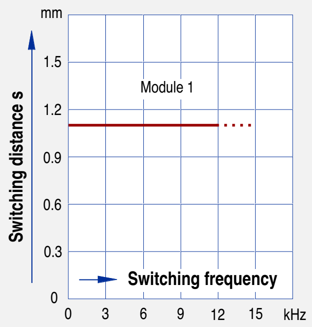


Safety Regulations
Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

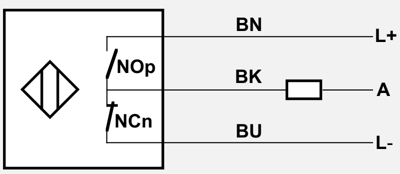
O M18 x 1; 82 mm	
PBT / CuZn nickel-plated	
-/1.0/-/-/- mm; flush	
-/0.5/-/-/- mm	
HAD-18mg82b1-5GT1, 13.26-80-050 (2)	
0 ... 20 kHz	
lead; 3 wires	





10 ... 24 ... 30 V DC	
≤ 25 mA	
≤ 25 mA	
≤ 1.5 V	
≤ 10 V	
75 V DC	
- 40 ... + 100 °C	
≤ 150 m	
GT / 5.0 m / 3 x 0.75 mm^2	
DC 12	
IP 67	
34 Nm / 70 Nm	
150 g + weight of the lead	

Wiring (2)
DC 3-poles, push-pull, outgoing lead



Safety Elements
Man and Machine

Right to Physical Integrity

The *Right to Life and Physical Integrity* is firmly anchored in the Federal Republic of Germany's Basic Constitutional Law.

This basic principle applies not only in our private surroundings but also where we go about our work. The legislature provides clear guidelines for this (excerpt):

"Machinery in Europe must satisfy the formal and basic health and safety requirements of the EC Directive governing Machinery (98/37/EC). This European Directive must be applied to all machinery, interchangeable equipment and safety components that are initially put into service in the European Community (EC)."

The Machinery Directive has been translated, like many other EU Directives, into national standards.

Equipment and Product Safety Act GPSG + **Maschinery-Ordinance 9.GPSGV** + **Annexes to 98/37/EG** = **Machinery Directive 98/37/EG**

What is a machine as defined by the Machinery Directive?

"A machine as defined by this Directive is an assembly of linked parts or components, at least one of which moves, with the appropriate actuators, control and power circuits, etc., joined together for a specific application, in particular for the processing, treatment, moving or packaging of a material. Also included in the scope of application are safety components brought into service individually.

A machine is also deemed to be an assembly of machines which, in order to achieve the same end, are arranged and controlled so that they function as an integral whole.

This Directive does not apply to … machinery whose only power source is directly applied manual effort, unless it is a machine used for lifting or lowering loads"

as well as a series of other instances of use that are not generally relevant for the industrial environment.

A, B and C Standards

The requirements of the Machinery Directive are concretised by the EN Standards which are split up into 3 hierarchically constructed category types.

Type A Standards

(Basic Standards) such as *EN 292* "Safety of Machinery – Basic Terms, General Design Guidelines" and *EN 1050* "Safety of Machinery – Principles for Risk Assessment" relate to basic regulations for machine safety.

Type B Standards

(Group Standards) such as *EN 954-1* "Safety-Related Parts of Control Systems" deal with a safety aspect that is applicable to a broad range of machinery; they are, in turn, classified into standard categories B1 and B2.

Type B1 Standards

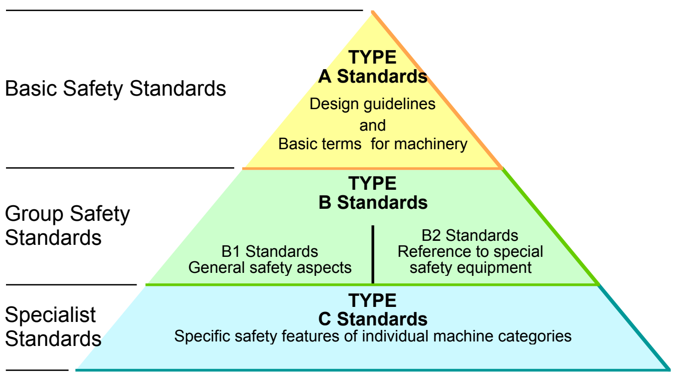
Specify regulations concerning superordinate safety aspects, such as ergonomic principles and safety gaps.

Type B2 Standards

Describe features of safety devices that may be used in different types of machinery – e.g. *EN 1088* "Interlocking Devices with and without guards".

Type C Standards

(Specialist or Product Standards) relate to individual types of machinery and areas of application such as packaging, injection/blow moulding or bakery machinery.



Duties and Opportunities of the Machine or Plant Manufacturer.

1. Determination of the risk which depends on the machine or plant.

Here consideration is given to how severe possible injuries might be, how frequently a person remains in the hazardous area and, if necessary, whether there are possibilities for preventing this hazard.

The result of this consideration is a code number (control category in EN 954-1; SIL = Safety Integrity Level in EN 61508) that provides a reference as to what measures are to be taken to minimise risks.

2. Reduction of the risk by means of appropriate technical measures

Enclosure/encasing of the hazardous area. Ensuring that accesses or interventions (e.g. for maintenance work or feeding in/removing workpieces) are only possible in the hazard-free state and that the machine or facility is brought safely into a hazard-free state when it is entered.

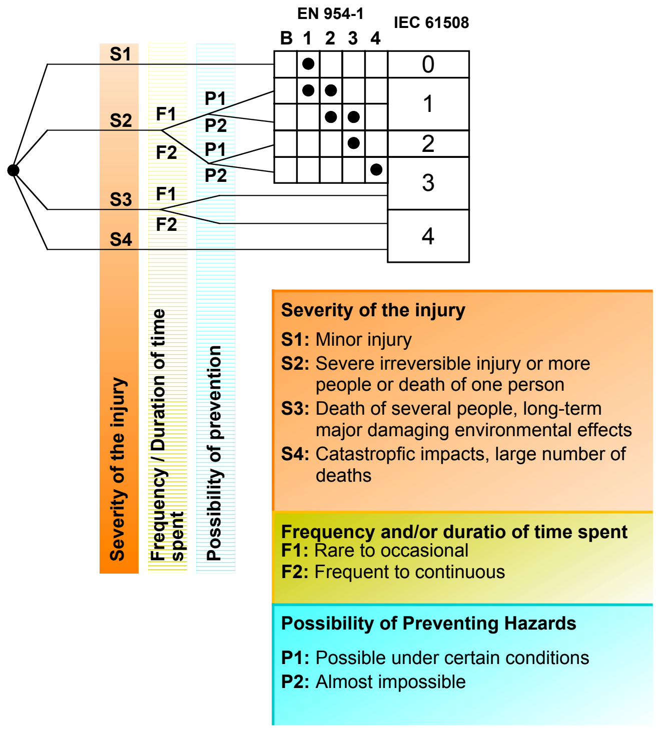
3. Minimisation of the remaining risk by informing the user

Highlighting of hazards in the operating instructions and instruction of the staff are both measures for reducing the remaining risk.

4. Assessment of whether the unavoidable risk is acceptable

If the remaining risk is still not acceptable, there is a jump back to step 2. The entire cycle is repeated until the remaining risk is sufficiently small.

Simplified Diagram:



Non-Contacting SIDENT Safety Switch SIDENT
Function and Method of Operation

Function

Safety zones in partly automated industrial plants are generally screened off by a system of safety fences and doors. The safety doors must be provided with safety locks or safety switches which comply with Safety Rating 3 or 4 conform the EN 954-1 (two-channel, reciprocal self-monitoring). A high degree of manipulation safety is essential.

Method of Operation of the Non-Contacting SIDENT Safety Switch

The safety switch and actuating element work together non-contacting. The reading head emitts an alternating field. The dimensions of the alternating field depend on he dimensions of the switch and determine the range, and thus the switching distance of the sensor.

Release is only given as long as the actuating element is within the actuation zone of the switch and the number of the actuating element is identical with that of the switch.

At this moment, the two green LED's of the safety switch are switched on. The hysteresis zone is indicated by a flashing of the red LED, while the green LED's are still blinking. Both outputs remain either connected or disconnected, depending on the direction of the movement and show the typical hysteresis behaviour. After leaving the hysteresis zone, both green LED's extinguish and a red LED blinks.

The code number in the safety switch undergoes a two-channel analysis procedure. The two channels monitor each other on a reciprocal basis. Every channel has got one output transistor which is put externally, e.g. from the safety PLC, at the supply voltage. The safety switch monitors the outputs and keeps them in open circuit status if either channel shows a short circuit between output and supply voltage. A short circuit to earth or low voltage at one output leads to the switching-off of both outputs. They are checked periodically to determine if the fault is still present. This results in short pulses at the non-faulty channel and is, at the same time, a short- circuit-protection.

The evaluation device is typically a safety PLC (= Programmable Logic Controller). It takes over the voltage supply of the safety switch and its both outputs. The supply of the outputs can give short timing signals which allow the PLC to check the connecting leads for circuit breaks and cross circuits A compatibility list, which is continuously updated, is available on demand.

Manipulation Safety

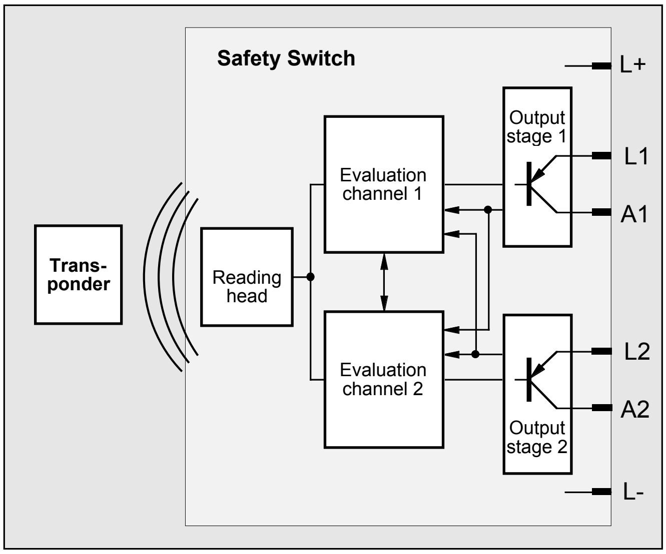
The SIDENT/III and IV safety switches, together with their actuating element SIDENT/B, work using the identification principle with a 6-digit safety code, which is issued only once. This means that only one "key", namely the matching actuating element with its imprinted code fits each "lock" on the SIDENT safety switch.

Versions

The different versions differ with regard to the Safety Rating as well as in design. Please find the Technical Data on the following pages.

Both, switch and actuating element, can be designed – up to a certain degree - according to customer specifications. Safety switch and actuating element can be designed in round housings, with or without thread.

The ability to be coded and Safety Rating are maintained in all versions.



Principal design of the the SIDENT safety switch with its two-channel structure.

Actuation Zone

The diagram on the right is received in case of parallel and centric alignment of the active surfaces of safety switch and actuating element.

If the sensing faces are inclined towards each other at an angle of up to 30°, deviations by ± 10% from the standard values occur. Adjacent metal faces influence the actuation zone in a similar way.

Mounting

The safety switch is normally attached to the door frame; whereas the actuating element, which requires no connecting leads, is fixed to the door itself. In case of a parallel and centric allignment of the sensing faces of safety switch and actuating element the following values apply (for this see also the Technical Data).

Switching distance	s = 20 mm
Width of the operating range	W = 34 mm
Depth of the operating range	D = 24 mm
Width of the hysteresis	h = 1 ... 2 mm.

The mounting position of the axis switch-actuating element is arbitrary. Regarding form and size of the operating zone it is insignificant which way the actuating element is moved towards the safety switch or moved away from it.

If the door is fitted with a bolt, the actuating element can also be fitted directly thereto. An inadvertent closing of the door does not activate the safety switch. In addition, a u-bolt can be fitted in order to prevent an inadvertent locking by the bolt.

Application Examples

Application examples for the use of safety relays can be supplied on demand.

Important Notes

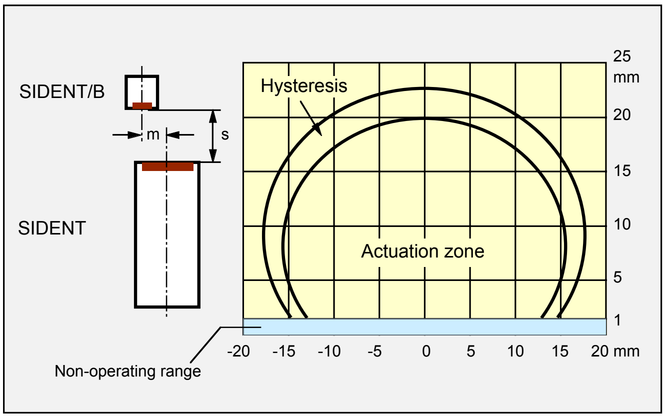
The products described here were developed in order to take over safety-related functions as part of an entire plant or a machine. A complete safety-related system usually contains sensors, evaluation units, signal devices and concepts for a safe disconnection.

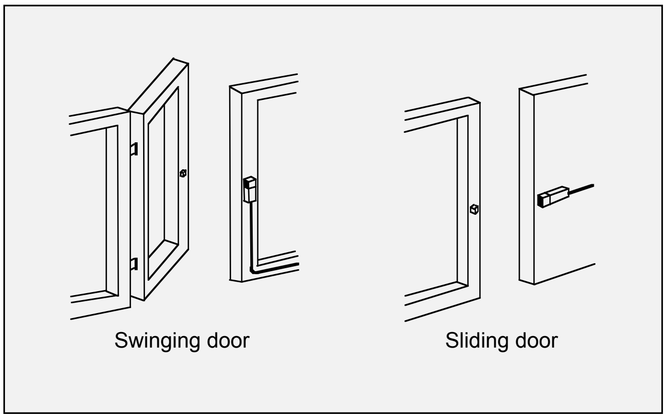
The manufacturer of a plant or a machine has the responsibility to guarantee the correct overall function. Klaschka GmbH & Co. KG is not able to guarantee all characteristics of an entire plant or a machine, which was not conceived by Klaschka.

Furthermore, Klaschka also does not take over any liability for recommendations, which are given and/or implied by this description. On basis of this description no new guarantee, warranty or liability claims, which exceed our terms of delivery, can be derived.

Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

CE   BG-PRÜFZERT GS   c UL us LISTED





Intended Use

The task of the SIDENT/IV safety switches is the monitoring of *mobile separating safety devices*. These have to guarantee that danger-bringing works at and with the machine or plant can be executed only if the safety device is closed.

The SIDENT/IV safety switch can accomplish its task only if it is employed, wired and installed according to the regulations of the manufacturer. In all other respects the relevant requirements and regulations must be kept.

These are:

- EN 954-1 - safety-related parts of control devices,
- EN 1088 - locking devices in connection with separating safety devices,
- EN 60204-1 - electrical equipment of machines,
- EN 60947-5-3 - requirements for proximity switches with a defined action under fault conditions.

For the machine or plant itself a risk evaluation has to be accomplished.

These are based on the following standards:

- EN 954-1 – safety-related parts of control devices,
- EN 1050 – safety of machines, risk evaluation.

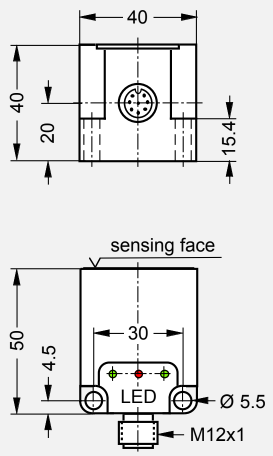
The described product was developed, produced, inspected and documented under consideration of the relevant safety standards. When observing the guidelines with regard to projecting, installation and appropriate use, as indicated in the manual for operation and installation, no dangers to property or the health of persons will arise due to SIDENT.

Safety Switches
Series SIDENT/III

	Design; length	**☐ 40mm x 40 mm**; 50 mm	
	Material of the sensing face / of the housing	PBT / PBT	
	Nominal switching distance, mounting (see page 1.0.4)	**20 mm, non-flush**	
	Range secured switching distance	1 ... 16.2 mm	
Type designation, Ref. no. (Wiring)	NO plus-switching 2 x NOp	SIDENT/III-40fq50n20-11Sh1C, 13.14-42 (1)	
	Maximum switching frequency / Minimum damping period	**1 Hz / ≥ 0.5 s**	
	Wiring (connector or lead); number of wires	connector M12; 6 wires	

Common Technical Data

Safety rating according to EN 954-1	**3**
Identification of the actuating element SIDENT/B ...	6-digit number code
Hysteresis of the switching point s	< 15%
Secured switching-off distance	35 mm
Structure	2-channel,
	mutual monitoring
Permisible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Function indication	2 x GN for identifcation
	1 x RD for fault
Certification of the BGFE:	
Design Type Test certificate	07003
GSTest Certificate	07004



Specific Technical Data

Permissible operating voltage range	15 ... 24 ... 30 V DC	
Current consumption without load	< 90 mA	
Supply voltage for the output stages	12 ... 24 ... 30 V DC, clockable	
Permissible load current per output with 40 °C / 70 °C	< 400 mA / < 200 mA	
Voltage drop over force-tripped output stage	≤ 3 V DC	
at 100 mA load current	typisch 1.75 V DC	
at 400 mA load current	maximally 3 V DC	
Operating time after recognition of the actuating element	> 150 ms, typically 185 ms	
Dropout delay after removal of the actuating element	> 75 ms, typically 100 ms	
Time delay after supply of the operating voltage	ca. 2 s	
Ambient temperature range	- 30 ... + 60 °C	
Maximum lead length	300 m	
Degree of protection according to IEC 60529	IP 67	
Protective insulation ⧈ according to IEC 947	Protection class II	
Weight	140 g	
Recommended accessories	see chapter 12	

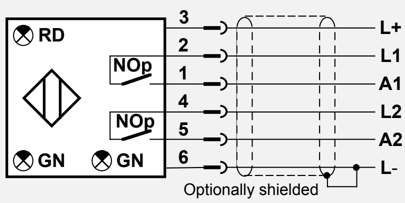
Certifications
Proximity switch according to standard: DIN EN 60 947-5-3: 2000-02.
73/23/EWG „Low voltage guideline“
89/336/EWG „EMC guidelines“
98/37/EG „Machinery guideline“
Produced according to DIN EN ISO 9001

Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotecnics.

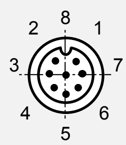
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

Subject to technical changes!

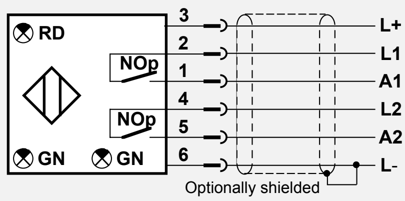
Wiring (1)
DC 6-poles, plug



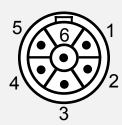
Plug M12



Wiring (2)
DC 6-poles, plug

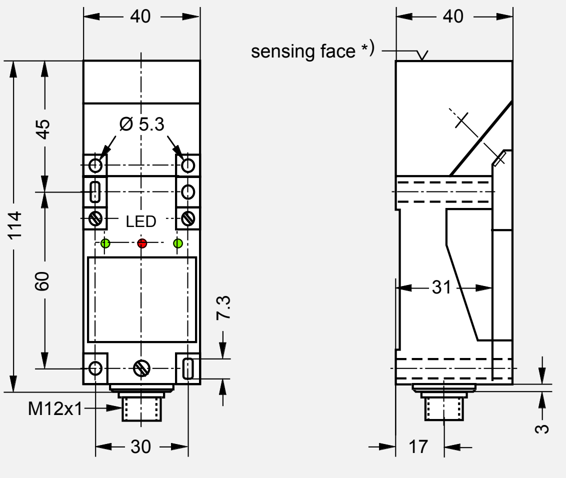


Plug M23

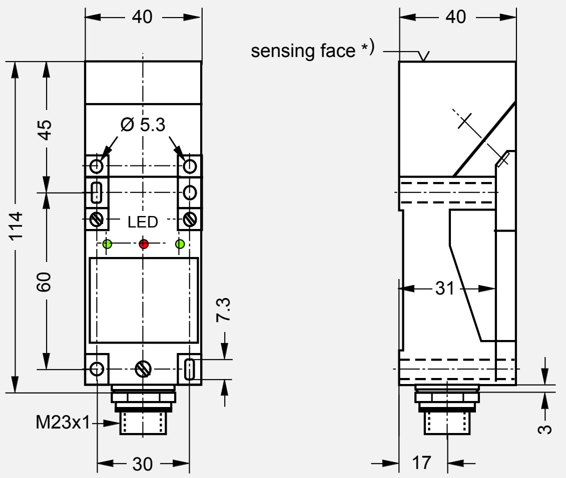


Klaschka Elektronik + Automation

☐ **40mm x 40 mm**; 114 mm	☐ **40mm x 40 mm**; 114 mm
PBT / PBT	PBT / PBT
20 mm, non-flush	**20 mm, non-flush**
1 ... 16.2 mm	1 ... 16.2 mm
SIDENT/III-40fv114n20-11Sh1C, 13.14-44 (1)	SIDENT/III-40fv114n20-11Z1C, 13.14-65 (2)
1 Hz / ≥ 0.5 s	**1 Hz / ≥ 0.5 s**
connector M12; 6 wires	connector M23; 6 wires



*) Orientation variable by reconstruction



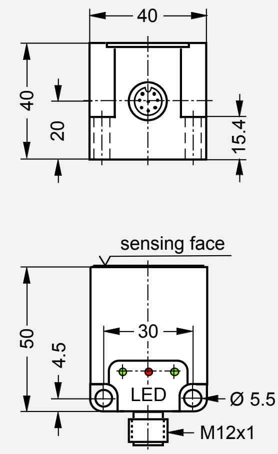
*) Orientation variable by reconstruction

15 ... <u>24</u> ... 30 V DC	15 ... <u>24</u> ... 30 V DC
< 90 mA	< 90 mA
12 ... <u>24</u> ... 30 V DC, clockable	12 ... <u>24</u> ... 30 V DC, clockakble
< 400 mA / < 200 mA	< 400 mA / < 200mA
≤ 3 V DC	≤ 3 V DC
typically 1.75 V DC	typically 1.75 V DC
maximally 3 V DC	maximally 3 V DC
> 150 ms, typically 185 ms	> 150 ms, typically 185 ms
> 75 ms, typically 100 ms	> 75 ms, typically 100 ms
ca. 2 s	ca. 2 s
- 30 ... + 70 °C	- 30 ... + 70 °C
300 m	300 m
IP 67	IP 67
Protection class II	Protection class II
250 g	250 g
see chapter 12	see chapter 12

Safety Switches
Series SIDENT/IV

Design; length	☐ **40mm x 40 mm**; 50 mm	
Material of the sensing face / of the housing	PBT / PBT	
Nominal switching distance, mounting (see page 1.0.4)	**20 mm, non-flush**	
Range secured switching distance	1 ... 16.2 mm	
Type designation, Ref. no. — NO plus-switching 2 x NOp	SIDENT/IV-40fq50n20-11Sh1C, 13.14-49 (1)	
Maximum switching frequency / Minimum damping period	**1 Hz / ≥ 0.5 s**	
Wiring (connector or lead); number of wires	connector M12; 6 wires	

Common Technical Data	
Safety rating according to EN 954-1	**4**
Identification of the actuating element SIDENT/B ...	6-digit number code
Hysteresis of the switching point s	< 15%
Secured switching-off distance	35 mm
Structure	2-channel,
	mutual monitoring
Permissible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Function indication	2 x GN for identifcation
	1 x RD for fault
Certification of the BGFE:	
Design type Test Certificate	06188
GS Test Certificate	06189



Specific Technical Data		
Permissible operating voltage range	15 ... 24 ... 30 V DC	
Current consumption without load	< 90 mA	
Supply voltage for the output stages	12 ... 24 ... 30 V DC, clockable	
Permissible load current per output with 40 °C / 70 °C	< 400 mA / 200 mA	
Voltage drop over force-tripped output stage	≤ 3 V DC	
at 100 mA load current	typically 1.75 V DC	
at 400 mA load current	maximally 3 V DC	
Operating time after recognition of the actuating element	> 150 ms, typically 185 ms	
Dropout delay after removal of the actuating element	> 75 ms, typically 100 ms	
Time delay after supply of the operating voltage	ca. 2 s	
Ambient temperature range	- 30 ... + 60 °C	
Maximum lead length	300 m	
Degree of protection according to IEC 60529	IP 67	
Protective insulation ⧈ according to IEC 947	Protection class II	
Weight	140 g	
Recommended accessories	see chapter 12	

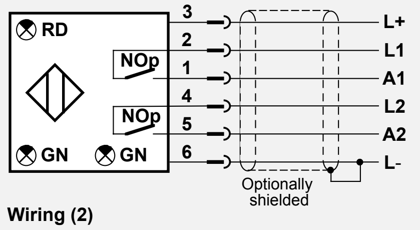
Certifications
Proximity switch according to standard: DIN EN 60 947-5-3: 2000-02.
73/23/EWG „Low voltage guideline“
89/336/EWG „EMC guidelines“
98/37/EG „Machinery guideline“
Produced according to DIN EN ISO 9001

Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotechnics.

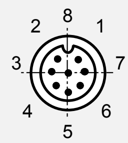
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

Subject to technical changes!

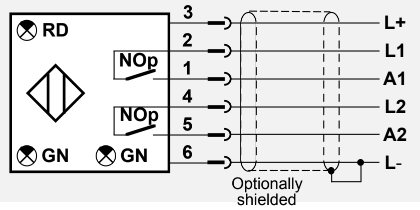
Wiring (1)
DC 6-poles, plug



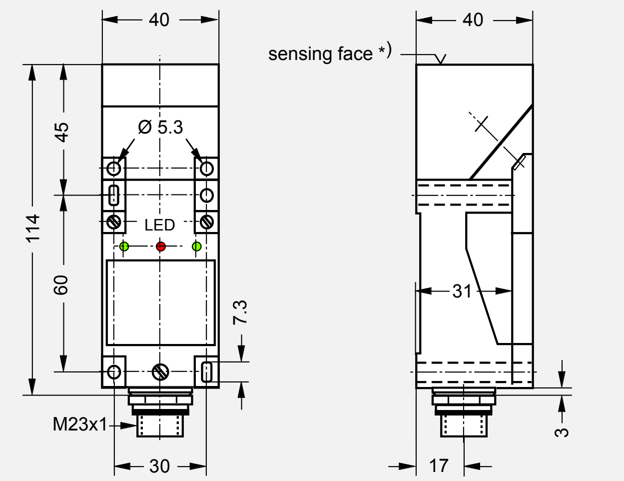
Plug M12



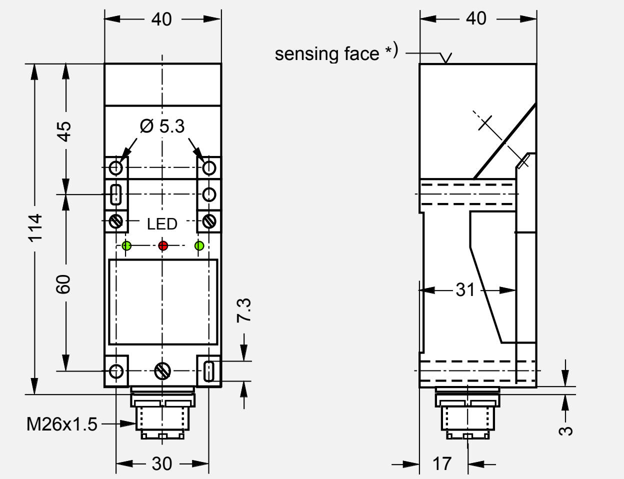
Wiring (2)
DC 6-poles, Coninvers RC plug



40mm x 40 mm; 114 mm	**40mm x 40 mm**; 114 mm
PBT / PBT	PBT / PBT
20 mm, non-flush	**20 mm, non-flush**
1 ... 16.2 mm	1 ... 16.2 mm
SIDENT/IV-40fv114n20-11Z1C, 13.14-33 (2)	SIDENT/IV-40fv114n20-11U2C, 13.14-37 (3)
1 Hz / ≥ 0.5 s	**1 Hz / ≥ 0.5 s**
connector Coninvers RC M23; 6 wires	connector Amphenol C 164 N M26; 7 wires



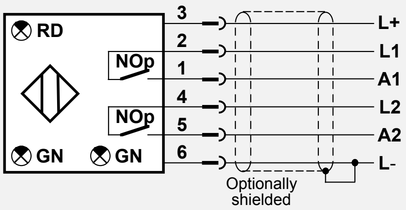
*) Orientation variable by reconstruction



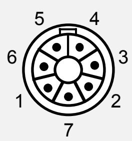
*) Orientation variable by reconstruction

15 ... 24 ... 30 V DC	15 ... 24 ... 30 V DC
< 90 mA	< 90 mA
12 ... 24 ... 30 V DC, clockable	12 ... 24 ... 30 V DC, clockable
< 400 mA / < 200 mA	< 400 mA / < 200 mA
≤ 3 V DC	≤ 3 V DC
typically 1.75 V DC	typically 1.75 V DC
maximally 3 V DC	maximally 3 V DC
> 150 ms, typically 185 ms	> 150 ms, typically 185 ms
> 75 ms, typically 100 ms	> 75 ms, typically 100 ms
ca. 2 s	ca. 2 s
- 30 ... + 70 °C	- 30 ... + 70 °C
300 m	300 m
IP 67	IP 65
Protection class II	Protection class II
250 g	250 g
see chapter 12	see chapter 12

Wiring (3)
DC 7-poles, Amphenol C 164 N plug



Plug M26

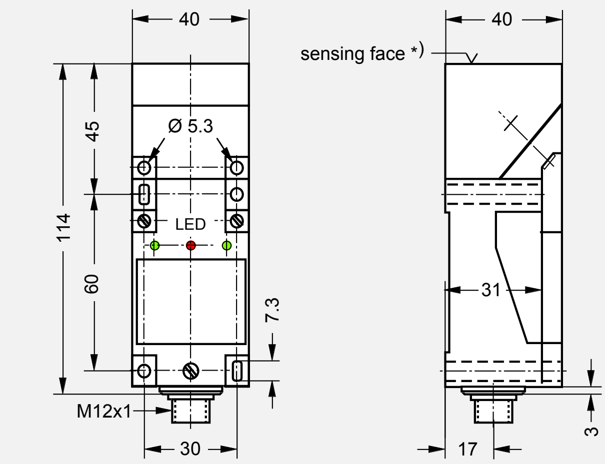


Safety Switches
Series SIDENT/IV

Design; length	**☐ 40mm x 40 mm**; 114 mm
Material of the sensing face / of the housing	PBT / PBT
Nominal switching distance, mounting (see page 1.0.4)	**20 mm, non-flush**
Range secured switching distance	1 ... 16.2 mm
Type designation, Ref. no. — NO plus-switching 2 x NOp	SIDENT/IV-40fv114n20-11Sh1C, 13.14-45 (1)
Maximum switching frequency / Minimum damping period	**1 Hz / ≥ 0.5 s**
Wiring (connector or lead); number of wires	connector M12; 6 wires

Common Technical Data

Safety rating according to EN 954-1	**4**
Identification of the actuating element SIDENT/B ...	6-digit number code
Hysteresis of the switching point s	< 15%
Secured switching-off distance	35 mm
Structure	2-channel, mutual monitoring
Permisible ripple voltage	≤ 15%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Function indication	2 x GN for identifcation 1 x RD for fault
Certification of the BGFE:	
Design Type Test Certificate	06188
GS Test Certificate	06189



*) Orientation variable by reconstruction

Specific Technical Data

Permissible operating voltage range	15 ... 24 ... 30 V DC
Current consumption without load	< 90 mA
Supply voltage for the output stages	12 ... 24 ... 30 V DC, clockable
Permissible load current per output with 40 °C / 70 °C	< 400 mA / < 200 mA
Voltage drop over force-tripped output stage	≤ 3 V DC
at 100 mA load current	typically 1.75 V DC
at 400 mA load current	maximally 3 V DC
Operating time after recognition of the actuating element	> 150 ms, typically 185 ms
Dropout delay after removal of the actuating element	> 75 ms, typically 100 ms
Time delay after supply of the operating voltage	ca. 2 s
Ambient temperature range	- 30 ... + 70 °C
Maximum lead length	300 m
Degree of protection according to IEC 60529	IP 67
Protective insulation ⧈ according to IEC 947	Protection class II
Weight	250 g
Recommended accessories	see chapter 12

Certifications

Proximity switch according to standard: DIN EN 60 947-5-3: 2000-02.
73/23/EWG „Low voltage guideline"
89/336/EWG „EMC guidelines"
98/37/EG „Machinery guideline"
Produced according to DIN EN ISO 9001

Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotechnics.

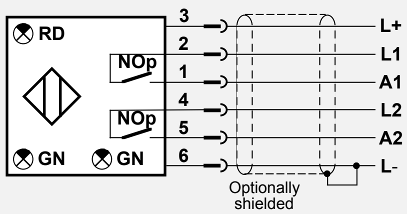
Safety Regulations

Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

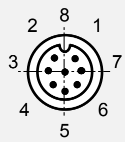
Subject to technical changes!

Wiring (1)

DC 6-poles, plug



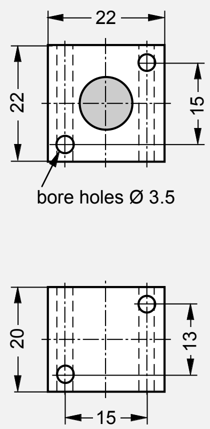
Plug M12

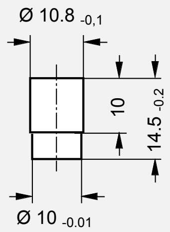


Safety Switches

Series Actuating Elements SIDENT/B

Design; length	□ **22mm x 22 mm;** 20 mm	**O 10.8 mm;** 14.5 mm
Material of the sensing face / of the mounting	plastic / plastic	Crastin / Crastin
Mounting	**non-flush**	**non-flush**
Type designation, Ref. no. — Actuating elements	SIDENT/B-22fv20-4O1, 13.14-30	SIDENT/B-11fs14-4O1, 13.14-40
Mounting instruction	preferably with one-way screws	preferably to be glued in place





Common Technical Data

Safety rating according to EN 954-1	**4 (includes category 3)**
Identification of the actuator SIDENT/B ...	6-digit number code
Ambient temperature range	- 30 ... + 70 °C
Degree of protection according to IEC 60529	IP 67
Protective insulation ⧈ according to IEC 947	Protection class II
Certification of the BGFE:	
Design Type Test Certificate	03088 / 06188 / 07003
GS Test Certificate	03089 / 06189 / 07004

Specific Technical Data

Weight	13 g	2 g

Certifications

Proximity switch according to standard: DIN EN 60 947-5-3: 2000-02.
73/23/EWG „Low voltage guideline“
89/336/EWG „EMC guidelines“
98/37/EG „Machinery guideline“
Produced according to DIN EN ISO 9001

Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotechnics.

Safety Regulations

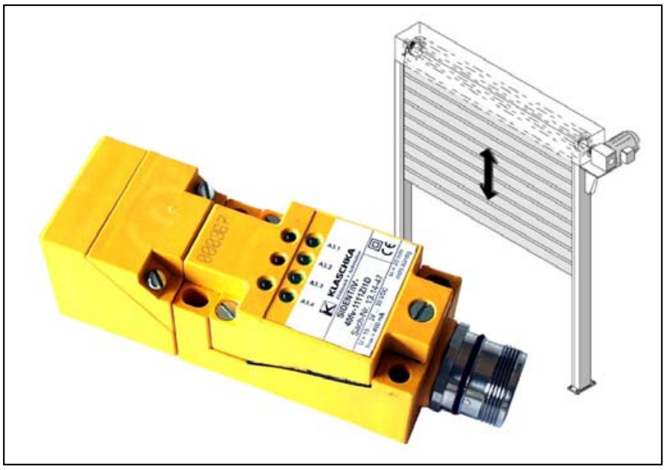
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

Subject to technical changes!

KLASCHKA
Elektronik + Automation

Non-Contacting SIDENT/IV Safety Switch Roller- / Lift Gates and Windows

Function, Construction and Versions



Function and Construction

Roller gates are frequently installed in safety fences. They allow a regular or individual access to production plants, which may be necessary for the inserting or removal of work pieces. If the roller gate is not completely closed, it has to be guaranteed that the plant operator cannot be endangered.

Safety switches, which are integrated into the safety chain of the plant control, serve for recognising the safe position (gate closed). Independently of it further position switches are used, which control the movement of the gate and detect its position.

The advantages of non-contact transponder-based safety switches (insensitivity to dirt, mechanical adjustment, manipulation etc.) can also be used for recognising and controlling the gate position. This special type of SIDENT/IV does not only monitor the "safe" position of the gate; it is further able to detect and to report a total of five positions (end positions, switching the speed from slow to fast and from fast to slow).

The SIDENT/IV is mounted at a suitable place of the gate (e.g. on the side) so that it can detect the actuating element, which is mounted at the gate or integrated into the gate itself. A specific code is assigned to each of the five actuating elements ("safe" end position, two or three changeover position and one not safety-related end position).

On basis of this specific code SIDENT/IV is able to recognise which actuating element is momentarily in the reading range.

All electronic components of the safety switch are fitted in just one sensor housing. The connection is made by connectors. Three LED's indicate the present status of the "safe" part (*red* for "no transponder recognised" and/or "error" and 2 x *green* for "transponder recognised"), four further LED's indicate the present position.

The (two-channel) evaluation electronics of the safety-related part is electrically isolated from that part of the switch, which only controls the movement, so that no reaction is possible. Only the reading head, which is turned towards the actuating elements, is common to both systems.

Versions

SIDENT/IV *for 4 positions*

The safety-related position (gate closed) as well as position 1 of the not safety-related part are identical. This means, that the safety-related outputs and one not safety-related output respond to one and the same actuating element.

SIDENT/IV *for 5 positions*

The safety-related position (gate closed) isn't identical to any of the not safety-related positions. The switch-off- and switching points are independent of the safe position (gate closed).

SIDENT/IV *for 4 positions with storage behaviour*

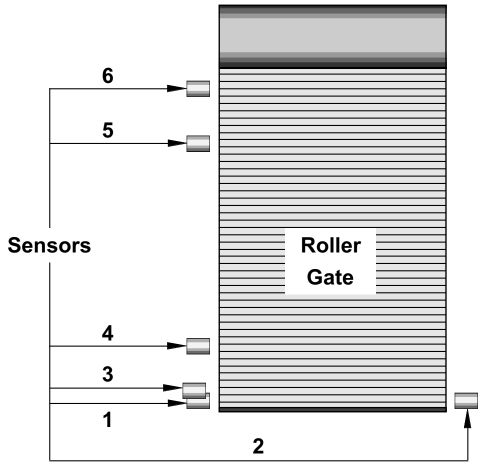
The safety-related position (gate closed) and position 1 of the not safety-related part are identical. For the direct activation of the frequency converters the positions 2 and position 3 are equipped with storage behaviour. When passing position 2 the output A3.2 obtains the status "High" and maintains it until position 1 has been reached. When opening the gate and passing position 3 the output A3.3 obtains the status "High". When position 4 has been reached (upper end position) the output is reset to status "Low" and A3.4 is activated.

SIDENT/IV *with 2 safe positions and storage behaviour (gate with two safe positions)*

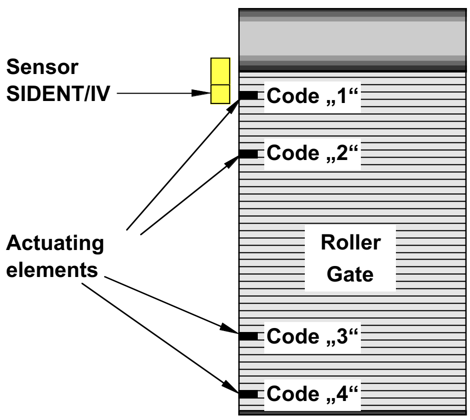
The two safety-related positions (gate closed in front and/or in the back) of the not safety-related part are identical. For the direct activation of the frequency converters the switchover positions 2 and 3 are equipped with storage behaviour. When passing position 2 the output A3.2 obtains the status "High" and maintains it until position 1 has been reached (gate closed in front). When opening the gate and passing position 3, the output A3.3 obtains the status "High". When reaching position 4 (door closed in back) the output is reset on status "Low" and A3.1 is activated.

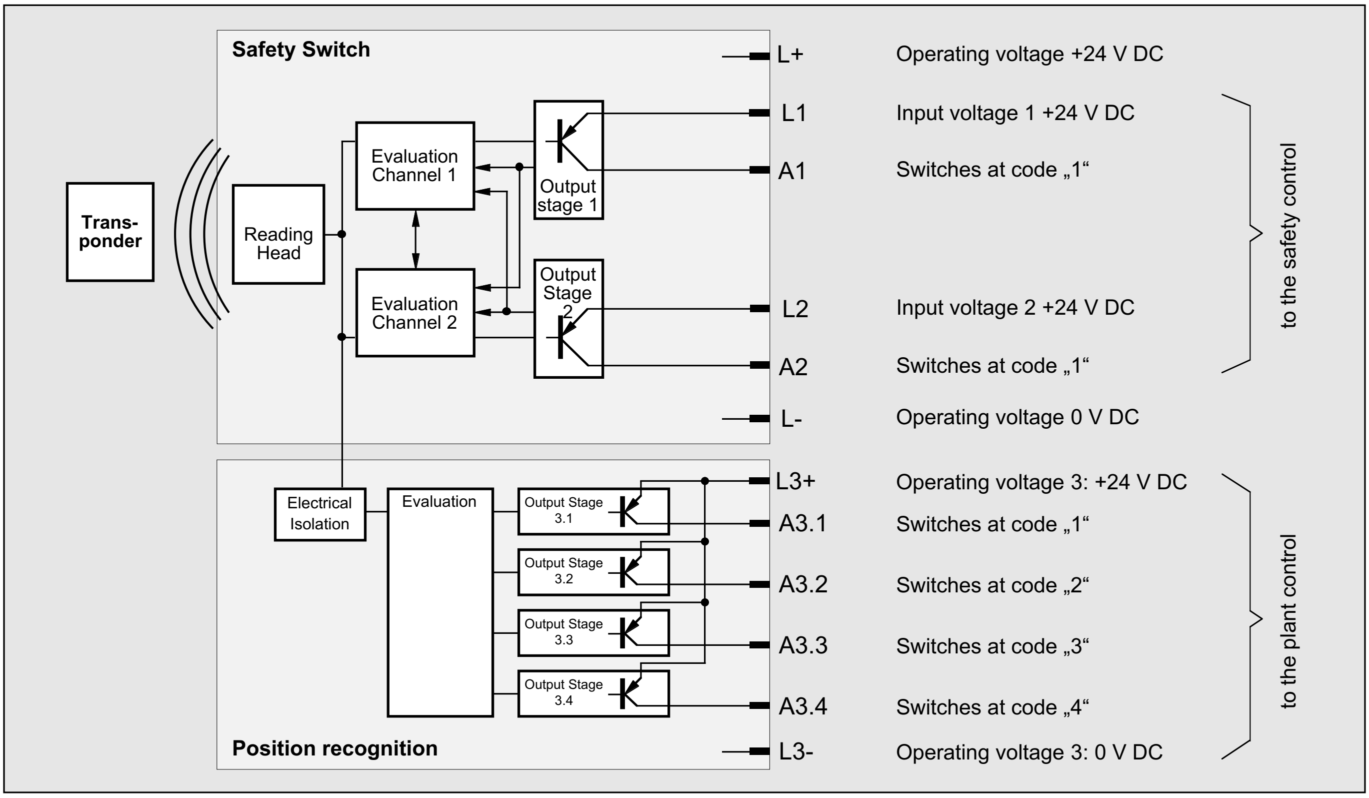
Application example with 4 positions:

Conventional roller gate monitoring:



Innovative roller gate monitoring:





Principle of the SIDENT/IV Safety Switch

The safety switch SIDENT/IV works together with its actuating element SIDENT/B using the identification principle with a 6-digit safety code which is issued only once. Only one "key”, namely the matching SIDENT/B actuating element with its imprinted code, actually fits each "lock" of the SIDENT/IV safety switch.

The safety switch and actuating element work on a non-contacting basis. Release is effected only when the actuating element is within the actuation zone of the switch and the code number of the actuating element matches that of the switch. At this point, the two green safety-switch indicators (CH1 + CH2) are lit. The hysteresis zone is identified by the blinking of the red display (ERR), while the green indicators continue to flash (both outputs remain either connected or disconnected, depending on the direction of the movement, and show the typical hysteresis behaviour). After exit from the hysteresis zone, both green indicators extinguish and a red indicator blinks.

The code numbers in the safety switch undergo a two-channel analysis procedure. The two channels monitor each other on a reciprocal basis. Each channel is provided with one output which features two output transistors. The output is continuously monitored also in a switched condition.

By the monitoring of the outputs a short-circuit between output and supply is recognised and a switching-on is prevented. In the event of short-circuit to earth or low voltage at one output, both outputs are switched-off. This results in short pulses on the non-faulty channel and, at the same time, constitutes a short-circuit-protection during normal operation. A resetting of the short-circuit-monitoring is not necessary due to the intermittent operation mode.

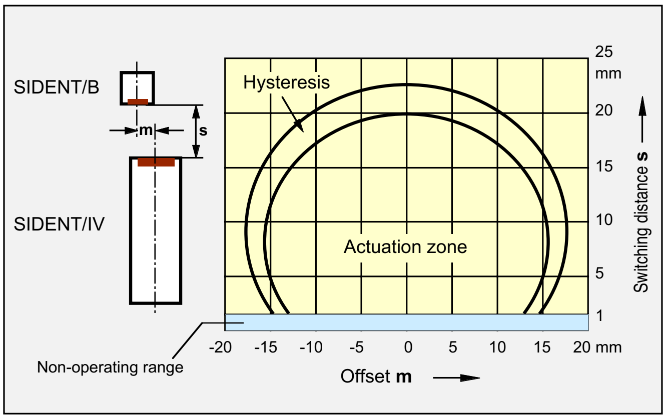
The evaluation device is typically a safety PLC (programmable logic controller) or an emergency relay. It supplies the operating voltage to the safety switch and its two outputs.

The supply of the outputs can give short timing signals which allow the PLC to check the connecting leads for circuit breaks and cross-circuits (for further details, refer to the technical data of the respective safety PLC). These are tolerated by SIDENT/IV to a large extent and do not impair its safety function. However, we recommend to compare with our compatibility list, which is continuously updated and can be requested on demand.

Actuation Zone

In case of parallel and centric alignment of the sensing faces of safety switch and actuating element, the following values apply. If the sensing faces are inclined at an angle of up to 30° to each other, deviations by ± 10% from the standard values occur.

Switching distance	s = 20 mm
Width of the actuation zone	W= 34 mm
Depth of the actuation zone	D = 24 mm
Width of the hysteresis	h = 1 ... 2 mm



Non-Contacting SIDENT/IV Roller- / Lift Gates and Windows

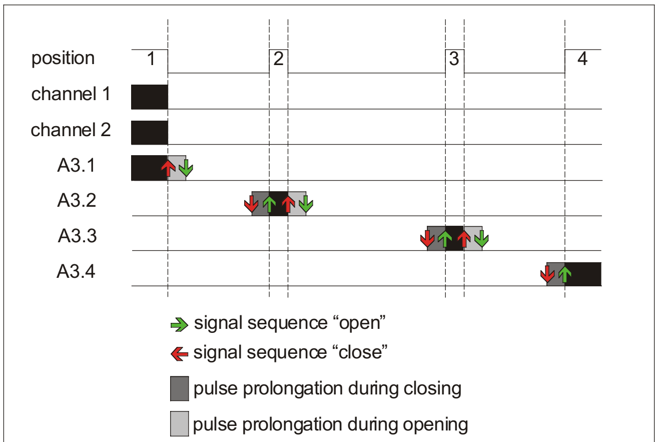
LED Display

The status of the SIDENT/IV (actuated/not actuated) and possible error situations can be derived from the LED indication. Some possibilities are represented below (version with 4 positions)

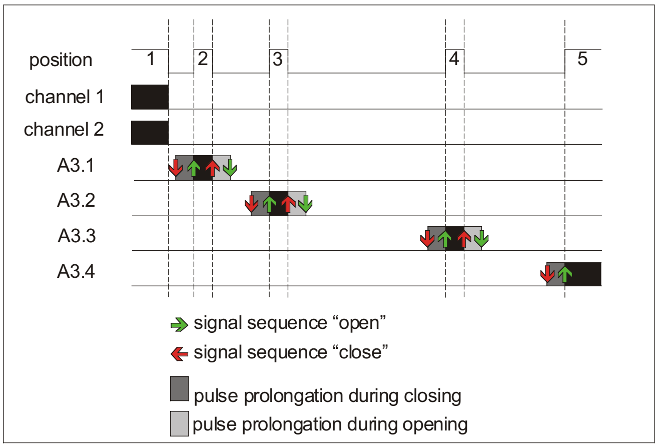
Situation	LED **CH1**	LED **CH2**	LED **error**	LED **A3.1**	LED **A3.2**	LED **A3.3**	LED **A3.4**
Normal operation							
Sensor actuated with safe position	on	on	off	on	off	off	off
position 2	off	off	on	off	on	off	off
position 3	off	off	on	off	off	on	off
position 4	off	off	on	off	off	off	on
Sensor not actuated	off	off	on	off	off	off	off
Hysteresis zone of the correspond. actuator	on	on	blinks	on	on	on	on
Error situation *(corresponding actuator in the actuating zone)*							
Channel 1 defective	off	on	on	off	off	off	off
Channel 2 defective	on	off	on	off	off	off	off
Short-circuit Channel 1*	blinks	blinks	on	off	off	off	off
Short-circuit Channel 2*	blinks	blinks	on	off	off	off	off
Short-circuit A3.1	on	on	off	blinks	off	off	off
Short-circuit A3.2	off	off	off	off	blinks	off	off
Short-circuit A3.3	off	off	off	off	off	blinks	off
Short-circuit A3.4	off	off	off	off	off	off	blinks

* against supply voltage (L-)

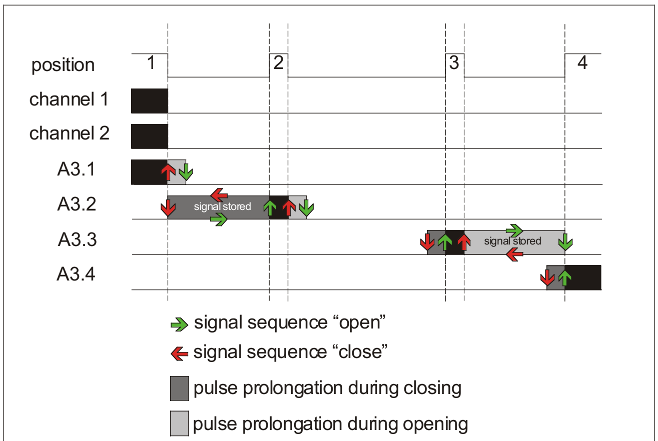
Signal sequence SIDENT/IV, ref. no. 13.14-47
for 4 positions without storage behaviour



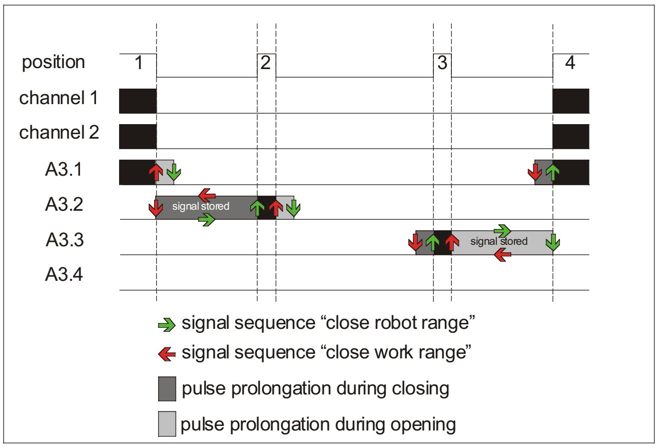
Signal sequence SIDENT/IV, ref. no. 13.14-47-100
for 5 positions without storage behaviour



Signal sequence SIDENT/IV, ref. no. 13.14-47-201
for 4 positions with storage behaviour

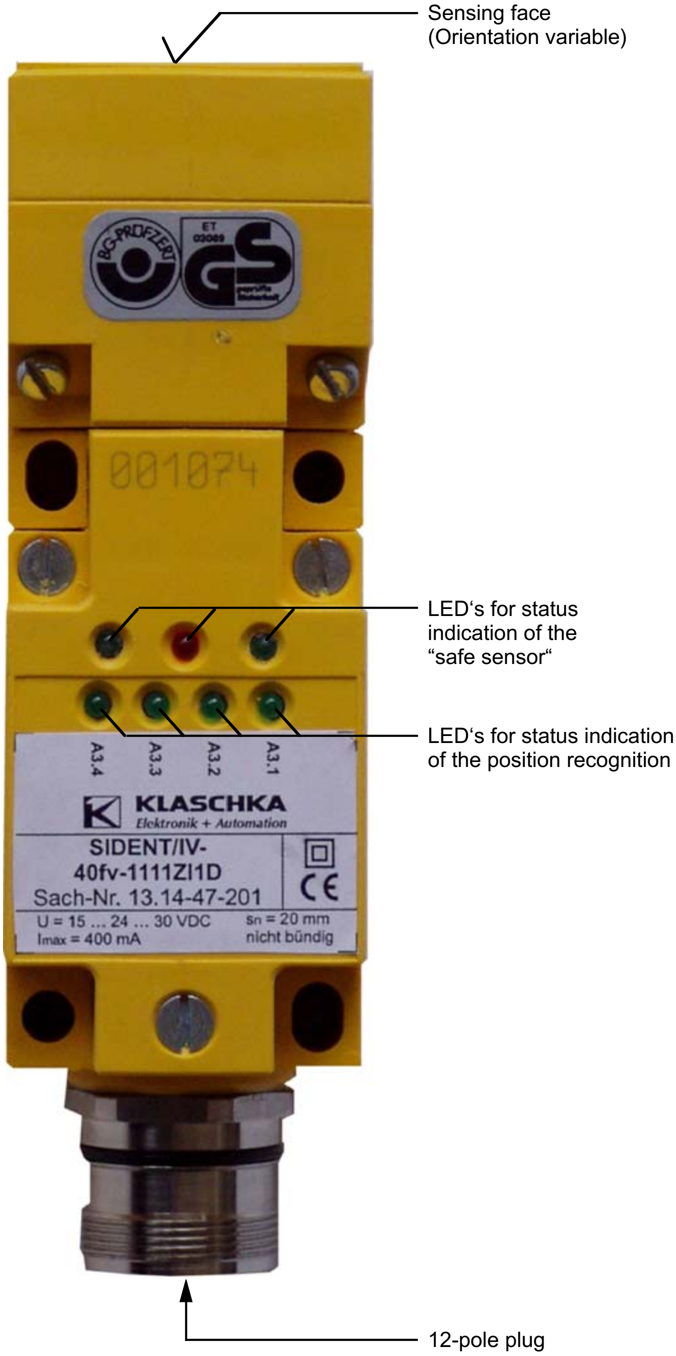


Signal sequence SIDENT/IV, ref. no. 13.14-47-202
with 2 safe positions and storage behaviour



Alignment of the Sensor Head

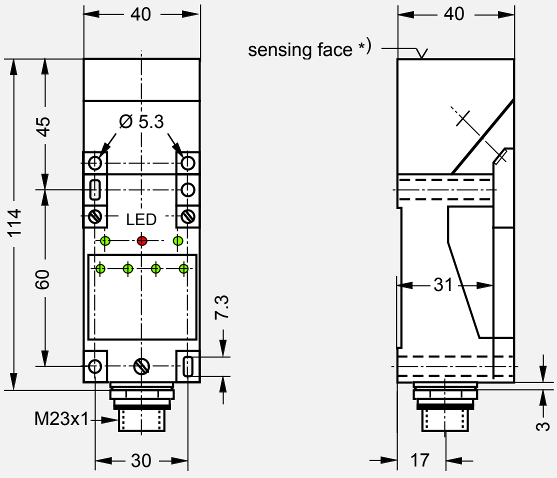
The sensor head is mounted by Klaschka in such a way so that the sensing face shows forward. The sensing face can be recognized at its impressed, concentric rings. In the case that another alignment is required, the orientation of the sensing face can be changed in two directions.



Non-Contacting Safety Switches
Series SIDENT/IV for Roller- / Lift Gates and Windows

Design; length	**☐ 40mm x 40 mm**; 114 mm	**☐ 40mm x 40 mm**; 114 mm
Material of the sensing face / of the housing	PBT / PBT	PBT / PBT
Nominal switching distance, mounting (see page 1.0.4)	**20 mm, non-flush**	**20 mm, non-flush**
Range secured switching distance	1 ... 16.2 mm	1 ... 16.2 mm
Type designation, Ref. no. — NO plus-switching 2 x NOp	SIDENT/IV-40fv-1111ZI1D, 13.14-47 (1)	SIDENT/IV-40fv-1111ZI1D, 13.14-47-100 (1)
Maximum switching frequency / Minimum damping period	**1 Hz / ≥ 0.5 s**	**1 Hz / ≥ 0.5 s**
Wiring (connector or lead); number of wires	connector M23; 12 wires	connector M23; 12 wires

Common Technical Data	
Safety rating according to EN 954-1	**4**
Identification of the actuating element SIDENT/B ...	6-digit number code
Hysteresis of the switching point s	< 15%
Secured switching-off distance	35 mm
Structure	2-channel, mutual monitoring
Permissible ripple voltage	≤ 15%
Short-circuit-proof ? / Prot. against polarity reversal ?	yes, clocking / yes
Function indication	2 x GN for identifcation 1 x RD for fault
Permissible operating voltage range	15 ... <u>24</u> ... 30 V DC
Current consumption without load	< 90 mA
Voltage supply for output stages	12 ... <u>24</u> ... 30 V DC, clock.
Perm. output current per output with 40 °C / 70 °C	< 400 mA / < 200 mA
Voltage drop over the force-tripped output stage	≤ 3 V DC
at 100 mA load current (A1)	typically 1.75 V DC
at 400 mA load current (A2)	maximally 3 V DC
Operating time after recognition of the act. element	150 ms, typically 185 ms
Dropout delay after removal of the act. element	> 75 ms, typically 100 ms
Time delay after supply of the operating voltage	ca. 2 s
Ambient temperature range	- 30 ... + 70 °C
Degree of protection according to IEC 60529	IP 67
Protective insulation ⧈ according to IEC 947	Protection class II
Weight	300 g



*) Orientation variable by reconstruction

Technical Data for Position Recognition		
Permissible operating voltage range L3+	15 ... <u>24</u> ... 30 V DC	15 ... <u>24</u> ... 30 V DC
Current consumption without load	< 45 mA	< 45 mA
Voltage drop over the force-tripped output stage at 100 mA load current	typically 1.75 V DC (A3.1 ... A3.4)	typically 1.75 V DC (A3.1 ... A3.4)
Permissible output current per output with 40 °C / 70°C	< 400 mA / < 200 mA (A3.1 ... A3.4)	< 400 mA / < 200 mA (A3.1 ... A3.4)
Operating time after recognition of the actuating element	typically 10 ms	typically 10 ms
Dropout delay after removal of the actuating element	typically 200 ms	typically 200 ms
Storage behaviour		
Time delay after supply of the operating voltage	ca. 1 s	ca. 1 s
Operating speed	maximally 1 m/s	maximally 1 m/s
Short-circuit-proof ? / protected against polarity reversal ?	yes, clocking / yes	yes, clocking / yes
Function indication	4 x GN for position	4 x GN for position
Max. lead length	300 m	300 m
Recommended accessories	see chapter 12	see chapter 12

Certifications
Proximity switch according to standard: DIN EN 60 947-5-3: 2000-02.
73/23/EWG „Low voltage guideline“
89/336/EWG „EMC guidelines“
98/37/EG „Machinery guideline“
Produced according to DIN EN ISO 9001

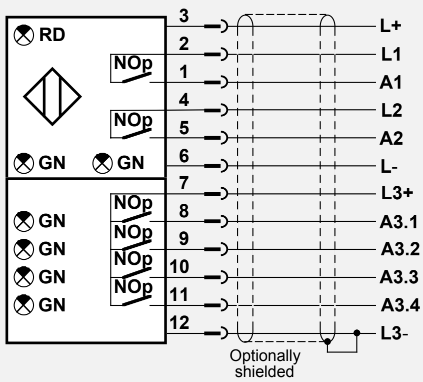
Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotechnics.

Design Type Test Certification 03088
GS Test Certificate 03089

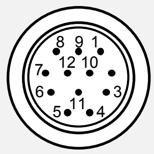
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

Subject to technical changes!

Wiring (1)
DC 12-poles, plug

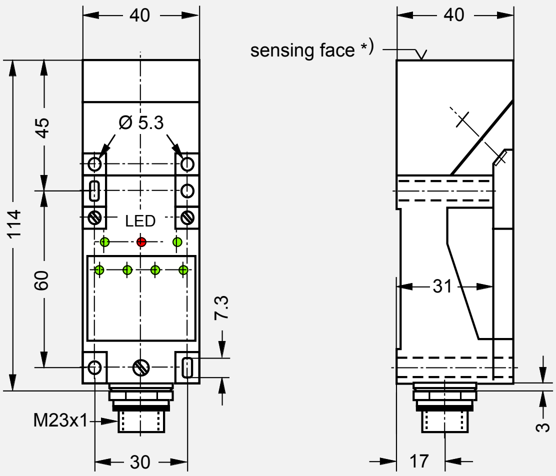


Plug M23



KLASCHKA
Elektronik + Automation

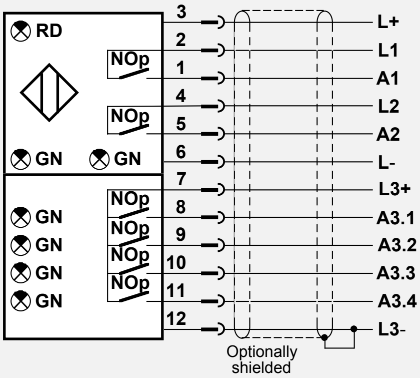
□ **40mm x 40 mm**; 114 mm	□ **40mm x 40 mm**; 114 mm		
PBT / PBT	PBT / PBT		
20 mm, non-flush	**20 mm, non-flush**		
1 ... 16.2 mm	1 ... 16.2 mm		
SIDENT/IV-40fv-1111ZI1D, 13.14-47-201 (2)	SIDENT/IV-40fv-1111ZI1D, 13.14-47-202 (2)		
1 Hz / ≥ 0.5 s	**1 Hz / ≥ 0.5 s**		
connector M23; 12 wires	connector M23; 12 wires		



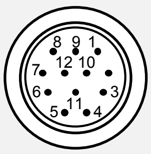
*) Orientation variable by reconstruction

15 ... 24 ... 30 V DC	15 ... 24 ... 30 V DC		
< 45 mA	< 45 mA		
typically 1.75 V DC (A3.1 ... A3.4)	typically 1.75 V DC (A3.1 ... A3.4)		
< 400 mA / < 200 mA (A3.1 ... A3.4)	< 400 mA / < 200 mA (A3.1 ... A3.4)		
typically 10 ms	typically 10 ms		
typically 200 ms	typically 200 ms		
ati A3.2 + A3.3	bei A3.2 + A3.3		
ca. 1 s	ca. 1 s		
maximally 1 m/s	maximally 1 m/s		
yes, clocking / yes	yes, clocking / yes		
4 x GN for position	4 x GN for position		
300 m	300 m		
see chapter 12	see chapter 12		

Wiring (2)
DC 12-poles, plug



Plug M23



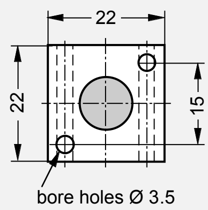
Non-Contacting Safety Switches

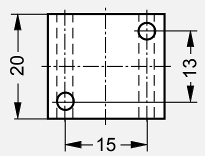
Series Actuating Elements SIDENT/Bfor Roller- / Lift Gates and Windows

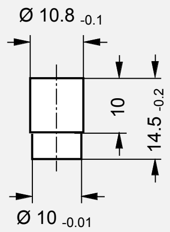
Design; length	☐ **22 mm x 22 mm;** 20 mm	**O 10.8 mm;** 14.5 mm
Material of the sensing face / of the housing	plastic / plastic	Crastin / Crastin
Mounting	**non-flush**	**non-flush**
Type designation, Ref. no. — Actuating elements	SIDENT/B-22fv20-4O1, 13.14-30-xxx	SIDENT/B-11fs14-4O1, 13.14-40-xxx
Mounting instruction	preferably with one-way-screws	preferably to be glued in place

Common Technical Data

Safety rating according to EN 954-1	**4 (includes category 3)**
Identification of the actuating element SIDENT/B ...	6-digit number code
Ambient temperature range	- 30 ... + 70 °C
Degree of protection according to IEC 60529	IP 67
Protective insulation ⧈ according to IEC 947	Protection class II
Certification of the BGFE:	
Design Type Test Certificate	03088 / 06188 / 07003
GS Test Certificate	03089 / 06189 / 07004







Specific Technical Data

Weight	13 g	2 g
Ref. no. for transponder with safety position and switching position 1	13.14-30-**001**	13.14-40-**001**
Ref. no. for transponder **spare part** with safety position and switching position 1	13.14-30-**002**	13.14-40-**002**
Ref. no. for actuating element with switching position 2	13.14-30-**022**	13.14-40-**022**
Ref. no. for actuating element with switching position 3	13.14-30-**032**	13.14-40-**032**
Ref. no. for actuating element with switching position 4	13.14-30-**042**	13.14-40-**042**
Only for SIDENT 13.14-47-100 = Ref. no. for act. element with switch.pos. 1	13.14-30-**012**	13.14-40-**012**

Certifications

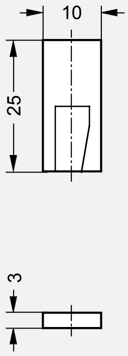
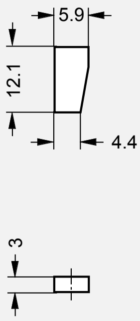
Proximity switch according to standard: DIN EN 60 947-5-3: 2000-02.
73/23/EWG „Low voltage guideline“
89/336/EWG „EMC guidelines“
98/37/EG „Machinery guideline“
Produced according to DIN EN ISO 9001

Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotechnics.

Safety Regulations

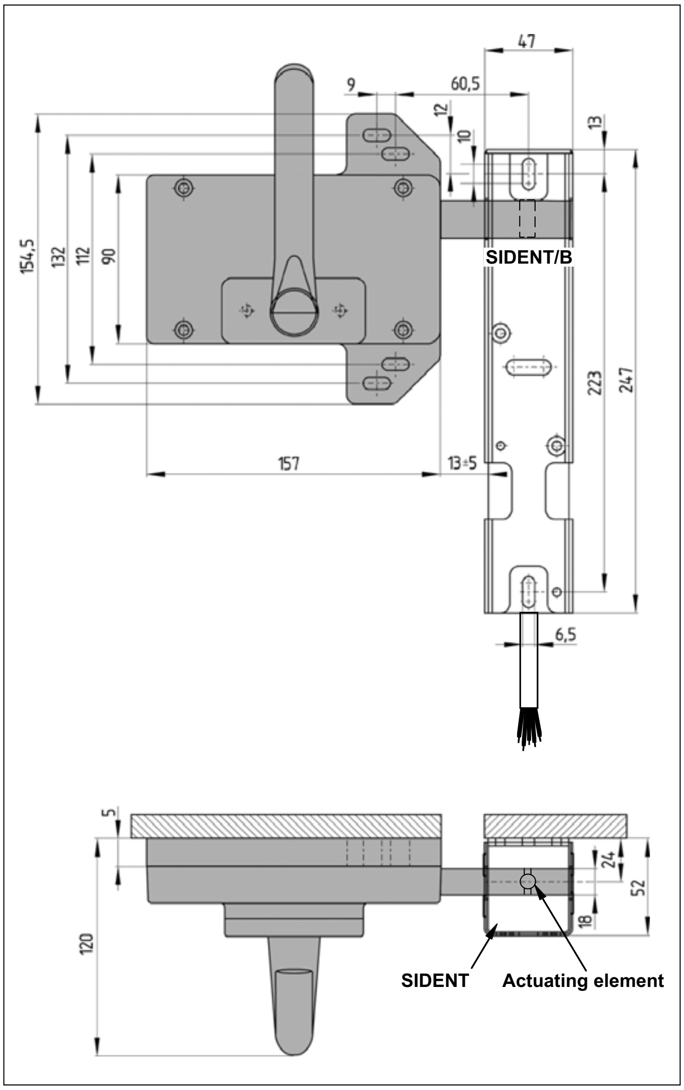
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

Subject to technical changes!

□ **10 mm x 3 mm;** 25 mm	□ **5.9 mm x 3 mm;** 12.1 mm		
plastic / plastic	plastic / plastic		
non-flush	**non-flush**		
SIDENT/B-10fs25-4O1, 13.14-64-xxx	SIDENT/B-6fs12-4O1, 13.14-66-xxx		
to be glued in unsolvably because of manipulation danger	to be glued in place unsolvably because of manipulation danger		
			
1 g	0.8 g		
13.14-64-**001**	13.14-66-**001**		
13.14-64-**002**	13.14-66-**002**		
13.14-64-**022**	13.14-66-**022**		
13.14-64-**032**	13.14-66-**032**		
13.14-64-**042**	13.14-66-**042**		
13.14-64-**012**	13.14-66-**012**		

Safety Components
Series Safety Door Handles with SIDENT

	Safety door handels	Door hinge left **without** panic handle, can be convert. for door hinge right	
	Safety rating according to EN 954-1	3	3
Type designation Ref no. (Wiring)		TGY/r1-Sid3-1.3, 43.20-01 (1)	TGY/r1-Sid3-2.3, 43.20-02 (2)
	Type designation safety switch	SIDENT/III-40fv114n20-11Z1C	SIDENT/III-40fv114n20-11Sh1C
	Ref no. safety switch	13.14-65	13.14-44
	Wiring (connector or lead); number of wires	connector M23; 6 wires	connector M12; 6 wires
	Manufacturer	Schmersal	Schmersal



Certifications
Proximity switch according to standard: DIN EN 60 947-5-3: 2000-02.
73/23/EWG „Low voltage guideline“
89/336/EWG „EMC guidelines“
98/37/EG „Machinery guideline“
Produced according to DIN EN ISO 9001

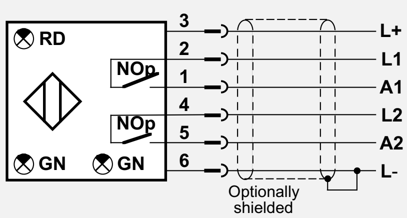
Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotechnics.

Design Type Test Certification	07003 / 06188
GS Test Certificate	07004 / 06189

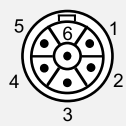
Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

Subject to technical changes!

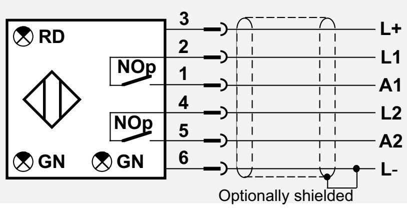
Wiring (1)
DC 6-poles, Coninvers RC plug



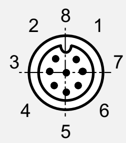
Plug M23



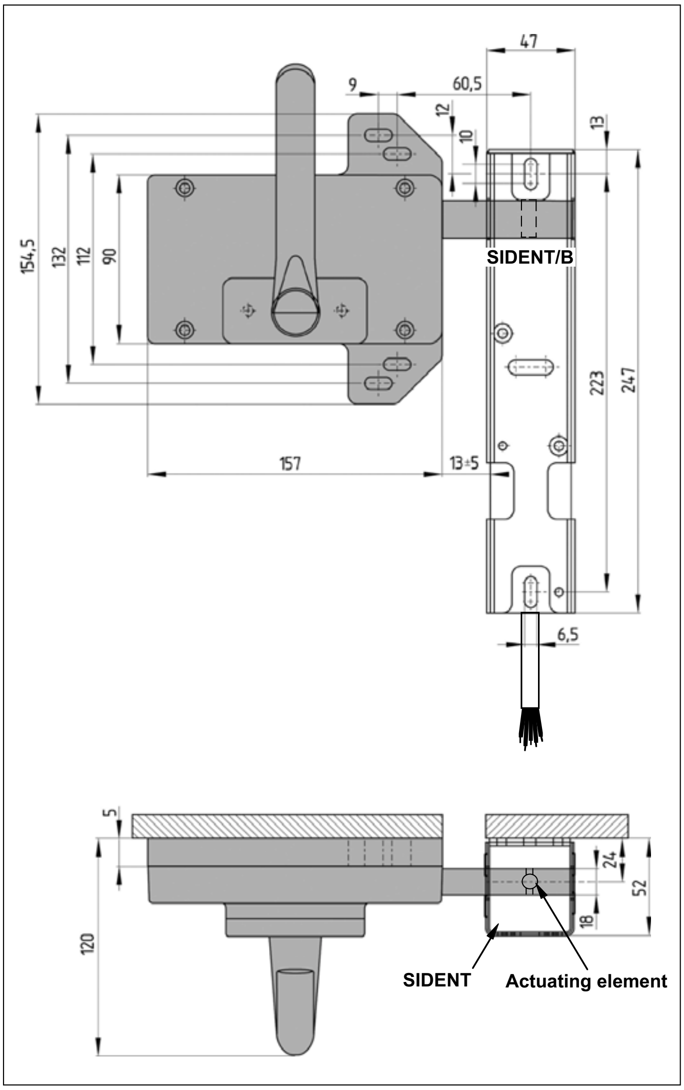
Wiring (2)
DC 6-poles, plug

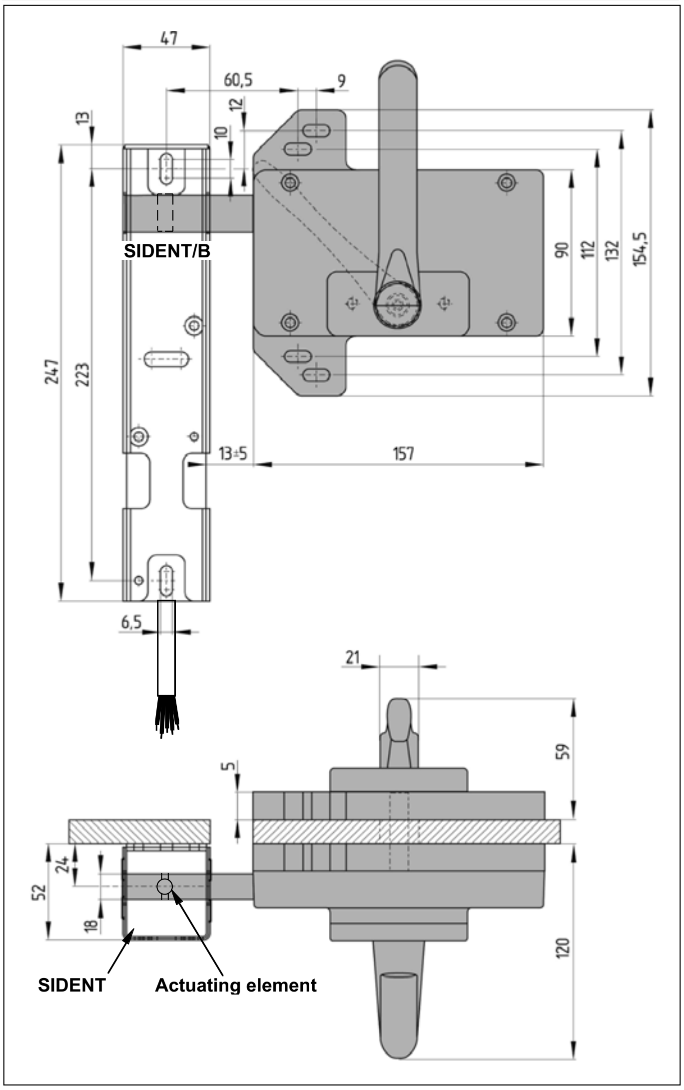


Plug M12



Door hinge left **without** panic handle, can be be converted for door hinge right	Door hinge right **with** panic handle, can be conv. for door hinge left	
4	3	4
TGY/r1-Sid4-1.3, 43.20-04 (1)	TGY/r1f-Sid3-1.3, 43.20-03 (1)	TGY/r1f-Sid4-1.3, 43.20-05 (1)
SIDENT/IV-40fv114n20-11Z1C	SIDENT/III-40fv114n20-11Z1C	SIDENT/IV-40fv114n20-11Z1C
13.14-33	13.14-65	13.14-33
connector M23; 6 wires	connector M23; 6 wires	connector M23; 6 wires
Schmersal	Schmersal	Schmersal





Specific Sensors
Foil Detection Sensors

Characteristics

In its response area the foil detection sensor reacts with the **same distance sensitivity** to all thin and thick layers and solid parts made of arbitrary metals. Environmental influences can be adapted by means of an integrated adjustment potentiometer.

The **sensivity** of the sensor depends on the size of the metal surface area which is parallel to the sensing face of the sensor. The **diagram** on the right shows the dependence of the maximum sensing switching distance s in relation to the nominal switching distance sn of the sensor as function of the ratio of diameter of the object to the diameter of the sensing face.

The sensor reacts with very short **response times** of less than 50 µs and is therefore capable of detecting very short parts, which move with a very high speed.

The sensor is magnetic field-resistant up to 150 mTesla. The presence of strong magnetic DC- and AC-fields, e.g. of engines or relays, do not lead to any disturbance or destruction of the sensor.

The sensor is available in **three different housing sizes** for sensing distances up to 70 mm. Special housings can be supplied on request.

Mounting is possible in a flush and a non-flush way. The permissible temperature range is between +10 °C and +60° C. With values of sn > nominal switching distance and thus greater sensivity, the temperature range is limited further.

Application

In the packaging industry, in the food and mail order business metal-coated plastic- and metal foils are frequently used.

Examples are:

- Carton packaging for milk and fruit juices,
- Packaging of chocolate and pralines,
- Cigarette packaging.

The foil detection sensor detects metallic coatings and/or the foil even through non-metallic partition walls and plastic packaging. It can be applied as a **presence detector** as well as for **counting procedures.**

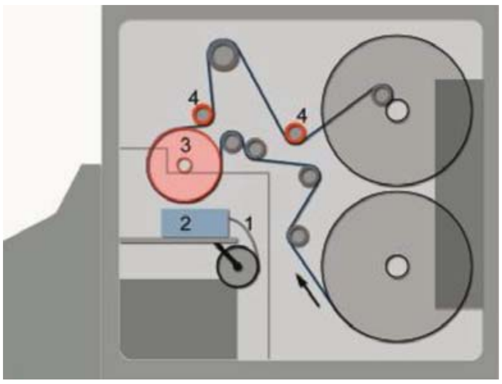
In addition, the sensor is also suitable for the **dispatch of modern data media** in paper- or plastic packing, as CDs, DVDs or SIM memory cards have several metallic coatings. These coatings are typically of aluminium or copper and have layer thicknesses of less than 1 µm. In sorting plants, the metal foil detection sensor safely detects a CD-ROM or a SIM card in a padded envelope.

When using the sensor for **quantity counting**, for example in packaging machines, the response time of the sensor and thus the attainable highest counting speed play an important role. Having a response time of less than 50 us, the sensor detects parts with the diameter of that of a 1 Cent coin.

(= 16.25 mm) in a distance of 20 mm and which move with a speed of 150 m/s.

Thus the sensor is also suitable for the detection of smallest parts, e.g. of coins after embossment. Production speeds up to over 100 pieces per second can be reliably controlled.

Another possible use is checking the presence of a metal coating in metal-plated injection-moulded housings.



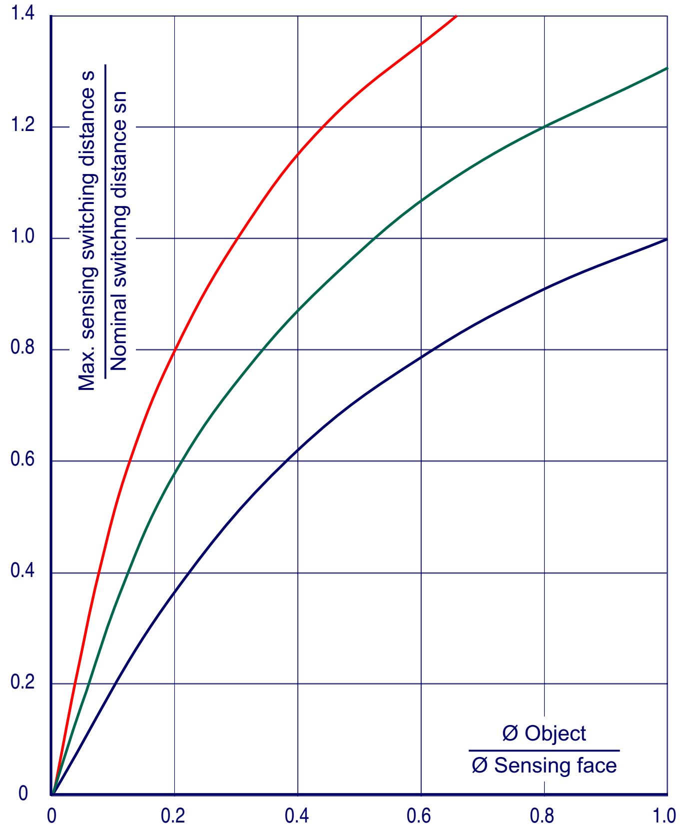
Function diagram of the coating plant:
metal wire (1), vaporizer (2),
coating drum (3) and measuring rolls (4)

Foil detection sensor IED/AHM-80aq40b40-12Sd1B

Foil detection sensors
IED/AHM-40aq40b15-12Sd1B IED/AHM-30mg50b10-12Sd1A

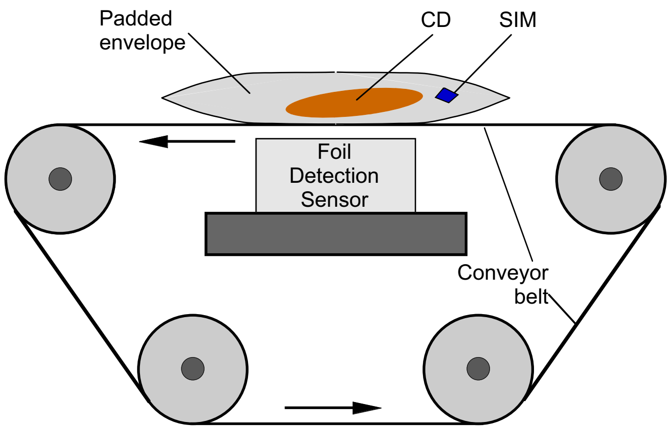
Foil Detection Sensor

Switching distance as a function of the diameter of the object



Application Example

CD and SIM - detection in a padded envelope



Foil Detection Sensors

Type	Ref. No.	Series	Nominal switching distance sn in mm	Mounting	Ø Sensing face mm
IED/AHM-30mg50b10-12Sd1A **)	11.39-04-000	All metall	9 ... 10 ... 18	b	27
IED/AHM-40aq40b15-12Sd1B **)	11.39-05-000	All metall	13 ... 15 ... 26	b	38
IED/AHM-80aq40b40-12Sd1B	11.39-03-000	All metall	35 ... 40 ... 70	b	78

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

****)** = supply on request

Foil Detection Sensors IED/AHM-30mg, -40aq, -80aq

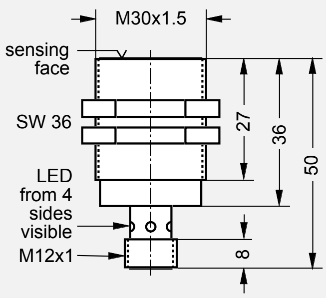
Sensor principle; design; height;	**Foil detection sensor; O M30 x 1.5 mm**
length	50 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated
Nominal switching distance, mounting (see page 1.0.4)	**10 mm, flush**
Type designation, Ref. no. — NO and NC plus-switching NOp + NCp	IED/AHM-30mg50b10-12Sd1A 11.39-04-000
Max. switching frequency / Min. damping period	**15 kHz / 33 µs**
Wiring (connector or lead); number of wires	connector M12; 4 wires

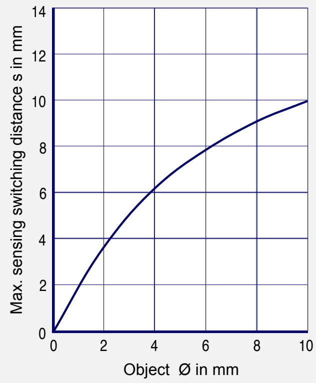
Common Technical Data

Reduction factor	**1 for all metals**
Hysteresis of the switching point s	< 15%
Permissible ripply voltage	≤ 10%
Short-circuit-protection ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	+ 10 ... + 60 °C

Note

For values sn > 40 mm the ambient temperature range is insignificantly reduced. This depends a.o. on the adjusted switching distance and the environmental conditioins. The adjustment of the switch should be done in a mounted condition. With values sn > 70 mm a reliable function cannot be guaranteed.





Specific Technical Data

Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 30 mA
Load current	≤ 200 mA
Permissible capacity at the output	75 V DC
Ø Sensing face	≤ 1.0 µF
	16.5 mm
Function indication	YE for actuated
Maximum lead length	500 m
Lead type / standard lead length / number of wires x lead cross section	
Utilization category according to IEC 60947-5-2	DC 13
Degree of protection according to IEC 60529	IP 67
Protection class	II, ⧈
Permissible torque without / with toothed disc	150 Nm / < 200 Nm
Weight	75 g
Recommended accessories	see chapter 12

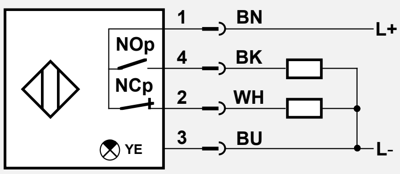
For proximity switches with connectors: Please find the required connector with connecting lead in chapter 12 “Accessories“. Order separately.

For proximity switches with connecting lead: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of the ref. no. by index -020 or -050. In case that deviating lengths are required, please indicate this in the ref. no..

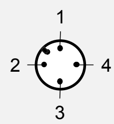
Examples: Lead length10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring

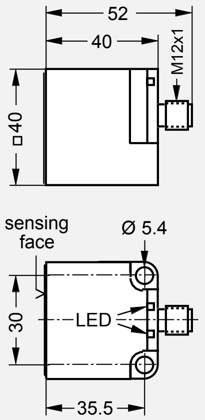
DC 4-poles, plug

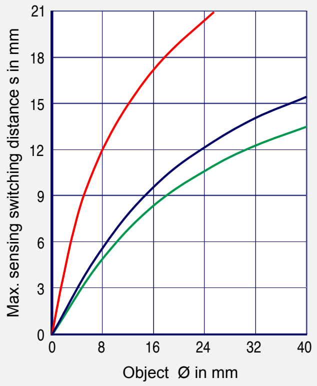


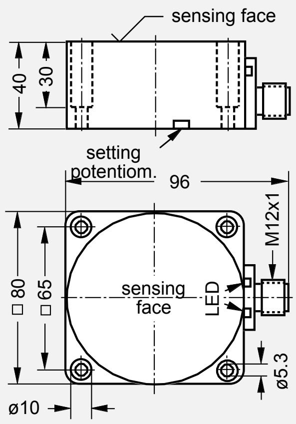
Euro Plug M12

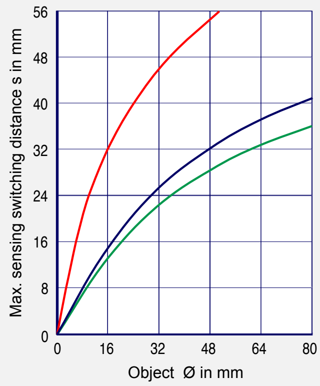


Foil detection sensor; □ 40 mm; 40 mm	**Foil detection sensor; □ 80 mm;** 40 mm
40 mm	80 mm
PBT / Al	PBT / Al
adjustable 13 ... 15 ... 26 mm, flush	**adjustable 35 ... 70 mm, flush**
IED/AHM-40aq40b15-12Sd1B 11.39-05-000	IED/AHM-80aq40b40-12Sd1B 11.39-03-000
10 kHz / 50 µs	**10 kHz / 50 µs**
connector M12; 4 wires	connector M12; 4 wires



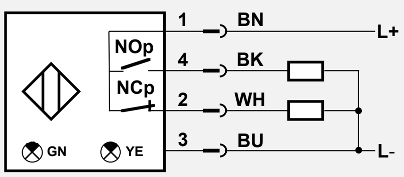




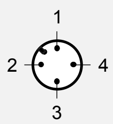


10 ... 24 ... 30 V DC	10 ... 24 ... 30 V DC
≤ 30 mA	≤ 30 mA
≤ 200 mA	≤ 200 mA
75 V DC	75 V DC
≤ 1.0 µF	≤ 1.0 µF
38 x 38 mm	78 mm
GN for operation, YE for actuated	GN for operation, YE for actuated
500 m	500 m
DC 13	DC 13
IP 67	IP 65
II, ⊡	
90 g	360 g
see chapter 12	see chapter 12

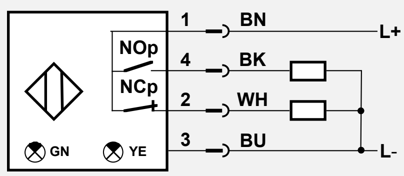
Wiring
DC 4-poles, plug



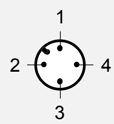
Euro Plug M12



Wiring
DC 4-poles, plug



Euro Plug M12



Specific Sensors
IND Sensors for Seam Detection at Metal Tubes

Task

Metal tubes are delivered on coils. These tubes are then fed into a processing machine. The seam between two succeeding tube sections must be reliably recognised in order to avoid damages at the tool and the machine.

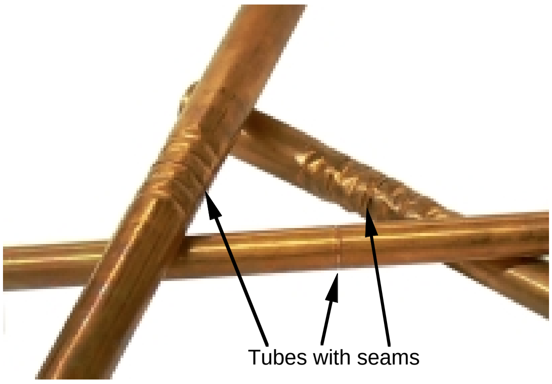
Tubes made of copper, aluminium, high-grade steel, steel or other suitable metals and metal alloys are used for the production of tube-machined parts, e.g. fittings, in tube-bending machines. The tube insertion frequently happens off a coil.

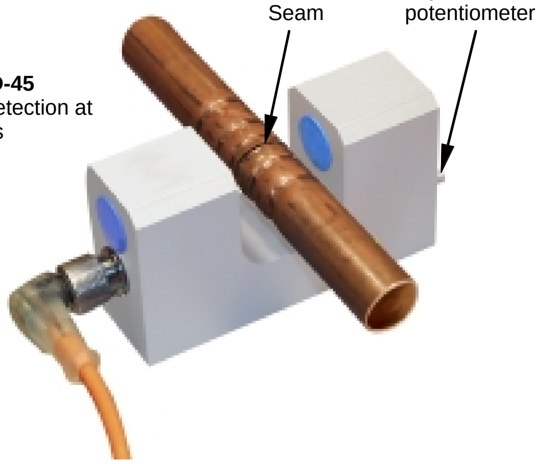
The ends of succeeding tube sections are connected with each other by pressing on a short tube piece with a smaller diameter.

The sensor detects the seams of the tube passing through and generates a pulse which lasts several hundred milliseconds. The machine is stopped and the seam is detached.

The sensor is available in two different sensor sizes for tube diameters from 12 to 22 mm and from 22 to 32 mm. Sensors for other tube diameters are available on request.

The sensor has a permissible ambient temperature range between + 10 °C and + 60 °C.





Sensor **IND-45**
for seam detection at
metal tubes

Principal Mode of Function

By means of an installed potentiometer the sensor can be adjusted to the tube diameter and in its sensitivity.

When the tube is passing through, the seam releases a short signal at the output of the IND sensor which is extended to approx. 300 ms by an installed time function element. The tube speed can thereby reach 1 m/s. This signal can be used for stopping the tube transport.

If no tube is inserted, a permanent signal appears at output A.

The output current IA may maximally be 200 mA.

The output signal A can be processed in the PLC-control of the machine.

The voltage supply range of the sensor is 12 … 24 … 30 V DC.

Tube-bending machine

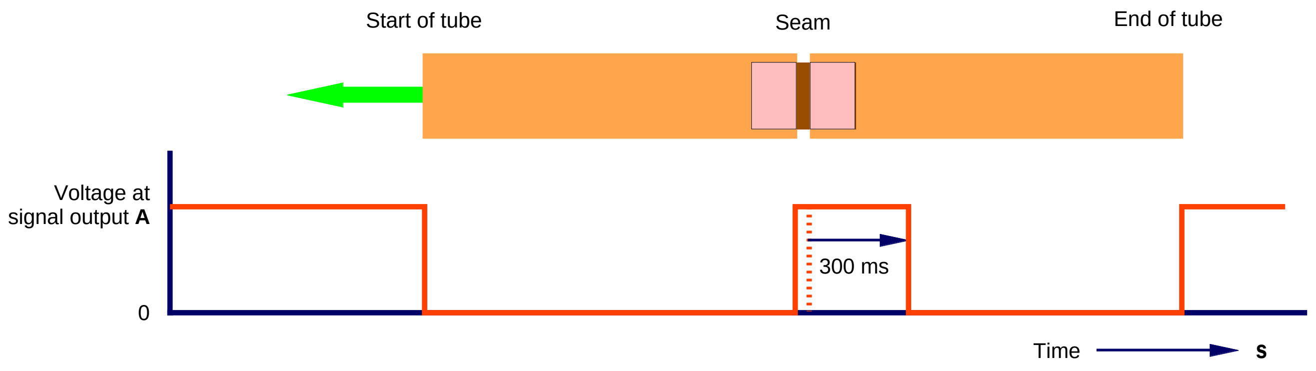
Application

The IND sensor is used for the seam detection after winding off a tube from a coil. The sensor is mounted before the tube enters the machine. Between sensor and intake into the machine sufficient place must be available for stopping the tube movement. The passage of the tube through the sensor must be sufficiently soothed by levelling rollers which are placed in front of and behind the sensor (side- and height fluctuations < 1 mm).

The sensor can be applied in all tube-processing machines, where the tube is supplied off a coil and where the feeding of a joint sleeve connecting tube sections must be prevented.

IND Sensor for Seam Detection at Metal Tubes

Signal sequence



IND Sensors for Seam Detection at Metal Tubes

Type	Ref. No.	Series	For tube diameter in mm	Mounting	Max. passage width in mm
IND/A-45as95n22...32-1Sd1A **)	15.16-01	Specific sensor	22 ... 32	Mounted on	45
IND/A-30as95n12...22-1Sd1A **)	15.16-02	Specific sensor	12 ... 22	Mounted on	33

**) = supply on request

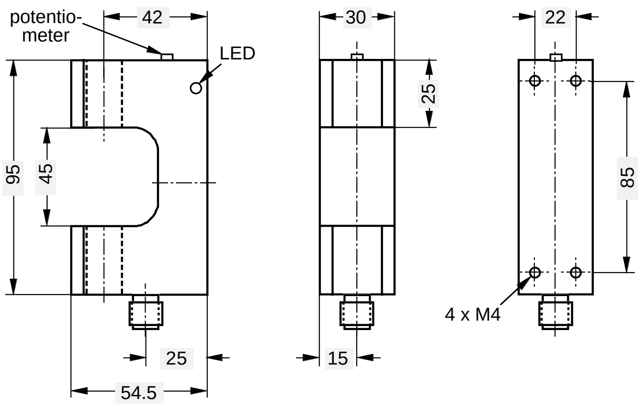
Specific Sensors
Seam Detection IND-45as, -33as

Sensor principle; design; length;	**Seam detection; fork;** 95 mm
Width; height	30 mm; 54.5 mm
Material of the sensing face / of the housing	PBT / Al
Fork width; applicable for tube-Ø	**45 mm; 22 ... 32 mm**
Mounting dimensions (l x w)	85 x 22 mm

Type designation, Ref. no.		IND/A-45as95n22...32-1Sd1A	15.16-01	(1)
Shortest temporal distance between 2 seams		**1.5 s**		
Wiring; number of wires		connector M12; 4 wires		

Common Technical Data

Suitability	**for all non-ferromagnetic metals**
Permissible ripple of the operating voltage	≤ 10%
Short-circuit-proof ?	yes, clocking
Protected against polarity reversal ?	yes
Voltage drop over a closed contact	≤ 2.5 V DC
Ambient temperature range	+ 10 ... + 60 °C



Specific Technical Data

Permissible operating voltage range	10 ... 24 ... 30 V DC
Current consumption without load	≤ 30 mA
Load current for each output	≤ 200 mA
Rated insulation voltage	75 V DC
Permissibly capacity at the output	≤ 1.0 µF
Ø Sensing face	16.5 mm
Function indication ?	YE for actuated
Maxum lead length	500 m
Lead type / standard lead length / number of cores x lead cross section	
Utilization category according to IEC 60947-5-2	DC 13
Protection type according to IEC 60529	IP 65
Protection class	
Weight	350 g
Recommended accessories	see chapter 12

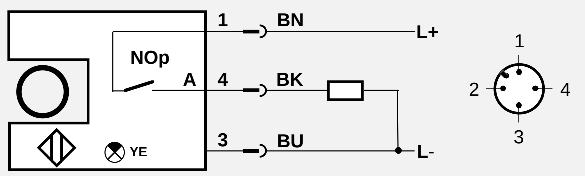
For proximity switches with connectors: Please find the required connector with lead connection in chapter 12 „Accessories". Order separately .

For proximity switches with lead connection: The standard lead length is 2.0 m and/or 5.0 m. Please indicate deviating lengths in the ref. no. index.

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 4-poles, plug

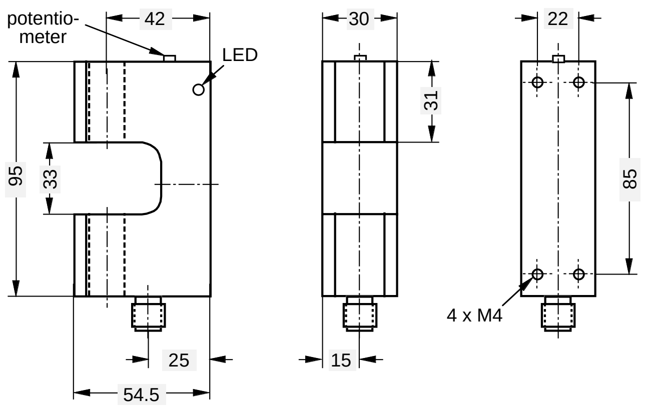
Euro plug M12



Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Seam detection; fork; 95 mm	
30 mm; 54.5 mm	
PBT / Al	
33 mm; 12 ... 22 mm	
85 x 22 mm	
IND/A-33as95n12...22-1Sd1A 15.16-02 (1)	
1.5 s	
connector M12; 4 wires	



10 ... 24 ... 30 V DC	
≤ 30 mA	
≤ 200 mA	
75 V DC	
≤ 1.0 µF	
16.5 mm	
YE for actuated	
500 m	
DC 13	
IP 65	
350 g	
see chapter 12	

Specific Sensors
IVA Inductive Valve Position Sensor

Task

The task of the inductive IVA valve position sensor is to convert the position of the manually operated actuator at one- or multi-position servo valves into an analogous end signal by interrogation of the tappet.

The inductive principle used shall be applicable to different tappet dimensions and stroke paths. The single-sided actuation out of an idle position has to be realisable as well as a double-sided actuation out of a central position.

The admissible ambient temperature range shall cover the range from - 40 °C up to + 105 ° C (optionally + 125 °C).

With an operating voltage of + 12 … 24 … 30 V DC the output voltage u via stroke path w shall range from 0 V via 5 V (central position) up to 10 V with a double-sided actuation, from 0 V (initial position) up to 10 V with a single-faced actuation.

The sensor shall be inexpensive and easy to be installed.

Principal Mode of Function

By its outer appearance the valve position sensor looks like a normal inductive sensor, but due to the design of the actuator and a specific circuit it is especially adapted to its task.

The tappet as actuator consists of three sections: A steel section, an air gap and a section of non-ferrous metal, e.g. aluminium.

These three different sections of the actuator generate an S-shaped output voltage signal over the stroke path. Its gradient can be modified by the formation of the width of the air gap, as shown in the charts on the right page.

The air gap width can be varied. If it exceeds a certain degree, a low gradient develops in the central position. Thus an adaptation to the stroke path required can be realised. A further adaptation can be achieved by deforming the faces of the metallic sections on either side up to the air gap, e. g. by chamfering the faces by 45 °.

The output signal u = 0 ... 10 V DC, which is analogous to the stroke path, can be processed via an analogous input in a programmable controller, which we gladly supply on request.

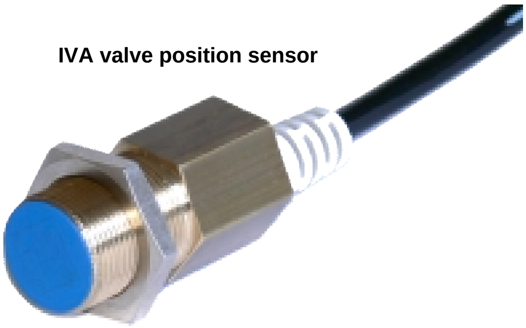
The supply voltage of the sensor is 12 … 24 … 30 V DC.

Application

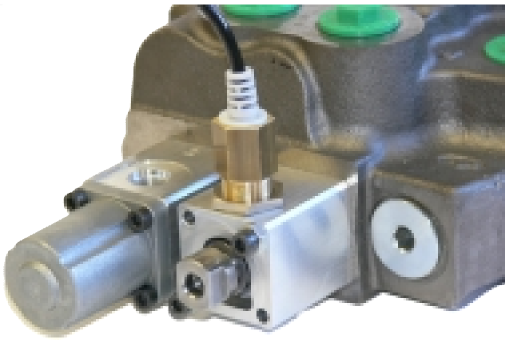
The IVA sensor is mainly used as valve position sensor for manually actuated sensor valves, but can also be used as actual value sensor at actuating elements of any type. Examples are:

- Handling facilities
- Lifting tables
- Doors
- Combinations break - coupling
- Pedal positions

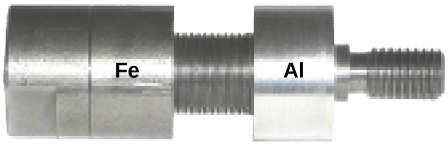
IVA valve position sensor

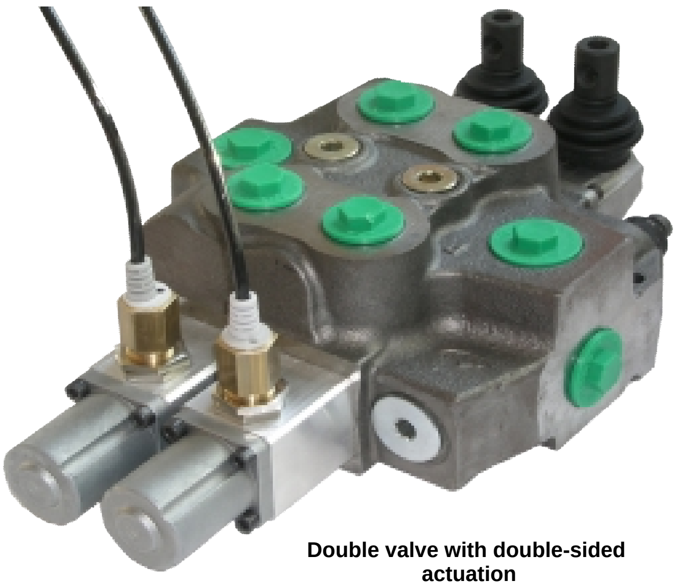


Valve position sensor installed (test)



Tappet

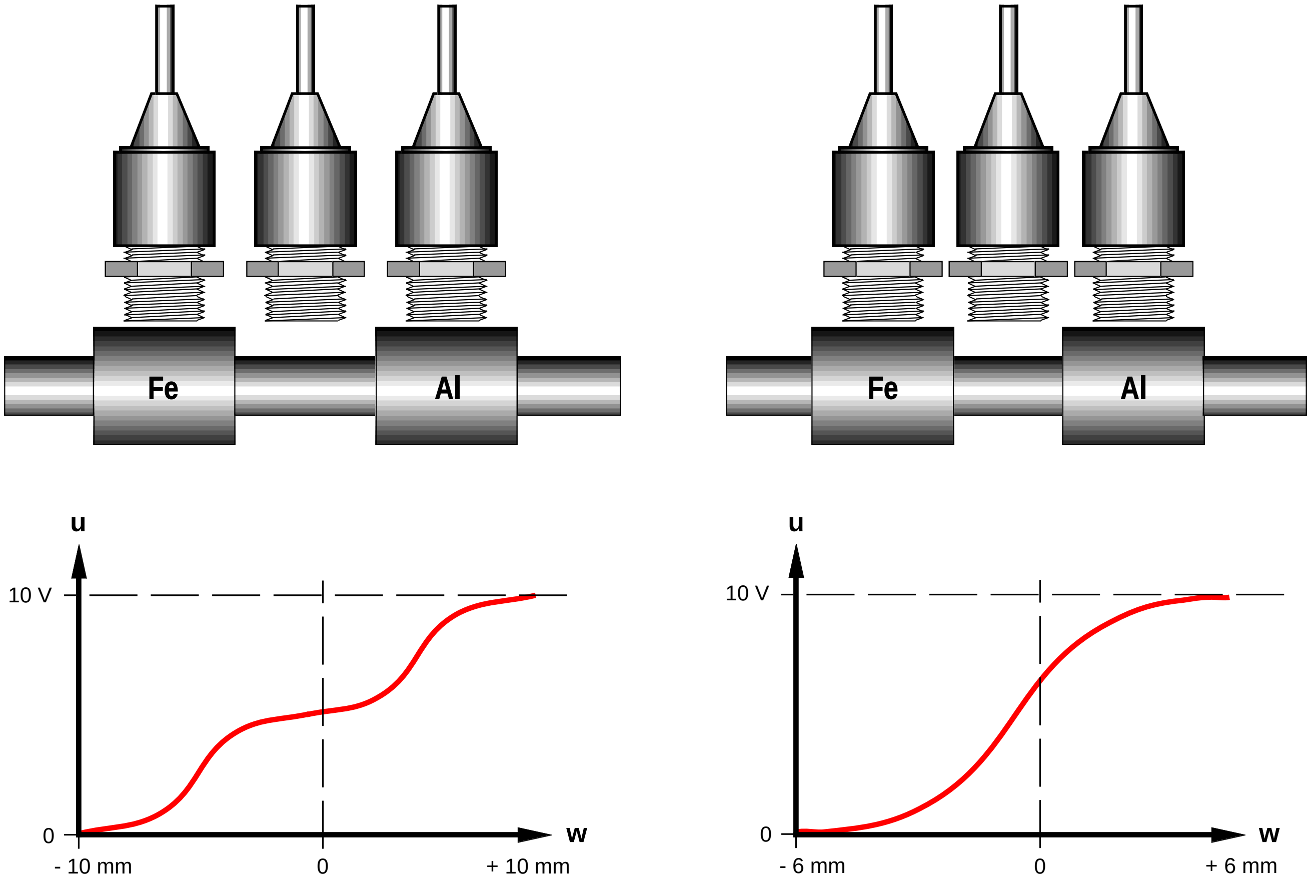




Double valve with double-sided actuation

IVA Sensor for Position Detection for Valves with Double-Sided Action

Principal signal trace



IVA Valve Position Sensor

Type	Ref. No.	Series	Travel range in mm	Mounting	Ø Sensing face in mm
IVA-18ms41b±6-1Pkc1/1	13.31-01	valve position	± 6 ... ± 10	flush	16.5

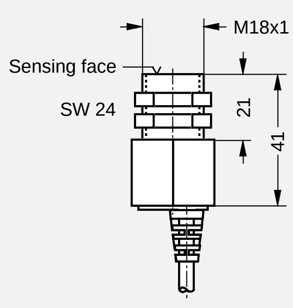
Specific Sensors
Valve Position Sensor IVA

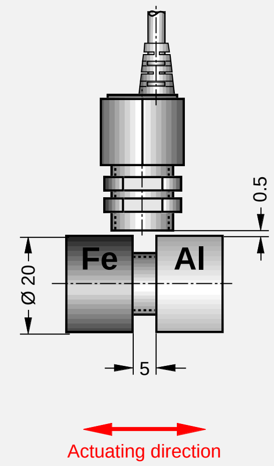
provisional

Sensor principle; design; length	**Valve position recognition; Ø M18 x 1;** 41 mm
Material of the sensing face / of the housing	PBT / CuZn nickel-plated
Path range; mounting	**± 7 mm; flush**
Actuating distance a	**0.5 mm**
Type designation, Ref. no. (Wiring)	IVA-18ms41b±6-1PKc1/1, 13.31-01 (1)
Wiring (connector or lead); number of wires	lead; 3 wires

Common Technical Data

Voltage output	approx. 0.5 ... 4.5 V DC
Repitition accuracy of the measuring range (m. r.)	approx. 0.5%
Deviation of the linearity in zero point	± 0.5% (m.r.)
Temperature drift in zero point (+ 20 ... + 80 °C)	± 0.05% (m.r.) / K
Sensitivity in zero point	1.12 V / mm
Permissible ripple of the operating voltage	≤ 10%
Short-circuit-proof ?	no
Protected against polarity reversal ?	yes





Specific Technical Data

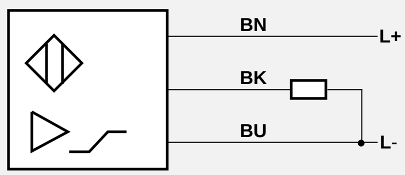
Permissible operating voltage range	15 ... 24 ... 30 V DC
Ø Sensing face	16.5 mm
Function indication	no
Maximum lead length	20 m
Lead type / standard lead length / number of leads x lead cross section	PK / 1.0 m / 3 x 0.34 mm^2
Protection type acording to IEC 60529	IP 67
Protection class	
Permissible torque with / without toothed disc	34 Nm / 70 Nm
Weight	approx. 77 g with 1 m lead (without counter nuts)
Recommended accessories	see chapter 12

These values refer to the specified actuator geometry:
Steel (Fe) ... 5 mm air gap ... Aluminium (Al).

For proximity switches with lead connection: The standard length is 2.0 m and/or 5.0 m. Lead lengths are marked at the end of each ref. no. by the index -020 and/or -050. Please indicate deviating lengths in the ref. no. index.

Examples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.

Wiring (1)
DC 3-poles, lead connection



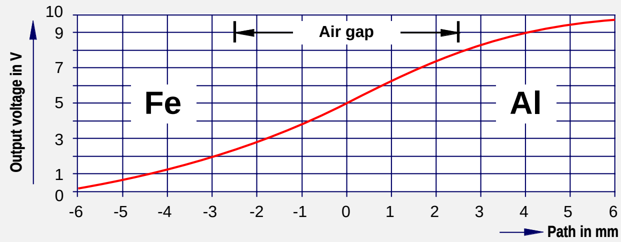
Certifications
Proximity switches according to standard:
DIN EN 60 947-5-2 (VDE 0660 Part 208).
Manufactured according to DIN EN ISO 9001

CE

Safety Regulations
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Output function with 5 mm air gap



KLASCHKA
Elektronik + Automation

Connectors, Leads, Adaptors, Distributors
Overview

Cordsets with sockets

Cordset with socket and plug

Field attachable leads and connectors

Cordsets with 2 sockets and 1 plug

Code for the Type Designation

Example of a type code	JS	M12	V	4	gy	/	L	H	3	x	0.34	u	4.5	BK
Consecutive number	1	2	3	4	5	6	7	8	9	10	11	12	13	14

= Sensor- / actor accessories socket M12 angled, 4-poles, green and yellow indicators. PVC radiation cross-linked lead, 3-lines, cross section of single line 0.34 m^2, unshielded lead, diameter of lead jacket 4.5 mm, black lead jacket

1 — **JS** sensor- / actor accessories of **connector**

2 — **Connector design**

F Panel connector	**M5** M5 connector
M6 M6 connector	**M8** M8 connector
M12 M12 connector	**M18** M18 connector
V30 Connector Ø 30 mm	
Y, Z Special connectors	

3 — **Connector versions**

- **E** Built-in plug, straight
- **F** Built-in plug, angled
- **G** Built-in socket, straight
- **H** Built-in socket, angled
- **K** Term. box for dir. mount.

Screwed connection (g):

- **S** Plug straight, g
- **T** Plug angled, g
- **U** Socket straight, g
- **V** Socket angled, g

Snap-in locking (r):

- **W** Male plug straight, r
- **X** Male plug angled, r
- **Y** Female plug straight, r
- **Z** Female plug angled, r

4 — **Pole number of connector**
Example: **4** 4-poles

5 — **Indicator in connector**
without LED: No marking

- **g** 1 LED green
- **r** 1 LED red
- **y** 1 LED yellow
- **gy** 1 LED green + 1 LED yellow

7 — **(J) L** Sensor / actor accessories **lead**

8 — **Lead Type, material of lead jacket**

- **N** PVC
- **P** PUR
- **T** Teflon / special lead
- **H** PVC radiation cross-linked
- **Q** PUR welding spark-proof

9 — **Number of lead lines**
Example: **3** 3-lines

11 — **Cross section of single line in 0.01 mm^2**
Example: **0.34** 0.34 mm^2 **1.0** 1.0 mm^2 usw.

12 — **Shield**

- **u** unshielded lead
- **s** single shield
- **v** pairwise stranded without shield
- **w** pairwise stranded with shield
- **x** pairwise stranded with double shield
- **k** coaxial lead
- **t** double shield

13 — **Diameter of lead jacket in mm**
Example: 3.5 3.5 mm

14 — **Colour of lead jacket**

BK black	**GN** green	**PK** pink
BN brown	**BU** blue	**TQ** turquoise
RD red	**VT** violet	**TR** transparent
OG orange	**GY** grey	
YE yellow	**WH** white	

For **leads with connectors on both ends** the number block between 2 and 5 of the type code of the second plug is entered separated by a backslash.
Example: JSM12U4gy / LP40.34u3.6BK / SM12S4
= Sensor- / actor accessories socket M12 straight, 4-poles, indicator green and yellow. PUR-lead, 4-poles, cross section of single line 0.34 m^2, unshielded lead, diameter of lead jacket 3.6 mm, black lead jacket; plug M12 straight, 4-poles, without indicator.

For **connectors** without lead the numbers between 7 and 14 of the type code are omitted.
Example: JSM8S3
= Sensor- / actor accessories plug M8 straight, 3-poles, without indicator

For **leads without connectors** the numbers between 2 and 6 of the type code are omitted.
Example: JLH3x0.34u4.5BK
= PVC radiation cross-linked lead , 3-poles, cross section of single line 0.34 m^2, unshielded lead, diameter of lead jacket 4.5 mm, black lead jacket

Versions with 2 equal plugs, 2 equal leads and 1 terminating plug have the follwoing type code:
JS2xM8U3gy / L2xP3x0.34u3.6BK / SM12S4.

Ref. No.
for Identification of Lead Length and Lead Type

For the order information the **type code** and **ref. no.** have to be indicated. The ref. no. of accessories with leads indicates

- the **length of the lead in 0.1 m-steps**
- the **lead type** in capital letters **according to the consecutive number 8 in the type code** in a 4-digit **annex** to the ref. no..

Scheme:

Ref. no. 13.97-16-**020Q** **the lead has a length of 2.0 m, the lead jacket is made of PUR, welding spark-proof**

Connectors with leads are supplied in **3 standard lengths**, on customer request - against an extra charge - also in **special lengths**:

Standard lengths:	**-020**	**lead length 2.0 m**
	-050	**lead length 5.0 m**
	-100	**lead length 10.0 m**
Example for special lengths:	**-150Q**	**lead length 15.0 m, PUR-lead welding spark-proof**
	-003N	**lead length 0.3 m PVC-lead**

Accessories for Sensors
Cordsets with M8- and M12- Connectors

Connector	lead M8	lead socket M8
Version; pole number;	straight; 3- and 4-poles	angled; 3- and 4-poles
Material: Housing / moulded 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

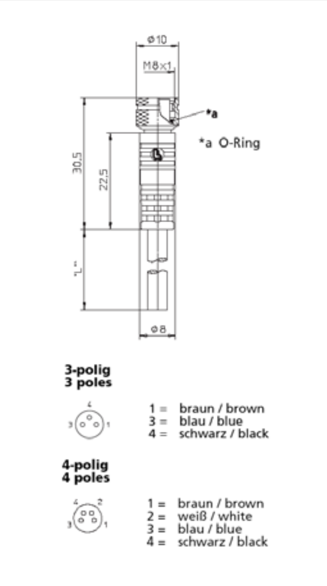
socket M8 angled

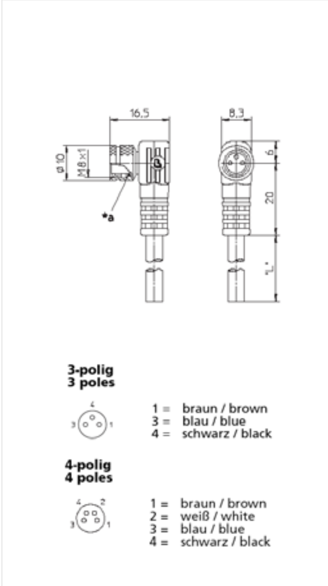
socket M8 angled with indicator

socket M12 straight

socket M12 straight with indicator

socket M12 angled with indicator

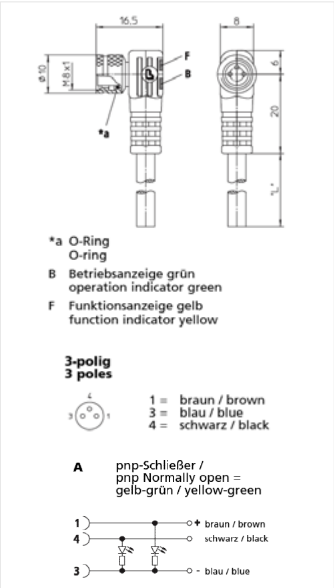


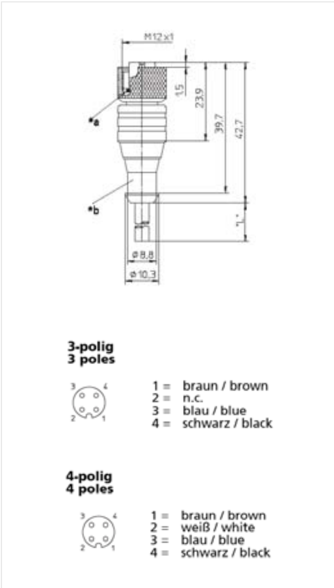


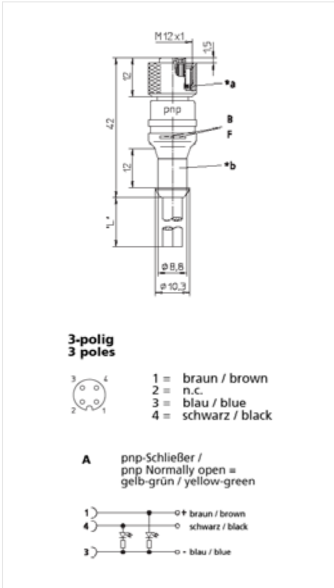
***) see type code on page 12.0.2**

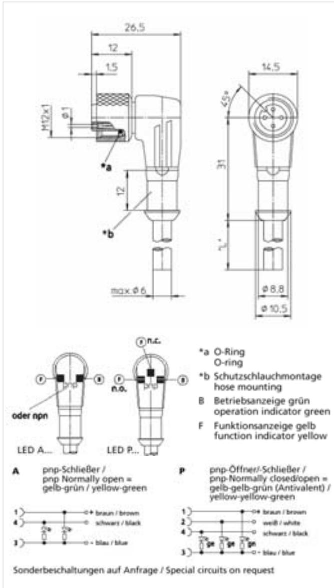
Type designation *)	**JSM8U3 / LN3x0.34u5.0OG**	**JSM8V3 / LN3x0.34u5.0OG**
Ref. no. for lead length 2 m; 5 m; 10 m; on request *)	**13.97-01-020; -050; -100; -xxx *)**	**13.97-05-020; -050; -100; -xxx *)**
Nominal voltage at 40 °C; contact resistance	60 V; 4 A; ≤ 5 mΩ	60 V; 4 A; ≤ 5 mΩ
Material of lead jacket; lead colour	PVC; OG	PVC; OG
Lead diameter; number of single lines x cross section	5.0 mm; 3 x 0.34 mm^2	5.0 mm; 3 x 0.34 mm^2
Number of LED's and colour	0	0
Degree of protection acc. to IEC 60529 (in locked position); shield	IP 67; unshielded	IP 67; unshielded
Ambient temperature range	- 25 ... + 80 °C	- 25 ... + 80 °C
Type designation *)	**JSM8U3 / LP3x0.34u4.3BK**	**JSM8V3 / LP3x0.34u4.3BK**
Ref. no. for lead length 2 m; 5 m; 10 m; on request *)	**13.97-02-020; -050; -100; -xxx *)**	**13.97-06-020; -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	PUR; BK	PUR; BK
Lead diameter; number of single lines x cross section	4.3 mm; 3 x 0.34 mm^2	4.3 mm; 3 x 0.34 mm^2
Number of LED's and colour	0	0
Degree of protection acc. to IEC 60529 (in locked position); 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 lines x cross section	5,0 mm; 4 x 0.25 mm^2	5.0 mm; 4 x 0.25 mm^2
Number of LED's and colour	0	0
Degree of protection acc. to IEC 60529 (in locked position); shield	IP 67; unshielded	IP 67; unshielded
Ambient temperature range	- 25 ... + 80 °C	- 25 ... + 80 °C
Type designation *)	**JSM8U4 / LP4x0.34u4.7BK**	**JSM8V4 / LP4x0.34u4.7BK**
Ref. no. for lead length 2 m; 5 m; 10 m; on request *)	**13.97-04-020; -050; -100; -xxx *)**	**13.97-08-020; -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	PUR; BK	PUR; BK
Lead diameter; number of single lines x cross section	4.7 mm; 4 x 0.34 mm^2	4.7 mm; 4 x 0.34 mm^2
Number of LED's and colour	0	0
Degree of protection acc. to IEC 60529 (in locked position); 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 with indicator**	**lead socket M12 with indicator**
angled; 3-poles	**straight; 3- and 4-poles**	**straight; 3-poles**	**angled; 3- and 4-poles**
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 gold-plated	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	Binder, Lumberg RKT/LED	Binder, Lumberg RKWT/LED





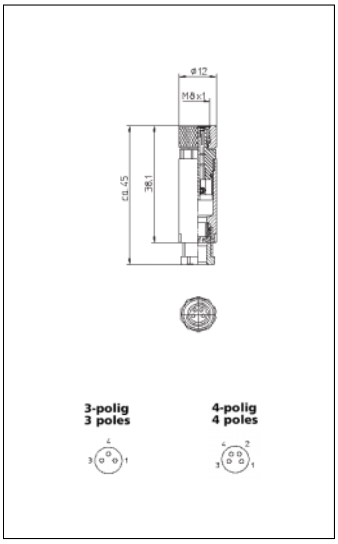


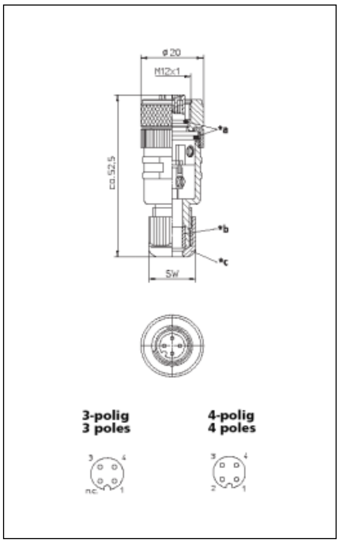


JSM8V3gy / LN3x0.34u5.0OG	**JSM12U3 / LN3x0.34u5.0OG**	**JSM12U3gy / LN3x0.34u5.0OG**	**JSM12V3gy / LN3x0.34u5.0OG**
13.97-09-020; -050; -100; -xxx *)	**13.97-11-020; -050; -100; -xxx *)**	**13.97-15-020; -050; -100; -xxx *)**	**13.97-17-020; -050; -100; -xxx *)**
10 ... 30 V DC; 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ	10 ... 30 V DC; 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	1 LED GN + 1 LED YE	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
JSM8V3gy / LP3x0.34u4.3BK	**JSM12U3 / LQ3x0.34u4.5OG**	**JSM12U3gy / LQ3x0.34u4.5OG**	**JSM12V3gy / LQ3x0.34u4.5OG**
13.97-10-020; -050; -100; -xxx *)	**13.97-12-020; -050; -100; -xxx *)**	**13.97-16-020; -050; -100; -xxx *)**	**13.97-18-020; -050; -100; -xxx *)**
10 ... 30 V DC; 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ	10 ... 30 V DC; 4 A; ≤ 5 mΩ	10 ... 30 V DC; 4 A; ≤ 5 mΩ
PUR; BK	PUR welding spark-proof; OG	PUR welding spark-proof; OG	PUR welding spark-proof; OG
4.3 mm; 3 x 0.34 mm^2	4.5 mm; 3 x 0.34 mm^2	4.5 mm; 3 x 0.34 mm^2	4.5 mm; 3 x 0.34 mm^2
1 LED GN + 1 LED YE	0	1 LED GN + 1 LED YE	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		**JSM12V4gyy / LN4x0.25u5.0OG**
	13.97-13-020; -050; -100; -xxx *)		**13.97-19-020; -050; -100; -xxx *)**
	240 V; 4 A; ≤ 5 mΩ		10 ... 30 V DC; 4 A; ≤ 5 mΩ
	PVC; OG		PVC; OG
	5.0 mm; 4 x 0.25 mm^2		5.0 mm; 4 x 0.25 mm^2
	0		1 LED GN + 2 LED YE
	IP 67; unshielded		IP 67; unshielded
	- 25 ... + 80 °C		- 25 ... + 80 °C
	JSM12U4 / LQ4x0.34u4.7OG		**JSM12V4gyy / LQ4x0,34u4.7OG**
	13.97-14-020; -050; -100; -xxx *)		**13.97-20-020; -050; -100; -xxx *)**
	240 V; 4 A; ≤ 5 mΩ		10 ... 30 V DC; 4 A; ≤ 5 mΩ
	PUR welding spark-proof; OG		PUR welding spark-proof; OG
	4.7 mm; 4 x 0.34 mm^2		4.7 mm; 4 x 0.34 mm^2
	0		1 LED GN + 2 LED YE
	IP 67; unshielded		IP 67; unshielded
	- 25 ... + 80 °C		- 25 ... + 80 °C

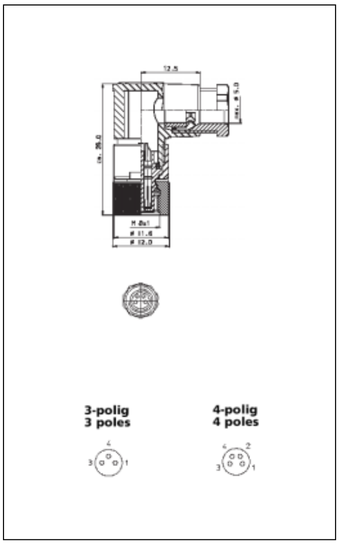
Accessories for Sensors
Field Attachable Sockets

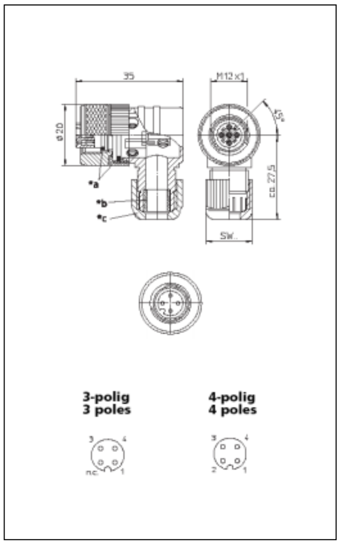
Connector; type of lead connection	lead socket M8; screwable	lead socket M12; screwable
Version	straight	straight
Pole number: Type designation; ref. no.	3-poles: JSM8U3; 13.98-01	3-poles: JSM12U3; 13.98-05
Pole number: Type designation; ref. no.	4-poles: JSM8U4; 13.98-02	4-poles: JSM12U4; 13.98-06
Material: Housing / moulded 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 lines x cross section	3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
Degree of protection acc. to IEC 60529 (in locked position)	IP 67	IP 67
Ambient temperature range	- 40 ... + 85 °C	- 25 ... + 90 °C
Manufacture	Lumberg RKMCK	Lumberg RKC



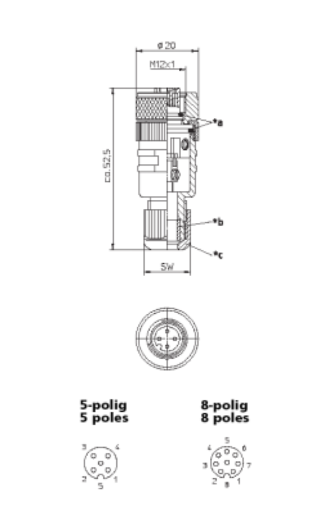


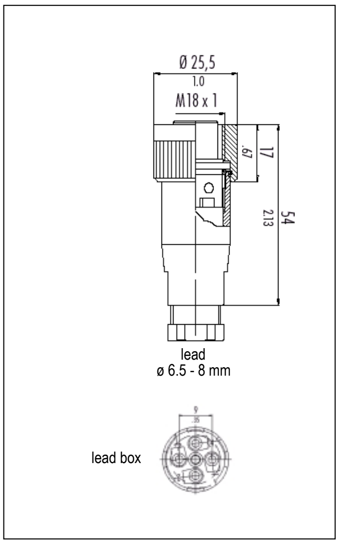
Connector; type of lead connection	socket M8; screwable	socket M12; screwable
Version	angled	angled
Pole number: Type designation; ref. no.	3-poles: JSM8V3; 13.98-03	3-poles: JSM12V3; 13.98-07
Pole number: Type designation; ref. no.	4-poles: JSM8V4; 13.98-04	4-poles: JSM12V4; 13.98-08
Material: Housing / moulded 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 lines x cross section	3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
Degree of protection acc. to IEC 60529 (in locked position)	IP 67	IP 67
Ambient temperature range	- 40 ... + 85 °C	- 25 ... + 90 °C
Manufacture	Lumberg RKMCW	Lumberg RKCW

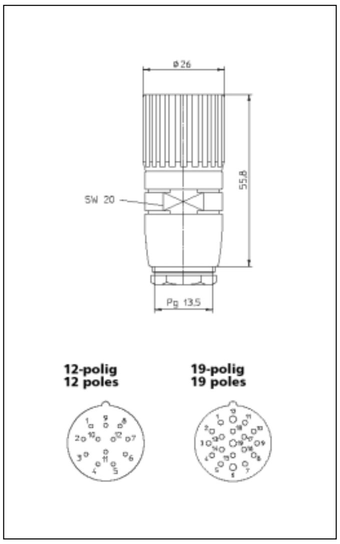


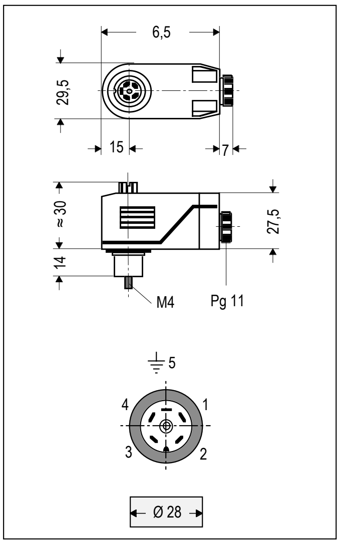


lead socket M12; screwable	lead socket M18; srewable	lead socket M23; solderable	socket V28; screwable
straight	straight	straight	angled
5-poles: JSM12U5; 13.98-09	4-poles: JSM18U4; 13.98-13	12-poles: JSM23U12; 13.98-15	5-poles: JSV28V5; 13.98-19
8-poles: JSM12U8; 13.98-10		19-poles: JSM23U19; 13.98-16	
PA / PA / PA	PA / PA / PA	CuZn nickel-plated / PBT / GF	
CuZn nickel-plated	CuZn	CuZn nickel-plated	
CuZn gold-plated	CuZn	CuZn gold-plated	
60 V (8-pol. 30 V); 4 A (8-pol. 2 A); ≤ 5 mΩ	250 V; 5 A; ≤ 8 mΩ	240 V (19-pol. 120 V); 7.5 A; ≤ 5 mΩ	
0	0	0	
3.0 ... 6.5 mm	3.0 ... 6.5 mm	PG 13.5	
5 / 8 x 0.34 mm^2	4 x 0.34 mm^2	12 / 19 x 0.34 mm^2	
IP 67	IP 65	IP 67	
- 25 ... + 90 °C	- 40 ... + 85 °C	- 40 ... + 90 °C	
Lumberg RKC	Binder series 714	Lumberg RKC	Amphenol

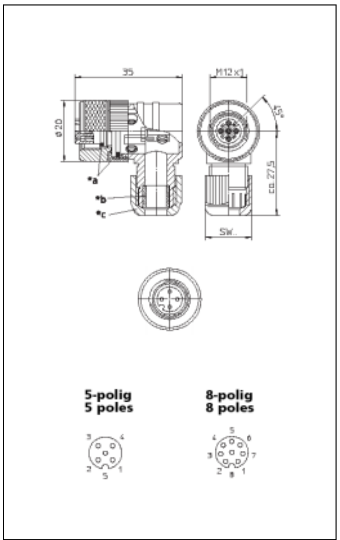


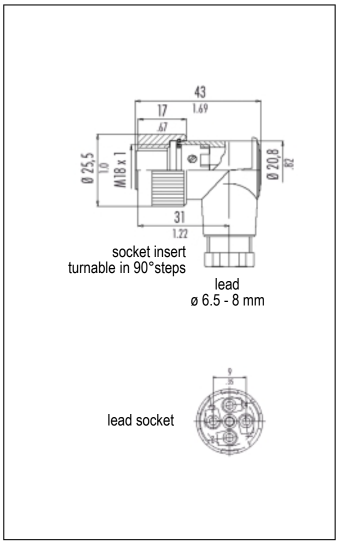


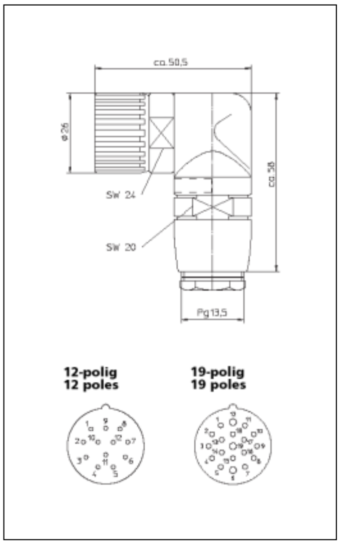




socket M12; screwable	socket M18; screwable	socket M23; solderable	
angled	angled	angled	
5-poles: JSM12V5; 13.98-11	4-poles: JSM18V4; 13.98-14	12-poles: JSM23V12; 13.98-17	
8-poles: JSM12V8; 13.98-12		19-poles: JSM23V19; 13.98-18	
PA	PBT / PA / PA	CuZn nickel-plated / PBT / GF	
CuZn nickel-plated	CuZn	CuZn nickel-plated	
CuSn gold-plated	CuZn	CuZn gold-plated	
60 V (8-pol. 30 V); 4 A (8-pol. 2 A); ≤ 5 mΩ	250 V; 5 A; ≤ 8 mΩ	240 V (19-pol. 120 V); 7.5 A; ≤ 5 mΩ	
0	0	0	
3.0 ... 6.5 mm (8-pol. 4.0 ... 8.0 mm)	3.0 ... 6.5 mm	PG 13.5	
5 / 8 x 0.34 mm^2	4 x 0.34 mm^2	12 / 19 x 0.34 mm^2	
IP 67	IP 65	IP 67	
- 25 ... + 90 °C	- 40 ... + 85 °C	- 40 ... + 90 °C	
Lumberg RKCW	Binder series 714	Lumberg RKCW	

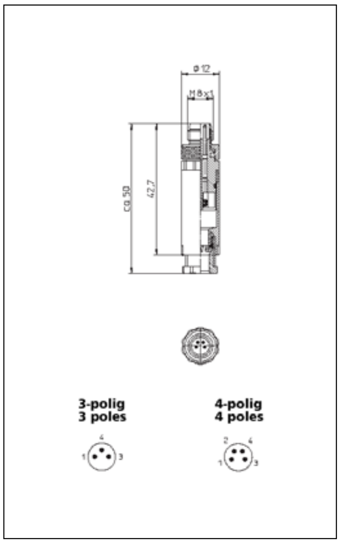


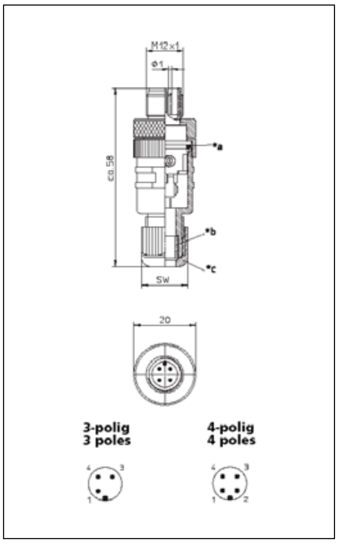




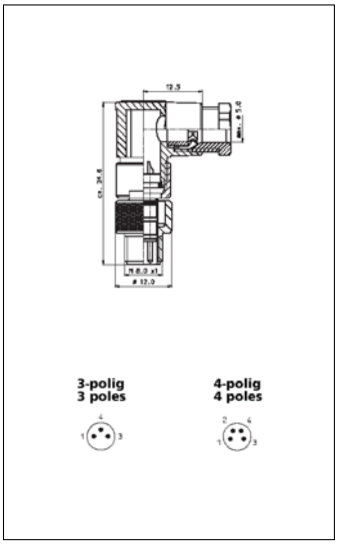
Accessories for Sensors
Field Attachable Plugs and Adaptors

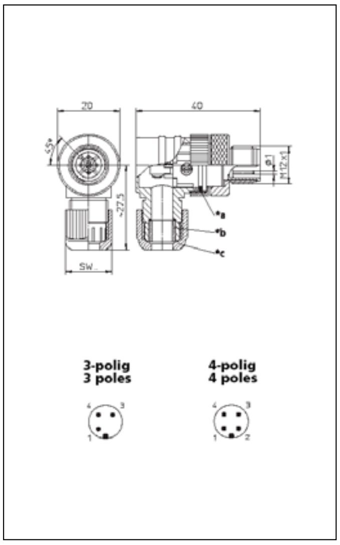
Connector; type of lead connection	plug M8, screwable	plug M12, screwable
Version	straight	straight
Pole number: Type designation; ref. no.	3-poles: JSM8S3; 13.98-30	3-poles: JSM12S3; 13.98-34
Pole number: Type designation; ref. no.	4-poles: JSM8S4; 13.98-31	4-poles JSM12S4; 13.98-35
Material: Housing / moulded 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 lines x cross section	3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
Degree of protection according to IEC 60529 (in locked position)	IP 67	IP 67
Ambient temperature range	- 40 ... + 85 °C	- 25 ... + 90 °C
Manufacture	Lumberg RSMCK	Lumberg RSC



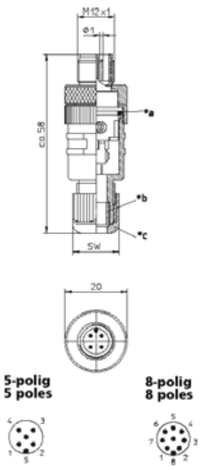


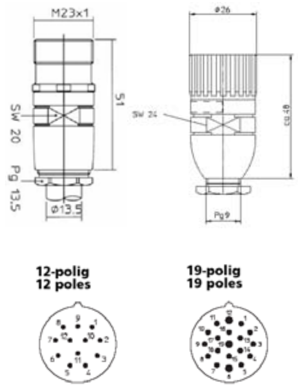
Connector; type of lead connection	plug M8; screwable	plug M12; screwable
Version	angled	angled
Pole number: Type designation; ref. no.	3-poles: JSM8T3; 13.98-32	3-poles: JSM12T3; 13.98-36
Pole number: Type designation; ref. no.	4-poles: JSM8T4; 13.98-33	4-poles: JSM12T4; 13.98-37
Material: Housing / moulded 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 lines x cross section	3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
Degree of protection according to IEC 60529 (in locked position)	IP 67	IP 67
Ambient temperature range	- 40 ... + 85 °C	- 25 ... + 90 °C
Manufacture	Lumberg RSMCW	Lumberg RSCW

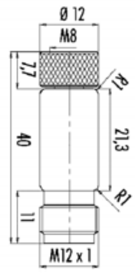




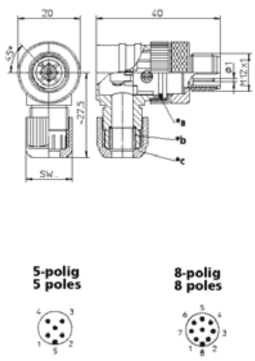
plug M12; screwable		plug M23; solderable	adaptors M8 / M12
straight		straight	straight
5-poles: JSM12S5; 13.98-38		12-poles: JSM23S12; 13.98-43	3-poles: JSM8U3/SM12U3; 13.98-48
8-poles: JSM12S8; 13.98-39		19-poles: JSM23S19; 13.98-44	4-poles: JSM8U4/SM12U4; 13.98-49
PA / PA / PA		2x CuZn nickel-plated / PBT GF	PA / PA / PA
CuZn nickel-plated		CuZn nickel-plated	CuZn nickel-plated
CuZn (8-pol. CuSnZn) gold-plated		CuZn gold-plated	CuZn gold-plated
60 V (8-pol. 30 V); 4 A (8-pol. 2 A); ≤ 5 mΩ		240 V; 7.5 A; ≤ 5 mΩ	60 V (4-pol. 30 V); 4 A; ≤ 5 mΩ
0		0	0
3.0 ... 6.5 mm (8-pol. 4.0 ... 8.0 mm)		PG 13.5	
5 / 8 x 0.34 mm^2		12 / 19 x 0.34 mm^2	
IP 67		IP 67	IP 67
- 25 ... + 90 °C		- 40 ... + 90 °C	- 40 ... + 85 °C
Lumberg RSC		Lumberg RSC-F (19-pol. RSC)	Binder series 765







plug M12; screwable			
angled			
5-poles: JSM12T5; 13.98-40			
8-poles: 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
PVC - Leads Unshielded

KLASCHKA
Elektronik + Automation

Material of the lead jacket	PVC	PVC radiation cross-linked
Type designation; ref. no.	JLN3x0.14u3.5BK; 13.98-70-xxxN	JLH3x0.14u3.5BK; 13.98-75-xxxH
Jacket colour	BK	BK
Jacket diameter	3.5 mm	3.5 mm
Number of lines x cross section	3 x 0.14 mm^2	3 x 0.14 mm^2
Shield	unshielded	unshielded
Line colours	BN, BK, BU	BN, BK, BU
Type designation; ref. no.	JLN3x0.34u5.0OG; 13.98-71-xxxN	JLH3x0.34u5.0OG; 13.98-76-xxxH
Jacket colour	OG	OG
Jacket diameter	5.0 mm	5.0 mm
Number of lines x cross section	3 x 0.34 mm^2	3 x 0.34 mm^2
Shield	unshielded	unshielded
Line colours	BN, BK, BU	BN, BK, BU
Type designation; ref. no.	JLN4x0.34u5.2OG; 13.98-72-xxxN	JLH4x0.34u5.2OG; 13.98-77-xxxH
Jacket colour	OG	OG
Jacket diameter	5.2 mm	5.2 mm
Number of lines x cross section	4 x 0.34 mm^2	4 x 0.34 mm^2
Shield	unshielded	unshielded
Line colours	BN, BK, WH, BU	BN, BK, WH, BU
Type designation; ref. no.	JLN5x0.34u5.7OG; 13.98-73-xxxN	JLH5x0.34u5.7OG; 13.98-78-xxxH
Jacket colour	OG	OG
Jacket diameter	5.7 mm	5.7 mm
Number of lines x cross section	5 x 0.34 mm^2	5 x 0.34 mm^2
Shield	unshielded	unshielded
Line colour	BN, WH, BU, BK, GY	BN, WH, BU, BK, GY
Type designation; ref. no.	JLN8x0.34u9.5BK; 13.98-74-xxxN	JLH8x0.34u9.5BK; 13.98-79-xxxH
Jacket colour	BK	BK
Jacket diameter	9.5 mm	9.5 mm
Number of lines x cross section	8 x 0.34 mm^2	8 x 0.34 mm^2
Shield	unshielded	unshielded
Line colours	WH, GN, YE, GY, PK, RD, BK, VT	WH, GN, YE, GY, PK, RD, BK, VT
Type designation; ref. no.		
Jacket colour		
Jacket diameter		
Number of lines x cross section		
Shield		
Line colours		
Type designation; ref. no.		
Jacket colour		
Jacket diameter		
Number of lines x cross section		
Shield		
Line colours		
Type designation; ref. no.		
Jacket colour		
Jacket diameter		
Number of lines x cross section		
Shield		
Line colours		
Type designation; ref. no.		
Jacket colour		
Jacket diameter		
Number of lines x cross section		
Shield		
Line colours		

Lead- and Line Colours
according to DIN IEC 60757

Colour	Abbrev.	DIN
black	sw	BK
brown	br	BN
red	rt	RD
orange	or	OG
yellow	ge	YE
green	gn	GN
blue	bl	BU
violet	vi	VT
grey	gr	GY
white	ws	WH
pink	rs	PK
turquoise	tk	TQ
transparent	tp	TR

Accessories for Sensors
PUR - Leads Unshielded

KLASCHKA
Elektronik + Automation

Ambient temperature range
- 40 ... + 85 °C

Material of the lead jacket	PUR halogen-free	PUR halogen-free + welding spark-proof
Type designation; ref. no.	**JLP3x0.14u3.5BK; 13.98-80-xxxP**	**JLQ3x0.14u3.5BK; 13.98-85-xxxQ**
Jacket colour	BK	BK
Jacket diameter	3.5 mm	3.5 mm
Number of lines x cross section	3 x 0.14 mm^2	3 x 0.14 mm^2
Shield	unshielded	unshielded
Line colours	BN, BK, BU	BN, BK, BU
Type designation; ref. no.	**JLP3x0.34u4.9BK; 13.98-81-xxxP**	**JLQ3x0.34u5.0BK; 13.98-86-xxxQ**
Jacket colour	BK	BK
Jacket diameter	4.9 mm	5.0 mm
Number of lines x cross section	3 x 0.34 mm^2	3 x 0.34 mm^2
Shield	unshielded	unshielded
Line colours	BN, BK, BU	BN, BK, BU
Type designation; ref. no.	**JLP4x0.34u5.2BK; 13.98-82-xxxP**	**JLQ4x0.34u5.2BK; 13.98-87-xxxQ**
Jacket colour	BK	BK
Jacket diameter	5.2 mm	5.2 mm
Number of lines x cross section	4 x 0.34 mm^2	4 x 0.34 mm^2
Shield	unshielded	unshielded
Line colours	BN, BK, WH, BU	BN, BK, WH, BU
Type designation; ref. no.	**JLP5x0.34u6.0BK; 13.98-83-xxxP**	**JLQ5x0.34u5.7BK; 13.98-88-xxxQ**
Jacket colour	BK	BK
Jacket diameter	6.0 mm	5.7 mm
Number of lines x cross section	5 x 0.34 mm^2	5 x 0.34 mm^2
Shield	unshielded	unshielded
Line colours	BN, WH, BU, BK, GY	BN, WH, BU, BK, GY
Type designation; ref. no.	**JLP8x0.34u9.5BK; 13.98-84-xxxP**	**JLQ8x0.34u9.5BK; 13.98-89-xxxQ**
Jacket colour	BK	BK
Jacket diameter	9.5 mm	9.5 mm
Number of lines x cross section	8 x 0.34 mm^2	8 x 0.34 mm^2
Shield	unshielded	unshielded
Line colours	WH, GN, YE, GY, PK, RD, BK, VT	WH, GN, YE, GY, PK, RD, BK, VT
Type designation; ref. no.		
Jacket colour		
Jacket diameter		
Number of lines x cross section		
Shield		
Line colours		
Type designation; ref. no.		
Jacket colour		
Jacket diameter		
Number of lines x cross section		
Shield		
Line colours		
Type designation; ref. no.		
Jacket colour		
Jacket diameter		
Number of lines x lead cross section		
Shield		
Line colours		
Type designation; ref. no.		
Jacket colour		
Jacket diameter		
Number of lines x cross section		
Shield		
Line colours		

Lead- and Line Colours
according to DIN IEC 60757

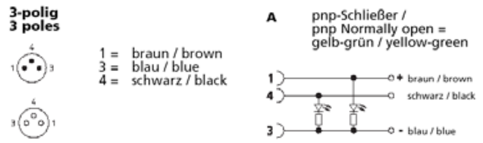
Colour	Abbrev.	DIN
black	sw	BK
brown	br	BN
red	rt	RD
orange	or	OG
yellow	ge	YE
green	gn	GN
blue	bl	BU
violet	vi	VT
grey	gr	GY
white	ws	WH
pink	rs	PK
turquoise	tk	TQ
transparent	tp	TR

Accessories for Sensors
Cordsets with M8- or M12-Connectors

Socket version; plug version	**M8 straight; M8 straight**	**M8 angled; M8 straight**
Connection type (screws or snap-ins)	**both socketsand plugs: screws**	**both sockets and plugs: screws**
Material: Housing / moulded 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
Degree of protection according to IEC 60529 (in locked position)	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 lines 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 lines x cross section / pole no. plug		
Type designation		
Ref. no.		
Pole no. socket / no. of lines x cross section / pole no. plug		
Type designation		
Ref. no.		
Pole no. socket / no. of lines x cross section / pole no. plug		
Type designation		
Ref. no.		
Pole no. socket / no. of lines x cross section / pole no. plug		
Type designation		
Ref. no.		

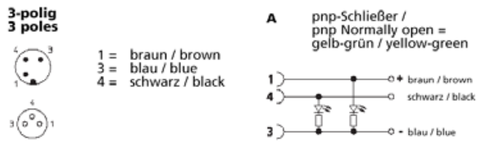
Socket M8 straight; Plug M8 straight

Socket M8 angled; Plug M8 straight



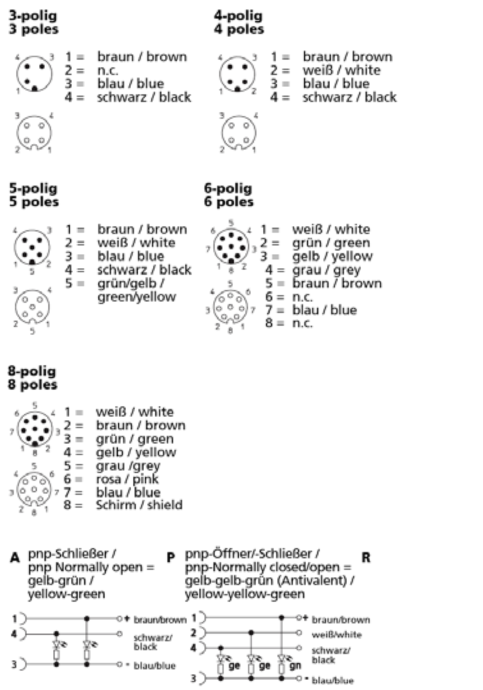
Socket M8 straight; Plug M12 traight

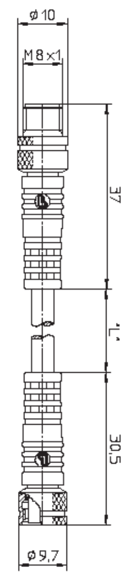
Socket M8 angled; Plug M12straight

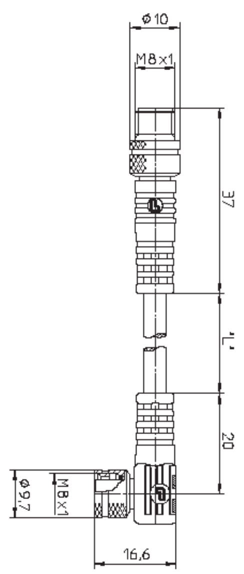


Socket M12 straight; Plug M12 straight

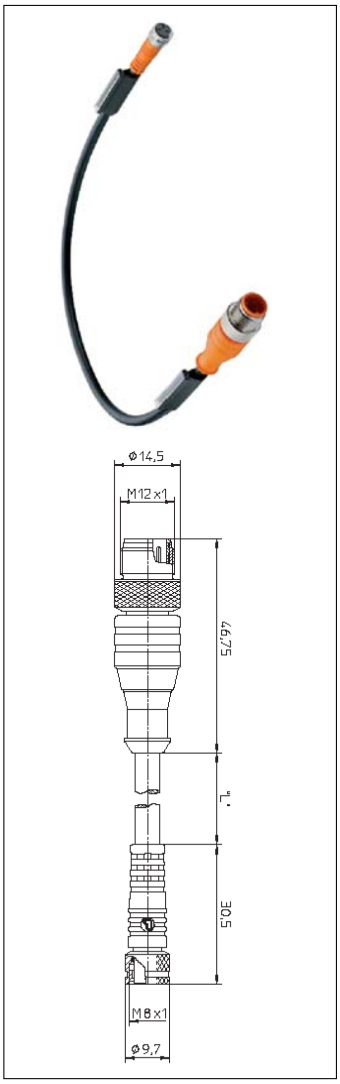
Socket M12 angled; Plug M12 straight

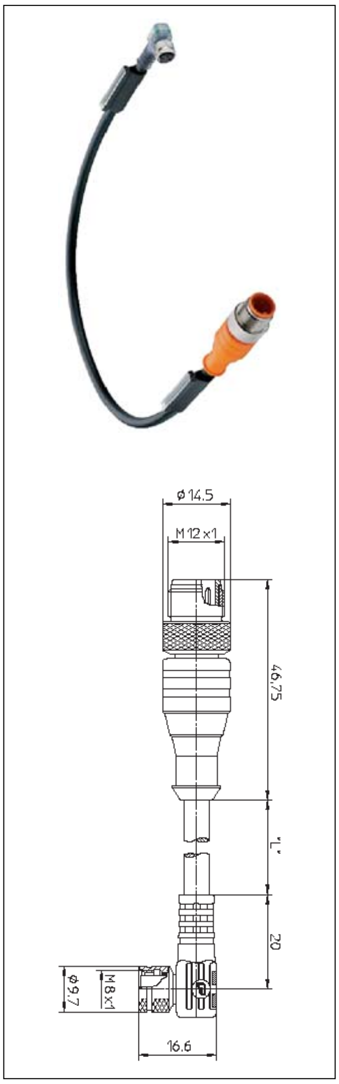


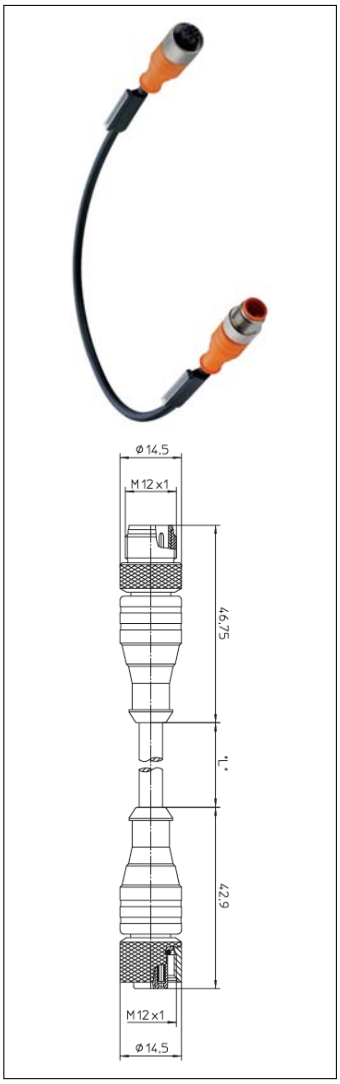


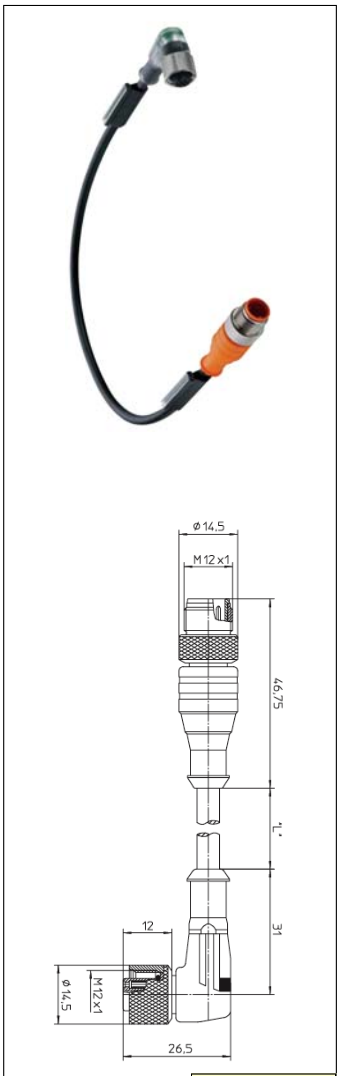


M8 straight; M12 straight	**M8 angled; M12 straight**	**M12 straight; M12 straight**	**M12 angled; M12 straight**
both sockets and plugs: screws	**both sockets and plugs: screws**	**both sockets and plugs: screws**	**both sockets and plugs: screws**
TPU	TPU	TPU	TPU
CuZn nickel-plated / CuZn gold-plated	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**
		5 / 5 x 0.50 mm^2 / 5	
		JSM12U5 / LP5x0.50u5.4BK / SM12S5	
		13.97-58-xxx	
		6 / 6 x 0.34 mm^2 / 6	
		JSM12U6 / LP6x0.34u6.0BK / SM12S6	
		13.97-60-xxx	
		8 / 7 x 0.25 mm^2 (1 x shield) / 8	
		JSM12U8 / LP7x0.25u6.0BK / SM12S8	
		13.97-62-xxx	









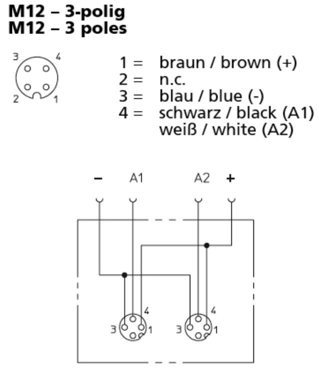
Accessories for Sensors
2 Sockets with Lead

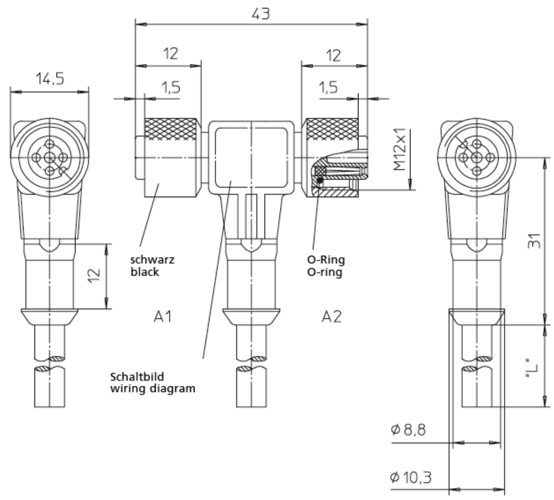
Version	**2 sockets M12, lead**
Connection type (screws or snap-ins)	**both sockets and plugs: screws**
Material: Housing / moulded body / contact carrier	TPU
Flange and surface / contact material and surface	CuZn nickel-plated / CuZn gold-plated
Nominal voltage	60 V
Nominal current at 40 °C	4 A
Lead jacket / colours	PUR / BK
Degree of protection according to IEC 60529 (in locked position)	IP 67
Ambient temperature range	- 25 ... + 80 °C
Manufacture	Lumberg ZV 2
Number sockets x pole no. socket / no. of lines x cross section	**2 x 3 / 4 x 0.25 mm^2**
Type designation	**JS2xM8G3 / LP3x0.25u4.0BK**
Ref. no.	**13.97-70-xxx**

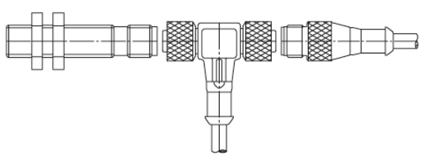
This double socket with outgoing lead has standard lead lengths of 2 m, 5 m and 10 m. The lead lengths in 0.1 m are marked in the ref. no.by the 3-digit index - **xxx**:

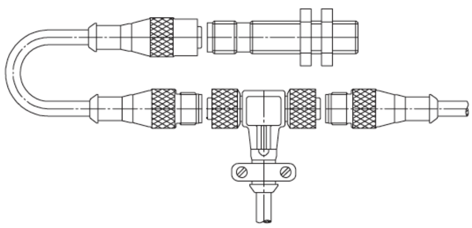
Standard lead lengths	**2.0 m**	**-020**
	5.0 m	**-050**
	10.0 m	**-100**
Special lead lengths, e.g.	**20.6 m**	**-206**

In case of deviating lead lengths please indicate this in the ref. no. when placing the order.









Accessories for Sensors
T-Connectors

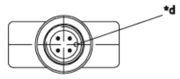
KLASCHKA
Elektronik + Automation

Version	2 sockets M8, 1 plug M12	2 sockets M12; 1 plug M12
Mode of connection (screws or snap-ins)	**both sockets and plugs: screws**	**both sockets and plugs: screws**
Material: Housing / moulded 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	M8: 60 V, M12: 240 V	M12: 4-poles 240 V, M12: 5-poles 60 V
Nominal current at 40 °C	2 A per port / 4 A max. in total	2 A per port / 4 A max. in total
Lead jacket / colours		
Degree of protection according to IEC 60529 (in locked position)	IP 67	IP 67
Ambient temperature range	- 25 ... + 90 °C	- 25 ... + 90 °C
Manufacture	Lumberg ASBS 2 M8 (- 90)	Lumberg ASBS 2 M12-4S - 5 (- 90)
Number sockets x pole no. socket / pole no. plug	**2 x 3 / 4**	**2 x 5 / 4**
Type designation	**JS2xM8G3 / SM12E4**	**JS2xM12G4 / SM12E4**
Ref. no.	**13.97-80**	**13.97-82**
Number sockets x pole no. socket / pole no. plug	**2 x 3 / 4**	**2 x 5 / 5**
Type designation	**JS2xM8G3 / SM12E4 - 45**	**JS2xM12G4 / SM12E4 - 45**
Ref. no.	**13.97-81**	**13.97-83**

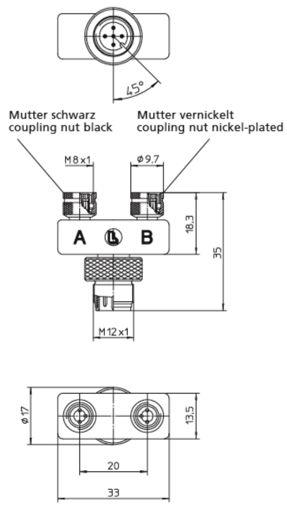
These T-connectors are in particular suitable for the connection of 2 sensors via outgoing leads at the input of a field bus interface.

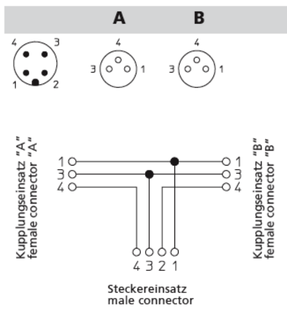
The T-connectors can be supplied optionally with a plug insert turned by 45 °.

Plug insert turned by 45 ° T
Type J2xM8G3 / M12E4 - 45

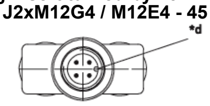


Type J2xM8G3 / M12E4

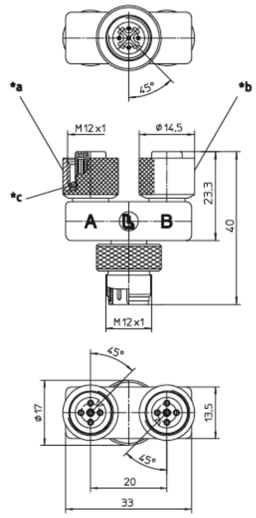


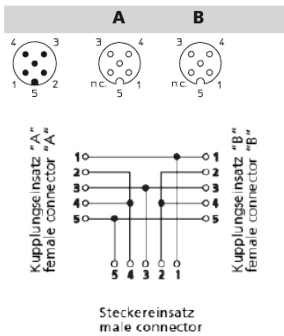


Plug insert turned by 45 °
Type J2xM12G4 / M12E4 - 45



Type J2xM12G4 / M12E4





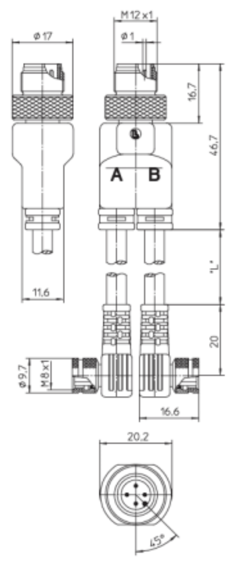
Accessories for 2 Sensors
Cordsets with 2 Sockets and 1 Plug

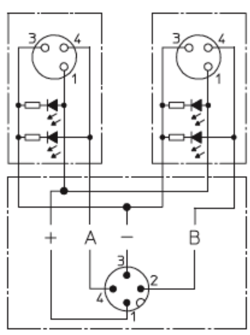
Version	**2 sockets M8 angled; plug M12 str.**	**2 sockets M12 straight; plug M12 str.**
Connection type (screw or snap-ins)	**both plugs and sockets: screws**	**both plugs and sockets: screws**
Material: Housing / moulded body / contact carrier	TPU	TPU
Flange and surface / contact material and surface	CuZn nickel-plated / CuZn gold-plated	CuZn nickel-plated / CuZn gold-plated
Nominal voltage	10-30 V DC	60 V
Nominal current at 40 °C	4 A per lead / 4 A max. in total	4 A per lead / 4 A max. in total
LED indicator in the angled box	1 x GN, 1 x YE	0
Lead jacket / colours	PUR / BK	PUR / BK
Protection degree according to IEC 60529 (in locked position)	IP 67	IP 67
Ambient temperature range	- 25 ... + 80 °C	- 25 ... + 80 °C
Manufacture	Lumberg ASB 2-RKMWV/LED	Lumberg ASB 2-RKT
Sockets x pole no.	**2 x 3**	**2 x 3**
Leads x lines x cross section	**2 x 3 x 0.34 mm^2**	**2 x 3 x 0.34 mm^2**
Pole no. plug	**4**	**4**
Type designation 2 sockets	**JS2xM8V3gy**	**JS2xM12U3**
2 Leads	**/ L2xP3x0.34u4.3BK**	**/ L2xP3x0.34u4.3BK**
Plug	**/ SM12S4**	**/ SM12S4**
Ref. no.	**13.97-90-xxx**	**13.97-91-xxx**

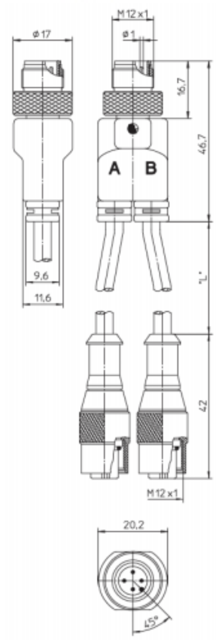
The lengths of both single leads of the cordset are identical. Standard lengths are 1 m, 1.5 m and 2 m: The lead lengths in 0.1 m are marked in the 3-digit index - **xxx** in the ref. no.:

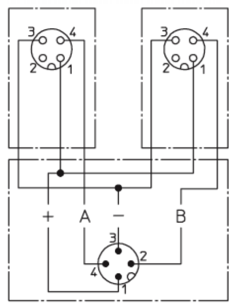
Standard lead lengths	**1.0 m**	**-010**
	1.5 m	**-015**
	2.0 m	**-020**
Special lead lengths, e.g.	**0.6 m**	**-006**

In case of deviating lead lengths please indicate this in the ref. no. when placing the order.

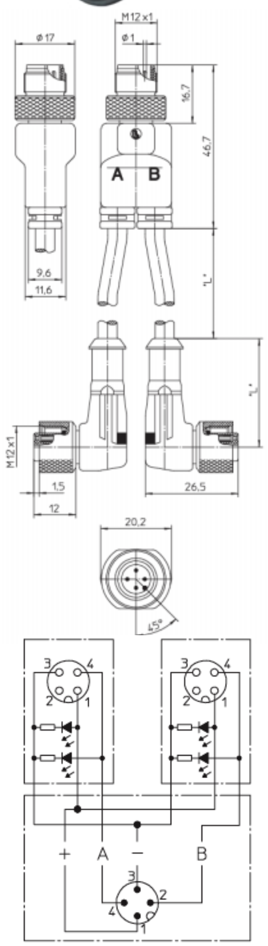


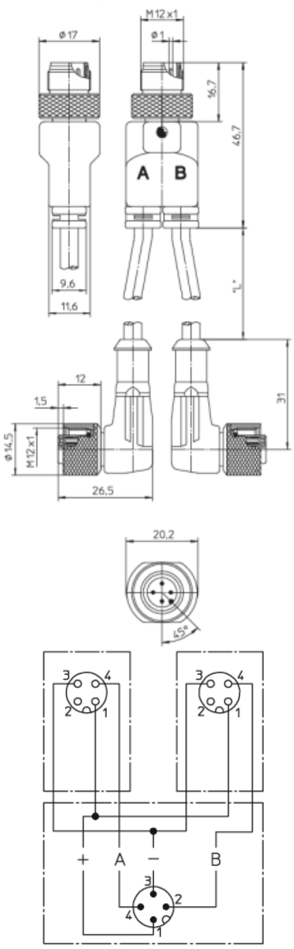






2 sockets M12 angled; plug M12 str.	2 sockets M12 angled; plug M12 str.		
both plugs and socekts: screws	both plugs and socekts: screws		
TPU	TPU		
CuZn nickel-plated / CuSn gold-plated	CuZn nickel-plated / CuZn gold-plated		
10-30 V DC	60 V		
4 A per lead / 4 A max. in total	4 A per lead / 4 A max. in total		
1 x GN, 1 x YE	0		
PUR / BK	PUR / BK		
IP 67	IP 67		
- 25 ... + 80 °C	- 25 ... + 80 °C		
Lumberg ASB 2-RKWT/LED	Lumberg ASB 2-RKWT		
2 x 3	**2 x 3**		
2 x 3 x 0.34 mm^2	**2 x 3 x 0.34 mm^2**		
4	**4**		
JS2xM12V4gy	**JS2xM12V4**		
/ L2xP3x0.34u4.3BK	**/ L2xP3x0.34u4.3BK**		
/ SM12S4	**/ SM12S4**		
13.97-92-xxx	**13.97-93-xxx**		





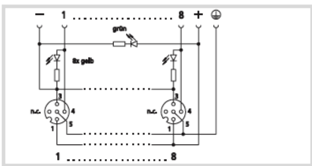
Accessories for Sensors
Distributors

Number of ports / signals per port / pole number per port	**8 / 1 / 4**	
Version	**8 sockets M12, lead**	
Locking type of connectors (screw or snap-ins)	**plugs: screw**	
Type of lead connection	terminals	
Material housing / moulded body	stainless steel	
Material of the contact carrier	PVC	
Contact material and surface	CuZn gold-plated	
Material screw socket / knurled screw and -nut / sleeve	stainless steel	
O-ring	EPDM	
Lead: Number of lines x cross section	3 x 0.75 mm^2 und 8 x 0.34 mm^2	
Nominal voltage	10 ... 30 V DC	
Nominal current at 40 °C	4 A per port / 12 A max. in total	
LED indicator in the angled distributor housing	1 x GN (operation), 8 x YE (signal)	
Lead jacket / colour	PVC / BK	
Standard lead lengths	5 m, 10 m or 15 m	
Other lead lengths	on request	
Protection type according to IEC 60529 (in locked position)	IP 67 / IP 69 K	
Ambient temperature range	- 25 ... + 70 °C	
Accessories	4 PVC protective covers	
Manufacture	Lumberg ASNBL 8/LED	

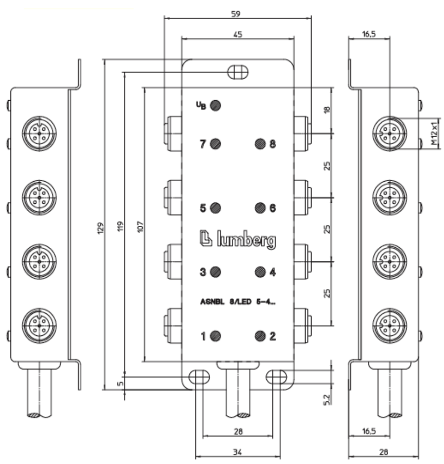
Number of sockets x type of socket / type of connection	**8 x M12 / outgoing lead**	
Type designation	**JS8xM12G4 / LN8x0.34u9.5BK**	
Ref. no.	**13.99-80-xxx**	

Number of sockets x type of socket / type of connection		
Type designation		
Ref. no.		

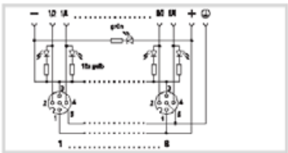
8-fach
8 ports



1 = braun / brown (+)
2 = n.c.
3 = blau / blue (-)
4 = weiß / white (1)
grün / green (2)
gelb / yellow (3)
grau / grey (4)
rosa / pink (5)
rot / red (6)
schwarz / black (7)
violett / violet (8)
5 = grün/gelb / green/yellow (PE)



8 / 2 / 5			
8 sockets M12, lead			
plugs: screws			
terminals			
stainless steel			
PVC			
CuZn gold-plated			
stainless steel			
EPDM			
3 x 1.00 mm^2 and 16 x 0.50 mm^2			
10 ... 30 V DC			
4 A per port / 12 A max. in total			
1 x GN (operation), 16 x YE (signal)			
PVC / BK			
5 m, 10 m or 15 m			
on request			
IP 67 / IP 69 K			
- 25 ... + 70 °C			
4 PVC protective covers			
Lumberg ASNBV 8/LED			
8 x M12 / lead			
JS8xM12G5 / LN16x0.50u11.6BK			
13.99-82-xxx			



1 = braun / brown (+)
2 = grau/rosa / grey/pink (1)
rot/blau / red/blue (2)
weiß/grün / white/green (3)
braun/grün / brown/green (4)
weiß/gelb / white/yellow (5)
gelb/braun / yellow/brown (6)
weiß/grau / white/grey (7)
grau/braun / grey/brown (8)
3 = blau / blue (-)
4 = weiß / white (1)
grün / green (2)
gelb / yellow (3)
grau / grey (4)
rosa / pink (5)
rot / red (6)
schwarz / black (7)
violett / violet (8)
5 = grün/gelb / green/yellow (PE)