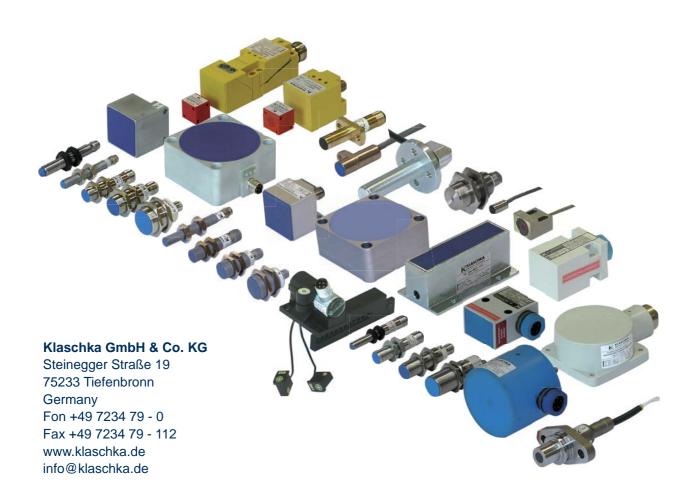


Sensors for Automation

ALSEN 1.08



Sensors for Automation

Content

0	Introduction	2	Pulse Sensors
0.0.3	Basics Type Code	2.0.1 2.0.2	Pulse Sensors, Magnetic Field and Hall Element Inductive Pulse Sensors, All Metal
0.0.5 0.0.6 0.0.7 0.0.8 0.0.9	Connecting Variables Connection Diagrams DC 3- and 4-poles Connection Diagrams DC and AC 2-poles Connection Diagrams DC 3-poles Push-Pull Materials and Leads	2.1 2.1.0.1 2.1.1.1 2.1.1.3 2.1.1.5 2.1.1.7 2.1.1.9	Pulse Sensors, Magnetic Field Characteristics, Overview Series HAD-10er, -11ms Series HAD-11ms Series HAD-11ms Series HAD-11ms Series HAD-11ms
1	Inductive Proximity Switches	2.1.1.11	Series HAD-11ms, -12aq, -12er
1.0.1 1.0.2 1.0.3 1.0.4	Tasks, Mode of Operation, Requirement Profiles Switching Behaviour Switching Frequency, External Influences Mounting Requirements	2.1.1.13 2.1.1.15 2.1.1.17 2.1.1.19 2.1.1.21	Series HAD-12ms, -14eg, -14er
1.1 1.1.0.1	All Metal Standard, DC 3- and 4-poles Characteristics, Overview	2.1.1.23	Series HAD-18ss, MAD-12aq
1.1.1.1 1.1.2.1 1.1.3.1 1.1.4.1	Series IAD/AHM-8eg Series IAD/AHM-12mg Series IAD/AHM-18eg, -mg Series IAD/AHM-30mg	2.2 2.2.0.1 2.2.1.1 2.2.2.1	Pulse Sensors, Inductive Characteristics, Overview Series IAD/AHM-8eg Series IAD/AHM-12mg
1.1.5.1 1.2 1.2.0.1 1.2.1.1	Series IAD/AHM-40aq, -40fq, -80aq, -80fq All Metal Automotive, DC 3- and 4-poles Characteristics, Overview Serie IAD/AHMS-8eg, -12mg, -18mg, -30mg	2.3 2.3.0.1 2.3.1.1 2.3.2.1	Pulse Sensors, Double Pulse Characteristics, Overview Series HDD-16ms, -12aq Series MDD-12aq
1.2.2.1	Serie IAD/AHMS-40aq, -40fq, -80aq, -80fq	2.4	Pulse Sensors, Heat-Resistant
1.3 1.3.0.1 1.3.1.1 1.3.2.1	Ferrous DC 3- and 4-poles Characteristics, Overview Series IAD-8eg, -8mq Series IAD-12eg, -12fg	2.4.0.1 2.4.1.1	Characteristics, Overview Series HTD-11ms, HAD-18mg
1.3.2.3	Series IAD-12mg	5	Safety Elements
1.3.2.5 1.3.2.7	Series IAD-12mg Series IAD-12mg	5.0.1	Terminology
1.3.2.9 1.3.3.1 1.3.3.3 1.3.3.5 1.3.3.7 1.3.4.1	Series IAD-12mg Series IAD-18fg, -18mg Series IAD-18mg Series IAD-18mg Series IAD-18mg Series IAD-30fg, -30mg	5.1 5.1.0.1 5.1.1.1 5.1.2.1 5.1.2.3 5.1.3.1	SIDENT Safety Switch Function Series SIDENT III Series SIDENT IV Series SIDENT IV Series SIDENT / B Actuating Elements
1.3.4.3 1.3.4.5 1.3.5.1 1.3.6.1 1.3.6.3	Series IAD-30mg Series IAD-30sg Series IAD-34aq, -34zq Series IAD-40aq, -40fq Series IAD-40fv	5.2 5.2.0.1 5.2.1.1 5.2.2.1	SIDENT for Roller- / Lift Gates and Windows Overview Series SIDENT IV for Roller- / Lift Gates and Windows Series SIDENT / B Actuating Elements
1.3.7.1 1.3.7.3	Series IAD-80aq, -80fq Series IAD-80fr	5.3 5.3.1.1	Safety Door Handles with SIDENT
1.4 1.4.0.1	Ferrous AC and DC 2-poles		
1.4.1.1	Characteristics, Overview Series IAB-8eg, -12mg	11	Specific Sensors
1.4.2.1 1.4.3.1 1.4.4.1	Series IAB-18mg, -30mg Series IAB-40fq, -40fv, -80fq Series IAW-18mg, ISW-18mg, ISW-30mg	11.2 11.2.0.1 11.2.1.1	Foil Detection Sensors Characteristics, Overview Series IED/AHM-30mg, -40aq, -80aq
1.6 1.6.0.1 1.6.1.1	Double and Multiple Characteristics, Overview Series IAD2/H-18zr	11.3 11.3.0.1 11.3.1.1	Seam Detection Characteristics, Overview Series IND/A-45as, -33as
		11.8 11.8.0.1 11.8.1.1	Valve Position Sensor Characteristicis, Overview Series IVA



12 **Accessories for Sensors**

12.1 Connectors, Leads, Adaptors, Distributors

- 12.1.0.1 Overview and Type Code
- 12.1.1.1 Socket Lead
- 12.1.2.1 Field Attachable Sockets12.1.2.3 Field Attachable Plugs, Adaptors
- 12.1.3.1 Unshielded Leads
- 12.1.4.1 Socket Lead Plug
- 12.1.5.1 Adaptors
 12.1.6.1 2 Sockets 2 Leads 1 Plug
 12.1.7.1 Distributors

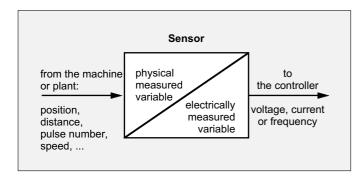
Basic Information



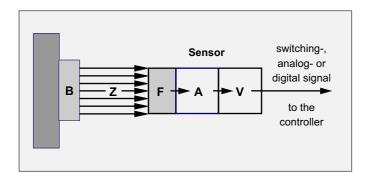
Principle and Function

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 nonferrous metals; the special designs are pressure-; magnetic fieldresistant, 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.

Type Code



1	Type Series: Principle A acoustic O optical B rotation speed dependent R rotary H hall T temperature-dependent I inductive Y safety-oriented K capacitive SIDENT safety sensor M magneto-resistive WIDENT tool recognition
2	Type Series: Properties A proximity switch 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 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

٦		- 0 7 0 9 10 11 - 12 13 14 13 10						
16	Le	ngth of the Connecting Lead in m (optiona	al entry)				
15	1	without LED display F with 2 6 LED displays	A	with 1	LED dis	splay		
14	Со	nsecutive Version Number, starting	with 1					
13	lde	nnection via Connector or Termina ntification with one capital letter = typ d one lower-case letter = pole numbe	e and	size				
	F K, S U W Y,	K, L, M, N clamp terminal 3-, 4-, 5-, 6-poles						
	Lead material]
		Connection via outgoing lead Identification with 2 capital letters	PVC nomal	PVC very flexible	PUR very flexible	Silicone rubber	Teflon or special	
		directly via kink protection via hose bush via PG-thread	ND NK NT NV	HD HK HT HV	PD PK PT PV	GD GK GT GV	TD TK TT TV	
	Po a d g j	le Number (optional entry) 5 2-poles 1-poles 6 5-poles 4-poles 6 5-poles 7-poles 6 8-poles 10-poles 6 11-poles	S		f 6-p i 9-p	poles poles poles poles		
12	1 3 Ou 6 8 Pu 5	tput Plus-Switching NO short-circuit-protected NO not short-circuit-protected tput Minus-Switching NO short-circuit-protected NO short-circuit-protected sh-Pull Output NO plus-switching, NC minus-switch NO minus-switching, NC plus-switch mbinations (Examples) NO and NC NO or NC		NC sho	short - ort-circu	circuit- _l	protecte ected	
	Ou 1 4 7	tput Analog or Digital voltage 2 current passive 5 digital				rent a . ital para		

digital contactless

Connecting Variables



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 \pm 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 idleor no-load current IR 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.

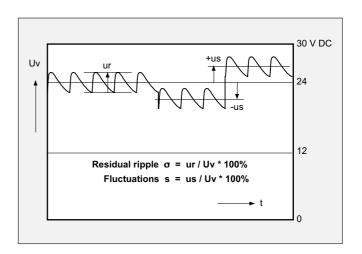
Each exit is protected against overloading by a clocking **short-circuit-protection**, which becomes effective from a **maximum load current l**_{Lmax}. For the verification of the short-circuit-resistance the standard EN 60947-5-2 requires for the type examination a power supply unit, which is capable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

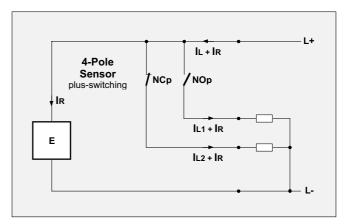
A **voltage drop** over the current-carrying output, whose extent depends to a certain degree on the magnitude of the load current, develops due to the short-circuit protection, pole protection, and a residual voltage.

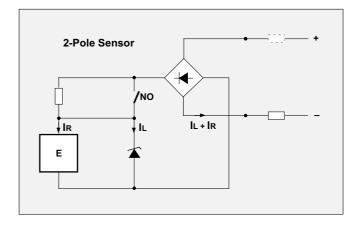
In the case of **3- and 4-pole sensors** a very small **residual current** of a few μ A develops due to the load arising when the output is closed. In the Technical Data the residual current is usually not indicated because the voltage drop at the load resistance caused by it is negligibly small. The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

Connection Diagrams DC 3- and 4-Poles



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

Connector

Outgoing Lead

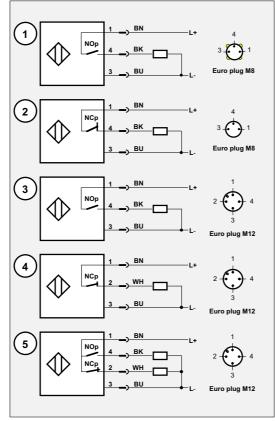


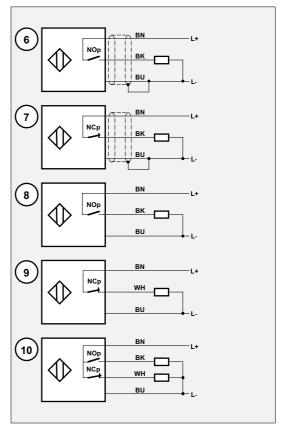




NC plus-switching NCp

NO and NC plus-switching NOp + NCp





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

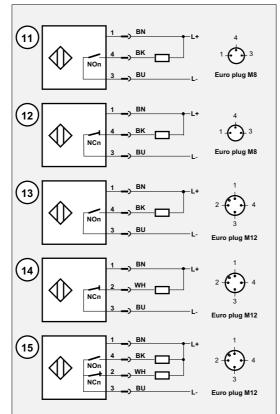
NO minus-switching NOn

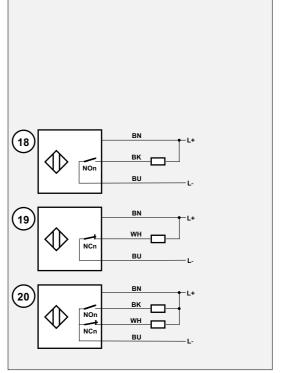
NC minus-switching NCn

NO minus-switching NOn

NC minus-switching NCn

NO and NC minus-switching NOn + NCn





Connection Diagrams DC and AC 2-Poles

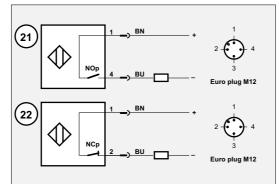


Connector

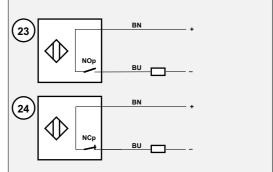
DC 2-poles polarized

NO plus-switching qON

NC plus-switching



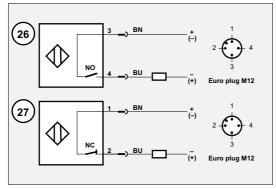
Outgoing Lead

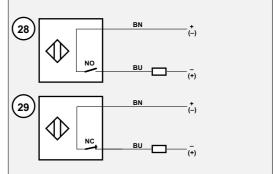


DC 2-poles non-polarized

NO non-polarized NO

NC non-polarized

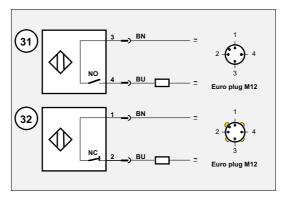


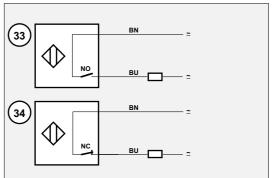


AC/DC 2-poles all-insualted

NO

NC

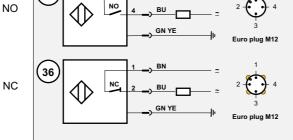


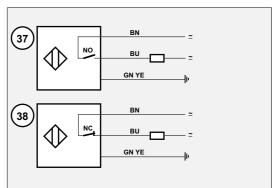


AC/DC 2-poles with protective wire

NO

35





Colours of lines acc. to DIN IEC 60757

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

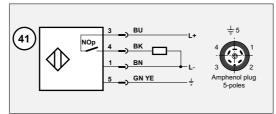
Connection Diagrams DC 3-Poles Push-Pull



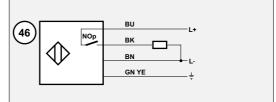
Connector

DC 4-poles with protective wire

NO plus-switching

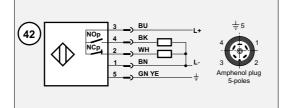


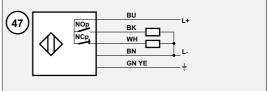
Outgoing Lead



DC 5-poles with protective wire

NO and NC plus-switching NOp + NCp





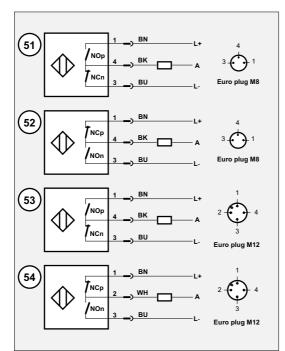
DC 3-poles push-pull

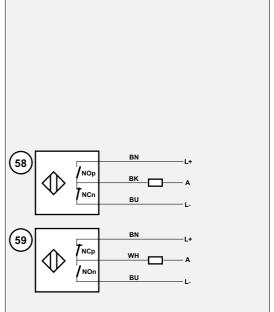
NO plus-switching NC minus-switching NOp + NCn

NO minus-switching NC plus-switching NOn + NCp

NO plus-switching NC minus-switching NOp + NCn

NO minus-switching NC plus-switching NOn + NCp

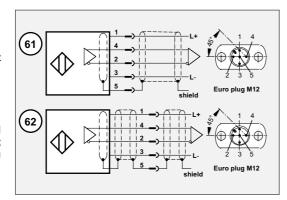


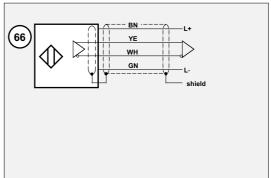


DC 5-poles push-pull shielded lead

with symmetrical output

with symmetrical output with adapter plug





Colours of lines acc. to DIN IEC 60757

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

Materials and Leads

Metal

employed as material for housings and mounting parts

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.

AI-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.

Stainless high-grade steel X...

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.

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

AI2O3 **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, corrosionresistant.

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.

ΕP 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

PΑ **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.

Polybutylenenterephtalate

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

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.

Polyoxymethylene

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

Polytetrafluorethylene

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

Polyurethane **PUR, TPU**

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

Number x lead cross section in mm^2 2x0.14	Outer diameter of the leads in mm 3.0 3.5	Number x lead cross section in mm^2	Outer diameter of the leads	Number x lead cross	Outer diameter
2x0.14	3.0	in mm^2		section	of the leads
			in mm	in mm^2	in mm
	3.5				
2x0.19					
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				

Tasks, Method of Function, Requirement Profiles



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

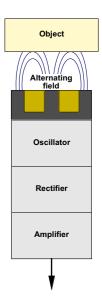
C. For NAMUR and DIN 19 234 Applications

- 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.









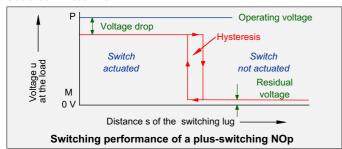




Switching Performance



See also EN 60947-5-2.



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 \leq 10%. Larger ones may have a difference of maximally \leq 5%.

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

w = path axis, s = distance axis, s = switching distance, r = switching radius, s = switching-on points, s = switching-off points, s = characteristic response curves,

Hw, Hs = switching hysteresis in w-direction and s-direction,

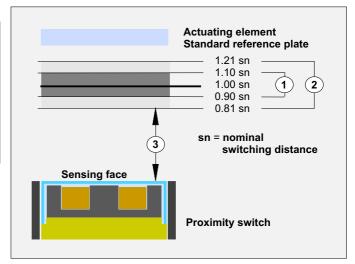
 \emptyset = diameter of the proximity switch and the reference plate.

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
- 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).

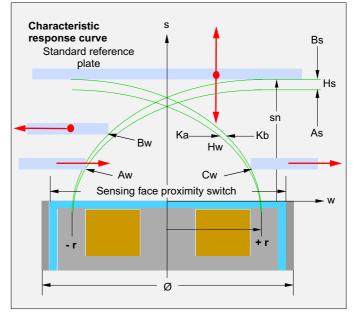
The differences between the switching-on- and switching-off points with an approaching and a receding reference plate are called **the switching hysteresis Hs, Hw** . For all proximity switches applies: $0.03 \text{ sn} \leq \text{Hs} \leq 0.2 \text{ sn}$.

The switching radius ${\bf r}$ 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.
- 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



Switching Frequency, External Influences



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

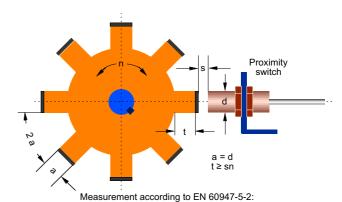
Disturbing **magnetic fields** are mainly produced in industrial plants by electrical welding and electrical drives. If an inductive proximity switch is within the magnetic interference field, fault signals may arise. Also see EN 60947-5-2 (1998) appendix E.

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.

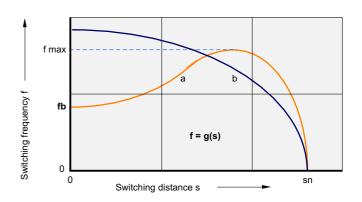
The ambient temperature also influences the switching behaviour.

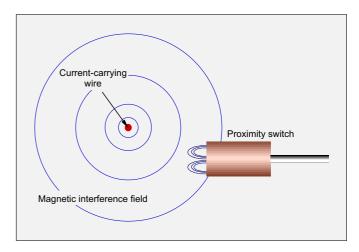
The **temperature dependency** of the switching distance s in the indicated ambient temperature range is described by a function $s=f\left(T\right)$ which is to be determined empirically.

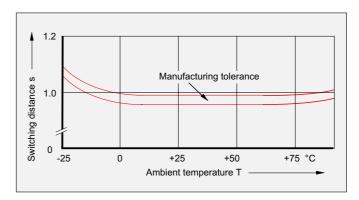
According to EN 60947-5-2 the permissible alternation or **drift of the switching distance** in the indicated ambient temperature range may not exceed a value of 10%.



The measuring wheel is a non-conducting disc with an applied sqared standard reference wheel







Installation Requirements



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.

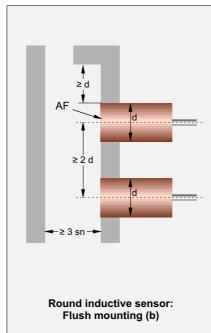
The flush mountable sensor with the diameter d and the nominal switching distance sn can be mounted into metal up to the sensing face. The following installation instructions apply:

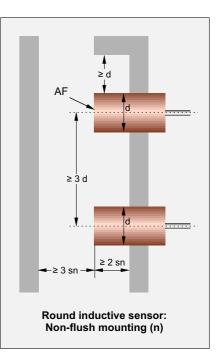
- Distance between the center of two sensors when these are arranged in row ≥ 2d
- Distance to an opposite metal face ≥ 3 sn
- Distance to a side face ≥ d

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





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:

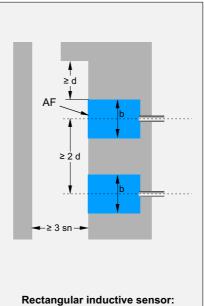
- Distance between the centre of two sensors when these are arranged in a row ≥ 2b
- Distance to an opposite metal face ≥ 3 sn
- Distance to all opposite me
 Distance to a side face ≥ b

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

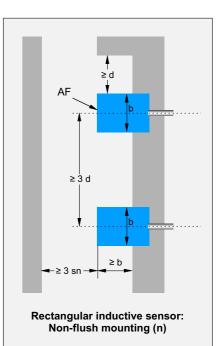
Non-flush mounting (n): A rectangular inductive sensor is non-flush mountable if a certain free zone around its sensing face is necessary in order to maintain its characteristics.

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:

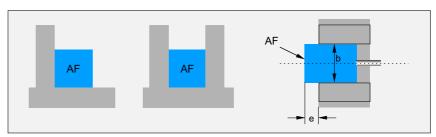
- Distance between the centre of two sensors when these are arranged in a row ≥ 3 b
- Distance of the sensing face to an opposite metal face ≥ 3 sn
- Distance to a side face ≥ b





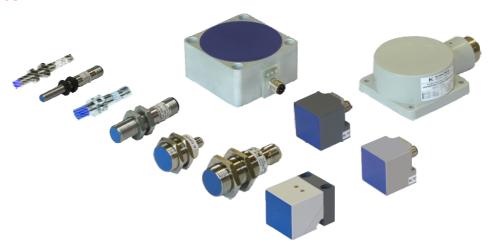


Installing the sensor onto a non-metallic material with the thickness $> 2 \mathrm{sn}$ allows a flush mounting.



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

Apart from the high maximum possible operating frequencies these sensors also offer very short operating times $\leq 50~\mu s$ (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

		Switching distance			Switching distance
Type	Ref. No.	in mm	Туре	Ref. No.	in mm
		Mounting *)			Mounting *)
IAD/AHM-8eg60b1.5-1Wc1A	11.37-22-000	1.5 b	IAD/AHM-18mg50b6-1Sd1A	11.37-04-000	6.0 b
IAD/AHM-8eg60b1.5-2Wc1A	11.37-24-000	1.5 b	IAD/AHM-18mg50b6-12Sd1A	11.37-06-000	6.0 b
IAD/AHM-8eg60b1.5-1Sd1A	11.37-23-000	1.5 b	IAD/AHM-18mg50b6-1NDc1A	11.37-30-020	6.0 b
IAD/AHM-8eg60b1.5-2Sd1A	11.37-25-000	1.5 b	IAD/AHM-18mg50b6-12NDd1A	11.37-32-020	6.0 b
IAD/AHM-8eg45b1.5-1NDc1A	11.37-26-020	1.5 b	IAD/AHM-18eg50b6-1Sd1A	11.37-37-000	6.0 b
IAD/AHM-8eg45b1.5-2NDc1A	11.37-27-020	1.5 b	IAD/AHM-18eg50b6-12Sd1A	11.37-38-000	6.0 b
IAD/AHM-8eg60n3-1Wc1A **)	11.37-57-000	3.0 n	IAD/AHM-18eg50b6-1NDc1A	11.37-39-020	6.0 b
IAD/AHM-8eg60n3-1Sd1A **)	11.37-58-000	3.0 n	IAD/AHM-18eg50b6-12NDd1A	11.37-40-020	6.0 b
IAD/AHM-8eg60n3-2Wc1A **)	11.37-59-000	3.0 n	IAD/AHM-18mg60n10-1Sd1A	11.37-54-000	10.0 n
IAD/AHM-8eg60n3-2Sd1A **)	11.37-60-000	3.0 n	IAD/AHM-18mg60n10-12Sd1A	11.37-55-000	10.0 n
IAD/AHM-8eg45n3-1NDc1A **)	11.37-61-020	3.0 n	IAD/AHM-18mg60n10-1NDc1A	11.37-67-020	10.0 n
IAD/AHM-8eg45n3-2NDc1A **)	11.37-62-020	3.0 n	IAD/AHM-18mg60n10-12NDd1A	11.37-69-020	10.0 n
IAD/AHM-12mg50b3.5-1Sd1A	11.37-03-000	3.5 b	IAD/AHM-30mg50b10-12Sd1A	11.37-07-000	10.0 b
IAD/AHM-12mg50b3.5-2Sd1A	11.37-10-000	3.5 b	IAD/AHM-30mg50b10-12NDd1A **)	11.37-33-020	10.0 b
IAD/AHM-12mg50b3.5-1NDc1A	11.37-28-020	3.5 b	IAD/AHM-30mg85n20-12Sd1A	11.37-70-000	20.0 n
IAD/AHM-12mg50b3.5-2NDc1A	11.37-29-020	3.5 b	IAD/AHM-30mg65n20-12NDd1A **)	11.37-71-020	20.0 n
IAD/AHM-12mg60n6-1Sd1A	11.37-52-000	6.0 n			
IAD/AHM-12mg60n6-2Sd1A	11.37-53-000	6.0 n	IAD/AHM-40aq40b15-12Sd1B **)	11.37-16-000	15.0 b
IAD/AHM-12mg60n6-1NDc1A	11.37-63-020	6.0 n	IAD/AHM-40fv54b15-12Sd1B **)	11.37-34-000	15.0 b
IAD/AHM-12mg60n6-2NDc1A	11.37-64-020	6.0 n			
			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)		3 mm, non-flush		
	Range secured switching distance	0 1.22 mm	0 2.43 mm		
	NO plus-switching NOp	IAD/AHM-8eg60b1.5-1Wc1A, 11.37-22 (1			
	NC plus-switching NCp	IAD/AHM-8eg60b1.5-2Wc1A, 11.37-24 (2			
Type designation,	NO and NC plus-switching NOp + NCp	(-	(-)		
Ref. no.	NO plus-, NC minus-switching NOp + NCn				
(Wiring)	NO minus-switching NOn				
	NC minus-switching NCn				
I	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		
Repetition	Reduction factor ysteresis of the switching point s accuracy of the switching point s - at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? tected against polarity reversal? Ditage drop over a closed contact Ambient temperature range 1 for all metals 3 10% ≤ 10% ≤ 15% yes, clocking yes, clocking yes ≤ 2.5 V DC - 25 + 85 °C	sensing face M8x1 Sensing face M8x1 W8x1 W8x1 W8x1 Dimensions subject to change!	sensing face M8x1 Sensing face M8x1 LED from 4- sides visible Dimensions subject to change!		
	Specific Technical Data	10 24 30 V DC	10 24 30 V DC		
	Permissible operating voltage range Current consumption load	≤ 20 mA	<u>10 <u>24</u> 30 √ DC ≤ 20 mA</u>		
	Load current		_ <u>≤ 20 mA</u> ≤ 200 mA		
	Nominal insulation voltage	75 V DC	75 V DC		
	Permissible capacity at output	≤ 1.0 μF	- <u>- √ √ √ √ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 </u>		
	Ø Sensing face	6.4 mm	6.4 mm		
Switching radi	ius 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		
	5				
-	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

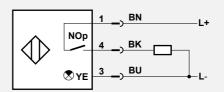


Safety Regulations

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

Subject to technical changes!

Wiring (1) DC 3-poles, plug

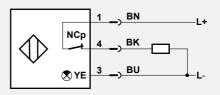


Euro Plug M8

with LED display YE from 4 sides visible



Wiring (2) DC 3-poles, plug



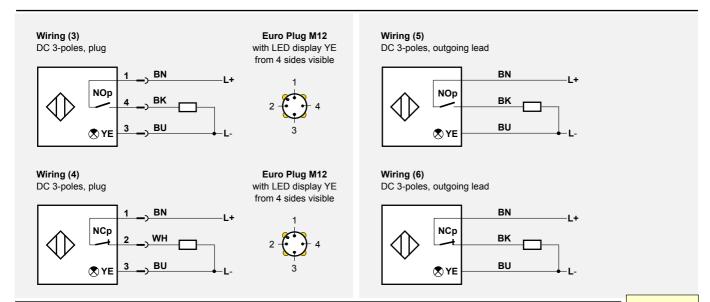
Euro Plug M8

with LED display YE from 4 sides visible





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
sensing face 13 LED from 4 sides visible M12x1	sensing face ∞ LED from 4 sides visible M12x1	sensing face LED standard lead length 2.0 m	sensing face
10 <u>24</u> 30 V DC	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	≤ 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
300 111		ND / 2.0 m / 3 x 0.14 mm^2	ND / 2.0 m / 3 x 0.14 mm^2
-		ND / 2.0 III / 3 X 0.14 IIIII 2	140 / 2.0 111 / 3 X 0.14 111111 2
DC 13	DC 13	DC 13	DC 13
IP 67		IP 67	IP 67
II, 🗆		II, 🗆	II, 🗆
- II, 山 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



Inductive Proximity Switches, All Metal Standard

Series IAD/AHM-12mg

	Design; length	O M12 x 1; 50 mm		O M12 x 1; 6) mm	
	Material of the sensing face / of the housing	PBT / CuZn nickel-pla	ted	PBT / CuZn nickel-plated 6 mm, non-flush		
	Nominal switching distance, mounting (see page1.0.4)	3,5 mm, flush				
	Range secured switching distance	0 2.83 mm		0 4.86 m	ım	
	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)
Type designation, - Ref. no	NO and NC plus-switching NOp + NCp	-		,		
(Wiring)	NO plus-, NC minus-switching NOp + NCn					
(vviiiig)	NO minus-switching NOn					
	NC minus-switching NCn					
M	laximum switching frequency / Minimum damping period	20 kHz / 25 μs		20 kHz / 25	μs	
	Wiring (connector or lead); number of wires	connector M12; 3 wir	es	connector M12;	3 wires	
Repetition a	Common Technical Data Reduction factor //steresis of the switching point s at permanent operating voltage and ambient temperature Magnetic field-resistant Permissible ripple voltage Short-circuit-proof? ected against polarity reversal? plate of the switching point s ≤ 10% ≤ 10% ≤ 150 mT ≤ 15% yes, clocking yes eletted against polarity reversal? plate of the switching point s ≤ 150 mT ≤ 15% yes, clocking yes eletted against polarity reversal? plate of the switching point s ≤ 2.5 V DC - 25 + 85 °C	LED from 4 sides visible p o d		sensing face M12x1 Sensing face LED from 4 sides visible M12x1	8 4 60 60 60 60 60 60 60 60 60 60 60 60 60	3
	Specific Technical Data					
	Permissible operating voltage range	10 <u>24</u> 30 V DC	<u> </u>	10 <u>24</u> 30 \	/ 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 radio	us 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, □				
	Permissible torque without / with toothed disc	9 Nm / 30 Nm		9 Nm / 30 N	m	
	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.

Certifications

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

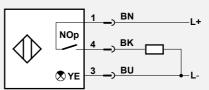


Safety Regulations

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

Subject to technical changes!

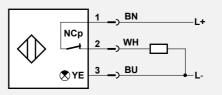
Wiring (1) DC 3-poles, plug



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

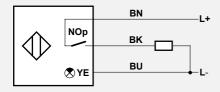




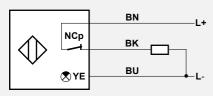
O M12 x 1; 50 mm	O M12 x 1; 60 mm	
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	
3.5 mm, flush	6 mm, non-flush	
0 2.83 mm	0 4.86 mm	
IAD/AHM-12mg50b3.5-1NDc1A, 11.37-28-020 (3)	IAD/AHM-12mg60n6-1NDc1A, 11.37-63-020 (3)	
IAD/AHM-12mg50b3.5-2NDc1A, 11.37-29-020 (4)		
20 kHz / 25 μs	20 kHz / 25 μs	
lead; 3 wires	lead; 3 wires	
M12x1	M12x1	
- IVI 12X I	-	
sonsing	sensing V	
sensing ————————————————————————————————————	face	
	1	
√S 17 H B	\$17 PH 8	
	<i>S</i> ¹⁷	
LED— ►□ 	LED V	
ata ata at		
standard lead length _	standard	
ead length [] 2.0 m	lead length	
	2.0 m	
10 <u>24</u> 30 V DC	10 <u>24</u> 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	
	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			
Type designation,	NO and NC plus-switching NOp + NCp	IAD/AHM-18eq50b6-12Sd1A, 11.37-38 (2)	IAD/AHM-18eq50b6-12NDd1A, 11.37-40-020 (4	
Ref. no.	NO plus-, NC minus-switching NOp + NCn	(-)	a za a a a a a a a a a a a a a a a a a	
(Wiring)	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	
Repition a	Common Technical Data Reduction factor ysteresis of the switching point s accuracy of the switching point s at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? yes, clocking yes coltage drop over a closed output Short-circuit-proof yes coltage drop over a closed output	sensing face	sensing face M18x1 Sensing face LED standard lead length 2.0 m	
	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	≤ 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 radiu	is 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	
I ead tyne	e / 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	
	Ambient temperature range			
	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	
	Wolgh.			
	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

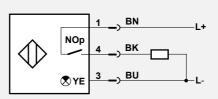


Safety Regulations

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

Subject to technical changes!

Wiring (1) DC 3-poles, plug

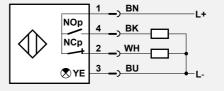


Euro Plug M12

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





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		
	(1) IAD/AHM-18mg60n10-1Sd1A, 11.37-54 (1)	IAD/AHM-18mg50b6-1NDc1A, 11.37-30-020 (3)	0 8.1 mm 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	
sensing face S 24 LED from 4 sides visible M12x1	sensing face M18x1 Sensing face OL OL OR M12x1 M12x1 M12x1 M12x1 M12x1 M12x1 M12x1	sensing face LED standard lead length 2.0 m	sensing face M18x1 Sensing face 0 0 0 0 0 0 0 0 0 0 0 0 0	
10 <u>24</u> 30 V DC	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	≤ 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	· 		
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 BN L+ NOP BK BU L Wiring (4) DC 4-poles, outgoing lead BN L+ NOP BK NOP BK NOP BK NOP NOP BK N

Inductive Proximity Switches, All Metal Standard

Series IAD/AHM-30mg

Range secured switching distance NO plus-switching NOp 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 Wiring (connector or lead); number of wires Common Technical Data Reduction factor Hysteresis of the switching point s Repetition accuracy of the switching points - at permanent operating voltage and ambient temperature NO more switching NOn NC minus-switching NCn NO m	·	
Nominal switching distance, mounting (see page 1.0.4) Range secured switching distance NO plus-switching NOp NC plus-switching NOp NC plus-switching NOP NCP Ref. no. (Wiring) NO plus-switching NOP NO minus-switching NOP		
Range secured switching distance NO plus-switching NOp NC plus-switching NCp NO and NC plus-switching NOp + NCp NO minus-switching NOp + NCn NO minus-switching NOn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data Reduction factor Hysteresis of the switching point s - at permanent operating voltage and ambient temperature Sensing face 0 8.1 mm 0 16. AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg85n20-12 AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg85n20-12 AD/AHM-30mg50b10-12Sd1A, 11.37-07 (1) AD/AHM-30mg	20 mm, non-flush	
Type designation, Ref. no. (Wiring) NO plus-switching NCp NO and NC plus-switching NOp + NCp NO plus-switching NOp + NCn NO minus-switching NOn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data Reduction factor Hysteresis of the switching point s - at permanent operating voltage and ambient temperature NO plus-switching NCp NOp + NCp NOp + NCp NOp + NCp NOp + NCp NO minus-switching NOp + NCn NO minus-switching NOn NC minus-switching NCn 15 kHz / 33 μs connector M12; 4 wires Connector M12; 4 wires wisensing face M30x1.5 M30x1.5 Sensing face		
Type designation, Ref. no. (Wiring) NC plus-switching NCp NO and NC plus-switching NOp + NCp NO plus-, NC minus-switching NOp + NCn NO minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data Reduction factor Hysteresis of the switching point s Repetition accuracy of the switching point s - at permanent operating voltage and ambient temperature NC plus-switching NCp NOp + NCp NOp + NCp NOp + NCn NO minus-switching NOn NC minus-switching NCn 15 kHz / 33 µs Connector M12; 4 wires Connector M12; 4 wires Connector M30x1.5 M30x1.5 Sensing face M30x1.5		
NO and NC plus-switching NOp + NCp NO plus-, NC minus-switching NOp + NCn NO minus-switching NOn NC minus-switching NCn		
NO plus-, NC minus-switching NOp + NCn NO minus-switching NCn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data Reduction factor Hysteresis of the switching point s Repetition accuracy of the switching point s - at permanent operating voltage and ambient temperature NO plus-, NC minus-switching NOp + NCn NC minus-switching NCn 15 kHz / 33 µs connector M12; 4 wires connector M12; 4 wires 15 kHz / 33 µs connector M12; 4 wires M30x1 Sensing face M30x1.5	Sd1A, 11.37-70 (*	
NO minus-switching NOn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data Reduction factor Hysteresis of the switching point s - at permanent operating voltage and ambient temperature NO minus-switching NOn NC minus-switching period 15 kHz / 33 µs connector M12; 4 wires Connector M12; 4 wires To rall metals 3 10% sensing face M30x1.5 M30x1.5 Sensing face M30x1.5 Sensing face	(
NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data Reduction factor 1 for all metals Hysteresis of the switching point s - at permanent operating voltage and ambient temperature ≤ 2% Naintended NCn 15 kHz / 33 μs connector M12; 4 wires connector M12; 4 wires This kHz / 33 μs connector M12; 4 wires To wire 15 kHz / 33 μs connector M12; 4 wires To wire 15 kHz / 33 μs connector M12; 4 wires To wire M30x1 Sensing face Additional in the metals of the switching point s Sensing face M30x1.5 This kHz / 33 μs connector M12; 4 wires To wire M30x1 Sensing face		
Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data Reduction factor 1 for all metals Hysteresis of the switching point s - at permanent operating voltage and ambient temperature ≤ 2% Maximum switching period 15 kHz / 33 μs connector M12; 4 wires connector M12; 4 wires M30x1 M30x1.5 M30x1.5 Sensing face		
Wiring (connector or lead); number of 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 - at permanent operating voltage and ambient temperature ≤ 2% Wiring (connector or lead); number of wires connector M12; 4 wires connector M12; 4 wires connector M30x1 sensing face	/ 33 116	
Common Technical Data Reduction factor Hysteresis of the switching point s Repetition accuracy of the switching point s - at permanent operating voltage and ambient temperature ≤ 2% M30x1.5 M30x1.5 M30x1.5 Sensing face	•	
Common Technical Data Reduction factor I for all metals Sensing Face Sensing Sensing Face Sensing	112, 4 WIIES	
Permissible ripple voltage Short-circuit-proof? Protected against polarity reversal? Protected against polarity reversal? Short-circuit-proof? yes LED from 4 sides	.50	
Voltage drop over a closed contact Ambient temperature range Ambient temperature range Specific Technical Data Visible → O ▼ M12x1 → □ M		
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	mA	
Load current ≤ 200 mA ≤ 200	mA	
Nominal insulation voltage 75 V DC 75 V	DC	
Permissible capacity at output $\leq 1.0 \ \mu\text{F}$ $\leq 1.0 \ \mu\text{F}$	μF	
Ø Sensing face 27.4 mm 27.4 l	<u> </u>	
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2) 11.0 mm 13.5 ii	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 1		
Degree of protection according to IEC 60529 IP 67 IP 6	67	
Protection class II, III		
Permissible torque without / with toothed disc 150 Nm / < 200 Nm 150 Nm / <	200 Nm	
Weight 75 g 130		
	g	
Recommended accessories	g	

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 $5.0 \ \text{m}$. 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

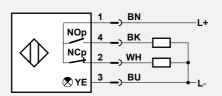


Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

Wiring (1)

DC 4-poles, plug



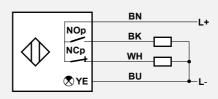
Euro Plug M12

with LED display YE from 4 sides visible



Wiring (2)

DC 4-poles, outgoing lead





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	
sensing face M30x1.5 sensing face Standard lead length 2.0 m	sensing face M30x1.5 Sensing face Square Sq	
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

	Material of the sensing face / of the housing Nominal switching distance, mounting (see page 1.0.4)	PBT / Al	PBT / PBT
	<u> </u>		
		15 mm, flush	15 mm, flush
	Range secured switching distance	0 12.2 mm	0 12.2 mm
	NO plus-switching NOp		
ype designation,	NC plus-switching NCp		
Ref. no.	NO and NC plus-switching NOp + NCp	IAD/AHM-40aq40b15-12Sd1B, 11.37-16 (1)	IAD/AHM-40fv54b15-12Sd1B, 11.37-34
(Wiring)	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
		52 ──	65
	Common Technical Data	_	
1	Reduction factor lysteresis of the switching point s 1 for all metals 3 10%	40 — VZ W	54 X
	lysteresis of the switching point s 3 10% accuracy of the switching point s ≤ 10%	↑ P <u>L*</u>	1
	- at permanent operating voltage	04 1	8
	and ambient temperature ≤ 2%	P	
	Magnetic field-resistance ≤ 150 mT	<u> </u>	1 / 0
	Permissible ripple voltage ≤ 15%		48.5 ──
	Short-circuit-proof? yes, clocking	sensing Ø 5.4 face	
Pro	otected against polarity reversal ? yes		Jacob
	oltage drop over a closed contact ≤ 2.5 V DC	 	LED LED
	Ambient temperature range - 25 + 85 °C	e +LED €	S S S S S S S S S S S S S S S S S S S
		' [1
	Specific Technical Data	35.5 →	3
	Permissible operating voltage range	10 <u>24</u> 30 V DC	10 <u>24</u> 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 radi	us 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 tvn	e / standard lead length / number of wires x lead cross section	555 III	
	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		
	nes with connectors: Please find the required connector with	Wiring (1)	Euro Plug M12
going lead in cha	apter 12 "Accessories". Order separately.	DC 4-poles, plug	
r proximity switc	ches with outgoing lead: The standard length is 2.0 m or	1 , BN	

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

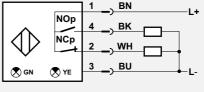
Proximity switches according to standard: DIN EN 60 947-5-2 (VDE 0660 Part 208). Manufactured according to DIN EN ISO 9001



Safety Regulations

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

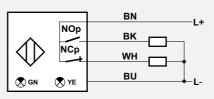
Subject to technical changes!





Wiring (2)

DC 4-poles, outgoing lead





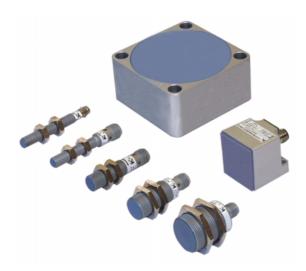
D 00 40 00	7 00 40 00	D. 90 marris 40 marris 90 marris	
■ 80 mm; 40 mm; 80 mm	80 mm ; 40 mm; 80 mm	■ 80 mm; 40 mm; 80 mm	
PBT / Al	PBT / Al	40 mm, partly flush	
40 mm, flush	40 mm, flush	0 32.4 mm	
0 32.4 mm	0 32.4 mm	U 32.4 IIIII	
IAD/AHM-80aq40b40-12Sd1B, 11.37-18 (1)	IAD/AHM-80ag40b40-12NKd1B, 11.37-35-050 (2)	IAD/AHM-80fq40t40-12Sd1B, 11.37-17 (1)	
IAD/ANIVI-00ay40040-12301B, 11.37-16 (1)	IADIAHIVI-80aq40b40-12NK01B, 11.37-33-030 (2)	1ADIAH INI-00144040-1230 IB, 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	
		, , ,	
96	96	6 4 4 1 1 1 1 1 1	
sensing G F F F F F F F F F F F F F F F F F F	sensing C C C C C C C C C C C C C C C C C C C	123 Sensing face Selection f	
10 <u>24</u> 30 V DC	10 <u>24</u> 30 V DC	10 <u>24</u> 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	



Series All Metal Automotive



Characteristics



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

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

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

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

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

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

- an increased switching distance with flush mounting
- an increased 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 $\leq 50~\mu s$ (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.

		Switching distance
Type	Ref. No.	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

		De	esign; length	O M8 x 1; 60 mm	O M8 x 1; 60 mm
	Material of the	sensing face / o	of the housing	PBT rad. cross-linked/V2A Teflcoated	PBT rad. cross-linked/V2A Teflcoated
	Nominal switching distance,	mounting (see	e page 1.0.4)	1.5 mm, flush	1.5 mm, flush
	Range	e secured switch	hing distance	0 1.22 mm	0 1.22 mm
	NO p	olus-switching	NOp	IAD/AHMS-8eg60b1.5-1Wc1A, 11.36-22 (1)	IAD/AHMS-8eg60b1.5-1Sd1A, 11.36-23 (2)
Type designation,	NC p	olus-switching	NCp		
Ref. no.	NO and NC p	olus-switching	NOp + NCp		
(Wiring)	NO plus-, NC mi	nus-switching	NOp + NCn		
(**************************************	NO mi	nus-switching	NOn		
	NC mi	nus-switching	NCn		
N	Maximum switching frequency /	Minimum dam	nping period	20 kHz / 25 μs	20 kHz / 25 μs
	Wiring (connec	tor or lead); nur	mber of wires	connector M8; 3 wires	connector M12; 3 wires
	Common Tooksiaal Data				
	Common Technical Data Reduction factor	1 for all metal	ls	M8x1	M8x1
Hv	steresis of the switching point s	3 10%		-	-
		≤ 10%		sensing —	sensing
	- at permanent operating voltage			face	face 🗼 🛦 🛦
	and ambient temperature	<u>≤ 2%</u>			
		≤ 150 mT		411	8 10 4
	Permissible ripple voltage	≤ 15%		∑ ₁₃	<u> </u>
	Short-circuit-proof?	yes, clocking		/~ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
Prot	tected against polarity reversal?	yes			LED
Vo	oltage drop over a closed contact	≤ 2.5 V DC			from 4 sides
	Ambient temperature range	25 + 85 °C		LED from 4 → 0 0	visible • • • •
				sides ☐☐ M8x1 ↓	M12x1 →
				visible	
		Specific Te	chnical Data	Dimensions subject to change!	Dimensions subject to change!
	Permiss	sible operating v	oltage range	10 <u>24</u> 30 V DC	10 <u>24</u> 30 V DC
	Curre	nt consumption	without load	≤ 20 mA	≤ 20 mA
			Load current	≤ 200 mA	≤ 200 mA
		Nominal insul	lation voltage	75 V DC	75 V DC
	Pe	ermissible capa	city at output	≤ 1 μF	≤ 1.0 μF
		Ø	Sensing face	6.4 mm	6.4 mm
Switching radiu	us r (at switching distance of the o	bject) s = 0; see	e page 1.0.2)	3.0 mm	3.0 mm
		Function	n indication ?	yes, YE	yes, YE
		Maximur	m lead length	500 m	500 m
Lead type	e / standard lead length / number				
	1160 -0		-0.00047.5.0	DO 10	DC 42
	Utilization category			DC 13	DC 13 IP 67
	Degree of protect			IF 0/	
	Dormingible term		otection class	0. Nlm / 20. Nlm	
	Permissible torqu	ie without / With		8 Nm / 20 Nm	8 Nm / 20 Nm
			Weight	10 g	12 g
		Recommended	d 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

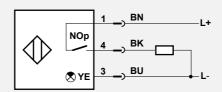


Safety Regulations

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

Subject to technical changes!

Wiring (1) DC 3-poles, plug

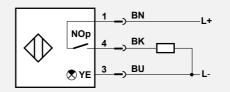


Euro Plug M8

with LED display YE from 4 sides visible



Wiring (2) DC 3-poles, plug



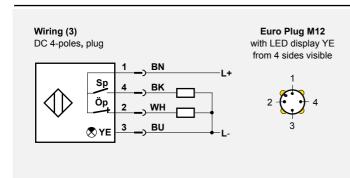
Euro Plug M12

with LED display YE from 4 sides visible





O M12 x 1; 50 mm	O M18 x 1; 50 mm	O M30 x 1.5; 50 mm	
PBT rad. cross-linked/V2A Teflcoated	PBT rad. cross-linked/V2A Teflcoated	PBT rad. cross-linked/V2A Teflcoated	
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	
sensing face S17 LED from 4 sides visible M12x1 M12x1 © 05	sensing face Sensing face Sensing face Sensing face Sensing face M18x1 Sensing face Sensing face M12x1 Sensing face Se	sensing face Sansing face Sa	
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	
.			



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
	NO plus-switching NOp		
	NC plus-switching NCp		
Type designation,	NO and NC plus-switching NOp + NCp	IAD/AHMS-40aq40b15-12Sd1B, 11.36-16 (1)	IAD/AHMS-40aq40b15-12Sd1B, 11.36-16 (
Ref. no.	NO plus-, NC minus-switching NOp + NCn		(
(Wiring)	NO minus-switching NOn		
	NC minus-switching NCn		
N	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
			05 -1
	Common Technical Data	52	65
	Reduction factor 1 for all metals	40 — X	54 × × × × × × × × × × × × × × × × × × ×
Hy	ysteresis of the switching point s 3 10%	↓	A P
Repitition a	accuracy of the switching point s ≤ 10%	<u></u> │ │ │ ├ ┌ ┸╢	
-	at permanent operating voltage	64	8
	and ambient temperature ≤ 2%		1/6
	Magnetic field-resistance ≤ 150 mT	<u> </u>	
	Permissible ripple voltage ≤ 15%	sensing Ø 5.4	48.5 ─►
	Short-circuit-proof? yes, clocking	sensing Ø 5.4 face I	_⊕
Prot	ected against polarity reversal ? yes		LED LED 3.3
Vol	Itage drop over a closed contact ≤ 2.5 V DC	₩	E LED
	Ambient temperature range - 25 + 85 °C	S +LED €	%
		↓ 	» <u> i </u>
		' [1
		⊸ -35.5 - ►	3
	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	≤ 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 38 x 38 mm	≤ 1.0 µF
Cwitching radiu	Ø Sensing face s r (at switching distance of the object) s = 0; see page 1.0.2)	17.0 mm	38 x 38 mm 17.0 mm
Switching radiu	s i (at switching distance of the object) s = 0, see page 1.0.2)	17.0 11111	17.0 111111
	Function indication ?	GN for operation, YE for actuated	GN for operation, YE for actuated
		·	· · · · · · · · · · · · · · · · · · ·
	Maximum lead length	500 m	500 m
Lead type	e / standard lead length / number of wires x lead cross section		
	1400-40		
	Utilization category according to IEC 60947-5-2	DC 13	DC 13
	Degree of protection according to IEC 60529		IP 67
	Permissible torque without / with toothed disc	II, 🗆	II, □
	· · · · · · · · · · · · · · · · · · ·		90 a
	Weight	90 g	90 g
	Recommended accessories		
For proximity switched	es with connectors: Please find the required connector with	Wiring (1)	Euro Plug M12
outgoing lead in cha	pter 12 "Accessories". Order separately.	DC 4-poles, plug	Laio i lag mil
or proximity switche	es with outgoing lead: The standard length is 2.0 m or 5.0 m.	, , , , , ,	
	arked at the end of the ref. no. by the index 020 or -050. In	1 BN	1.4
•	engths are required, please indicate this in the ref. no	NOp 4 BK	1
		NC2 4 -> BK	
zxampies: Lead ienç	gth 10.0 m: Index -100, lead length 0.5 m: Index -005.	NCp 2 WH 5	ー 」 ² 弋・ナ ⁴

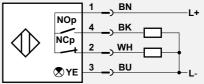
Certifications

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



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

Subject to technical changes!



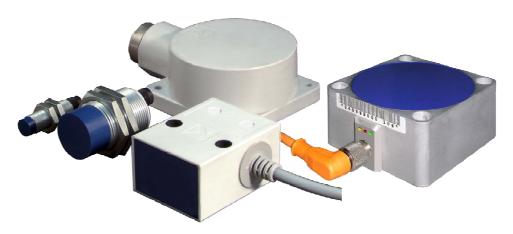




□ 80 mm ; 40 mm; 80 mm	□ 80 mm ; 40 mm; 80 mm	
PBT ceramic-coated / Al	PBT + PTFE / PBT + PTFE	
40 mm, flush	40 mm, partly flush	
0 32.4 mm	0 32.4 mm	
IAD/AHMS-80aq40b40-12Sd1B, 11.36-18 (1)	IAD/AHMS-80fq40t40-12Sd2B, 11.36-17 (1)	
15 kHz / 33 μs	15 kHz / 33 μs	
connector M12; 4 wires	connector M12; 4 wires	
, , , , , , , , , , , , , , , , , , , ,		
100 100 100 100 100 100 100 100 100 100	000	
96 Sensing Face Sensing Face 80 80 80 80 80 80 80 80 80 8	106 Sensing face XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	
10 <u>24</u> 30 V DC	10 <u>24</u> 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	 . ————
<u> </u>	02.0 11111	
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, 🗆		
п, 🖰	п, Ц	
260 ~	250 ~	
360 g	350 g	

Type Ferrous DC 3- and 4-poles

Characteristics

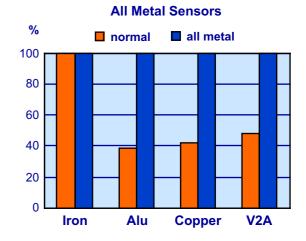


The **series ferrous 3- and 4-poles** comprises the "orthodox" Inductive Proximity Switches, which have been developed in the last decades under consideration of the special requirements of our customers. This series is standardized according to EN 60947-5-2.

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

		Switching distance		_	Switching distance
Туре	Ref. No.	in mm	Туре	Ref. No.	in mm
		Mounting *)			Mounting *)
round M8 x L			round M30 x L		
IAD-8eg45b1.5-1ND1A **)	11.32-53-020	1.5 b	IAD-30fg80b10-12NK1A	11.16-50-020	10 b
IAD-8eg45n2.5-1ND1A **)	11.32-54-020	2.5 n	IAD-30fg80n20-12NK1A	11.17-62-020	20 n
IAD-8eg60b1.5-1W1A **)	11.32-56-000	1.5 b	IAD-30mg50b10-1S1A	11.22-19-000	10 b
IAD-8eg60n2.5-1W1A **)	11.32-57-000	2.5 n	IAD-30mg65n20-1S1A	11.32-36-000	20 n
IAD-8mq40b1.5-1ND1A **)	11.32-55-020	1.5 b	IAD-30mg70b10-1S1A	11.25-88-000	10 b
IAD-8mg60b1.5-1W1 **)	11.32-58-000	1.5 b	IAD-30mg80b10-1NT1A	11.20-03-020	10 b
1712 diriquos 1.0 1001)			IAD-30mg80n20-12S1A	11.22-05-000	20 n
round M12 x L			IAD-30mg95b10-12T2A	11.18-45-000	10 b
IAD-12eg60b2-12S2A	11.24-89-000		IAD-30mg95b10-1S1A	11.22-86-000	10 b
IAD-12eg60b2-12S3A	11.32-85-000	2 b	IAD-30mg95b10-1T2A	11.18-19-000	10 b
IAD-12fg50b2-1NK1A	11.32-61-020	2 b	IAD-30sg80b10-12S1A	11.22-04-000	10 b
IAD-12fg50n5-1NK1A	11.32-62-020		IAD-30sg80b10-12NT1A	11.18-71-020	10 b
IAD-12mg35m4-1PD1A	11.33-05-020	4 m	IAD-30sg80n20-1NT1A	11.22-10-020	20 n
IAD-12mg35m4-2PD1A	11.33-20-020	4 m			
IAD-12mg35m4-6ND1A	11.33-10-020	4 m	rectangular 34 x 50 x 65		
IAD-12mg40b2-1NK1A	11.20-67-030	2 b	IAD-34aq65b12-1NKe3A	11.35-24-020	12 b
IAD-12mg45b2-1NK1A	11.32-17-020	2 b	IAD-34aq65b12-12NKe3A	11.35-25-020	12 b
IAD-12mg45b2-1TK1A	11.32-18-020	2 b	IAD-34zq65b12-1S1A	11.25-90-000	12 b
IAD-12mg45b2-7NK1A	11.32-19-050	2 b	IAD-34aq65b12-1T3A	11.03-15-000	12 b
IAD-12mg45b2-7TK1A	11.32-20-020	2 b	•		
IAD-12mg50b2-1PK1A	11.22-42-020	2 b	rectangular 40 x 40 x L		
IAD-12mg50b2-1S1A	11.20-73-000	2 b	IAD-40aq40b15-12NKd1B **)	11.35-27-020	15 b
IAD-12mg60b2-12NK1A	11.22-11-020	2 b	IAD-40aq40b15-12Sd1B **)	11.35-26-000	15 b
IAD-12mg60b2-12S1A	11.22-12-000	2 b	IAD-40fq54b15-12NKd1B **)	11.35-29-020	15 b
IAD-12mg60b2-1NT1A	11.20-01-020	2 b	IAD-40fq54b15-12Sd1B **)	11.35-28-000	15 b
IAD-12mg60b2-1S2A	11.25-85-000	2 b	IAD-40fq75b15-1T1A	11.16-12-000	15 b
IAD-12mg60m4-1NT1A	11.24-09-020	4 m	IAD-40fv114b15-12L1B	11.25-52-000	15 b
IAD-12mg60m4-1PD1A	11.25-81-020	4 m	IAD-40fv114n25-12L1B	11.25-53-000	25 n
IAD-12mg60m4-1S1A	11.25-03-000	4 m	IAD-40fv114b15-12S1B	11.25-66-000	15 b
IAD-12mg60n5-12S1A	11.22-23-000	5 n	IAD-40fv114n25-12S1B	11.32-98-000	25 n
IAD-12mg60n5-1NK1A	11.20-15-020	5 n	IAD-40fv114n25-12T1B	11.24-08-000	25 n
IAD-12mg60n5-1S1A	11.25-04-000	5 n			
IAD-12ms35m5-1Y1	11.33-03-021	5 m	rectangular 80 x 80 x L		
			IAD-80aq40b40-12NKd1B **)	11.35-31-050	40 b
round M18 x L			IAD-80aq40b40-12Sd1B **)	11.35-30-000	40 b
IAD-18fg80b5-1NK1A	11.17-12-020	5 b	IAD-80fq40t40-12Sd2B **)	11.35-32-000	40 t
IAD-18fg80n10-1NK1A	11.20-95-020	10 n	IAD-80fq40n40-1T1A	11.16-30-000	40 n
IAD-18mg35b5-1NK1A	11.20-30-020	5 b	IAD-80fr70e80-1T3A	11.03-21-000	80 n
IAD-18mg40m8-1ND1A	11.33-22-020	8 m	IAD-80fr70n35-12T1A	11.33-21-000	35 n
IAD-18mg40m8-6ND1A	11.33-11-020	8 m	IAD-80fr70n50-1T1A	11.03-98-000	50 n
IAD-18mg50b5-1S1A	11.22-06-000	5 b	IAD-80fr70n50-1S1A	11.25-92-000	50 n
IAD-18mg50m8-1S1A	11.33-18-000	8 m	IAD-80fr70n50-1NT1A	11.03-94-050	50 n
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 IAD-18mg80b5-1S1A		10 n 5 b			
IAD-18mg80n10-1S1A	11.22-91-000	10 n	-		
IAD-18mg85b5-1NT1A	11.20-02-020	5 b			
		5 b			
IAD-18mg85b5-12NK1A	11.18-32-020				
IAD-18mg85n10-1NT1A	11.20-75-020	10 n			
IAD-18mg100b5-171A	11.17-89-000	5 b	-		
IAD-18mg100b5-12T1A IAD-18mg100b5-1T2A		5 b			
IAD-18mg100n10-1T1A	11.18-37-000	10 n			
IAD-TOING TOURING-LLIA		10 11	-		

^{*)} 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	
	NO plus-switching NOp	IAD-8eg45b1.5-1ND1A, 11.32-53-020 (1		
	NC plus-switching NCp			
Type designation,	NO and NC plus-switching NOp + NCp			
Ref. no.	NO plus-, NC minus-switching NOp + NCn			
(Wiring)	NO minus-switching NOn			
-	NC minus-switching NCn			
N	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	
	Triming (commencer or ready), manuser or times			
	Common Technical Data			
	Reduction factor Fe / Al 1 / 0.35	M8x1	M8x1	
	/steresis of the switching point s 3 20%	-	-	
	accuracy of the switching point s ≤ 10%	sensing	sensing — v	
	at permanent operating voltage	face	face	
	and ambient temperature ≤ 2%			
	Magnetic field-resistance			
	Permissible ripple voltage ≤ 15%	<i>S</i> 13 1 1 1 4 4 4 4 4 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6	√S ₁₃	
	Short-circuit-proof? yes, clocking			
Prot	ected against polarity reversal ? yes			
	Itage drop over a closed contact ≤ 1.5 V DC	LED —	LED -	
	Ambient temperature range - 25 + 75 °C			
	7 and one composition of carries 20 mm. 10 0	standard	standard	
		lead length	lead length	
		2.0 m	2.0 m	
	Specific Technical Data	Dimensions subject to change!	Dimensions subject to change!	
	Permissible operating voltage range	10 <u>24</u> 36 V DC	10 <u>24</u> 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 radiu	s 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	e / 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		
	Protection class	01		
	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	
	Weight	g · woight of the load		
	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



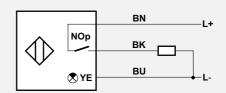
Safety Regulations

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

Subject to technical changes!

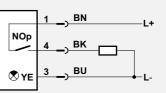
Wiring (1)

DC 3-poles, outgoing lead



Wiring (2)

DC 3-poles, plug



Euro Plug M8





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 / CuZn nickel-plated PBT / CuZn nickel-plated		
	PBT / stainless steel PBT / stainless steel		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 /> 0.4mc	2 kHz / ≥ 0.1ms	2 kHz / ≥ 0.1ms	
connector M8; 3 wires	connector M8; 3 wires	lead; 3 wires	connector M8; 3 wires	
sensing face M8x1 LED 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	sensing face sensing face 8 -2.5 M3x0.5		sensing face 2.5 M3x0.5	
10 <u>24</u> 36 V DC	10 <u>24</u> 36 V DC	10 <u>24</u> 36 V DC	10 <u>24</u> 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	YE yes, YE yes, YE		yes, YE	
300 m	300 m	300 m	300 m	
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		

Series IAD-12eg, -12fg

Nominal switching distance, mounting (see page 10.4) Range secured switching distance NO plus-switching NOp NOp Ref. no. NO plus-switching NOp NOp NO no NO plus-switching NOp NOp NO minus-switching NOp NOn NO minus-switching NOp NO NO minus-switching NOp		Design; length	O M12 x 1; 60 mm	O M12 x 1; 60 mm	
Nominal switching distance, mounting (see page 1.0.4) Range secured switching distance No plus-switching Nop		<u> </u>			
Range secured switching distance NO plus-switching NOP NO plus-switching NOP NOP NO minus-switching NOP NOP NO minus-switching NOP NOP NO minus-switching NOP NO minus-switc					
NO plus-switching NOp		0 1 01 1			
NC plus-switching NCp N			0 1.02 mm	0 1.02 IIIII	
No and NC plus-switching NOp + NCn					
No plus. NC minus-switching NOp + NCn		1 0 1	IΔD-12eα60h2-12S2Δ 11.24-80 (1)	IAD 12og60b2 12S3A	
No minus-switching NCn NC minus-switching NCn NC minus-switching NCn Wiring (connector or lead); number of wires Common Technical Data Reduction factors Fe / Al / V2A Hysteresis of the switching point s 3. 20% Repittion accuracy of the switching point s 3. 20			17.24 03 (1)	IAD-12eg0002-1200A, 11.02-00 (1)	
Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires SkHz / 2 0.1 ms SkHz / 2 0.1 ms Connector M12; 4 wires Connector	(Wiring)				
Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data Reduction factors Fe / Al / V2A Hysteresis of the switching points Hy		<u> </u>			
Wiring (connector or lead); number of wires Common Technical Data Reduction factors Fe / Al / V2A 1.0 / 0.4 / 0.5 Hysteresis of the switching point s ≤ 10% - a permanent operating voltage - and makinet temperature ≤ 2% Magnetic field-resistance Permissible voltage ripple 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 Current consumption without load Economic September 100 mA Specific Technical Data Permissible operating voltage range Current consumption without load Load current S ≥ 200 mA S ≥ 2		•	3 kHz / > 0.1 ms	3 kHz / > 0.1 ms	
Common Technical Data Reduction factors Fe / Al / V2A Replittion accuracy of the switching points 3 20% Replittion accuracy of the switching points 5 20% Replittion accuracy of the switching points 5 20% Replittion accuracy of the switching points 5 20% Magnetic field-resistance Permissible voltage ripple 5 51% Short-circuit-proof? yes, clocking Protected against polarity reversal? yes Voltage drop over a closed contact 51.5 V DC 11.32-6162: 52.5 V DC Ambient temperature range - 25 + 75 °C Specific Technical Data Permissible operating voltage range Current consumption without load Load current 5 50 mA 5		<u> </u>			
Reduction factors Fe / Al / V2A Hysteresis of the switching point s Reptition accuracy of the switching point s - at permanent operating voltage and ambient temperature Permissible voltage ripple 5 15% Short-circuit-proof? Protected against polarity reversal? Voltage drop over a closed contact 5 1.5 V DC Ambient temperature range Specific Technical Data Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at output Ø Sensing face Permissible capacity at output Ø Sensing face 10. 24 30 V DC 10. 25 30 V DC 10. 26 30 V DC 10		Willing (conficedor of fedd), flumber of wires	5555.62,55	CONTICCION WILE, 4 WILES	
Reduction factors Fe / Al / V2A Hysteresis of the switching point s Reptition accuracy of the switching point s - at permanent operating voltage and ambient temperature Permissible voltage ripple 5 15% Short-circuit-proof? Protected against polarity reversal? Voltage drop over a closed contact 5 1.5 V DC Ambient temperature range Specific Technical Data Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at output Ø Sensing face Permissible capacity at output Ø Sensing face 10. 24 30 V DC 10. 25 30 V DC 10. 26 30 V DC 10		Common Toohniaal Data			
Hysteresis of the switching point s Repitition accuracy of the switching point s S 10% sensing face and ambient temperature \$\frac{200}{2}\$ 45° C			M12x1	M12x1	
Repitition accuracy of the switching point is 3 10% - at permanent operating voltage and ambient temperature 5 2% Magnetic field-resistance Permissible voltage ripple 5 15% Short-circuit-proof? yes, clocking Protected against polarity reversal? yes Voltage drop over a closed contact 51.5 V DC Ambient temperature range 25.5 V DC Ambient temperature range 26.5 V DC A			→ →	→	
## Action and ambient temperature \$2 \\				sensing — V	
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 Specific Technical Data Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at output 10 24 30 V DC 11.32-61, -62: ≤ 2.5 V DC -25 + 75 °C 11.32-61, -62: ≤ 2.5 V DC -25 + 75 °C 11.32-61, -62: ≤ 2.5 V DC -25 + 75 °C M12x1 LED 11.2x1 30 V DC 10 24 30 V		, , , , , , , , , , , , , , , , , , ,	face	face	
Magnetic field-resistance Permissible voltage ripple ≤ 15% Short-circuit-proof? 2 yes, clocking Protected against polarity reversal? yes Voltage drop over a closed contact 11.32-6162: ≤ 2.5 V DC 11.32-6162: ≤ 2.5 V DC Ambient temperature range - 25 + 75 °C Specific Technical Data Permissible operating voltage range Current consumption without load Load current South Tomas Substituting and South Sout					
Permissible voltage ripple \$ 15% Short-circuit-proof? yes, clocking Protected against polarity reversal? yes Voltage drop over a closed contact \$ 1.5 V DC		<u> </u>	C 17		
Short-circuit-proof? yes, clocking Protected against polarity reversal? yes Voltage drop over a closed contact \$1.5 \times DC 11.32-61, -62: ≤ 2.5 \times DC 10.32 \times DC 13.65		-	/>>'' 🛱 🕴	/>" 📑 🛉	
Protected against polarity reversal ? Voltage drop over a closed contact ≤ 1.5 V DC			000	0,0	
Voltage drop over a closed contact ≤ 1.5 V DC	Prot				
11.32-61, -62: ≤ 2.5 V DC -25 + 75 °C			LED +	LED 🗕 🗘	
Specific Technical Data Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at output Ø Sensing face Switching radius r (at switching distance of the object s = 0; see page 1.0.2) Maximum lead length Lead type / standard lead length / number of wires x lead cross section Weight Permissible torque without / with toothed disc Weight M12x1		<u> </u>		i +	
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 60929 IP 67 IP 67 Permissible torque without / with toothed disc 12 Nm / 45 Nm 12 Nm / 45 Nm Weight			M12x1 —	M12v1 —	
Permissible operating voltage range 10 24 30 V DC 10 24 30 V DC	_		zx.	M12X1 - 1	
Permissible operating voltage range 10 24 30 V DC 10 24 30 V DC			1		
Current consumption without load Load current Load current Load current Solve DC Permissible capacity at output Solve Description without load Solve Description without load Nominal insulation voltage 75 V DC Permissible capacity at output Solve Description Descriptio		Specific Technical Data			
Load current Nominal insulation voltage Permissible capacity at output Sensing face Switching radius r (at switching distance of the object s = 0; see page 1.0.2) Maximum lead length Lead type / standard lead length / number of wires x lead cross section Utilization category according to IEC 60947-5-2 Permissible torque without / with toothed disc Weight Sensing face 10.5 μF 1.85 mm 10.5 mm 10.5 mm 10.5 mm 1.85 mm 1.85 mm 1.85 mm 1.85 mm Desmall of the object s = 0; see page 1.0.2) 1.85 mm 1.85 mm 1.85 mm 1.86 mm 1.87 mm 1.88 mm 1.89 mm 1.89 mm 1.80 mm		Permissible operating voltage range	10 <u>24</u> 30 V DC	10 <u>24</u> 30 V DC	
Nominal insulation voltage Permissible capacity at output Ø Sensing face Switching radius r (at switching distance of the object s = 0; see page 1.0.2) Function indication? Maximum lead length Lead type / standard lead length / number of wires x lead cross section Utilization category according to IEC 60947-5-2 Protection class Permissible torque without / with toothed disc Weight Nominal insulation voltage 75 V DC 94.0.9 in με 10.5 mm 1.85 mm 1.85 mm 300 m 300 m 300 m 300 m 100 T 3 100 T		Current consumption without load			
Permissible capacity at output 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) Function indication? yes, YE Waximum lead length 300 m Lead type / standard lead length / number of wires x lead cross section Utilization category according to IEC 60947-5-2 Degree of protection according to IEC 60529 Protection class Permissible torque without / with toothed disc Weight Weight S 1.0 μF ≤ 1.0 μF ≤ 1.0 μF ≤ 1.0 μF ≤ 1.0 μF Σ 1.85 mm 1.85 mm 10.5 mm 10.7 mp 10.8 mm 10.9					
Ø Sensing face Switching radius r (at switching distance of the object s = 0; see page 1.0.2) Function indication? Function indication? yes, YE yes, YE Maximum lead length 300 m Lead type / standard lead length / number of wires x lead cross section Utilization category according to IEC 60947-5-2 Degree of protection according to IEC 60529 Protection class Permissible torque without / with toothed disc Weight Weight 10.5 mm 10.5		<u> </u>			
Switching radius r (at switching distance of the object s = 0; see page 1.0.2) 1.85 mm 1.85			<u>'</u>	· · · · · · · · · · · · · · · · · · ·	
Function indication? yes, YE yes, YE					
Maximum lead length 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 Permissible torque without / with toothed disc Weight Maximum lead length 300 m DC 13 DC 13 IP 67 IP 67 IP 67 II □ 12 Nm / 45 Nm 12 Nm / 45 Nm 30 g 30 g	Switching radi	us r (at switching distance of the object s = 0; see page 1.0.2)	1.85 mm	1.85 mm	
Maximum lead length 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 Permissible torque without / with toothed disc Weight Maximum lead length 300 m DC 13 DC 13 IP 67 IP 67 IP 67 II □ 12 Nm / 45 Nm 12 Nm / 45 Nm 30 g 30 g					
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 Protection class Permissible torque without / with toothed disc Weight DC 13 DC 13 IP 67 IP 67 II □ Permissible torque without / with toothed disc 30 g 30 g		Function indication ?	yes, YE	yes, YE	
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 Protection class Permissible torque without / with toothed disc Weight DC 13 DC 13 IP 67 IP 67 II □ Permissible torque without / with toothed disc 30 g 30 g		Maxima in la - d l dl	200	200	
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 DC 13 DC 13 IP 67 IP 67 II □ 12 Nm / 45 Nm 12 Nm / 45 Nm 30 g 30 g	Loadting	<u> </u>		300 111	
Degree of protection according to IEC 60529 IP 67 IP 67 Protection class Permissible torque without / with toothed disc Weight Permissible torque without / with toothed disc Weight Permissible torque without / with toothed disc Weight Degree of protection according to IEC 60529 IP 67 IP 67 II □ 12 Nm / 45 Nm 12 Nm / 45 Nm 30 g 30 g	Leau type	57 Standard lead length / number of wires x lead cross section			
Degree of protection according to IEC 60529 IP 67 IP 67 Protection class Permissible torque without / with toothed disc Weight Permissible torque without / with toothed disc Weight Permissible torque without / with toothed disc Weight Degree of protection according to IEC 60529 IP 67 IP 67 II □ 12 Nm / 45 Nm 12 Nm / 45 Nm 30 g 30 g		Utilization category according to IEC 60947-5-2	DC 13	DC:13	
Protection class Permissible torque without / with toothed disc Weight Permissible torque without / with toothed disc Weight 12 Nm / 45 Nm 12 Nm / 45 Nm 30 g 30 g		<u> </u>			
Permissible torque without / with toothed disc 12 Nm / 45 Nm 12 Nm / 45 Nm Weight 30 g 30 g		<u> </u>	5.		
Weight 30 g 30 g			12 Nm / 45 Nm	· · · · · · · · · · · · · · · · · · ·	
		· · · · · · · · · · · · · · · · · · ·			
Recommended accessories					
		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

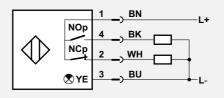


Safety Regulations

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

Subject to technical changes!

Wiring (1) DC 4-poles, plug

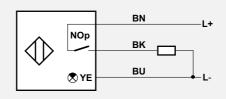


Euro Plug M12



Wiring (2)

DC 3-poles, outgoing lead





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	
sensing face M12x1 Sensing face LED 98	sensing face M12x1 O TO THE PROPERTY OF THE	
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	
≤ 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	

Series IAD-12mg

	Material of the sensing face / of the ho Nominal switching distance, mounting (see page		PBT / CuZn nickel-plated
	Nominal switching distance, mounting (see page		
		.0.4) 4 mm, flush, maximized	4 mm, flush, maximized
	Range secured switching dis		0 3.24 mm
	NO plus-switching NO	IAD-12mg35m4-1PD1A, 11.33-05-020 (1	<u></u>
Type designation,	NC plus-switching NC		IAD-12mg35m4-2PD1A, 11.33-20-020 (2
Ref. no.	NO and NC plus-switching NOp +	· ·	
(Wiring)	NO plus-, NC minus-switching NOp +	Cn	
	NO minus-switching NO		
	NC minus-switching NC		
М	laximum switching frequency / Minimum damping p	-	0.8 kHz / ≥ 0.3 ms
	Wiring (connector or lead); number of	vires lead; 3 wires	lead; 3 wires
	Common Technical Data	M12x1	Mova
R	deduction factors Fe / Al / V2A 1.0 / 0.4 / 0.5	M12X1	M12x1
	esteresis of the switching point s 3 20%	sensing	. 7
	accuracy of the switching point s ≤ 10%	face	sensing
· · · · · · · · · · · · · · · · · · ·	at permanent operating voltage	— III T	T T
	and ambient temperature ≤ 2%		
	Magnetic field-resistance	— <i>S</i> 17 H 8	<i>S</i> 17
	Permissible voltage ripple ≤ 15%	LED → Φ	LED —
	Short-circuit-proof? yes, clocking		<u>_</u>
Prote	ected against polarity reversal ? yes		
	tage drop over a closed contact ≤ 2.5 V DC,		lil lil
	11.32-18, -20: ≤ 3.5 V	oc III	
	Ambient temperature range - 25 + 75 °C		
		——————————————————————————————————————	H
	Specific Technical	Data	
	Permissible operating voltage	ange 10 <u>24</u> 30 V DC	10 <u>24</u> 30 V DC
	Current consumption withou	load ≤ 10 mA	≤ 10 mA
	Load c	rrent ≤ 400 mA	≤ 200 mA
	Nominal insulation ve	tage 75 V DC	75 V DC
	Permissible capacity at o	ıtput ≤ 1.0 μF	≤ 1.0 µF
	Ø Sensin		10.5 mm
Switching radius	s r (at switching distance of the object) s = 0; see page	.0.2) 3.6 mm	3.6 mm
	Function indica	on ? yes, YE	yes, YE
	Maying	nath 200	200
Maximum lead length Lead type / standard lead length / number of wires x lead cross section		<u> </u>	300 m
сеай туре	/ standard lead length / humber of wires X lead cross s	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 6094		DC 13
	Degree of protection according to IEC	0529 IP 67	IP 67
	Protection	<u></u>	
	Permissible torque without/ with toothe	disc 9 Nm / 30 Nm	9 Nm / 30 Nm
	V	eight 20 g + weight of the lead	20 g + weight of the lead
	Recommended acces	ories	-

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 $2.0~\mathrm{m}$ or $5.0~\mathrm{m}$. 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



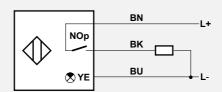
Safety Regulations

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

Subject to technical changes!

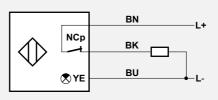
Wiring (1)

DC 3-poles, outgoing lead



Wiring (2)

DC 3-poles, outgoing lead

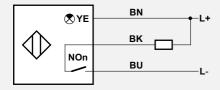




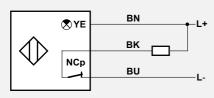
O M12 x 1; 35 mm	O M12 x 1 ; 40 mm	O M12 x 1; 45 mm	O M12 x 1; 45 mm	
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	
4 mm, flush, maximized	2 mm, flush	2 mm, flush	2 mm, flush	
0 3.24 mm	0 1.62 mm	0 1.62 mm	0 1.62 mm	
	IAD-12mg40b2-1NK1A, 11.20-67-020 (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	
,	,.			
sensing face SE	sensing face M12x1 Sensing face VG	sensing face Sensing face Sensing Sens	sensing face Sensing face LED 09	
10 <u>24</u> 30 V DC	10 <u>24</u> 30 V DC 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	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	
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	



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 Material of the sensing face / of the housing PBT / CuZn nickel-plated Dam, 1 NO plus-switching distance NO plus-switching NCp NOP ND-12mg45b2-1TK1A, 11.32-18-020 (1) IAD-12mg45b2-1TK1A, 11.32-18-020 (1) IAD-12mg45b2-TK1A, NC plus plus plus plus plus plus plus plus	nickel-plated flush 62 mm 11.32-20-020 (2) 2 0.1 ms
Range secured switching distance NO plus-switching NOp AD-12mg45b2-1TK1A, 11.32-18-020 (1) Type designation, NC plus-switching NCp Ref. no. (Wiring) NO plus-, NC minus-switching NOp + NCp NO minus-switching NOp NO minus-switching NOn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data	11.32-20-020 (2) 2 0.1 ms wires
NO plus-switching NOp IAD-12mg45b2-1TK1A, 11.32-18-020 (1) Type designation, NC plus-switching NCp Ref. no. (Wiring) NO plus-, NC minus-switching NOp + NCp NO minus-switching NOn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data NO plus-switching NCp NOp + NCp NO minus-switching NOn NC minus-switching NCn 3 kHz /≥ 0.1 ms lead; 3 wires lead; 3 Sensing face Sensing face Sensing face	11.32-20-020 (2) 2 0.1 ms wires
Type designation, Ref. no. (Wiring) 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 Wiring (connector or lead); number of wires Common Technical Data NC plus-switching NCp NOp + NCp NO minus-switching NOn NC minus-switching NCn 3 kHz /≥ 0.1 ms 3 kHz /≥ 0.1 ms 1 kab-12mg45b2-7TK1A, 3 kHz /≥ 0.1 ms	2 0.1 ms wires
NO and NC plus-switching NOp + NCp	2 0.1 ms wires
Ref. no. (Wiring) NO and NC plus-switching NOp + NCp NO plus-, NC minus-switching NOp NC minus-switching NCn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data NO and NC plus-switching NOp + NCp NO minus-switching NOn NC minus-switching NCn SkHz / ≥ 0.1 ms	2 0.1 ms wires
(Wiring) NO plus-, NC minus-switching NOp + NCn NO minus-switching NOn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data NO minus-switching NCn 3 kHz / ≥ 0.1 ms 3 kHz / ≥ 0.1 ms 1 km² / ≥ 0.1 ms 3 kHz / ≥ 0.1 ms 4 km² / ≥ 0.1 ms 3 kHz / ≥ 0.1 ms 3 kHz / ≥ 0.1 ms 3 kHz / ≥ 0.1 ms 4 km² / ≥ 0.1 ms 5 km² / ≥ 0.1 ms 6 km² / ≥ 0.1 ms 6 km² / ≥ 0.1 ms 7 km² / ≥ 0.1 ms 8 km² / ≥ 0.1 ms 9 km² / ≥ 0.1 ms 1	2 0.1 ms wires
NO minus-switching NOn NC minus-switching NCn Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires Common Technical Data NO minus-switching NOn NC minus-switching NCn 3 kHz / ≥ 0.1 ms 1 kHz / ≥ 0.1 ms 3 kHz / ≥ 0.1 ms 1 kHz / ≥ 0.1 ms 3 kHz / ≥ 0.1 ms 4 kHz / ≥ 0.1 ms 3 kHz / ≥ 0.1 ms 4 kHz / ≥ 0.1 ms 5 kHz / ≥ 0.1 ms 6 kHz / ≥ 0.1 ms 6 kHz / ≥ 0.1 ms 7 kHz / ≥ 0.1 ms 8 kHz / ≥ 0.1 ms 9 kHz / ≥	2 0.1 ms wires
Maximum switching frequency / Minimum damping period 3 kHz / ≥ 0.1 ms 3 kHz / ≥ Wiring (connector or lead); number of wires lead; 3 wires lead; 3 wires Common Technical Data Sensing face Sensing face	e 0.1 ms wires
Wiring (connector or lead); number of wires lead; 3 wires lead; 3 vires	wires
Common Technical Data sensing face — M12x1 sensing face	
sensing face — sensing face — sensing face	— M12x1
Hysteresis of the switching point s Repitition accuracy of the switching point s - at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible voltage ripple Short-circuit-proof? Protected against polarity reversal? Voltage drop over a closed contact Ambient temperature range Specific Technical Data	10 40 45 60 45
Permissible operating voltage range 8 24 30 V DC 8 24 3	30 V DC
Current consumption without load ≤ 10 mA ≤ 10 r	
Load current ≤ 200 mA ≤ 200) mA
Nominal insulation voltage 75 V DC 75 V I	DC
Permissible capacity at output $\leq 1.0 \mu\text{F}$ $\leq 1.0 \mu$	·
Ø Sensing face 10.5 mm 10.5 r	
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2) 1.85 mm 1.85 m	mm
Function indicator ? yes, YE yes, Y	
Maximum lead length 300 m 300 l	
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	1 mm^2, spiralled
Utilization category according to IEC 60947-5-2 DC 13 DC 1	13
Degree of protection according to IEC 60529 IP 67 IP 6	
Protection class	~·
Permissible torque without / with toothed disc 9 Nm / 30 Nm 9 Nm / 3	30 Nm
Weight 40 g + weight of the lead 40 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 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



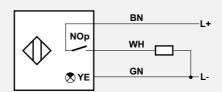
Safety Regulations

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

Subject to technical changes!

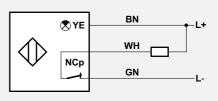
Wiring (1)

DC 3-poles, outgoing lead



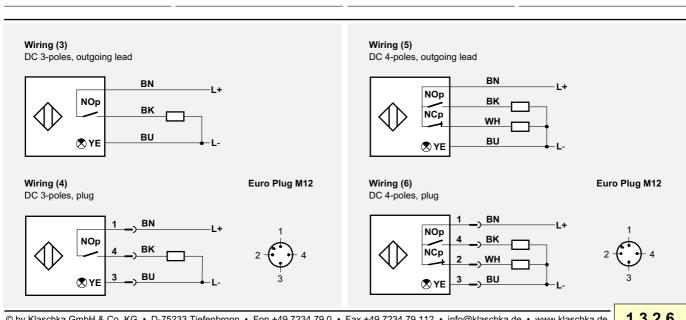
Wiring (2)

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		
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)	5 1.5 <u>2</u> 11111	5 1.02 mm	
(-)	The state of the s			
		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	
sensing face 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	sensing face M12x1 Sensing face M12x1 M12x1 M12x1 M12x1 M12x1	ensing face \$\int_{\text{led}}\$ Sensing face \$\int_{\text{led}}\$ \$\i		
8 <u>24</u> 30 V DC	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	≤ 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 10.5 mm	≤ 1.0 μF 10.5 mm	≤ 1.0 μF 10.5 mm	≤ 1.0 μF 10.5 mm	
1.85 mm	1.85 mm	1.85 mm	1.85 mm	
1.00 mm	1.00 mm	1.03 mm	1.00 111111	
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	



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	
	NO plus-switching NOp	IAD-12mg60b2-1NT1A, 11.20-01-020 (1)	IAD-12mg60b2-1S2A, 11.25-85 (2)	
Type designation,	NC plus-switching NCp			
Ref. no.	NO and NC plus-switching NOp + NCp			
(Wiring)	NO plus-, NC minus-switching NOp + NCn			
	NO minus-switching NOn			
	NC minus-switching NCn	2 kHz / ≥ 0.2 ms	2 kHz / ≥ 0.2 ms	
	Maximum switching frequency / Minimum damping period		connector M12; 3 wires	
	Wiring (connector or lead); number of wires	lead; 3 wires	Connector W12, 3 wires	
	Common Trabulasi Data	M12x1		
	Common Technical Data Reduction factors Fe / Al / V2A 1.0 / 0.4 / 0.5		M12x1	
	ysteresis of the switching point s 3 20%	sensing — V face		
	accuracy of the switching point s $\leq 10\%$		sensing	
	at permanent operating voltage	_	face	
	and ambient termperature ≤ 2%	<i>S</i> ¹⁷		
	Magnetic field-resistance			
	Permissible ripple voltage ≤ 15%	09	<i>S</i> ¹⁷ → ₹	
	Short-circuit-proof? yes, clocking	LED +0 -	09	
Prof	tected against polarity reversal? yes		LED	
	ltage drop over a closed contact ≤ 1.5 V DC		from 4	
	11.20-01: ≤ 1.5 V DC	└ ┌┼┼ ┤	visible → o d	
	11.22-23: ≤ 1.5 V DC		M12x1 → ∞ ▼	
	Ambient temperature range - 25 + 75 °C	<u> </u>		
		<u>jj</u>		
	Specific Technical data	8 24 30 V DC	8 24 30 V DC	
	Permissible operating voltage range Current consumption without load	6 <u>24</u> 30 V DC ≤ 10 mA	6 <u>24</u> 30 V DC ≤ 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 radiu	is 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	e / 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	0 Nm / 20 Nm	,	
	Permissible torque without / with toothed disc	9 Nm / 30 Nm	9 Nm / 30 Nm 30 g	
	Weight	40 g + weight of the lead	აυ <u>ყ</u>	
	Recommended accessories			
	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



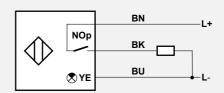
Safety Regulations

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

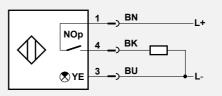
Subject to technical changes!

Wiring (1)

DC 3-poles, outgoing lead



Wiring (2) DC 3-poles, plug

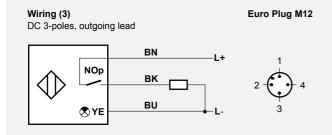


Euro Plug M12 with LED YE from 4 sides visible





PBT / CuZn nickel-plated PBT / CuZn nickel-	O M12 x 1; 60 mm	O M12 x 1; 60 mm O M12 x 1; 60 mm		O M12 x 1; 60 mm	
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 3.24 mm AD-12mg60m4-INTIA, 11.24-09-020 (I) AD-12mg60m4-IPDIA 11.25-81-020 (I) AD-12mg60m4-ISIA, 11.25-03 (Z) 1 kHz / ≥ 0.3 ms 1 kHz / ≥ 0.1 ms 1 kHz / ≥ 0.3 ms 1 kHz / ≥ 0.3 ms lead; 3 wires connector M12; 3 wires connector M12; 3 wires sensing face M12x1 M12x1 sensing face M12x1 <th></th> <th colspan="2"></th> <th colspan="2">PBT / CuZn nickel-plated</th>				PBT / CuZn nickel-plated	
AD-12mg60m4-INTIA 11.24-09-020 (1) AD-12mg60m4-IPDIA 11.25-81-020 (1) AD-12mg60m4-ISIA 11.25-03 (2) AD-12mg60m4-ISIA 11.25-03 (2) AD-12mg60m5-12SIA 11.22-23 AD-12mg60m5-12SIA AD-12mg60m5-12SIA 11.22-23 AD-12mg60m5-12SIA 11.22-23 AD-12mg60m5-12SIA AD-12mg60m5	4 mm, flush, maximized			5 mm, non-flush	
1 kHz / ≥ 0.3 ms 1 kHz / ≥ 0.1 ms 1 kHz / ≥ 0.3 ms connector M12; 3 wires connector M12; 4 wires 10 24 30 V DC ≤ 10 mA ≤ 400 mA ≤ 51.0 μF 10.5 mm 10.5 mm 10.5 mm 3.6 mm 3.6 mm 3.6 mm 3.6 mm 3.5 mm Yes, YE PD / 20 m / 3 x 0.34 mm²2 DC 13	0 3.24 mm	0 3.24 mm	0 3.24 mm	0 4.05 mm	
1 kHz / ≥ 0.3 ms lead; 3 wires lead; 3 wires lead; 3 wires lead; 3 wires connector M12; 3 wires connector M12; 4 wires	IAD-12mg60m4-1NT1A, 11.24-09-020	1) IAD-12mg60m4-1PD1A, 11.25-81-020 (1)	AD-12mg60m4-1S1A, 11.25-03 (2)		
lead; 3 wires				IAD-12mg60n5-12S1A, 11.22-23 (3)	
lead; 3 wires lead; 3 wires connector M12; 4 wires connector M12; 4 wires M12x1	1 kHz / > 0.3 ms	1 kHz / > 01 ms	1 kHz / > 0.3 ms	1 kHz / > 0.3 ms	
M12x1 Sensing face M12x1 Sensing face M12x1 Sensing face D17 Sensing face Sensing face Sensing face Sensing face Sensing face Sensing face Sensing face Sensing face Sensi					
Sensing face M12x1	·				
≤ 10 mA ≤ 10 mA ≤ 10 mA ≤ 10 mA ≤ 400 mA ≤ 400 mA ≤ 200 mA 75 V DC 75 V DC 75 V DC ≤ 1.0 μF ≤ 1.0 μF ≤ 0.47 μF 10.5 mm 10.5 mm 10.7 mm 3.6 mm 3.6 mm 3.5 mm yes, YE yes, YE yes, YE 300 m 300 m 300 m NT / 2.0 m / 3 x 0.34 mm²2 PD / 2.0 m / 3 x 0.34 mm²2 DC 13 DC 13 DC 13 IP 67 IP 67	sensing face 04 07 09 92	sensing face	sensing face Sensing face Office face LED from 4 sides visible visible	sensing face 0 C C 17 C S S S S S S S S S S S S S S S S S S	
≤ 400 mA ≤ 400 mA ≤ 200 mA 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 10.7 mm 3.6 mm 3.6 mm 3.5 mm yes, YE yes, YE yes, YE 300 m 300 m 300 m NT / 2.0 m / 3 x 0.34 mm²2 PD / 2.0 m / 3 x 0.34 mm²2 DC 13 DC 13 DC 13 DC 13 IP 67 IP 67 IP 67	10 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC	
75 V DC 75 V DC 75 V DC 75 V DC 2 1.0 μF ≤ 0.47 μF ≤ 0.47 μF 10.5 mm 10.7 mm 10.7 mm 10.7 mm 3.6 mm 3.5 mm 300 m 30					
≤ 1.0 μF ≤ 1.0 μF ≤ 0.47 μF 10.5 mm 10.5 mm 10.7 mm 3.6 mm 3.6 mm 3.5 mm yes, YE yes, YE yes, YE 300 m 300 m 300 m NT / 2.0 m / 3 x 0.34 mm²2 PD / 2.0 m / 3 x 0.34 mm²2 DC 13 DC 13 DC 13 IP 67 IP 67 IP 67					
10.5 mm 10.5 mm 10.7 mm 3.6 mm 3.6 mm 3.5 mm yes, YE yes, YE yes, YE 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 IP 67 IP 67 IP 67					
3.6 mm 3.6 mm 3.5 mm yes, YE 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	·			·	
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 DC 13 DC 13 IP 67 IP 67 IP 67					
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 DC 13 IP 67 IP 67 IP 67	3.0 Hilli			J.5 IIIII	
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 IP 67 IP 67 IP 67	yes, YE	yes, YE	yes, YE	yes, YE	
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 IP 67 IP 67 IP 67	300 m	300 m 300 m		300 m	
DC 13 DC 13 DC 13 DC 13 IP 67 IP 67 IP 67 IP 67					
IP 67 IP 67 IP 67 IP 67	-	_	·		
	DC 13	DC 13	DC 13		
	IP 67			IP 67	
		II,□	II,□		
9 Nm / 30 Nm					
40 g + weight of the lead 40 g + weight of the lead 30 g 30 g	40 g + weight of the lead	40 g + weight of the lead	30 g	30 g	



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

		D	esign; length	O M12 x 1;	60 mm	O M12 x 1	1 ; 60 mm
	Material of the	sensing face / c	of the housing	PBT / C		PBT / CuZn r	nickel-plated
Nominal switching distance, mounting (see page 1.0.4)		5 mm, non-flush		5 mm, non-flush			
		e secured switch		0 4.05		0 4.0	
		olus-switching	NOp	IAD-12mg60n5-1NK1A,	11.20-15-020 (1)	IAD-12mg60n5-1S1A,	11.25-04 (2)
Type designation,		olus-switching	NCp				
Ref. no.		olus-switching					
(Wiring)	NO plus-, NC mi		NOp + NCn				
		nus-switching	NOn				
		nus-switching	NCn				
	Maximum switching frequency		<u> </u>	1 kHz / ≥ 0		1 kHz / ≥	
	Wiring (connect	or or lead); nur	mber of wires	lead; 3 v	vires	connector M	112; 3 wires
Repition a	Common Technical Data Reduction factors Fe / AI / V2A ysteresis of the switching point s accuracy of the switching point s - at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? Detected against polarity reversal? Ditage drop over a closed contact Ambient temperature range	3 20% ≤ 10% ≤ 2% ≤ 15% yes, clocking yes ≤ 2.5 V DC 11.22-23: ≤ 1. - 25 + 75 °C		sensing face M12x1 sensing face LED	——————————————————————————————————————	sensing face Solution face Solution face Solution face Solution face Solution face Solution face M12: Solution face M12: Solution face M12: Solution face M12: M13: Solution face M12: Solution face M13: S	X1
	Permiss	sible operating	voltage range	8 <u>24</u> 3	0 V DC	8 <u>24</u>	30 V DC
	Curre	ent consumption		≤ 10 n	nA	≤ 10	
			Load current	≤ 400 ı		≤ 400	
			lation voltage	75 V [75 V	
	Р	ermissible capa		≤ 0.47		≤ 0.47	·
0	and the southern state of the same of the		Sensing face	10.7 mm		10.7	
Switching radiu	us r (at switching distance of the c	object) s = U; se	e page 1.0.2)	3.5 m	ım	3.5 r	nm
		Functio	n indication ?	yes, \	ſΕ	yes,	YE
		Maximu	m lead length	300 г	m	300	m
Lead type	e / 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 1		DC			
	Degree of protect			IP 6	7	IP 6	67
	5		otection class				
	Permissible torqu	ue without / with		9 Nm / 3		9 Nm / 3	
			Weight	40 g + weight	of the lead	30	g
		Docommondo	d accomparies				
		Recommende	u 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



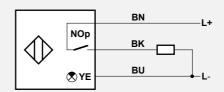
Safety Regulations

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

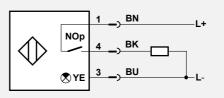
Subject to technical changes!

Wiring (1)

DC 3-poles, outgoing lead



Wiring (2) DC 3-poles, plug

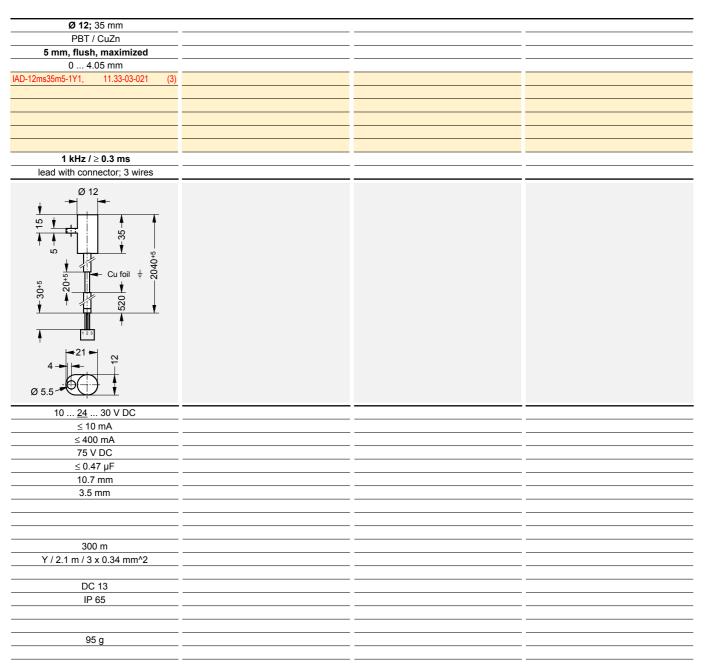


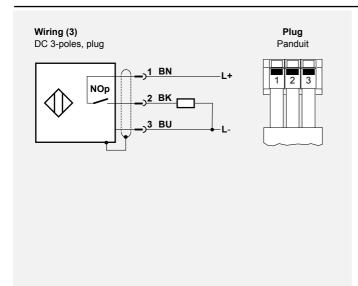
Euro Plug M12

with LED display YE from 4 sides visible









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	
	NO plus-switching NOp	IAD-18fg80b5-1NK1A, 11.17-12-020 (1)		
	NC plus-switching NCp		2.12 totgeome materia, 1.120 co e2c (1)	
Type designation,	NO and NC plus-switching NOp + NCp			
Ref. no.	NO plus-, NC minus-switching NOp + NCn			
(Wiring)	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	
	Willing (confidence of food), frameof of whose			
	Common Technical Data	→ M18x1 -	. → M18x1 →	
	Reduction factors Fe / Al / V2A 1,0 / 0,4 / 0,5	sensing face	sensing face	
	ysteresis of the switching point s 3 20%			
	accuracy of the switching point s ≤ 10%			
	- at permanent operating voltage		<u> </u>	
	and ambient temperature ≤ 2%	S 24 2 3 8 1	\$24	
	Magnetic field-resistance			
	Permissible ripple voltage ≤ 15%		E 1 3 1 .	
	Short-circuit-proof? yes, clocking	- 95	96 -	
Prof	tected against polarity reversal ? yes	<u> </u>	<u> </u>	
	ltage drop over a closed contact ≤ 2.5 V DC			
	Ambient temperature range - 25 + 75 °C			
-	Ambient temperature range -25 175 C	LED -	LED -	
		₹	₩ <u></u>	
	Specific Technical Data	Ш	Ų	
	Permissible operating voltage range	8 <u>24</u> 30 V DC	10 <u>24</u> 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 radiu	us 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 / star	ndard 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 $2.0~\mathrm{m}$ or $5.0~\mathrm{m}$. 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



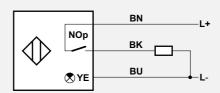
Safety Regulations

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

Subject to technical changes!

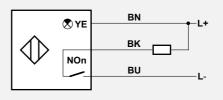
Wiring (1)

DC 3-poles, outgoing lead



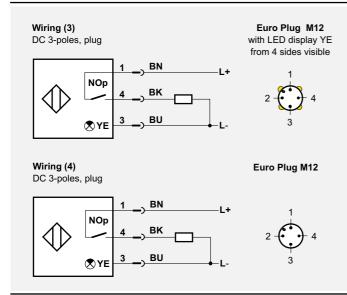
Wiring (2)

DC 3-poles, outgoing lead





O 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	
sensing face LED M18x1 Selection of the selection of t	sensing face LED M18x1 OF	sensing face M18x1 Sensing face LED from 4 sides visible M12x1 M12x1	sensing face 24 LED M12x1 M12x1	
8 <u>24</u> 30 V DC	10 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC	10 <u>24</u> 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			
141.7 2.0 III / 0 A 0.04 IIIII Z	115 / 2.0 HI / 0 X 0.04 HIII Z	-	-	
		DC 13	DC 13	
DC 13	DC 13			
DC 13	DC 13	-		
DC 13 IP 67	DC 13 IP 67	IP 67	IP 67	
IP 67	IP 67	IP 67	IP 67 Ⅱ,□	
		-	IP 67	



Series IAD-18mg

-		Des	sign; length	O M18 x 1;	50 mm	O M18 x 1	; 60 mm
	Material of the	sensing face / of t	the housing	PBT / CuZn nic	kel-plated	PBT / CuZn ni	ckel-plated
	Nominal switching distance,	mounting (see	page 1.0.4)	10 mm, nor	ı-flush	5 mm, f	lush
		e secured switchin	ng distance	0 8.1 r	mm	0 4.05	5 mm
	NO p	olus-switching	NOp	IAD-18mg50n10-1S1A,	11.22-16 (1)		
Type designation,		olus-switching	NCp				
Ref. no.	NO and NC p	olus-switching N	Op + NCp			IAD-18mg60b5-12S1A,	11.22-03 (2)
(Wiring)	NO plus-, NC mi	nus-switching N	Op + NCn				
, ,		nus-switching	NOn				
		nus-switching	NCn				
	Maximum switching frequency /			800 Hz / ≥		1 kHz / ≥	
	Wiring (connec	tor or lead); numb	ber of wires	connector M12	2; 3 wires	connector M1	12; 4 wires
H: Repitition	Common Technical Data Reduction factors Fe / Al / V2A ysteresis of the switching point s accuracy of the switching point s - at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? tected against polarity reversal? oltage drop over a closed contact Ambient temperature range	3 20% ≤ 10% ≤ 2% ≤ 15% yes, clocking yes ≤ 2.5 V DC		sensing face C 24 LED O	41	sensing face M18x1 Sensing face LED from 4 sides visible M12x1	8 4 40
		Specific Tech					
		sible operating vo		10 <u>24</u> 3		8 <u>24</u> 3	
	Curre	nt consumption v		≤ 10 m		≤ 10 r	
		Nominal insulat	oad current	≤ 400 m		≤ 400 × 75 V I	
	P	ermissible capaci		≤ 1.0 µ		≤ 1.0	
	F		ensing face	16.5 m		16.5 n	
Switching radii	us r (at switching distance of the o			6.0 mn		4.8 m	
	as r (at owntorning diotarios or the o		indication ?	yes, Yl		yes, \	
Lead type	e / standard lead length / number		lead length oss section	300 m	1	300 ו	n
	Utilization category	according to IEC	60947-5-2	DC 13	<u> </u>	DC 1	3
		type according to		IP 67		IP 6	
-	1 TOLOGIOIT		ection class	07		0	
	Permissible torqu			34 Nm / 70) Nm	34 Nm / 7	70 Nm
			Weight	45 g		60 (
		Recommended a	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.

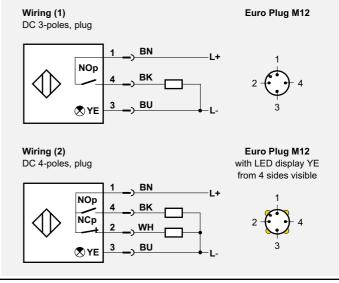
Certifications

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



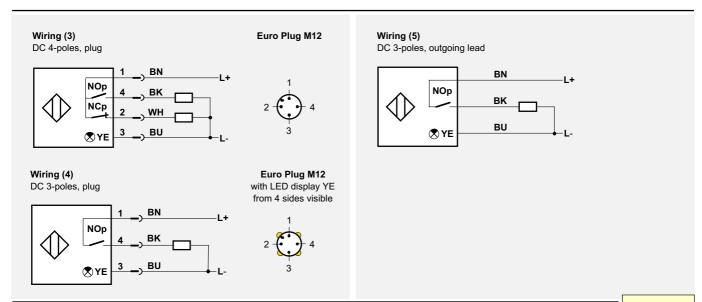
Safety Regulations

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

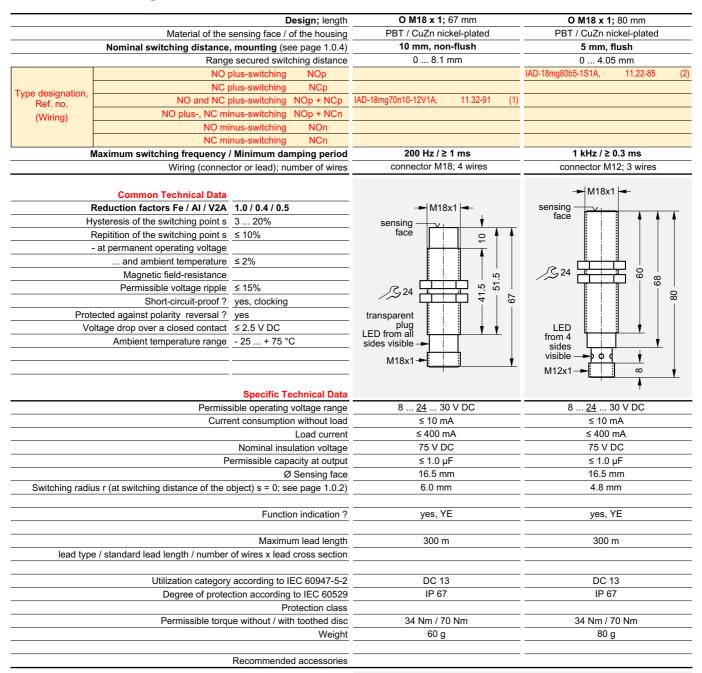




O M49 v 41 CO mana	O M40 x 41 70 mm	O M49 v. 4. 70 mm	O M49 v 4. 70 mm	
O M18 x 1; 60 mm	O M18 x 1; 70 mm	O M18 x 1; 70 mm PBT / CuZn nickel-plated	O M18 x 1; 70 mm PBT / CuZn nickel-plated	
PBT / CuZn nickel-plated 10 mm, non-flush	PBT / CuZn nickel-plated 5 mm, flush	8 mm, flush, maximized	8 mm, flush, maximized	
0 8.1 mm	0 4.05 mm	0 6.48 mm	0 6.48 mm	
0 8: I IIIIII	IAD-18mg70b5-1S1A, 11.25-86 (4)	IAD-18mg70m8-1PD1A, 11.25-82-020 (5)		
	IAD-16111g7005-151A, 11.25-66 (4)	IAD-18119701116-1FDTA, 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	
CONTROLOT WITE, 4 WITES	Connector W12, 3 Wiles	lead, 5 wires	connector wriz, 5 wires	
sensing face OP NO SENSING FACE OF NO SENSING FACE	sensing face M18x1 Sensing face LED from 4 sides visible M12x1 M12x1	M18x1 ≥m∞ 09 02	sensing face M18x1 Sensing face LED from 4 sides visible wisible wi	
8 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC	10 <u>24</u> 30 V DC	10 <u>24</u> 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		
		1 D / 2.0 III / 0 X 0.04 IIIII 2		
DC 13	DC 13	DC 13	DC 13	
IP 67	IP 67	IP 67	IP 67	
01		07	51	
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	



Series IAD-18mg



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.

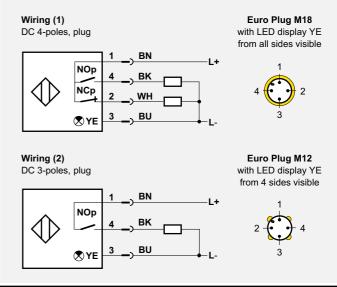
Certifications

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



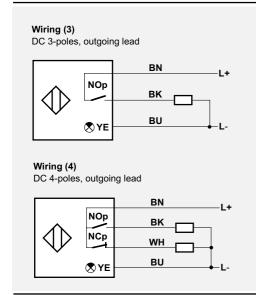
Safety Regulations

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

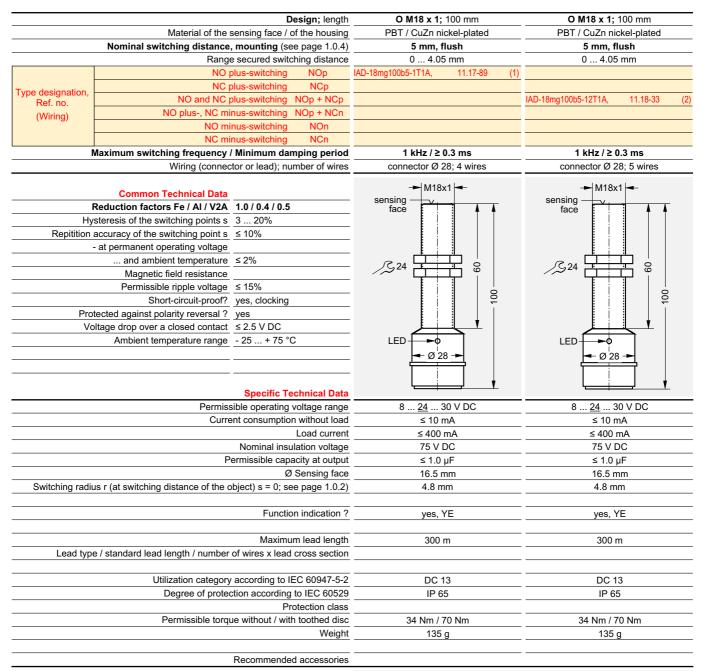




O M18 x 1; 80 mm	O M18 x 1; 85 mm	O M18 x 1; 85 mm	O M18 x 1; 85 mm	
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	
10 mm, non-flush	5 mm, flush	10 mm, non-flush	10 mm, non-flush	
0 8.1 mm	0 4.05 mm	0 8.1 mm	0 8.1 mm	
IAD-18mg80n10-1S1A, 11.22-91	(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	
sensing face M18x1 Sensing face Q1 Q24 LED from 4 sides visible M12x1 M12x1 M18x1	sensing face M18x1	sensing face M18x1 Sensing face LED M18x1	sensing face M18x1 Sensing face 01 W18x1 Sensing face 02 W18x1 W18x	
10 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC	10 <u>24</u> 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 80 g	34 Nm / 70 Nm 100 g + weight of the lead	34 Nm / 70 Nm 100 g + weight of the lead	34 Nm / 70 Nm 90 g + weight of the lead	



Series IAD-18mg



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.

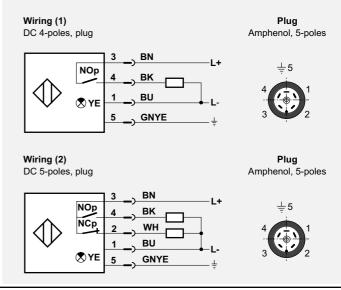
Certifications

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



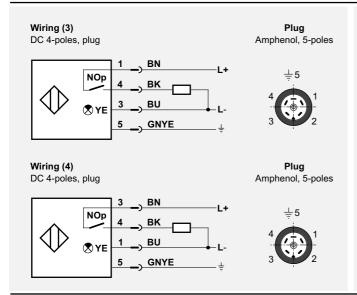
Safety Regulations

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





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	
sensing face M18x1	sensing M18x1 Sensing Garage OF Gar	
8 <u>24</u> 30 V DC	10 <u>24</u> 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	
4.8 11111	6.0 111111	
yes, YE	yes, YE	
yes, YE	yes, YE	
300 m		
	300 111	
DC 13	DC 13	
IP 65	IP 65	
34 Nm / 70 Nm	34 Nm / 70 Nm	
135 g	120 g	



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	e secured switching distance	0 8.1 mm	0 16.2 mm
	NO p	olus-switching NOp		
Type designation,	NC p	olus-switching NCp		
Ref. no.	NO and NC p	olus-switching NOp + NCp	IAD-30fg80b10-12NK1A, 11.16-50-020 (1)	IAD-30fg80n20-12NK1A, 11.17-62-020 (1)
(Wiring)	NO plus-, NC mi	nus-switching NOp + NCn		
(0,	NO mi	nus-switching NOn		
		nus-switching NCn		
	Maximum switching frequency	Minimum damping period	300 Hz / ≥ 1 ms	150 Hz / ≥ 2 ms
	Wiring (connec	tor or lead); number of wires	lead; 4 wires	lead; 4 wires
Hepitition :	Common Technical Data Reduction factors Fe / AI / V2A ysteresis of the switching point s accuracy of the switching point s	3 20%	sensing M30x1.5	sensing M30x1.5
	at permanent operating voltage			
	and ambient temperature	≤ 2%	36 8	\$36
	Magnetic field-resistance			
	Permissible ripple voltage		95	96
	Short-circuit-proof?		<u> </u>	<u> </u>
	tected against polarity reversal?	<u> </u>		
V0	Itage drop over a closed contact Ambient temperature range	≤ 2.5 V DC	LED TO THE	LED -
		Specific Technical Data	LED	LED-
	Permiss	sible operating voltage range	8 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC
		ent consumption without load	≤ 10 mA	≤ 10 mA
		Load current	≤ 400 mA	≤ 400 mA
		Nominal insulation voltage	75 V DC	75 V DC
	P	ermissible capacity at output	≤ 0.47 μF	≤ 1.0 µF
		Ø Sensing face	27.4 mm	27.4 mm
Switching radiu	us r (at switching distance of the o	bject) 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	e / 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
		according to IEC 60947-5-2	DC 13	DC 13
	Degree of protect	etion according to IEC 60529	IP 67	IP 67
	B	Protection class	0 New / 40 New	0 Nim / 40 Nim
	Permissible torqu	ue 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.

Certifications

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



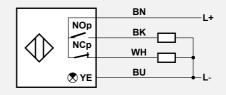
Safety Regulations

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

Subject to technical changes!

Wiring (1)

DC 4-poles, outgoing lead



Wiring (2)

DC 3-poles, plug

1 BN L+ NOp 4 BK **YE 3 BU L-

Euro Plug M12

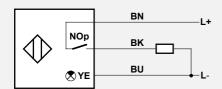
with LED-display YE from 4 sides visible





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	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	
10 mm, flush 0 81 mm 0 16.2 mm 0 16.2 mm 0 16.2 mm 0 81 m	·	<u> </u>			
08.1 mm AD-30mg50010-IS1A, 11.22-19 2	·	•	10 mm, flush		
300 Hz / ≥ 1 ms connector M12; 3 wires lead; 3 wires / lead; 4 wires sensing face ### M30x1.5		- <u> </u>	0 8.1 mm		
Connector M12; 3 wires Lead; 3 wires Lead; 3 wires Lead; 4 wires	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)	
Connector M12; 3 wires Lead; 3 wires Lead; 3 wires Lead; 4 wires					
82430 V DC 82430 V DC 510 mA 5400 mA 5400 mA 55 V DC 75 V	300 Hz / ≥ 1 ms	150 Hz / ≥ 2 ms	300 Hz / ≥ 1 ms	300 Hz / ≥ 1 ms	
82430 V DC \$2430 V DC \$20 MA \$2430 V DC \$20 MA \$2430 V DC \$20 MA \$20 N MA \$20 N M \$2430 V DC \$20 N M	connector M12; 3 wires	connector M12; 3 wires	connector M12; 3 wires	lead; 3 wires / lead; 4 wires	
≤ 10 mA ≤ 10 mA ≤ 10 mA ≤ 10 mA ≤ 400 mA ≤	sensing face 36 LED from 4 sides visible	sensing face Safe Safe Safe Safe Safe Safe Safe Saf	sensing face 36 LED from 4 sides visible	sensing face	
≤ 10 mA ≤ 10 mA ≤ 10 mA ≤ 10 mA ≤ 400 mA ≤	8 24 30 V DC	8 24 30 V DC	10 24 30 V DC	8 24 30 V DC	
≤ 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 9.4 mm 9.4 mm 9.4 mm yes, YE yes, YE yes, YE yes, YE 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 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☐ II☐ 150 Nm / < 200 Nm			· 	· 	
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 NT / 2.0 m / 3 x 0.34 mm^2 11.18-71: NT / 2.0 m / 4 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 □ II □ 150 Nm / < 200 Nm			≤ 400 mA	≤ 400 mA	
27.4 mm 27.4 mm 27.4 mm 27.4 mm 9.4 mm 9.4 mm 9.4 mm 9.4 mm yes, YE yes, YE yes, YE yes, YE yes, YE 300 m 300 m 300 m 300 m NT / 2.0 m / 3 x 0.34 mm^2 DC 13 IP 67 IP 67 IP 67 II□ II□ II□ II□ 150 Nm / < 200 Nm 150 Nm / < 200 Nm 150 Nm / < 200 Nm	75 V DC		75 V DC	75 V DC	
9.4 mm 9.5 mm 9.5 mm 9.6 mm 9.6 mm 9.6 mm 9.6 mm 9.6 mm 9.6 mm 9.7 mm 9.7 mm 9.8 mm 11.18-71: NT / 2.0 m / 3 x 0.34 mm/2 11.18-71: NT / 2.0 m / 4 x	≤ 0.47 μF	≤ 1.0 μF	≤ 0.47 μF	≤ 0.47 μF	
yes, YE yes, YE yes, YE yes, YE 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 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 □ II □ 150 Nm / < 200 Nm	27.4 mm	27.4 mm	27.4 mm	27.4 mm	
300 m 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 11.18-71: NT / 2.0 m / 4 x 0.34 mm^2 DC 13 DC 13 DC 13 DC 13 □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	9.4 mm	12.2 mm	9.4 mm	9.4 mm	
NT / 2.0 m / 3 x 0.34 mm^2	yes, YE	yes, YE	yes, YE	yes, YE	
NT / 2.0 m / 3 x 0.34 mm^2	300 m	300 m	300 m	300 m	
DC 13 DC 13 DC 13 DC 13 DC 13 DC 13					
DC 13 DC 13 DC 13 IP 67 IP 67 IP 67 II		-	-		
IP 67 IP 67 IP 67 IP 67 II □ II □ II □ 150 Nm / < 200 Nm	DC 13	DC 13	DC 13	· .	
II					
150 Nm / < 200 Nm	0,			· 	
	150 Nm / < 200 Nm			150 Nm / < 200 Nm	
	.50 9				

Wiring (3) DC 3-poles, outgoing lead



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	
	NO plus-switching NOp	5 III 10:2 IIIIII		
	NC plus-switching NCp			
Type designation, Ref. no.	NO and NC plus-switching NOp + NCp	IAD-30mg80n20-12S1A, 11.22-05 (1)	IAD-30mg95b10-12T2A, 11.18-45 (2)	
(Wiring)	NP plus-, NC minus-switching NOp + NCn	(/	()	
(vviilig)	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	
Repitition a	Common Technical Data Reduction factors Fe / Al / V2A yesteresis of the switching point s accuracy of the switching point s at permanent operating voltage and ambient temperare Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? yes, clocking yes ltage drop over a closed contact Ambient temperature range Common Technical Data 1.0 / 0.4 / 0.5 3 20% 2 10% 2 10% 2 10% 2 10% 2 10% 2 10% 2 10% 2 10% 2 10% 2 10% 2 2 5 4 75 °C	sensing face M30x1.5 Sensing face G2 G36 LED from 4 sides visible M12x1	sensing face M30x1.5 LED 09 W30x1.5	
	Specific Technical Data			
	Permissible operating voltage range	8 <u>24</u> 30 V DC	8 <u>24</u> 30 V DC	
	Current consumption without load	≤ 10 mA	≤ 10 mA	
	Load current	≤ 400 mA 75 V DC	≤ 400 mA	
	Nominal insulation voltage Permissible capacity at output	≤ 1.0 μF	75 V DC ≤ 0.47 μF	
	Ø Sensing face	27.4 mm	27.4 mm	
Switching radiu	is r (at switching distance of the object) s = 0; see page 1.0.2)	12.2 mm	9.4 mm	
Ownering radio	13 r (at switching distance of the object) 3 – 0, see page 1.0.2)			
	Function indication ?	yes, YE	yes, YE	
	Maximum lead length	300 m	300 m	
Lead type	e / 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.

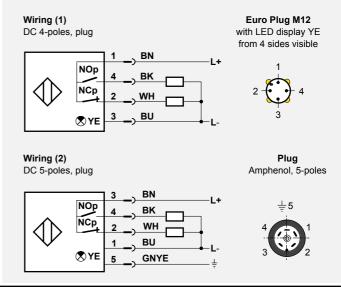
Certifications

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



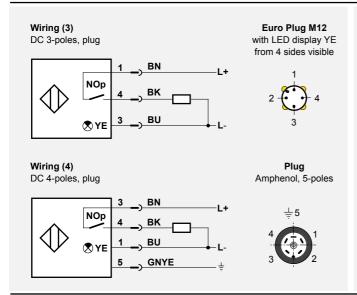
Safety Regulations

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





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	
► M30x1.5	1	
sensing ————————————————————————————————————	sensing M30x1.5	
face A A	face	
	i i i	
	_ [[]]	
S 36 8	\$36	
81		
96-	95	
LED LED	IED P	
from 4	LED ► •	
sides	Ø 28=	
visible → o d		
WIIZXI = F	<u> </u>	
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	



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

		De	esign; length	O M30 x 1.5	; 82 mm	O M30 x 1.	5 ; 80 mm
	Material of the	sensing face / o	f the housing	PBT / steel nic	kel-plated	PBT / steel ni	ckel-plated
	Nominal switching distance	, mounting (see	e page 1.0.4)	10 mm, 1	lush	10 mm,	flush
	Range	e secured switch	hing distance	0 8.1	mm	0 8.1	mm
	ON	olus-switching	NOp				
Type designation,		olus-switching	NCp				
Ref. no.		olus-switching		IAD-30sg80b10-12S1A,	11.22-04 (1)	IAD-30sg80b10-12NT1A,	11.18-71-020 (2)
(Wiring)	NP plus-, NC mi		NOp + NCn				
		nus-switching	NOn				
		nus-switching	NCn				
	Maximum switching frequency		<u> </u>	300 Hz / ≥		300 Hz /	
	Wiring (connec	tor or lead); nur	mber of wires	connector M1	2; 4 wires	lead; 4	wires
H Repitition	Common Technical Data Reduction factors Fe / AI / V2A ysteresis of the switching point s accuracy of the switching point s - at permanent operating voltage and ambient temperare Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? tected against polarity reversal? oltage drop over a closed contact Ambient temperature range	3 20% ≤ 10% ≤ 2% ≤ 15% yes, clocking yes ≤ 2.5 V DC - 25 + 75 °C		SW 36 LED from 4 sides visible M12x1	5	sensing face SW 36	5, 09 08 06
	Dorming	sible operating v	chnical Data	8 24 3	0 V DC	8 <u>24</u> 3	0 \ DC
		ent consumption		<u>6 <u>24</u> 5 ≤ 10 m</u>		0 <u>∠4</u> 3 ≤ 10 n	
	Ouric	<u> </u>	Load current	≤ 400 r			
		Nominal insul		75 V D		75 V E	
	P	ermissible capa		≤ 0.47		≤ 0.47	
			Sensing face	27.4 m		27.4 m	•
Switching radiu	us r (at switching distance of the c			9.4 mi	m	9.4 m	
			n indication ?	yes, Y		yes, Y	
	. Astronomical transfer		m lead length	300 n	n	300 r	
Lead type	e / standard lead length / number	ot wires x lead	cross section			NT / 2.0 m / 4 x	U.34 mm^2
	Utilization category	according to IF	C 60047 5 2	DC 1:	2		2
	Degree of protect			IP 67		DC 1	
	Degree of protect		otection class	IF 07		IP 6/	1
	Permissible torqu			170 Nm / < 2	200 Nm	170 Nm / <	200 Nm
	i emissible torqu	20 WILLIOUT / WILLI	Weight	170 1017 < 2		190 g + weight	
			vvoigiit		9	ioo g i weight	or the lead
		Recommended	d 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 $5.0\ \text{m.}$ 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

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

Certifications

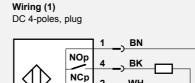
Proximity switches according to standard: DIN EN 60 947-5-2 (VDE 0660 Part 208). Manufactured according to DIN EN ISO 9001



Safety Regulations

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

Subject to technical changes!



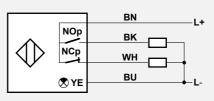
WH

Euro Plug M12 with LED display YE from 4 sides visible



Wiring (2)

DC 4-poles, outgoing lead





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			
lead, 5 wiles			
N20v1 F			
sensing M30x1.5			
sensing face			
<u> </u>			
<u> </u>			
SW 36 4 6 0			
-66			
The state of the s			
LED — TIT			
\ 			
₩ <u></u>			
8 <u>24</u> 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 BN NOp BK BU BU

⊗YE

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
	NO plus-switching NOp	IAD-34aq65b12-1NKc3A, 11.35-24-020 (1)	
Type designation,	NC plus-switching NCp		
Ref. no.	NO and NC plus-switching NOp + NCp		IAD-34aq65b12-12NKd3A, 11.35-25-020 (2)
(Wiring)	NO plus-, NC minus-switching NOp + NCn		
(*******3)	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 Tochnical Data	sensing face	sensing face
	Common Technical Data Reduction factors Fe / AI / V2A 1.0 / 0.4 / 0.5	Ø 6.6	Ø 6.6
	lysteresis of the switching point s 3 20%		0.0
	accuracy of the switching point s ≤ 10%	LED	LED 18
	- at permanent operating voltage	LED 1 59	
	and ambient temperature ≤ 2%		
	Magnetic field-resistance		
	Permissible ripple voltage ≤ 15%	thread potentiometer	thread potentiometer
	Short-circuit-proof? yes, clocking	M6 → 36 → Potentionneter	M6 → 36 → potentiometer
Pro	tected against polarity reversal ? yes		
	oltage drop over a closed contact ≤ 2.5 V DC		
	Ambient temperature range - 25 + 75 °C	4 - 11 - 11 - 2	€
		 	
		→ 15 → 50 →	→ 15 ← 50 →
		65 —	65 ─►
	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	≤ 10 mA	≤ 10 mA ≤ 400 mA
	Load current Nominal insulation voltage	≤ 400 mA 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 radio	us r (at switching distance of the object) s = 0; see page 1.0.2)	11.8 mm	11.8 mm
Owntoning radio	do r (dr. omroning distance of the object) 5 - 0, 366 page 1.0.2)	11.0 mm	11.0 mm
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	300 m	300 m
Lead type	e / 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
	December of		
	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



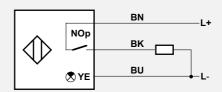
Safety Regulations

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

Subject to technical changes!

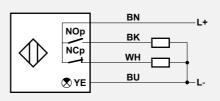
Wiring (1)

DC 3-poles, outgoing lead



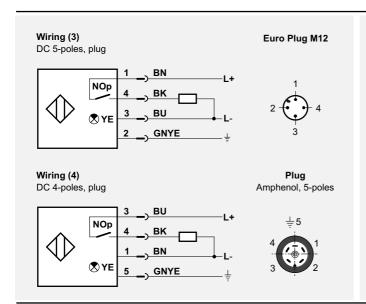
Wiring (2)

DC 4-poles, outgoing lead

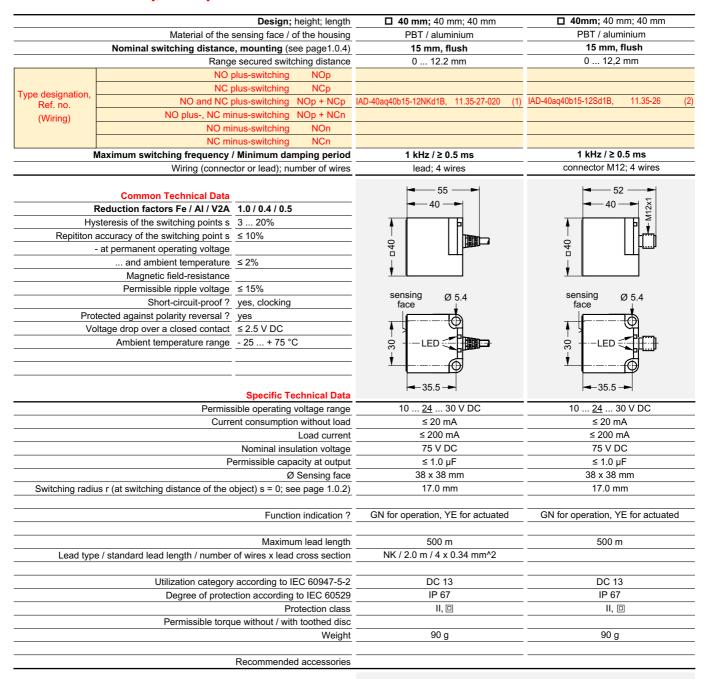




☐ 50 x 34 mm; 65 mm	□ 50 x 34 mm; 65 mm	
PBT / AI	PBT / Al	
12 mm, flush	12 mm, flush	
0 9.72 mm	0 9.72 mm	
IAD-34aq65b12-1S1A, 11.25-90 (3)	IAD-34aq65b12-1T3A, 11.03-15 (4)	
300 Hz / ≥ 1 ms	300 Hz / ≥ 1 ms	
connector M12; 4 wires	connector Ø 28; 4 wires	
sensing face	sensing face	
Ø 6.6	Ø 6.6	
	6	
red \$8	LII FED 8	
	t∰ / ↓ ® ĭ	
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
thead 36 -	thread 36	
M6 1-36-1	M6	
	turnahla alua inaart	
lil lill +	turnable plug insert	
###### £	<u> </u>	
↑   <del>                                   </del>	8 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
₹ 50 →	A 7-1+1	
∑  <del></del> 50 <del></del>	18→ 50 →	
	12 1 1 22 1	
10 <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	
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	 



# Series IAD-40aq, -40fq



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



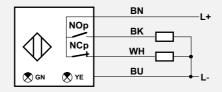
### Safety Regulations

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

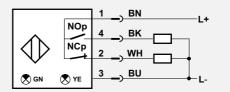
Subject to technical changes!

# Wiring (1)

DC 4-poles, outgoing lead



#### Wiring (2) DC 4-poles, plug

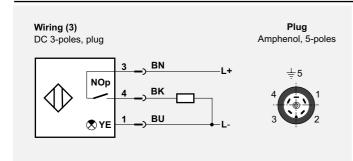


#### Euro Plug M12





		<b>5</b> 42 40 04	
□ 40mm; 40 mm; 54 mm	<b>40mm</b> ; 40 mm; 54 mm	□ 40mm; 40 mm; 64 mm	
PBT / PBT	PBT / PBT	PBT / PBT	
15 mm, flush 0 12.2 mm	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)		
1715 TOTAL TENTAL TENTA	IAD-401q04b10-12301b, 11.33-20 (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	
		,	
69 54	65 × × × × × × × × × × × × × × × × × × ×	75	
04 04 04 04 04 04 04 04 04 04 04 04 04 0	94	sensing S Face	
48.5	48.5	64 — 6	
45.5	45.5	1 43 F	
sensing face	sensing face	sensing face	
10 <u>24</u> 30 V DC	10 <u>24</u> 30 V DC	8 <u>24</u> 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 17.0 mm	38 x 38 mm 17.0 mm	38 x 38 mm 13.0 mm	
17.0 ППП	17.0 111111	13.0	
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	
QII	QII		
90 g	90 g	150 g	



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

Material of the sensing face / of the housing   PBT / PBT   PBT   PBT		Design; height; length	<b>□ 40 mm</b> ; 40 mm; 114 mm	<b>□ 40 mm</b> ; 40 mm; 114 mm
Type designation, Ref. no. (Wiring)  NO plus-switching NOP NO and NC plus-switching NOP NO minus-switching NOP NO minu		<u> </u>		· · · · · · · · · · · · · · · · · · ·
NO plus-switching NOp NC plus-switching NOp NC plus-switching NOp NC plus-switching NOp+NCp NO and NC plus-switching NOp+NCp NO plus-NC minus-switching NOp+NCp NO mus-switching NOp+NCp NOP+NCp NO mus-switching NOp+NCp NO		<u> </u>	15 mm, flush	25 mm, non-flush
NO plus-switching NOp NC plus-switching NOp NC plus-switching NOp NC plus-switching NOp+NCp NO and NC plus-switching NOp+NCp NO plus-NC minus-switching NOp+NCp NO mus-switching NOp+NCp NOP+NCp NO mus-switching NOp+NCp NO		Range secured switching distance	0 12.2 mm	0 20.25 mm
No and NC plus-switching   NOp + NCp				
NO and NC plus-switching NOp + NCp NO plus, NC minus-switching NOp + NCp NC minus-switching NCn NC minus-switching		NC plus-switching NCp		
No plus, NC minus-switching   NOp   NCn		NO and NC plus-switching NOp + NCp	IAD-40fv114b15-12L1B, 11.25-52 (1)	IAD-40fv114n25-12L1B, 11.25-53 (1
NO minus-switching NOn NC minus-switching NOn NC minus-switching Poch Signature (at switching requency / Minimum damping period Wiring (connector or lead); number of wires    Common Technical Data		NO plus-, NC minus-switching NOp + NCn		
Maximum switching frequency / Minimum damping period  Wiring (connector or lead); number of wires  Common Technical Data  Reduction factors Fe / Al / V2A  Replittion accuracy of the switching points   3 20%  Replittion accuracy of the switching point   5 20%  Magnetic field-resistance  Permissible ripple voltage   5 5%  Short-circuli-proof   7 9e, clocking  Protected against polarity reversal   7 9e  Voltage drop over a closed contact   2 5 75 °C  Ambient temperature range   2 5 75 °C  Specific Technical Data  Permissible operating voltage range   10 24 45 ∨ DC  Current consumption without load   ≤ 20 mA   ≤ 15 mA   ≤ 400 mA	(vviiiig)	NO minus-switching NOn		
Wiring (connector or lead); number of wires  Common Technical Data  Reduction factors Fe / Al / V2A 1.0 / 0.4 / 0.5  Hysteresis of the switching point s 3 20% Replition accuracy of the switching point s 5 10%  -at permanent operating voltage  and ambient temperature s 2%  Magnetic field-resistance  Permissible inple voltage s 515% Short-circul-proof 7 yes, clocking Protected against polarity reversal 7 yes Voltage drop over a closed contact s 2.5 V D C Ambient temperature range -25 + 75 ° C  Specific Technical Data  Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at output s 5 400 mA 5 50 mA 5 50 mB 5 75 V D 6 7		NC minus-switching NCn		
Common Technical Data  Reduction factors Fe / Al / V2A Replittion accuracy of the switching point s 3 20% Standard temperature services of the switching point s 2 10%  - at permanent operating voltage and ambient temperature services services services and services	Ň	Maximum switching frequency / Minimum damping period	200 Hz / ≥ 1.5 ms	100 Hz / ≥ 3 ms
Reduction factors Fe / IA/V2A Hysteresis of the switching point s Repitition accuracy of the switching point s - at permanent operating voltage and ambient temperature s Magnetic field-resistance Permissible ripple voltage s Short-circuit-proof? yes, clocking Protected against polarity reversal? yes Voltage drop over a closed contact s 2.5 V DC Ambient temperature range  Specific Technical Data Permissible operating voltage range Current consumption without load s 2.0 mA  Specific Technical Data  Permissible operating voltage range Current consumption without load s 2.0 mA  Specific Technical Data  Permissible operating voltage range Current consumption without load s 2.0 mA  Specific Technical Data  Permissible operating voltage range Current consumption without load s 2.0 mA  Specific Technical Data  Specific Technical Data  Permissible operating voltage range Current consumption without load s 2.0 mA  Substitution of the substitution voltage sold with the substitution volta		Wiring (connector or lead); number of wires	terminals; 4 wires	terminals; 4 wires
Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at output Ø Sensing face Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Maximum lead length Lead type / standard lead length / number of wires x lead cross section  Permissible torque without / with toothed disc Weight  Permissible to number of wires x lead cross described in the content of the content o	Hy Repitition a - Prot	Reduction factors Fe / Al / V2A  ysteresis of the switching point s accuracy of the switching point s at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? yes, clocking yes ltage drop over a closed contact Ambient temperature range  1.0 / 0.4 / 0.5  3 20%  ≤ 10%  ≤ 2%  yes  ≤ 15%  yes, clocking yes  ≤ 2.5 V DC  - 25 + 75 °C	953 Ø53 Ø53 Ø53 Ø53 Ø53 Ø53 Ø53	05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05.53 05
Current consumption without load Load current Load current Load current Load current Load current S 400 mA  S V DC Permissible capacity at output S 1.0 µF S 1.0		·	10 24 45 V DC	8 24 30 V DC
Load current Nominal insulation voltage Permissible capacity at output Ø Sensing face Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Maximum lead length Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2 Permissible torque without / with toothed disc Weight  Sensing face  38 x 38 mm  300 m  50 For operation, YE for actuated  Consideration of the object of protection according to IEC 60947-5-2 Protection class Permissible torque without / with toothed disc Weight  220 g  220 g		<u>, , , , , , , , , , , , , , , , , , , </u>		<del></del>
Nominal insulation voltage Permissible capacity at output  Ø Sensing face Ø Sen		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
Permissible capacity at output Ø Sensing face Ø Sensing face 38 x 38 mm 38 x 38 mm 38 x 38 mm 15.0 mm  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Function indication?  GN for operation, YE for actuated  Maximum lead length 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 Protection class Permissible torque without / with toothed disc Weight  220 g 220 g				
Ø Sensing face Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Function indication?  GN for operation, YE for actuated  Maximum lead length Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2 Degree of protection according to IEC 60529 Protection class Permissible torque without / with toothed disc Weight  Ø Sensing face 38 x 38 mm 15.0 mm  GN for operation, YE for actuated  Function indication?  DC 13 DC 20 DC 13 DC 20 DC 13 DC 20 DC		<u>U</u> _		
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)    Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)    Function indication ?			· · · · · · · · · · · · · · · · · · ·	·
Maximum lead length Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2 Degree of protection according to IEC 60529 Protection class Permissible torque without / with toothed disc Weight  300 m 300 m  DC 13 DC 13 DC 13 IP 67 IP 67  P2 07 P2 08 P2 09 P2 09 P20 09	Switching radiu	<u> </u>		
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  Protection class  Permissible torque without / with toothed disc  Weight  DC 13  DC 13  IP 67  IP 67  Portection class  Permissible torque without / with toothed disc  Weight		Function indication ?	GN for operation, YE for actuated	GN for operation, YE for actuated
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  Protection class Permissible torque without / with toothed disc  Weight  DC 13  DC 13  IP 67  IP 67  P20  P20 g  P20 g		Maximum lead length	300 m	300 m
Degree of protection according to IEC 60529 IP 67 IP 67  Protection class Permissible torque without / with toothed disc Weight 220 g 220 g	Lead type	e / standard lead length / number of wires x lead cross section		
Degree of protection according to IEC 60529 IP 67 IP 67  Protection class Permissible torque without / with toothed disc Weight 220 g 220 g				
Protection class Permissible torque without / with toothed disc Weight 220 g 220 g		<u> </u>		
Permissible torque without / with toothed disc  Weight 220 g 220 g		· · · · · · · · · · · · · · · · · · ·	IP 67	IP 67
Weight         220 g         220 g				
		<u> </u>		
December of the control of the contr		Weight _	220 g	220 g

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  $2.0~\mathrm{m}$  or  $5.0~\mathrm{m}$ . 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



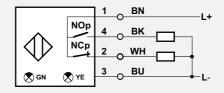
### Safety Regulations

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

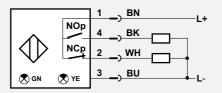
Subject to technical changes!

# Wiring (1)

DC 4-poles, clamp terminal



#### Wiring (2) DC 4-poles, plug

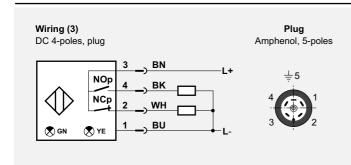


### Euro Plug M12





<b></b>	<b></b>	<b>5.40</b>	
PBT / PBT	PBT / PBT	PBT / PBT	
15 mm, flush 0 12.2 mm	25 mm, non-flush 0 20.25 mm	25 mm, non-flush 0 20.25 mm	
0 12.2 IIIIII	0 20:23	0 20.25 Hilli	
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	
		- 1	
connector M12; 4 wires	connector M12; 4 wires	connector M30; 4 wires	
40 — 40 — 40 — 40 — 40 — 40 — 40 — 40 —	05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3 05.3	40 — 40 — 40 — 40 — 40 — 40 — 40 — 40 —	
10 <u>24</u> 45 V DC	8 <u>24</u> 30 V DC	8 <u>24</u> 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	
		<u> </u>	
DC 13	DC 13	DC 13	
IP 67	IP 67	IP 65	
230 g	2230 g	240 g	



# Series IAD-80aq, -80fq

Material of the sensing face / of the housing PBT / Al PBT / Al  Nominal switching distance, mounting (see page 1.0.4) 40 mm, flush  Range secured switching distance 0 32.4 mm 0 32.4 mm  NO plus-switching NOp  NC plus-switching NCp		Design; height; length	□ 80 mm; 40 mm; 80 mm	<b>□ 80 mm</b> ; 40 mm; 80 mm
Nominal switching distance, mounting (see page 10.4)   40 mm, flush   0 32.4 mm   0				
Type designation, Ref. no.  NO plus-ewitching NOp  NC plus-ewitching NOp  NC plus-ewitching NOp  NC plus-ewitching NOp  NC plus-ewitching NOp  NO plus-NC plus-ewitching NOp  NO plus-NC plus-ewitching NOp NOp  NO plus-NC plus-ewitching NOp NOp NOD  NO minus-ewitching NOn  NC minus-ewitching Non		<u> </u>		
NO plus-switching   NOp		<u> </u>		
NC plus-switching NCp		NO plus-switching NOp		
No and NC plus-switching NOp + NCD NO plus- NC minus-switching NOp + NCD NC minus-switching NC minus-switchin				
NO plus-, NC minus-switching NOp + NCn   NO minus-switching NOn   NO		, , , , , , , , , , , , , , , , , , , ,	IAD-80aq40b40-12NKd1B, 11.35-31-050 (1)	IAD-80aq40b40-12Sd1B, 11.35-30 (2
NO minus-switching NOn NC minus-switching NCn NC minus-switching NCn NC minus-switching NCn Wiring (connector or lead); number of wires    Naximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires    Naximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires    Naximum lead length / Normial misulation voltage		NO plus-, NC minus-switching NOp + NCn		
Maximum switching frequency / Minimum damping period Wiring (connector or lead); number of wires  Common Technical Data Reduction factors Fe / Al / 1/2A  Replittion accuracy of the switching points 3 20%  Replittion accuracy of the switching points 3 20%  Replittion accuracy of the switching points 3 20%  Replittion accuracy of the switching points 4 25%  Magnetic field-resistance Permissible ripple voltage 5 45%  Magnetic field-resistance Permissible ripple voltage 5 45%  Nort-circult-proof 7 yes, clocking Protected against pointry reversal 9 25 + 75 °C  Ambient temperature range 25 + 75 °C  Specific Technical Data  Replittion accurately 10 45%  Specific Technical Data  Reprintsible operating voltage range Current consumption without load Load current Nominal insulation voltage 75 v DC  Permissible capacity at output 5 10 µF  Soening face  Permissible capacity at output 5 10 µF  Soening radius r (at switching distance of the object) s = 0; see page 1.0. 2)  Function indication ?  GN for operation, YE for actuated  Maximum lead length Maximum lead length Maximum lead length Maximum lead length Utilization cacedgory according to IEC 60947-5-2 Degree of protection according to IEC 60947-5-2 Degree of pro	(Willing)	NO minus-switching NOn		
Common Technical Data		NC minus-switching NCn		
Common Technical Data  Reduction factors Fo   A  /VZA   1.0 / 0.4 / 0.5   Hysteresis of the switching points   3 20%   Explition accuracy of the switching points   5 10%   - at permanent operating voltage   and ambient temperature   22%   Magnetic field-resistance   Permissible inpole voltage   5.5%   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   24 30 V DC   Substituting a sensing   24 3	N	laximum switching frequency / Minimum damping period	1 kHz / ≥ 0.5 ms	1 kHz /≥ 0.5 ms
Reduction factors Fe / Al / V2A 1.0 / 0.4 / 0.5   10 / 0.5   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3 20%   3		Wiring (connector or lead); number of wires	lead; 4 wires	connector M12; 4 wires
Permissible operating voltage range Current consumption without load Load current S 400 mA S	Hy Repitition a - Prot	Accuracy of the switching point s accuracy of the switching point s at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? ected against polarity reversal? Itage drop over a closed contact Ambient temperature range  1.0 / 0.4 / 0.5  3 20%  2 2%  2 2%  2 25%  yes, clocking yes  2 2.5 V DC  2 25 + 75 °C	96 96 Sensing Garage Face Face  Face	96 Sensing Face Se
Current consumption without load  Load current  Load current  Load current  Load current  SumA  Sum A  Sum B  Sum		•	9 24 20 V DC	8 24 30 V DC
Load current Nominal insulation voltage Permissible capacity at output Ø Sensing face Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Function indication?  Maximum lead length Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2 Permissible torque without / with toothed disc  Weight  V S V DC  75 V DC  78 mm  78 mm  27.0 mm  27.0 mm  300 m  NK / 5.0 m / 4 x 0.34 mm ² 2  DC 13 DC 13 DC 13 DF 19 67  Protection class Permissible torque without / with toothed disc  Weight  Weight  Weight of the lead  450 g + weight of the lead		<u> </u>		
Nominal insulation voltage Permissible capacity at output Ø Sensing face Ø Sensing face Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Function indication?  Maximum lead length Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2 Degree of protection according to IEC 60529 Protection class Permissible torque without / with toothed disc  Weight  Nominal insulation voltage  75 ∨ DC  7		<u> </u>	·	
Permissible capacity at output Ø Sensing face Ø Sensing face Function indication?  Maximum lead length Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2 Protection class Permissible torque without / with toothed disc  Weight  Permissible torque without / with toothed disc  Weight  Sensing face  78 mm  78 mm  27.0 mm  27.0 mm  300 m  300 m  300 m  NK / 5.0 m / 4 x 0.34 mm^22  DC 13				3
Ø Sensing face78 mm78 mmSwitching radius r (at switching distance of the object) s = 0; see page 1.0.2)27.0 mm27.0 mmFunction indication ?GN for operation, YE for actuatedGN for operation, YE for actuatedMaximum lead length300 m300 mLead type / standard lead length / number of wires x lead cross sectionNK / 5.0 m / 4 x 0.34 mm^2Utilization category according to IEC 60947-5-2DC 13DC 13Degree of protection according to IEC 60529IP 67IP 67Protection classPermissible torque without / with toothed discWeight450 g + weight of the lead450 g		<u> </u>		
Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Punction indication?  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Function indication?  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Punction indication?  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching distance of the object) s = 0; see page 1.0.2)  Switching radius r (at switching radius			·	
Maximum lead length Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2 Degree of protection according to IEC 60529 Protection class Permissible torque without / with toothed disc Weight  Maximum lead length NK / 5.0 m / 4 x 0.34 mm^2  DC 13 DC 13 DP 67 IP 67 IP 67  Weight  450 g + weight of the lead  450 g	Switching radiu	<u> </u>		27.0 mm
Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2  Degree of protection according to IEC 60529  Protection class  Permissible torque without / with toothed disc  Weight  NK / 5.0 m / 4 x 0.34 mm^2  DC 13  DC 13  IP 67  IP 67  Protection class  Permissible torque without / with toothed disc  Weight		Function indication ?	GN for operation, YE for actuated	GN for operation, YE for actuated
Lead type / standard lead length / number of wires x lead cross section  Utilization category according to IEC 60947-5-2  Degree of protection according to IEC 60529  Protection class  Permissible torque without / with toothed disc  Weight  NK / 5.0 m / 4 x 0.34 mm^2  DC 13  DC 13  IP 67  IP 67  Protection class  Permissible torque without / with toothed disc  Weight		Maximum lead length	300 m	300 m
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	Lead type	<u> </u>	NK / 5.0 m / 4 x 0.34 mm^2	
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		100 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	D0 /2	DC 10
Protection class Permissible torque without / with toothed disc Weight 450 g + weight of the lead 450 g		<u> </u>		
Permissible torque without / with toothed disc  Weight 450 g + weight of the lead 450 g			IP 67	IP 67
Weight 450 g + weight of the lead 450 g				
		· · · · · · · · · · · · · · · · · · ·	450 - 1	AFO
Decommonded economics		Weight	450 g + weight of the lead	450 g

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  $5.0\ \text{m.}$  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

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



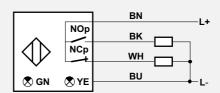
### Safety Regulations

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

Subject to technical changes!

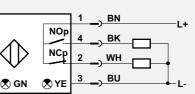
# Wiring (1)

DC 4-poles, outgoing lead



# Wiring (2)

DC 4-poles, plug

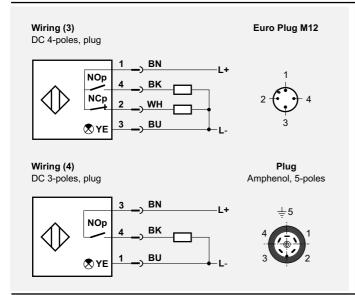


### Euro Plug M12





■ 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	
94 123	2 120	
5.3 — Face 65 — 65 — 65 — 65 — 65 — 65 — 65 — 65	S.3 - LED	
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	
≤ 1.0 µF	≤ 1.0 μF	 
78 mm	78 mm	 
27.0 mm	27.0 mm	 
GN for operation, YE for actuated	yes, YE	
200	300 m	 
300 m		 
	DC 13	
DC 13	DC 13 IP 65	
IP 67	CO 7I	 
IF U!		 
	450 ~	 
450 g	450 g	 
yo y		 



# 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
	NO plus-switching NOp	IAD-80fr70e80-1T3A, 11.03-21 (1)	
Town and a street and	NC plus-switching NCp		
Type designation, - Ref. no.	NO and NC plus-switching NOp + NCp		IAD-80fr70n35-12T1A, 11.33-21 (2)
(Wiring)	NO plus-, NC minus-switching NOp + NCn		
(vviiiig)	NO minus-switching NOn		
	NC minus-switching NCn		
N	laximum 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
Repitition a	Common Technical Data Reduction factors Fe / Al / V2A Asteresis of the switching point s accuracy of the switching point s at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? ected against polarity reversal? Itage drop over a closed contact Ambient temperature range  Specific Technical Data	M8 — adjustment potentiometer  LED  Amphenol plug	M8 — LED  Amphenol plug
	Permissible operating voltage range	8 <u>24</u> 30 V DC	10 <u>24</u> 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 radiu	s 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.

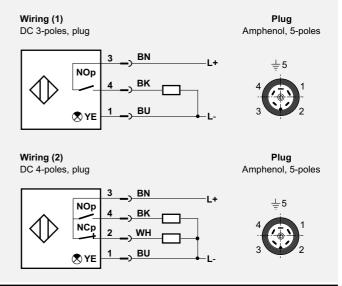
# Certifications

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



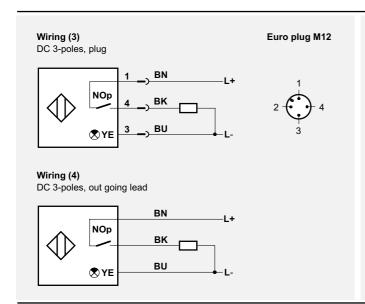
# Safety Regulations

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





<b>~ ~ ~</b>	<b>6.00</b> 70	<b>2 22</b> 32	
Ø 80 mm; 70 mm PBT / PBT	Ø 80 mm; 70 mm PBT / PBT	Ø 80 mm; 70 mm 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-80fr70n50-1S1A, 11.25-92 (3)	IAD-80fr70n50-1NT1A, 11.03-94-050 (4)	
IAD-0011701130-1111A, 11.03-30 (1)	1AD-0011701130-131A, 11.23-32 (3)	(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	
M8 - LED  Amphenol plug	M8 - LED	M8 — LED	
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 80 mm	≤ 1.0 µF	
80 mm 30.6 mm	31.0 mm	80 mm 31.0 mm	
		31.0 mm	
yes, YE	yes, YE	yes, YE	
· · ·	<u> </u>		
300 m	300 m	300 m	
		NT / 5.0 m / 3 x 0.75 mm^2	
DC 13	DC 13 IP 67	DC 13	
IP 65	IF 0/	IP 67	
600 g	600 g	600 g + weight of the cable	



# **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 disapprearance 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..

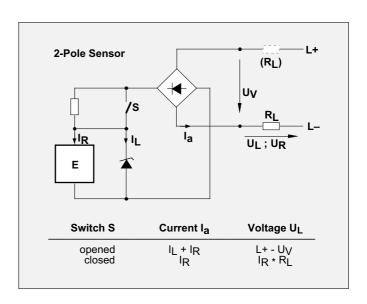
The same applies for AC- and / or DC-voltage sensors. These so-called All Voltage Sensors can be operated with an alternating voltage in the range from 50 to 60 Hz or with direct voltage.

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 RI, 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 RI



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.

Fe-switch	All metal switch
1.00	1.00
0.33 0.42	1.00
0.33 0.45	1.00
0.56 1.00	1.00
0.30 0.45	1.00
0.88 1.00	1.00
	1.00 0.33 0.42 0.33 0.45 0.56 1.00 0.30 0.45



## **Design Ferrous AC- and DC 2-poles**

- Design Ferrous Ac unit	•	Switching distance
Туре	Ref. No.	in mm
.,,,,,		Mounting *)
		mounting /
round M8 x L		
IAB-8eg40b1-3ND1 ***)	11.02-81-020	1.0 b
IAB-0eg40b1-3ND1 )		1.0 0
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 ***)		
15VV-3UMg8UD1U-3N11A *****)	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

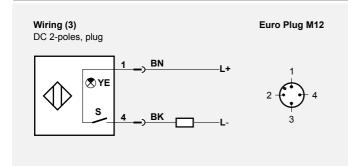
## **Inductive Proximity Switches, Ferrous DC 2-poles**

## 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	
NO plus- or minus-switching NOp IAB-8eg40b1-3ND1, 11.02-81-020 (1)	
NC plus-switching NCp	
Type designation, Ref. no. NO and NC plus-switching NOp + NCp	
(Wiring) 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 % sensing face face	
- 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 standard	
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	
onto migrature (at out the migrature of the object) of the page 1612,	
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 Wiring (1)	
with outgoing lead in chapter 12 "Accessories". Order separately.  DC 2-poles, outgoing lead	
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	—_L+
-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.	
BK BK	—L-
Out the state of	
Certifications Wiring (2)	
Manufactured according to DIN EN ISO 9001 DC 2-poles, outgoing lead	
BN	—L+
Safety Regulations YE	
Connection, start-up and maintenance may only be accomplished by	
specialists or instructed personnel.	



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	
sensing face  M12x1  Sensing face  LED  OF  17  19  19  19  19  19  19  19  19  19	sensing face 00 00 00 00 00 00 00 00 00 00 00 00 00	sensing face  M12x1  Sensing face  M12x1  W12x1  W12x1	sensing face Scale of the sensing face Scale	
10 <u>24</u> 60 V DC	10 <u>24</u> 60 V DC	10 <u>24</u> 60 V DC	10 <u>24</u> 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 10.5 mm	≤ 1.0 μF 10.5 mm	≤ 1.0 µF	
10.5 mm 1.85 mm	3.5 mm	1.85 mm	10.5 mm 3.5 mm	
	3.3 11111	111111 CO.11	3.5 11111	
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		



## **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
	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		, , , , , , , , , , , , , , , , , , , ,
Type designation,	NO and NC plus-switching NOp + NCp		
Ref. no. (Wiring)	NO plus-, NC minus-switching NOp + NCn		
(******9)	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	→ M18x1 →	-► M18x1 -
Н	ysteresis of the switching point s 3 20 %	sensing —	
	tition of the switching accuracy s ≤ 10 %	face A A A	sensing face
	- at permanent operating voltage		
	and ambient temperature ≤2 %	S 24 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	Magnetic field-resistance		\$24 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	Permissible ripple voltage ≤ 15 %		· · · · · · · · · · · · · · · · · · ·
	Short-circuit-proof?	₩ 8	09-
Pro	tected against polarity reversal ? ja		LED
	oltage drop over a closed contact ≤ 5 V DC		sides
	Ambient temperature range - 25 + 75 °C	LED	visible → ♦ ♦
		<del>                                     </del>	M12x1 <u>∞</u> <u>▼</u>
-			' <b>↑</b>
	Specific Technical Data		40 04 00 170
	Permissible operating voltage range	10 <u>24</u> 60 V DC	10 <u>24</u> 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 16.5 mm
Curitohina == -!:-	Ø Sensing face us r (at switching distance of the object) s = 0; see page 1.0.2)	16.5 mm 4.8 mm	4.8 mm
Switching radii	as I (at switching distance of the object) s = 0, see page 1.0.2)	4.0	4.0 111111
	Function indication ?	yes, YE	yes, YE
	i unction indication :	yco, 1L	
	Maximum lead length	300 m	300 m
L ead type	e / standard lead length / number of wires x lead cross section	NT / 2.0 m / 2 x 0.34mm^2	
		2.0 2 X 0.0 111111 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.

#### Certifications

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



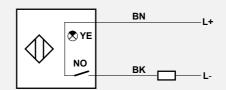
#### Safety Regulation:

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

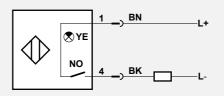
Subject to technical changes!

## Wiring (1)

DC 2-poles, outgoing lead



#### Wiring (2) DC 2-poles, plug



## Euro Plug M12

with LED display YE from 4 sides visible





0.1110	0.100 4.5 07	0.1100 4.5 00	
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)	
000 H= / 4 mm	300 Hz / 1 ms	300 Hz / 1 ms	
200 Hz / 1 ms connector M12; 2 wires	lead; 2 wires	connector M12; 2 wires	
connector W12; 2 wires	lead, 2 wires	connector M12; 2 wires	
sensing face  M18x1  Sensing face  Q24  LED from 4 sides visible  M12x1  M12x1	sensing face M30x1.5	sensing face M30x1.5  Sensing face M30x1.5  LED from 4 sides visible M12x1	
10 <u>24</u> 60 V DC	10 <u>24</u> 60 V DC	10 <u>24</u> 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	
Was VE	Voo VE	VF	
yes, YE	yes, YE	yes, YE	
300 m	300 m	300 m	
300 III	NK / 2.0 m / 2 x 0.75mm^2	300 111	
		. ————	
DC 13	DC 13	DC 13	
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	
<u> </u>		3	

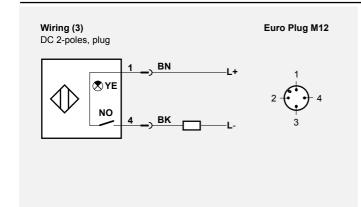
## **Inductive Proximity Switches, Ferrous DC 2-poles**

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
	NO plus- or minus-switching NOp	IAB-40fq75b15-1T1, 11.26-20 (1)	IAB-40fv114b15-3K1A, 11.26-04 (2)
Type designation,	NC plus-switching NCp		
Ref. no.	NO and NC plus-switching NOp + NCp		
(Wiring)	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
			40 -
	Common Technical Data	75	1 40 1   1 40 1
	Reduction factors Fe / Al / V2A 1.0 / 0.4 / 0.5	<u> </u>	* *
	ysteresis of the switching point s 3 20 %	sensing	
	accuracy of the switching point s ≤ 10 %	9 (scale) 8 1	1 4 0 5.3 X
	- at permanent operating voltage	<b>▼ ▼ ▼</b>	
	and ambient temperature ≤ 2 %		
	Magnetic field-resistance	64	4 PIED
	Permissible ripple voltage ≤ 15 %	64 — 64 m	
	Short-circuit-proof? 11.26-20: yes	45 - 4	09
	tected against polarity reversal? yes		
Vol	tage drop over a closed contact ≤ 5 V DC	sensing iii	
	11.26-20: ≤ 8 V DC	of face	
	Ambient temperature range 25 + 75 °C	<u> </u>	
		- <b>→</b>  8 <del> </del> -	→ 30 ← → 17 ← \
		→ 13 -	lead entry PG 13.5
	Specific Technical Data		
	Permissible operating voltage range	18 <u>24</u> 60 V DC	10 <u>24</u> 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
Outlabia a sa di	Ø Sensing face	38 x 38 mm	38 x 38 mm
Switching radit	us r (at switching distance of the object) s = 0; see page 1.0.2)	13.0 mm	13.0 mm
	Function indication ?		yes, YE
	T unction maleation :		
	Maximum lead length	300 m	300 m
Lead type	e / 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 switch	es with connectors: Please find the required connector	Wiring (1)	Plug
with outgoing lead in	n chapter 12 "Accessories". Order separately.	DC 2-poles, plug	Amphenol, 5-poles
For proximity switch	es with outgoing lead: The standard length is 2.0 m		
•	hs are marked at the end of the ref. no. by the index	3 BN	L+
	e that deviated lengths are required, please indicate		= 5
this in the ref. no	3		4 1
	gth 10.0 m: Index -100, lead length 0.5 m: Index -005.	NO NO	- <del>( (                                 </del>
Lxamples. Lead len	gui 10.0 m. maex - 100, lead lengui 0.5 m. maex -005.	4 BK	3 2 2
Certifications		Wiring (2)	
Manufactured accor	ding to DIN EN ISO 9001	DC 2-poles, clamp terminal	
		1 BN	L+
Safety Regulations	•	<b>⊗</b> YE SYE	_
Connection, start-up	and maintenance may only be accomplished by	14P	
specialists or instruc	eted personnel.	NO A PK	
Subject to technical	changes!	4 BK	L-
,	<u>-</u>		



☐ 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	
0 5.3 0 7.2 0	120 sensing face Fig. 120 to 1	
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	



## **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
	NO plus- or minus-switching NOp	IAW-18mg100b5-1T1A, 11.15-66 (1)	ISW-18mg85b5-3NT1A, 11.19-10-020
ives designation	NC plus-switching NCp		
ype designation, Ref. no.	NO and NC plus-switching NOp + NCp		
(Wiring)	NO plus-, NC minus-switching NOp + NCn		
(willing)	NO minus-switching NOn		
	NC minus-switching NCn		
ı	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	→ M18x1 <del>-</del>	-► M18x1 -
	Reduction factors Fe / AI / V2A 1.0 / 0.4 / 0.5	sensing face	sensing
Н	ysteresis of the switching point s 3 20 %		
	accuracy of the switching point s ≤ 10 %		
	- at permanent operating voltage		
	and ambient temperature ≤2 %		S 24 5 8 8
	Magnetic field-resistance	S ²⁴ → 8	
	Permissible ripple voltage ≤ 15 %		85
	Short-cirucit-proof?	100	
Pro	tected against polarity reversal ? yes		
	oltage drop over a closed contact ≤ 10 V AC	<u> </u>	i
	11.15-66: ≤ 5 V AC	LED -	LED <del>  </del>
	Ambient temperature range - 25 + 75 °C	Ø 28 -►	thread -
	7 iii 20 iii 10 ii	[	PG7
			<u> </u>
	Specific Technical Data	<del></del>	eh
	Permissible operating voltage range	20 <u>230</u> 265 V AC	90 <u>230</u> 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 radiu	us r (at switching distance of the object) s = 0; see page 1.0.2)	4.8 mm	4.8 mm
	<u>, , , , , , , , , , , , , , , , , , , </u>		
	Function indication ?	yes, YE	yes, YE
	Maximum lead length	300 m	300 m
Lead type	e / 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

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!

## 



O M40 4 - 400	O M20 4 5- 00	O M20 4 5- 05	
O M18 x 1; 100 mm  PBT / CuZn nickel-plated	O M30 x 1,5; 80 mm	O M30 x 1.5; 95 mm	
5 mm, flush	PBT / CuZn nickel-plated	PBT / CuZn nickel-plated	
0 4.05 mm	10 mm, flush 0 8.1 mm	0 8.1 mm	
ISW-18mg100b5-3T1A, 11.15-93 (1)	ISW-30mg80b10-3NT1A, 11.19-12-020 (2)		
15W-16Hig 100b3-31 IA, 11.13-93 (1)	15W-30HIgoub10-3N11A, 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	
sensing face  M18x1  Sensing face  M28  M28  M18x1	sensing face M30x1.5  LED 08 08 66	sensing M30x1.5 sensing face M30x1.5 sensing face W30x1.5 sensing face W	
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 NT / 2.0 m / 3 x 0.75 mm^2	300 m	
DC 13 IP 65	DC 13	DC 13	
CO YI	IF 0/	IP 65	
34 Nm / 70 Nm	150 Nm / < 200 Nm	150 Nm / < 200 Nm	
145 g	190 g + weight of the lead	150 Nill / < 200 Nill 150 g	
electrically isolated coil	electrically isolated coil	electrically isolated coil	
Cicotifically isolated coll		Ciccindany isolated coll	

## **Inductive Proximity Switches**

## **Type Double Switch**

#### **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 (backwardsforwards 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 allround inspection window clearly shows the switching status in each case.

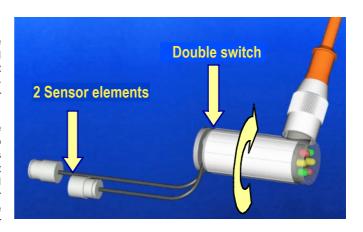


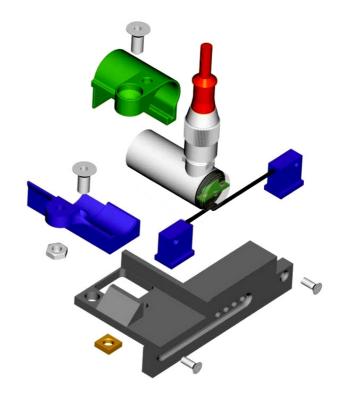
The sensor elements can be provided with supply leads of up to 1 m in length for end positions lying further apart (> 100 mm). This allows the detection of even large travel paths in machines. The sensor elements can be accommodated in a ceramic envelope with heat resisting supply lead where increased 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).

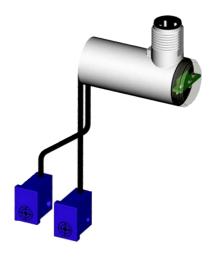
The two-channel evaluator allows an operating frequency of up to 20 kHz and sits in a metal housing with a large all-round inspection window on the end face to display the switching status. The switch is insensitive to magnetic fields up to 100 mT and non-welding. The holder for the evaluator is made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

	·	Switching distance		·
Туре	Ref. No.	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
Nomir	nal switching distance s, mounting	2 mm, non-flush
	Range secured switching distance	0 1.62 mm
Type designation		IAD2/H-18zr42n2-11Sd1C 15.14-08-001 (1)
Ref. no.		
Maximum switching free	quency / Minimum damping period	20 kHz / 25 μs
Wiring	(connector or lead); number of wires	connector M12; 4 wires
Common Technic  Reduction factors Fe / A  Hysteresis of the switching Repitition of the switching - at permanent operating and ambient temp Magnetic field-res Permissible ripple Short-circuit Protected against polarity rev Voltage drop over a closed	1.0 / 0.4 / 0.5     1.0 in to   1.0     1.0	42 32.5 918 918 918 918 918 918
	Specific Technical Data	40 04 00 100
	Permissible operating voltage range	10 <u>24</u> 30 V DC
	Permissible operating voltage range Current consumption without load	≤ 20 mA
	Permissible operating voltage range Current consumption without load Load current	≤ 20 mA ≤ 200 mA
	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage	≤ 20 mA ≤ 200 mA 75 V DC
	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF
Switching radius r (at switching distance	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 µF 8 mm
Switching radius r (at switching distance	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2)	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF
Switching radius r (at switching distance	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication:	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm
Switching radius r (at switching distance	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 µF 8 mm 3.3 mm
Switching radius r (at switching distance	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm 2 LED, GN 2 LED, YE (sensor S 01, A1)
Switching radius r (at switching distance	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 µF 8 mm 3.3 mm
Switching radius r (at switching distance	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm 2 LED, GN 2 LED, YE (sensor S 01, A1)
Switching radius r (at switching distance	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm 2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2)
	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated Ambient temperature range	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm 2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2) -10 + 70 °C
	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated  Ambient temperature range Maximum lead length	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm 2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2) -10 + 70 °C 300 m
Lead length between se	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated  Ambient temperature range Maximum lead length	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm 2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2) -10 + 70 °C 300 m
Lead length between se	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated  Ambient temperature range Maximum lead length nsor elements and evaluation device	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm 2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2) -10 + 70 °C 300 m 105 108 mm
Lead length between se	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated  Ambient temperature range Maximum lead length nsor elements and evaluation device	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm 2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2) -10 + 70 °C 300 m 105 108 mm
Lead length between se	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated  Ambient temperature range Maximum lead length nsor elements and evaluation device	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm  2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2)  -10 + 70 °C 300 m 105 108 mm
Lead length between se  Utilization of Degree	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated  Ambient temperature range Maximum lead length nsor elements and evaluation device category according to IEC 60947-5-2 of protection according to IEC 60529 Protection class	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm  2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2)  -10 + 70 °C 300 m 105 108 mm  DC 13 IP 67 II,□
Lead length between se  Utilization of Degree	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated  Ambient temperature range Maximum lead length nsor elements and evaluation device category according to IEC 60947-5-2 of protection according to IEC 60529 Protection class Shocks and oscillations	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm  2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2)  -10 + 70 °C 300 m 105 108 mm  DC 13 IP 67 II,□ according to IEC 60947-5-2 / 7.4
Lead length between se  Utilization of Degree	Permissible operating voltage range Current consumption without load Load current Nominal insulation voltage Permissible capacity at the output Ø Sensing face of the objects s = 0; see page 1.0.2) Function indication: On / operating voltage Clamp open / not actuated Clamp closed / actuated  Ambient temperature range Maximum lead length nsor elements and evaluation device category according to IEC 60947-5-2 of protection according to IEC 60529 Protection class Shocks and oscillations	≤ 20 mA ≤ 200 mA 75 V DC ≤ 1.0 μF 8 mm 3.3 mm  2 LED, GN 2 LED, YE (sensor S 01, A1) 2 LED, RD (sensor S 02, A2)  -10 + 70 °C 300 m 105 108 mm  DC 13 IP 67 II,□ according to IEC 60947-5-2 / 7.4

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.

## Certifications

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

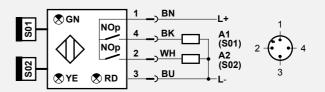


## Safety Regulations

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

Subject to technical changes!

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



Euro Plug M12



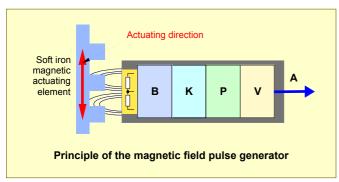

## Pulse Sensors, Magnetic Field Plate and Hall Element

#### 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.



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
- 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.

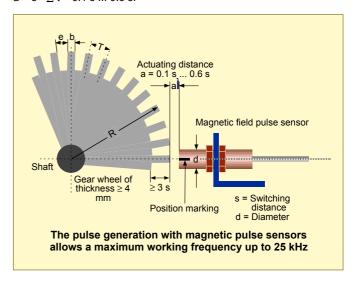
**Special versions**, e.g. for extended temperature range (e.g. - 40 ... + 100 °C), with LED etc. as well as special designs on request.

Principle of magnetic field pulse sensor	Typical switching distance	Actuating frequency
static	1 mm	0 25 kHz
dynamic	2.5 mm	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):  $a = s - \sum t = 0.1 \ s \dots 0.6 \ s$ .



#### **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).

## **Inductive Pulse Sensors**

## Inductive All Metal Pulse Sensors

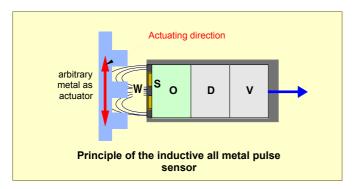




### Method of Operation of Inductive All Metal - Pulse Sensors

An inductive all metal pulse sensor consists of an oscillator with oscillating circuit S, a discrimator 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.



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.

Actuating distance a = 0.1 s ... 0.6 s Shaft Proximity switch with switching Steel cam distance = s and  $\emptyset$  = d thickness D ≥ d Select c as to achieve a 1:1 duty cycle at the maximum rotation speed (see below).

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.

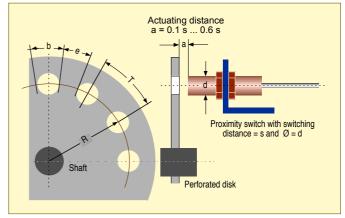
## Pulse Generation using All Metal Pulse Sensor and Perforated

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:**

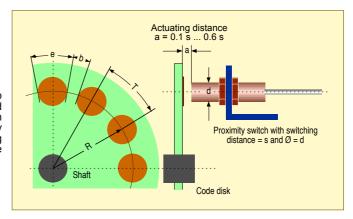
 $a = 0.6 \text{ s} (0.5 \dots 0.7 \text{ s})$ Distance disk / switch: b = ca. 2 dDiameter of holes:

Distance between holes: e = ca dT = b + e Pitch: 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, 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.

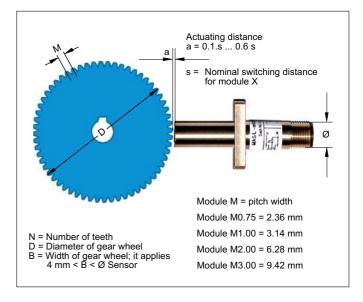
The lateral displacement of the gear wheel / of the rack rail may not exceed 0.2 mm at the smallest width. The run-out should be < 0.2 mm.

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.





		Switching distance			Switching distance
Туре	Ref. No.	in mm	Туре	Ref. No.	in mm
		Mounting *)			Mounting *)
HALL round 10 Ø x L			HALL round 14 Ø x L		
HAD-10er59b2-6TK1 **)	13.26-29-020	2.0 b	HAD-14eg50b1-5ND1	13.26-77-025	1.0 b
, , ,		2.0 0	HAD-14er120b1-5TT3	13.26-79-030	1.0 b
HALL round 10.8 Ø x L					-
HAD-11ms45b2.5-5S1	13.26-01-000	2.5 b	HALL round 16 Ø x L		
HAD-11ms60b1-5Sd1	13.26-66-000	1.0 b	HAD-16ss96b1-5Yd1	13.26-73-000	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	HALL round 18 Ø x L		
HAD-11ms60b2.5-50Y2	13.26-08-000	2.5 b	HAD-18eg82b1-5NT1	13.26-71-020	1.0 b
HAD-11ms60b2.5-50Y3	13.26-10-000	2.5 b	HAD-18mg82b1-5NT1	13.26-69-020	1.0 b
HAD-11ms60b2.5-50Y4	13.26-12-000	2.5 b	HAD-18mg93b1-5Sd1	13.26-68-000	1.0 b
HAD-11ms60b2.5-50Y5	13.26-27-000	2.5 b	HAD-18mg98b1-5Vd1	13.26-67-000	1.0 b
HAD-11ms60b2.5-50Y6	13.26-28-000	2.5 b	HAD-18sg80b2.5-5TK1	13.26-50-020	2.5 b
HAD-11ms60b2.5-50Z1	13.26-02-000	2.5 b	HAD-18ss100b1.6-5NT1	13.26-65-005	1.6 b
HAD-11ms60b2.5-5S1	13.26-13-000	2.5 b	HAD-18ss85b1-5NT1	13.26-64-060	1.0 b
HAD-11ms60b2.5-5S4	13.26-56-000	2.5 b			
HAD-11ms60b2.5-5Y2	13.26-53-000	2.5 b	magneto-resistant round 12 Ø x L		
HAD-11ms60b2.5-5Y3	13.26-54-000	2.5 b	MAD-12aq50b0.4-5NK1	13.21-59-020	0.4 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			

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

^{**) =} supply on request

## Series HAD-10er, -11ms

		Design; length	O 10 m	nm; 59 mm	
Material of the sensing face / of the housing			stainless steel / stainless steel		
Nom. switching	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,	NO	olus-switching NOp			
Ref. no.	NO plus-, NC mi	nus-switching NOp + NCn	HAD-10er59b2-6TK1,	13.26-29-020 (1)	
	•	Switching frequency range	1	500 Hz	
	Wiring (connec	tor or lead); number of wires	lead	; 3 wires	
	Common Technical Data		Actuating direction		
Reduction fa	actors Fe / Non-ferroes metals	1.0 / 0			
Hyster	esis of the switching distances s	3 20%	sensing Ø 10 ^{± 0.1}		
			face		
	Permissible ripple voltage	≤ 10%		4 mm	
	Short-cirucuit-proof?	yes, for ≤ 20 s		Ø	
Prot	tected against polarity reversal?	yes		<b>2</b> 3	
			- 59	Blind hole wheel	
				<b>B</b> 2	
			i	Blind hole wheel	
				Ng 1	
			x)		
			譜	0	
			晉	0 250 500 Hz	
			e)	Switching frequency	
			$\triangle$		
			<b>₹</b> ₹		
			x)		
		Specific Technical Data	x) position marking		
-	Permiss	sible operating voltage range	* *	30 V DC	
		ent consumption without load		20 mA	
	Guire	Load current		25 mA	
	Voltage d	rop over the switched output		20 110 1	
	voltage d	- at load current 0	<	1.5 V	
		- at load current 25mA	≤ 10 V		
		at load bullont Lonint	<del>_</del>	-	
		Nominal insulation voltage	75	V DC	
		Ambient temperature range	- 25 + 110 °C		
		Max. lead length	≤	150 m	
Lead type	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	С	IC 12	
	Degree of protection according to 60529		I	P 67	
		Protection class			
	Permissible torqu	ue without / with toothed disc			
		Weight	30 g + wei	ght of the lead	
		Recommended accessories			
<del></del>					

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.

## Certifications

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



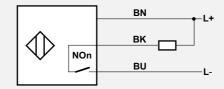
## Safety Regulations

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

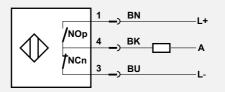
Subject to technical changes!

## Wiring (1)

DC 3-poles, push-pull, outgoing lead



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



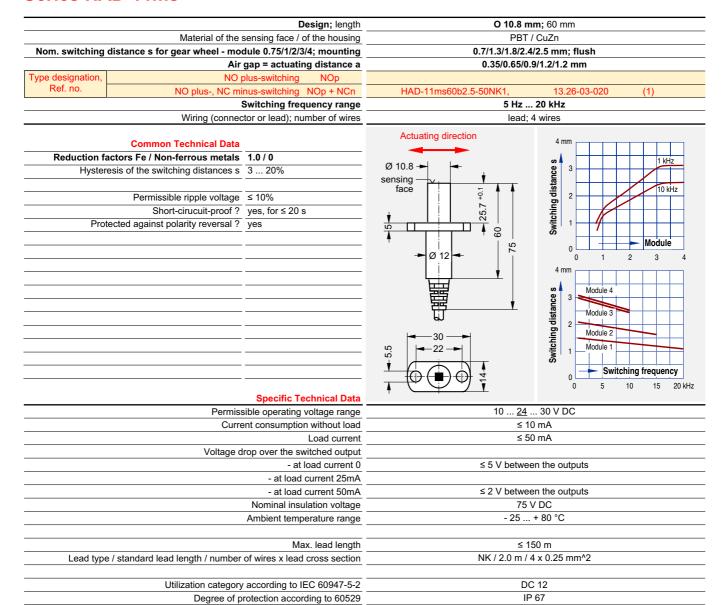
### Euro Plug M12





O 10.8 mm; 45 mm O 10.8 mm; 60 mm PBT / CuZn PBT / CuZn 0.7/1.3/1.8/2.4/2.5 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-11ms45b2.5-5S HAD-11ms60b1-5Sd1 5 Hz ... 20 kHz 5 Hz ... 20 kHz connector M12; 4 wires connector M12; 4 wires **Actuating direction** Actuating direction 4 mm Switching distance s Switching distance s Ø 10.8 -Ø 10.8 sensing face 10 kHz sensing face 2 25.7 +0,1 +0.1 25.7 Module Module 0 0  $\Box$ 09 3 3 0 0 Ø 12 ø 12 Switching distance s Switching distance s M12x1 Module 4 3 M12x1 Module 3 2 2 Module 2 Module 2 -22 Modul 1 Module 1 5.5 Module 0.75 Switching frequency Switching frequency 20 kHz 10 15 20 kHz 6 ... <u>24</u> ... 30 V DC 10 ... <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 ... + 80 °C 25 ... + 100 °C ≤ 150 m ≤ 150 m DC 12 DC 12 IP 65 IP 65 30 g 30 g

## **Series HAD-11ms**



Recommended accessories

Permissible torque without / with toothed disc

Protection class

Weight

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.

## Certifications

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

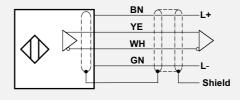


#### Safety Regulations

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

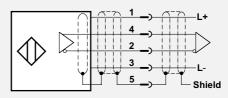
Subject to technical changes!

#### Wiring (1) DC 4-poles, outgoing lead



30 g + weight of the lead

#### Wiring (2) DC 5-poles, plug



Euro Plug M12





	Elektronik + Automation		
O 10.8 mm; 60 mm	<b>O 10.8 mm</b> ; 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		
Actuating direction  Actuating direction  Actuating direction  Actuating direction  Actuating direction  Actuating direction  Switching frequency  0 5 10 15 20 kHz	Actuating direction  Actuating		
10 <u>24</u> 30 V DC	10 <u>24</u> 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		

## **Series HAD-11ms**

		Design; length		O 10.8 m	<b>m</b> ; 60 mm	
	Material of the sensing face / of the housing		PBT / CuZn			
Nom. switching	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	9/1.2/1.2 mm	
Type designation,		plus-switching NOp				
Ref. no.		inus-switching NOp + NCn	HAD-11ms60	· · · · · · · · · · · · · · · · · · ·	13.26-10	(1)
		Switching frequency range		5 Hz	20 kHz	
	Wiring (connec	ctor or lead); number of wires		connector with	n lead; 5 wires	
Hyster	Common Technical Data actors Fe / Non-ferrous metals resis of the switching distances s  Permissible ripple voltage Short-cirucuit-proof? tected against polarity reversal?	1.0 / 0 3 20% ≤ 10% yes, for ≤ 20 s yes	M12x1  S1  Silicone tube	Ø 10.8 17 10.8 17 10.8 17 10.8 17 10.8 17 10.8 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10	4 mm s and s	1 kHz 10 kHz Module 2 3 4
		Specific Technical Data	Actuating direction	3.5	2 Module 2 Module 1	itching frequency  10 15 20 kHz
	Permis	sible operating voltage range		10 <u>24</u>	. 30 V DC	
	Curre	ent consumption without load		≤ 10		
		Load current		≤ 50	mA	
	Voltage d	Irop over the switched output				
		- at load current 0		≤ 5 V betwee	n the outputs	
		-at load current 25 mA				
		- at load current 50mA	≤ 2 V between the outputs			
		Nominal insulation voltage	75 V DC			
		Ambient temperature range	- 25 + 80 °C			
		Ambient temperature range		≤ 15	60 m	
		Max. lead length		/ 0.45 m / 4 x		
Lead type	e / standard lead length / number			shielded lead with		
	•			DC		
	Utilization category	according to IEC 60947-5-2		IP	65	
	Degree of p	rotection according to 60529				
		Protection class				
	Permissible torque without / with toothed disc			80	) g	
		Weight				
		Recommended accessories				
	es with connectors: Please find the	•	Wiring (1)			Euro Plug M12

For proximity switches with connectors: Please find the required connector wit 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.

## Certifications

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

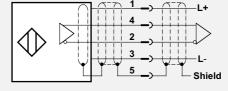


## Safety Regulations

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

Subject to technical changes!

#### Wiring (1) DC 5-poles, plug



### Euro Plug M12





O 10.8 mm; 60 mm		O 10.8 mm; 60 mm		
PBT / CuZn		PBT / CuZn		
0.7/1.3/1.8/2.4/2.5 mm; flush 0.35/0.65/0.9/1.2/1.2 mm		0.7/1.3/1.8/2.4/2.5 mm; flush		
			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	
	h lead; 5 wires		h lead; 5 wires	
Actuating direction 0 10.8  Actuating direction 0 15.5	s eourstip build a sound of the state of the	Actuating direction  Ø 10.8  Ø 10.8  Ø 10.8  From 13.5  From 13.5  Ø 10.8  From 13.5  From 13	Sepure to the first of the firs	
10 <u>24</u> 30 V DC		10 <u>24</u>		
≤ 10			0 mA	
≤ 50	mA	≤ 50	) mA	
≤ 5 V betwee	n the outputs	≤ 5 V between the outputs		
≤ 2 V betwee	n 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			x 0.34 mm^2	
shielded lead with 5-pole plug M12		shielded PUR-lead v		
DC 12 IP 65		DC	: 12 65	
IP 65		IF	00	
80	) a	70	) g	
	. 3		· <del>3</del>	
		-		

## **Series HAD-11ms**

	Material of the	<b>Design</b> ; length sensing face / of the housing		<b>O 10.8 mm</b> PBT / 0	·	
Nom. switching di	istance s for gear wheel - mo			0.7/1.3/1.8/2.4/2		
Type designation,		gap = actuating distance a plus-switching NOp	HAD-11ms6	0.35/0.65/0.9/	13.26-28	(1)
Ref. no.		nus-switching NOp + NCn	TIAD-TITIISO	002.5-5010,	13.20-20	(1)
		Switching frequency range		5 Hz 2	20 kHz	
		etor or lead); number of wires		connector with	lead; 5 wires	
Paduation fac	Common Technical Data	1.0 / 0	31 <del> </del> 31 <del> </del> 13.5 <del> </del>	Ø 10.8	4 mm	
	sis of the switching distances s	3 20%		- A	<b>8</b> 3	1 kHz
	Permissible ripple voltage Short-cirucuit-proof? cted against polarity reversal?		M12X1 M12X1	09 12 09 09	Switching distance s	Module 2 3 4
		Specific Technical Data	Actuating direction	Ø 15 - 5.5 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8 -	4 mm  Module 4  Module 2  Module 2  Module 1  Module 2  Swi  0  5	tching frequency  10 15 20 kHz
		sible operating voltage range		10 <u>24</u>	. 30 V DC	
	Curre	ent consumption without load	≤ 10 mA			
-	V/ "	Load current	≤ 50 mA			
	Voltage d	rop over the switched output - at load current 0		< 5 \/ hot	n the cutnute	
		- at load current 0		≤ 5 V betwee	n me outputs	
-		- 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		≤ 15		
Lead type /	standard lead length / number	of wires x lead cross section		/ 0.03 m / 4 x		2
	Utilization category	according to IEC 60947-5-2	SI	nielded PUR-lead v DC		
	Utilization category according to IEC 60947-5-2  Degree of protection according to 60529			IP		
	20g.00 01 p	Protection class				
-	Permissible torqu	ue without / with toothed disc				
		Weight		60	) g	

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.

## Certifications

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



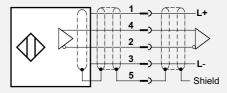
Recommended accessories

## Safety Regulations

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

Subject to technical changes!

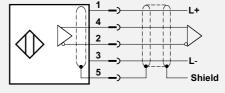
#### Wiring (1) DC 5-poles, plug



## Euro Plug M12



#### Wiring (2) DC 5-poles, plug



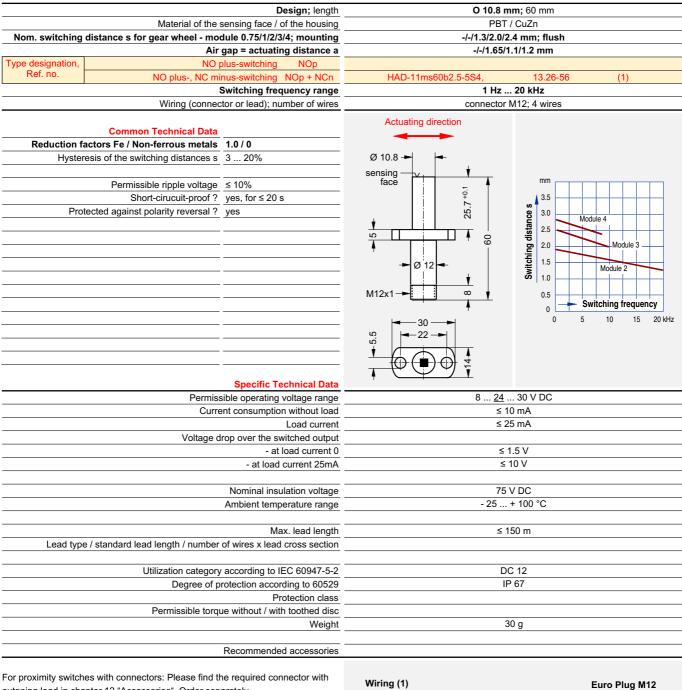
Euro Plug M12





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-11ms60b2.5-50Z1 HAD-11ms60b2.5-5S1 5 Hz ... 20 kHz 5 Hz ... 20 kHz connector with lead M12; 5 wires connector M12; 4 wires Actuating direction Actuating direction Switching distance s Switching distance s Ø 10.8 -Ø 10.8 sensing face sensing face +0.1 +0.1 25.7 + 25.7 Module Module 0 0 9 9 3 3 0 Ø 12 Ø 12 Switching distance s Module 4 Module 4 Switching distance s 3 M12x1 M12x1 Module 3 Module 3 2 2 Module 2 Module 2 30 Module 1 22 Module 1 5.5 -22 Switching frequency Switching frequency 0 0 5 10 15 20 kHz 5 10 15 20 kHz 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) Euro Plug M12 DC 3-poles, plug BN /NOp BK NCn BU

## **Series HAD-11ms**



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

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

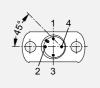


### Safety Regulations

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

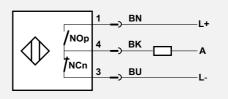
Subject to technical changes!

## DC 3-poles, push-pull, plug BN /NOp **7**NCn BU



Euro Plug M12





WH

Shield





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 -/-/1.3/2.0/2.5 mm; flush 0.35/0.65/0.9/1.2/1.2 mm -/-/1.65/1.0/1.2 mm HAD-11ms60b2.5-5Y2 HAD-11ms60b2.5-5Y3 1 Hz ... 20 kHz 1 Hz ... 20 kHz connector with lead; 4 wires connector with lead; 4 wires Ø 10.8 Ø 10.8 M12x1 M12x1 Switching distance s 25.7 +0.1 25.7 09 Switching distance s Module 4 Module Module 3 3 0 Module 2 Ø 15 Module 4 Switching distance **-** 5.5 Switching frequency **-** 5.5 10 5 15 20 kHz Actuating Module 2 direction Actuating Module 1 direction - Switching frequency 0 15 20 kHz 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 4-pole plug M12 shielded lead with male plug 4-poles M12 DC 12 DC 12 IP 65 IP 65 80 g + weight of the lead 60 g Wiring (3) Euro Plug M12 DC 3-poles, push-pull, male plug BN /ЮОр ВК /NCn BU WH Shield

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

	Matarial of the	Design; length		O 10,8 mm		
Nom switching	Material of the sensing face / of the housing  Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting			PBT / CuZn		
Nom. switching	Air gap = actuating distance a			0.7/1.3/1.8/2.4/2.5 mm; flush 0.35/0.65/0.9/1.2/1.2 mm		
Type designation,		plus-switching NOp	Ų.	.00/0.00/0.0/	,	
Ref. no.		inus-switching NOp + NCn	HAD-11ms60b2.5-5	Y4,	13.26-57	(1)
		Switching frequency range		1 Hz 2	0 kHz	
	Wiring (connec	ctor or lead); number of wires	cor	nector with	ead; 3 wires	
	Common Technical Data actors Fe / Non-ferrous metals esis of the switching distances s		Ø 10 M12x1 →	0.8	4 mm	1 kHz
Trysten	Permissible ripple voltage		\$\frac{17}{8}	25.7 +0.1	Switching distances	10 kHz
Prot	Short-cirucuit-proof? tected against polarity reversal?	· · · · · · · · · · · · · · · · · · ·		<del> </del>	2 witch	
	<u> </u>		01	2	0 1	Module 2 3 4
				5 -	4 mm	
			PUR-lead with silicone tube	<del>▼</del> 5.5	Modul 2 Modul 2 Modul 1 Modul 1 Modul 1	
				0.0	Modul	
			Actuating		Modul Modul	
			direction	기 ^및 위	3 1 - Modul	
				<u>'</u>		Switching frequency
		-	<b>→</b> 14	-	0 5	10 15 20 kHz
		Specific Technical Data				
	Permis	sible operating voltage range		8 <u>24</u>	30 V DC	
	Curre	ent consumption without load	≤ 10 mA			
		Load current	≤ 25 mA			
	Voltage o	drop over the switched output				
	- at load current 0			≤ 1.		
-		- at load current 25mA		≤ 10	) V	
		Nominal insulation voltage		75 V	DC	
		Ambient temperature range		- 25 +		
		7 iiii Didiit toiii portataro Tarigo				
		Max. lead length		≤ 15	0 m	
Lead type	e / standard lead length / number	of wires x lead cross section		/ 0.45 m / 3 x		
			shielded PU	JR-lead with	male plug 4-pol	es M12
		y according to IEC 60947-5-2		DC		
	Degree of p	protection according to 60529	IP 65			
		Protection class				
	Permissible torq	ue without / with toothed disc				
		Weight		80	9	
		Recommended accessories				
		recommended accessories				
	es with connectors: Please find t pter 12 "Accessories". Order sep	· ·	Wiring (1) DC 3-poles, push-pull, p	olug		Euro Plug M12
For proximity switch	es with outgoing lead: The stand	ard length is 2.0 m and/or		J		
	are marked at the end of the ref.	=	1	BN	1+	1
050. In case that dev	viating lengths are required, plea	se indicate this in the	A /110	_,		1
ref. no		/NOp 4	<u>→</u> BK	<b>¬</b> —_А	2 (6) 4	
Examples: Lead leng	gth 10.0 m: Index -100, lead leng	gth 0.5 m: Index -005.	/ _{NCn}		_	$\mathbf{\psi}$
			3	) BU	L-	3
			W			
Certifications			Wiring (2) DC 3-poles, push-pull, of	outaoina loos		
	according to standard:		DO 3-poles, pusti-pull, (	bargonig lead		
	(VDE 0660 Part 208).			BN		
manutactured accor	ding to DIN EN ISO 9001		,	511	L+	
Safety Regulations			/NOp	вк _	_	
	and maintenance may only be ac	ccomplished by specialists	7 _{NCn}		A	
or instructed person	nel		I Y INCH			

or instructed personnel. Subject to technical changes!



□ 25 mm x 12 mm; 50 mm	O 12 n	nm; 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  1.5  0.4  0.3  0.3  0.3  0.3  0.4  0.4  0.5  0.5  0.5  0.6  0.7  0.7  0.8  0.8  0.8  0.8  0.8  0.8	Actuating direction  sensing face    Ø 12	1.5 Module 1 1.2 0.9 0.6 0.6 0.3 6 9 12 15 kHz	
	x) —— x) position marking	30 V DC	
10 <u>24</u> 30 V DC ≤ 25 mA		30 V DC 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		3 x 0.34 mm^2	
DC 12		C 12	
IP 67		P 67	
40 g + weight of the lead	25 g + wei	ght of the lead	

## Series HAD-12er, -12mg

Design; length		<b>O 12 mm</b> ; 55 mm
	Material of the sensing face / of the housing	PBT / stainless steel
Nom. switching distant	ce 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,	NO plus-switching NOp	HAD-12er55b2.4-5NK2, 13.26-72-020 (1)
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

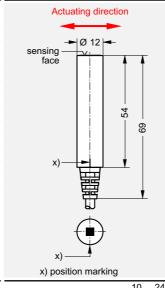
 Reduction factors Fe / Non-ferrous metals
 1.0 / 0

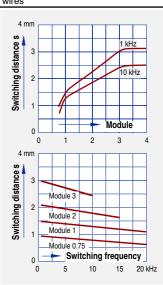
 Hysteresis of the switching distances s
 3 ... 20%

 Permissible ripple voltage
 ≤ 10%

 Short-cirucuit-proof?
 yes, for ≤ 20 s

 Protected against polarity reversal?
 yes





x) posi	Specific Technical Data
	Permissible operating voltage range
	Current consumption without load
	Load current
	Voltage drop over the switched output
	- at load current 0
	- at load current 25mA
	Nominal insulation voltage
	Ambient temperature range
	Max. lead length
	Lead type / standard lead length / number of wires x lead cross section

A) poolaon manang	
10	. <u>24</u> 30 V DC
	≤ 10 mA
	≤ 25 mA
	≤ 1.5 V
	≤ 10 V
	75 V DC
- 2	25 + 80 °C
	≤ 150 m
NK / 2.0	m / 3 x 0.34 mm^2

d lead length / number of wires x lead cross section

Utilization category according to IEC 60947-5-2

Degree of protection according to 60529

Protection class

Permissible torque without / with toothed disc

Weight

25 g + weight of the lead

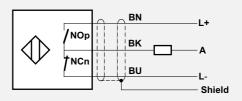
DC 12 IP 67

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



Recommended accessories

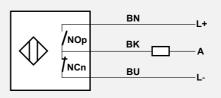
## Safety Regulations

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





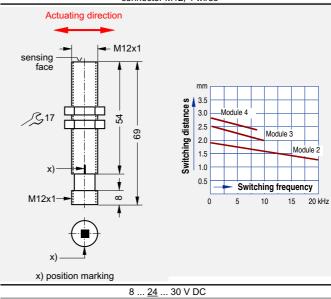
<b>O 12 mm</b> ; 55 mm		O M12 x 1; 70 mm	
PBT / stainless steel		PBT / CuZn nickel-plated	
-/1.3/1.8/2.4/2			.4/- mm; flush
	1.2/1.2 mm	0.35/0.65/	0.9/1.2/- mm
HAD-12er55b2.5-5NK1, 13.26-3	8-020 (1)		
1 Hz	20 1411-	HAD-12mg50b2.5-5ND1,	13.26-06-020 (2)
lead; 3		5 Hz 20 kHz lead; 3 wires	
Actuating direction  sensing face  x)  x) position marking	4 mm  Secure of the secure of	Actuating direction  sensing face  x)  x)  x) position marking	sequences of the sequence of t
10 <u>24</u>	30 V DC		30 V DC
		6 <u>24</u> 30 V DC ≤ 10 mA	
≤ 10 mA ≤ 50 mA		≤ 25 mA	
≤ 1.			.5 V
≤ 10 V		≤ 10 V	
75 \	I DC	75 V DC	
75 V DC - 25 + 80 °C		- 25 + 80 °C	
-			
≤ 15		≤ 150 m	
NK / 2.0 m / 3	x 0.34 mm^2	ND / 2.0 m / 3 x 0.34 mm^2	
DC	12	Dr	2.12
DC 12 IP 67		DC 12 IP 67	
	<del></del>	<u></u>	
		9 Nm / 30 Nm	
25 g + weight of the lead		25 g + weight of the lead	

## 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		unting -/-/1.3/2.0/2.4 mm; flush	
Air gap = actuating distance a		-/-/0.65/1/1.2 mm	
Type designation,	NO plus-switching NOp	HAD-12mg70b2.5-5S2, 13.26-55 (1)	
Ref. no.	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** 

Common recimical Data	
eduction 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
Current consumption without load
Load current
Voltage drop over the switched output
- at load current 0
- at load current 25mA
Nominal insulation voltage

	at load carrent o
	- at load current 25mA
	Nominal insulation voltage
	Ambient temperature range
	Max. lead length
	Lead type / standard lead length / number of wires x lead cross section
	Utilization category according to IEC 60947-5-2
	Degree of protection according to 60529
	Protection class
	Permissible torque without / with toothed disc
	Weight
•	

≤ 1.5 V
≤ 10 V
75 V DC
- 25 + 80 °C
≤ 150 m
DC 12
IP 65
9 Nm / 30 Nm
50 g

≤ 10 mA ≤ 25 mA

## 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

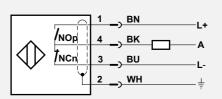


## Safety Regulations

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

Subject to technical changes!

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



# 2 ( 4

Euro Plug M12

3 position marking

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

## Euro Plug M12





O M12 x 1; 70 mm O M12 x 1; 41 mm PBT / CuZn nickel-plated PBT / CuZn nickel-plated -/-/1.3/2.0/2.4 mm; flush 0.7/1.3/1.8/2.4/- mm; flush 0.35/0.65/0.9/1.2/- mm -/-/0.65/1.0/1.2 mm HAD-12mg70b2.5-5S HAD-12ms41b2.5-5NK1 1 Hz ... 20 kHz 1 Hz ... 20 kHz connector M12; 4 wires lead; 3 wires Actuating direction Switching distance s — M12x1 sensing position marking face 2 3.5 Switching distance s 3.0 9 54 M12x1 Module 2.5 0 2 Module 3 3 0 2.0 1.5 1.0 Switching distance s 3 0.5 Switching frequency M12x1ω 2 0 10 15 20 kHz Module 2 Module 1 Module 0.75 Switching frequency 0 5 15 20 kHz x) position marking 6 ... <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 ... + 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 BN /иор BK NCn BU

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

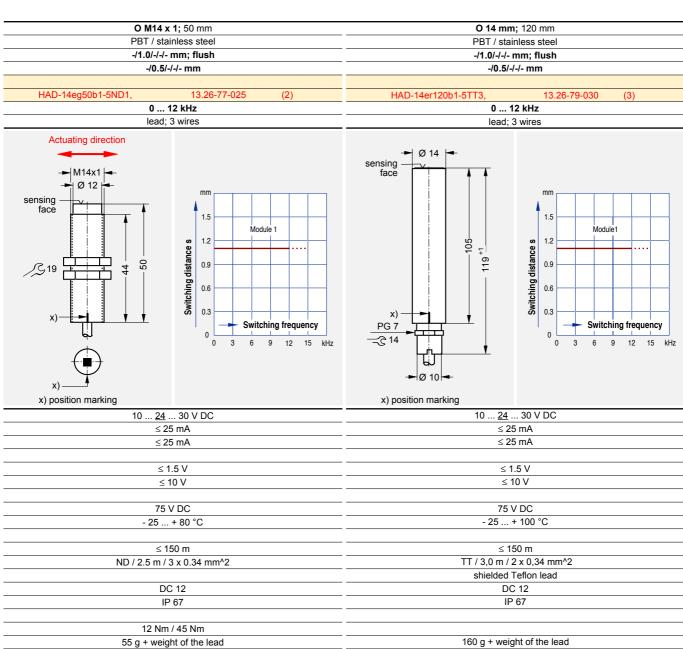
Design; length		O M12 x 1; 41 mm		
Material of the sensing face / of the housing		PBT / CuZn		
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting		-/-/1.3/2.0/2.4 mm; flush		
		gap = actuating distance a	-/-/0.65/1	.0/1.2 mm
Type designation, Ref. no.	NO plus-, NC minus	us-switching NOp + NCn	1115 10 1110 5 511	40.00.50
IXel. IIO.			HAD-12ms41b2.5-5Y1,	13.26-52 (1)
		Switching frequency range		. 20 kHz
	Wiring (connec	tor or lead); number of wires	connector wit	h lead; 4 wires
Hystere	Permissible ripple voltage Short-cirucuit-proof?	3 20%	M12x1 position marking	Module 4 — Module 3 2.5 2.0 Module 3 1.5 Module 2 1.5 1.0
		Specific Technical Data	Actuating direction	0.5 Switching frequency 0 5 10 15 20 kHz
Permissible operating voltage range		8 <u>24</u> 30 V DC		
	Curre	ent consumption without load	≤ 10 mA	
		Load current	≤ 25	5 mA
	Voltage d	rop 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		50 m
Lead type	/ standard lead length / number	of wires x lead cross section		x 0.34 mm^2
				h 4-pole plug2
		according to IEC 60947-5-2		2 12
	Degree of pr	rotection according to 60529	IP	65
		Protection class		
	Permissible torqu	ue without / with toothed disc		/ 30 Nm
		Weight	80	0 g
		Recommended accessories		
	s with connectors: Please find th	ne required connector with	Wiring (1)	Euro Plug M12
For proximity switche 5.0 m. Lead lengths a	oter 12 "Accessories". Order sept s with outgoing lead: The stands are marked at the end of the ref. iating lengths are required, pleas	ard length is 2.0 m and/or no. by the index 020 or -	DC 3-poles, push-pull, plug $ \begin{array}{cccccccccccccccccccccccccccccccccc$	L+ 1 4 L- 3
Safety Regulations	VDE 0660 Part 208). ling to DIN EN ISO 9001 nd maintenance may only be ac	complished by specialists	Wiring (2) DC 3-poles, push-pull, outgoing lea  BN  NCn  BK  NOp	L+ A

or instructed personnel.

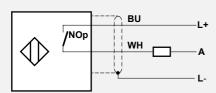
Subject to technical changes!

BU





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



# Pulse Sensors, Magnetic Field Series HAD-16ss, -18eg, -18mg

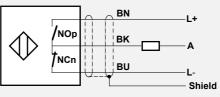
	Burton to other	0.40	. 00
Design; length		O 16 mm; 96 mm	
Material of the sensing face / of the housing		PBT / steel	
Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounting		-/0.8/1.3/1.6/1.6 mm; flush -/0.4/0.65/0.8/0.8 mm	
	r gap = actuating distance a plus-switching NOp	-/0.4/0.65/0	J.6/U.6 IIIII
D (	ninus-switching NOp + NCn	HAD-16ss96b1-5Yd1,	13.26-73 (1)
INO pids-, NC II	Switching frequency range		13.26-73 (1) 2 kHz
Wiring (conne	ector or lead); number of wires		onnector; 4 wires
	color or leady, flamber of wires		Silicotor, 4 wiles
Common Technical Data	•	Actuating direction	4 mm
Reduction factors Fe / Non-ferrous metals	·	<del></del>	φ <u> </u>
Hysteresis of the switching distances s		sensing — Ø 16	se and the state of the state o
	<u> </u>	6 T =	lista
Permissible ripple voltage	< 10%	1ace 1 1 1 1 1 1	2 1 kHz
Short-cirucuit-proof		53	10 kHz
Protected against polarity reversal 3		0 8	im 1
		• I i I I I	Module
		→ Ø 18 <del>→</del> ↓ 96	0
		<u>□ □ □ </u>	0 1 2 3 4
			4,,,,,
			9 3
		<u>"</u> "	auce auce
		42—►I Ø 9	ig 2
		42 09	Module 3 / Module 4
			Butter and the state of the sta
		† <del>**</del> † † † † † † † † † † † † † † † † † †	
			Switching frequency
		60 5 x 45°	0 5 10 12 kHz
	Specific Technical Data		
	ssible operating voltage range	10 <u>24</u> 30 V DC	
Cur	rent consumption without load	≤ 25 mA	
Load current		≤ 25 mA	
Voltage	drop over the switched output		
	- at load current 0	≤ 1.5 V ≤ 10 V	
- at load current 25mA		≤ 10 V	
	Naminal insulation voltage	75 V DC	
Nominal insulation voltage		- 25 + 100 °C	
Ambient temperature range		- 20 1 100 0	
	Max. lead length	 ≤ 150 m	
Lead type / standard lead length / numbe			NO 111
	1 of whoch load cross section		
Utilization categor	ry according to IEC 60947-5-2	DC	12
	protection according to 60529	IP.	
	Protection class		
Permissible toro	que without / with toothed disc		
	Weight	210	0 g
	Recommended accessories		
For proximity switches with connectors: Please find	the required connector with	Wiring (1)	5 v 81 v 1440
outgoing lead in chapter 12 "Accessories". Order se	parately.	DC 4-poles, push-pull, plug	Euro Plug M12
For proximity switches with outgoing lead: The stand	dard length is 2.0 m and/or	- · F, F, b, b3	
5.0 m. Lead lengths are marked at the end of the rei	_	1 BN	1 #
050. In case that deviating lengths are required, plea		/NOp 3 BK	
ref. no			<b>→</b> A
Examples: Lead length 10.0 m: Index -100, lead len	ath 0.5 m; Index -005	NCn 2 BU	L- TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
	J. 1.1	4 GNYE	
			<del></del>
Certifications		Wiring (2)	
Proximity switches according to standard:		DC 3-poles, push-pull, outgoing lead	d
DIN EN 60 947-5-2 (VDE 0660 Part 208).	CE		

Manufactured according to DIN EN ISO 9001

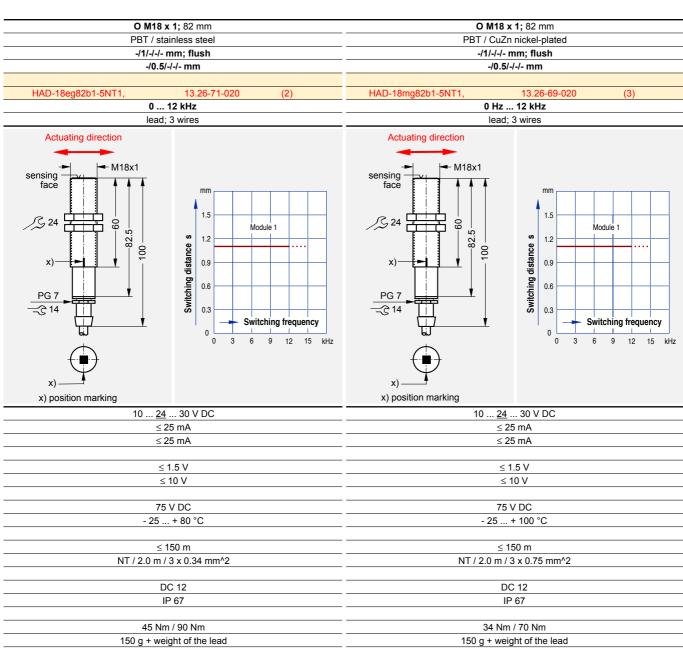


Conection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

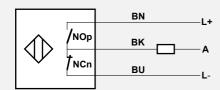
Subject to technical changes!







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

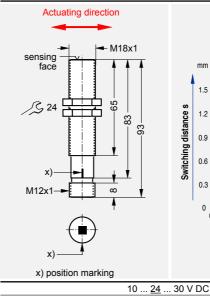


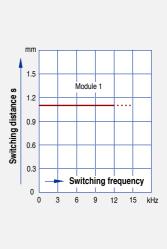
# **Pulse Sensors, Magnetic Field**

# Series HAD-18mg, -18sg

		De	sign; length		O M18	<b>x 1</b> ; 93 mm	
	Material of the	sensing face / of	f the housing		PBT / Cuz	Zn nickel-plated	
Nom. switching	distance s for gear wheel - mod	dule 0.75/1/2/3/	4; mounting		-/1/-/-	- mm; flush	
	Air	gap = actuating	g distance a		-/0.	5/-/-/- mm	
Type designation,	NO p	olus-switching	NOp	HAD-18mg9	3b1-5Sd1,	13.26-68	(1)
Ref. no.	NO plus-, NC mi	nus-switching I	NOp + NCn				
	•	Switching frequ	lency range		0	. 12 kHz	
	Wiring (connec	tor or lead); nun	nber of wires		connecto	or M12; 4 wires	
				Actuating	direction		
	Common Technical Data						
Reduction fa	actors Fe / Non-ferrous metals	1.0 / 0					
Hystere	esis of the switching distances s	3 20%		-	→ M18x1		

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

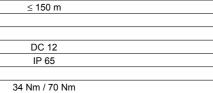




Specific Technical Data
Permissible operating voltage range
Current consumption without load
Load current
Voltage drop over the switched output
- at load current 0
- at load current 25mA

≤ 25 mA
≤ 1.5 V
≤ 10 V
75 V DC

Ambient temperature range
Max. lead length
Lead type / standard lead length / number of wires x lead cross section
Utilization category according to IEC 60947-5-2
Degree of protection according to 60529
Protection class
Permissible torque without / with toothed disc
Weight
·



≤ 25 mA

25 ... + 80 °C

160 g

#### Recommended accessories

Nominal insulation voltage

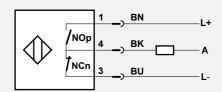
For proximity switches with connectors: Please find the required connector with outgoing lead in chapter 12 "Accessories". Order separately.

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





Euro Plug M18

#### Certifications

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

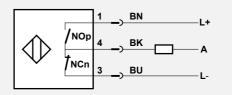


#### Safety Regulations

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

Subject to technical changes!

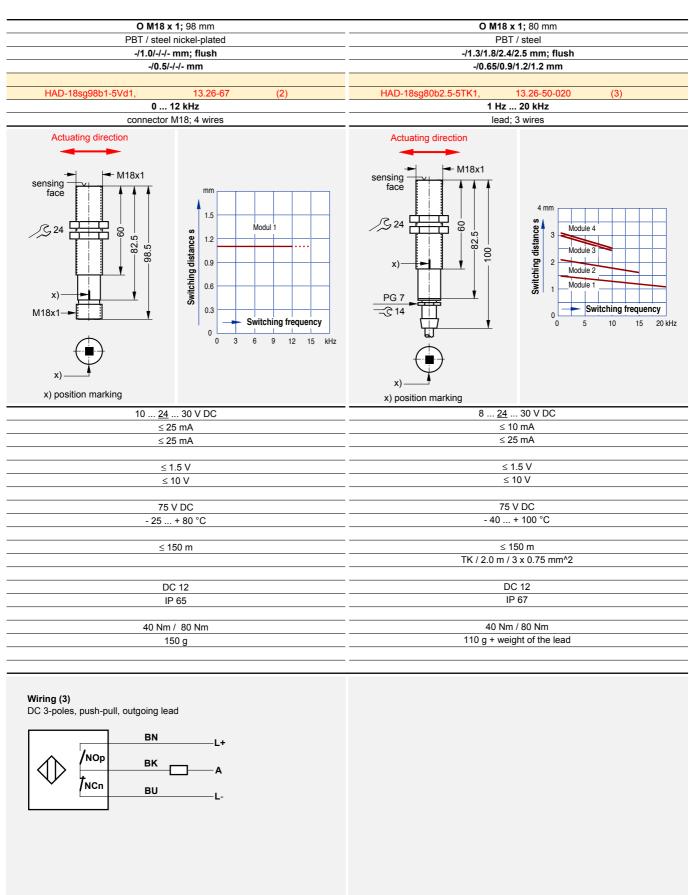
#### Wiring (2) DC 3-poles, push-pull, plug





2.1.1.21





# **Pulse Sensors, Magnetic Field**

# Series HAD-18ss, MAD-12aq

		Design; length	0	<b>17 mm</b> ; 100 mm
		sensing face / of the housing		PBT / steel
Nom. switching	distance s for gear wheel - mo			1.3/1.6/1.6 mm; flush
T d		gap = actuating distance a	-/0.	.4/0.65/0.8/0.8 mm
Type designation, Ref. no.		olus-switching NOp		
1101.110.		nus-switching NOp + NCn	HAD-18ss100b1.6-5NT1,	13.26-65-005 (1)
		Switching frequency range		0 12 kHz
	vviring (connec	ctor or lead); number of wires		lead; 3 wires
	Common Technical Data		Actuating direction	4 mm
Reduction fa	actors Fe / Non-ferrous metals	1.0 / 0	<b>→</b>  Ø 17  <del>-</del>	8
Hystere	esis of the switching distances s	3 20%	sensing	3 2 2 1 kHz 100 kHz
			face	is is
	Permissible ripple voltage		1.0#	E 2 1 kHz
	Short-cirucuit-proof?	<u> </u>		10 kHz
Prot	ected against polarity reversal?	yes	center punch point	- 26 S
				- Module
			↑	0 1 2 3 4
				8 4 mm
				<u> </u>
			PG / / _ C 14 <b>→</b> _ 42 — <b>→</b>	3
			, ,2	10 1 15 I
			5° → Ø 32°	Module 3 / Module 4
			Ø 6.6.	±0.1 distribution of the state
				Module 1
				Switching frequency
				0 5 10 12 kHz
		Specific Technical Data	center punch point	- U 5 10 12 KM2
	Parmiss	sible operating voltage range	10	) <u>24</u> 30 V DC
		ent consumption without load		≤ 25 mA
	Ouric	Load current		≤ 25 mA
	Voltage d	rop 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	e / standard lead length / number	of wires x lead cross section	NT /	0.5 m / 3 x 0.5 mm^2
		according to IEC 60947-5-2		DC 12
-	Degree of p	rotection according to 60529		IP 67
		Protection class		
	Permissible torqu	ue without / with toothed disc		
		Weight	170 g	g + weight of the lead

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.

#### Certifications

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



Recommended accessories

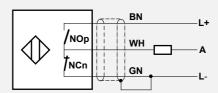
#### Safety Regulations

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

Subject to technical changes!

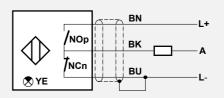
#### Wiring (1)

DC 3-poles, push-pull, outgoing lead

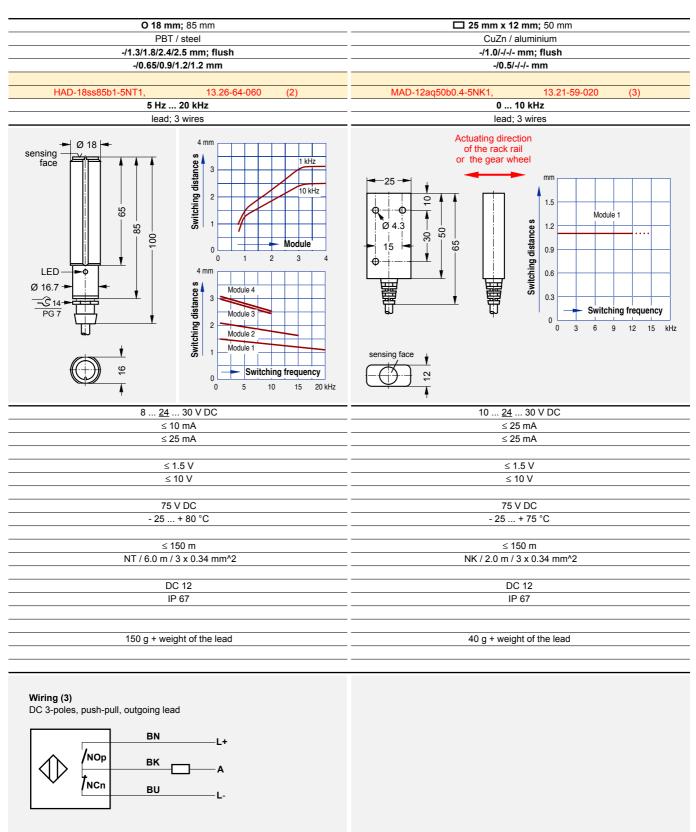


#### Wiring (2)

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  $60\,947\text{-}5\text{-}2$  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  $times \leq 50~\mu s$  (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**

		Switching distance	·		Switching distanc
Туре	Ref. No.	in mm	Туре	Ref. No.	in mm
		mounting *)			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 stee	el	PBT / stainles	s 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 n	nm	
	NO plus-switching NOp	IAD/AHM-8eg60b1.5-1Wc1A, 11	.37-22 (1)	IAD/AHM-8eg60n3-1Wc1A,	11.37-57	(1)
Type designation,	NC plus-switching NCp	IAD/AHM-8eg60b1.5-2Wc1A, 11	.37-24 (2)	IAD/AHM-8eg60n3-2Wc1A,	11.37-59	(2)
Ref. no.	NO and NC plus-switching NOp + NCp					
(Wiring)	NO plus-, NC minus-switching NOp + NCn					
`	NO minus-switching NOn					
	NC minus-switching NCn					
M	laximum switching frequency / Minimum damping period	20 kHz / 25 μs		20 kHz / 25	μs	
	Wiring (connector or lead; number of wires)	connector M8; 3 wire	es	connector M8;	3 wires	
Repetition a	Common Technical Data  Reduction factor //steresis of the switching point s accuracy of the switching point s at permanent operating voltage and ambient temperature Magnetic field-resistance Permissible ripple voltage Short-circuit-proof? ected against polarity reversal? tage drop over a closed contact Ambient temperature range  Common Technical Data  1 for all metals  2 10%  5 10%  5 150 mT  5 15%  7 yes, clocking  9 yes  2 2.5 V DC  - 25 + 85 °C	sensing face  Sensing face  LED from 4 sides visible	- 09	sensing face  Sensing face  LED from 4- sides visible	88 09 H	
	Specific Technical Data	Dimensions subject to o	change!	Dimensions subject	t to change	e!
	Permissible operating voltage range	10 <u>24</u> 30 V DC		10 <u>24</u> 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		
0 '1 ' ' '	Ø Sensing face	6.4 mm		6.4 mm		
Switching radio	us 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 N	١m	
	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  $5.0 \ \text{m}$ . 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

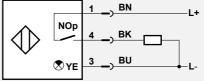


Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

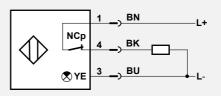
Subject to technical changes!

#### Wiring (1) DC 3-poles, plug

NOp



#### Wiring (2) DC 3-poles, plug



## Euro Plug M8

with LED display YE from 4 sides visible



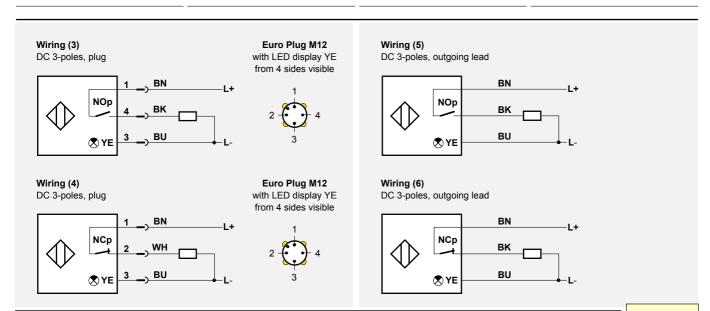
# Euro Plug M8

with LED display YE from 4 sides visible





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 3 mm, non-flush		
1.5 mm, flush	3 mm, non-flush	1.5 mm, 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-8eg45b1.5-1NDc1A, 11.37-26-020 (5)	AD/AHM-8eg45n3-1NDc1A, 11.37-61-020 (5)		
IAD/AHM-8eq60b1.5-2Sd1A, 11.37-25 (4)	IAD/AHM-8eq60n3-2Sd1A, 11.37-60 (4)	IAD/AHM-8eq45b1.5-2NDc1A, 11.37-27-020 (6)	IAD/AHM-8eg45n3-2NDc1A, 11.37-62-020 (6)		
1.27 1.11 cogod 1.0 200 1.1, 1.10 20 (1)	in En a min degeone Zeam, There exists				
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		
sensing face  13  LED from 4 sides visible M12x1	sensing face	sensing face  Standard lead length 2.0 m	sensing face which sensing face with the sen		
10 <u>24</u> 30 V DC	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	≤ 20 mA	≤ 20 mA		
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA		
75 V DC ≤ 1.0 μF	75 V DC ≤ 1.0 μF	75 V DC ≤ 1.0 μF	75 V DC ≤ 1.0 μF		
6.4 mm	≤ 1.0 μF 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		



# **Inductive Proximity Switches, Inductive**

# Series IAD/AHM-12mg

	Design; length	O M12 x 1; 50 mm		O M12 x 1; 6	) mm	
	Material of the sensing face / of the housing	PBT / CuZn nickel-pla	ted	PBT / CuZn nick	el-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 m	ım	
	NO plus-switching NOp	IAD/AHM-12mg50b3.5-1Sd1A, 11	.37-03 (1)	IAD/AHM-12mg60n6-1Sd1A,	11.37-52	
	NC plus-switching NCp	IAD/AHM-12mg50b3.5-2Sd1A, 11	.37-10 (2)	IAD/AHM-12mg60n6-2Sd1A,	11.37-53	(1)
Type designation, - Ref. no	NO and NC plus-switching NOp + NCp	-		,		
(Wiring)	NO plus-, NC minus-switching NOp + NCn					
(vviiiig)	NO minus-switching NOn					
	NC minus-switching NCn					
M	laximum switching frequency / Minimum damping period	20 kHz / 25 μs		20 kHz / 25	μs	
	Wiring (connector or lead); number of wires	connector M12; 3 wir	es	connector M12;	3 wires	
Repetition a	Common Technical Data  Reduction factor //steresis of the switching point s at permanent operating voltage and ambient temperature  Magnetic field-resistant Permissible ripple voltage Short-circuit-proof? ected against polarity reversal? placed drop over a closed output Ambient temperature range  Common Technical Data  1 for all metals 3 10%  ≤ 10%  ≤ 150 mT  ≤ 150 mT  yes, clocking yes  ≥ 2.5 V DC  - 25 + 85 °C	LED from 4 sides visible p o d		sensing face  M12x1  Sensing face  LED from 4 sides visible M12x1	8 4 60 60 60 60 60 60 60 60 60 60 60 60 60	3
	Specific Technical Data					
	Permissible operating voltage range	10 <u>24</u> 30 V DC	<u> </u>	10 <u>24</u> 30 \	/ 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 radio	us 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, □				
	Permissible torque without / with toothed disc	9 Nm / 30 Nm		9 Nm / 30 N	m	
	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.

#### Certifications

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

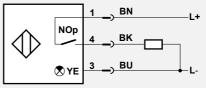


#### Safety Regulations

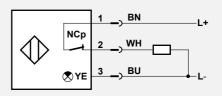
Connection, start-up and maintenance may only be accomplished by specialists or instructed personnel.

Subject to technical changes!

# Wiring (1) DC 3-poles, plug



#### Wiring (2) DC 3-poles, plug



## Euro Plug M12

with LED display YE from 4 sides visible



## Euro Plug M12

with LED display YE from 4 sides visible

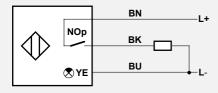




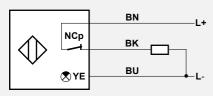
O M12 x 1; 50 mm	O M12 x 1; 60 mm		
PBT / CuZn nickel-plated	PBT / CuZn nickel-plated		
3.5 mm, flush	6 mm, non-flush		
0 2.83 mm	0 4.86 mm		
/AHM-12mg50b3.5-1NDc1A, 11.37-28-020 (3	IAD/AHM-12mg60n6-1NDc1A, 11.37-63-020 (3)		
/AHM-12mg50b3.5-2NDc1A, 11.37-29-020 (4			
, , , , , , , , , , , , , , , , , , , ,	3		
20 kHz / 25 μs	20 kHz / 25 μs		
lead; 3 wires	lead; 3 wires		
	load, o wildo		
sensing face  M12x1  Sensing face  Standard lead length 2.0 m	sensing face  M12x1  M12x1  LED  Standard lead length 2.0 m		
10 <u>24</u> 30 V DC	10 <u>24</u> 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		
• •		<del></del>	
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		
. i g · moight of the lead			

#### Wiring (3)

DC 3-poles, outgoing lead



Wiring (4) DC 3-poles, outgoing lead



#### **Pulse Sensors**

# **Type Double Pulse**

#### **Characteristics**



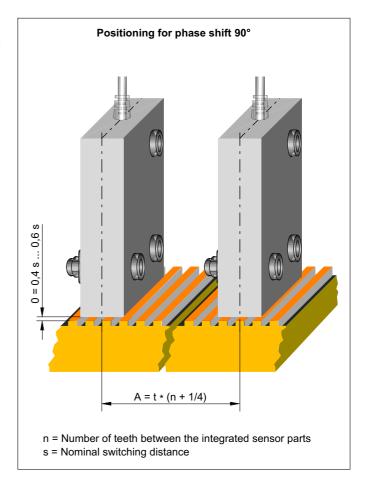
Double pulse sensors of the type **magnetic field** are suitable for the generation of speed-proportional, phase-shifted pulse sequences. Thus the user can detect the rotational direction and/or direction of motion. For these sensors static Hall- or magneto-resistive elements can be used as sensing elements.

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.





## **Pulse Sensors Type Double Pulse**

		Switching distance			Switching distance	
Type	Ref. No.	in mm	Type	Ref. No.	in mm	
		Mounting *)			Mounting*)	
HALL			magneto-resistive			
rectangular 16 x 16 x L			rectangular			
HDD-16ms60b1.5-5050ND1 **)	13.26-47-020	3.0 b	MDD-12aq50b0.4-55NK2 **)	13.21-51-020	1.0 b	
,			MDD-12aq50b0.4-55NK3 **)	13.21-58-020	1.0 b	
rectangular 25 x 12 x L	-					
HDD-12aq50b0.4-55NK1	13.26-58-020	1.0 b				
-					_	
	-					
	-					
	-					
	-					

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

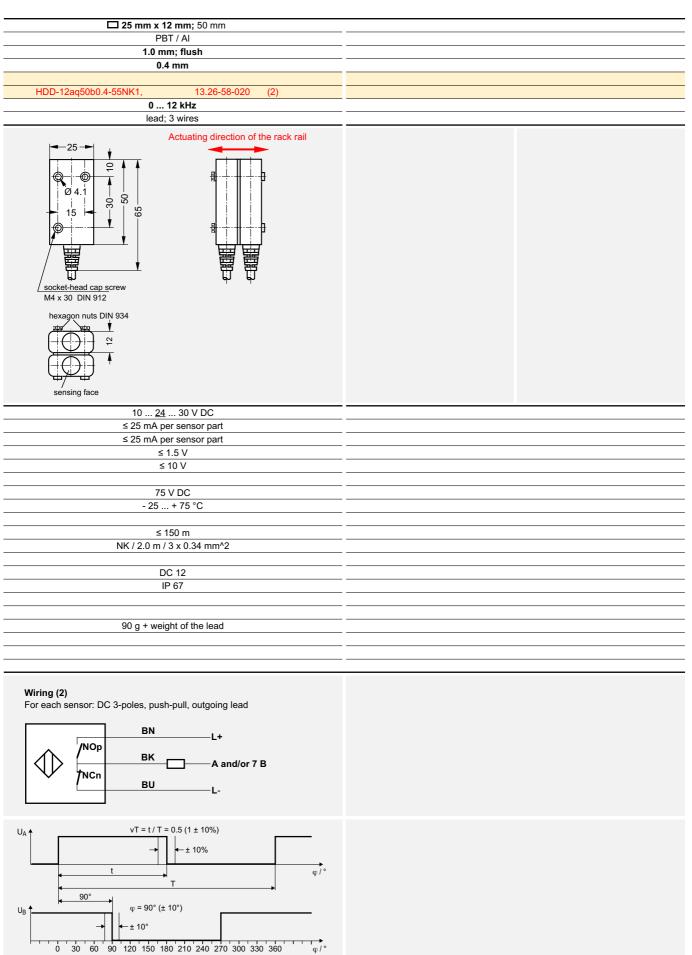
^{**) =} supply on request

# Pulse Sensors, Double Pulse

# Series HDD-16ms, -12aq

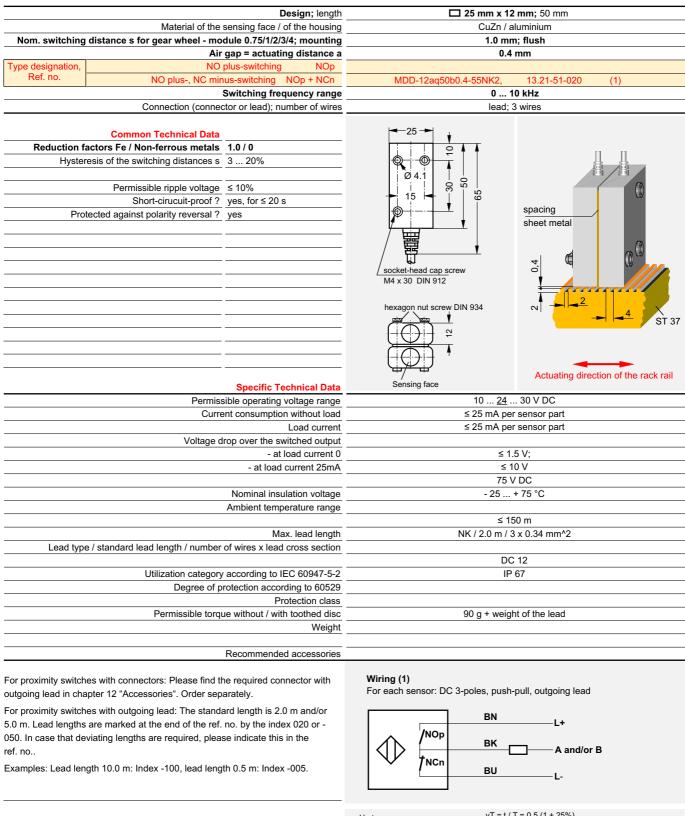
Design; leng			
Material of the sensing face / of the hous  Nom. switching distance s for gear wheel - module 0.75/1/2/3/4; mounti	<u> </u>		
Air gap = actuating distance			
Type designation, NO plus-switching NOp Ref. no.			
Ref. no. NO plus-, NC minus-switching NOp + NC Switching frequency ran			
Wiring (connector or lead); number of wi	<u> </u>		
Common Technical Data  Reduction factors Fe / Non-ferrous metals  Hysteresis of the switching distances s  Permissible ripple voltage Short-cirucuit-proof? yes, for ≤ 20 s  Protected against polarity reversal?	16 16 17 18 19 10 10 10 10 10 10 10 10 10 10		
Specific Technical Date of Permissible operating voltage ran			
Current consumption without lo			
Load curn Voltage drop over the switched out			
- at load currer	t 0 ≤ 5 V between the outputs		
- at load current 25r	≤ 3 V between the outputs		
Nominal insulation volta	age 75 V DC		
Ambient temperature ran	ge - 25 + 75 °C		
Max. lead len	gth ≤ 10 m		
Lead type / standard lead length / number of wires x lead cross sect	<u> </u>		
188 6 4 150 000 17			
Utilization category according to IEC 60947-1  Degree of protection according to 605	_		
Protection cla			
Permissible torque without / with toothed d			
Recommended accessor	ies 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.	Wiring (1) DC 6-poles, RS-422 (26LS31), outgoing lead		
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.	BN L+ WH S1 YE S1 GY S2 PK S2 GN L-		
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!	$VT = t/T = 0.5 (1 \pm 10\%)$		
	0 30 60 90 120 150 180 210 240 270 300 330 360 φ/°		





# Pulse Sensors, Double Pulse

## Series MDD-12aq



#### Certifications

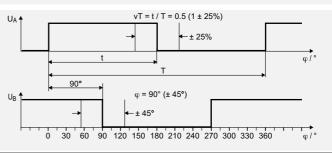
Proximity switches according to standard: DIN EN 60 947-5-2 (VDE 0660 Part 208). Manufactured according to DIN EN ISO 9001



#### 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 40 5010 4 55NI/O 40 04 50 000 (4)	
MDD-12aq50b0.4-55NK3, 13.21-58-020 (1)	
0 10 kHz lead; 3 wires	
ieau, 5 wires	
spacing sheet metal  socket-head cap screw M4 x 30 DIN 912  hexagon nuts DIN 934  Actuating direction of the rack rail sensing face	
10 <u>24</u> 30 V DC	
≤ 25 mA per sensor part	
≤ 25 mA per sensor part	
≤ 1.5 V	
≤ 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	

7	2	ൗ	ൗ
4	. J	·.Z	.ა



#### **Characteristics**



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

	Switching distance	Temperature
Ref. No.	in mm	range
	Mounting*)	in °C
13.26-61-000	1.0 b	- 25 + 120
13.26-80-050	1.0 b	- 40 + 100
	-	
	13.26-61-000	Ref. No. in mm Mounting*)  13.26-61-000 1.0 b

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

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

		Design; length	0.10.8	<b>mm</b> ; 65 mm
	Material of the	sensing face / of the housing		ed / CuZn Teflon-coated
Nom. switching	distance s for gear wheel - mod	<u>_</u>		6/1.7 mm; flush
	•	gap = actuating distance a		7/0.8/0.8 mm
Type designation,		olus-switching NOp		
Ref. no.		nus-switching NOp + NCn	HTD-11ms65b1.5-1Y2,	13.26-61 (1)
1		Switching frequency range	0	. 12 kHz
		tor or lead); number of wires	connecto	r Ø 16; 3 wires
	<u> </u>	,	Ø 10.8 →	2.0 mm
	Common Technical Data		sensing	
	actors Fe / Non-ferrous metals	1.0 / 0	face	81
Hyster	esis of the switching distances s	3 20%		1.5 10 kHz
		- 100/	25.7	9 1.0
	Permissible ripple voltage		φ	if
	Short-cirucuit-proof?	yes, for ≤ 20 s	5 6	0.5
Prot	ected against polarity reversal?	yes	[†] → Ø 12 →	
				0 Module
				0 1 2 3 4
-			<u> </u>	2.0 mm Module 4
				Modul 3
			→ 5.5	1.5 Module 2 Module 1 Module 1
			Oji Citys	Woodle 2
			Olike Olika	<b>2</b> 1.0
				Module 1
			<b>(♦)</b> 8 8	0.5
				Switching frequency
		Specific Technical Data	<b>-14</b> -	0 5 10 15 20 kHz
	Permiss	sible operating voltage range	10 24	4 30 V DC
		ent consumption without load		10 mA
	Odire	Load current		25 mA
-	Voltane d	rop over the switched output		20 Hill C
	voltage u	- at load current 0		1.5 V
		- at load current 25mA	≤ 1.5 V ≤ 10 V	
-		Nominal insulation voltage	75 V DC	
		Ambient temperature range	- 25 + 120 °C	
-			- 25	120 0
		Max. lead length	<	150 m
L ead type	e / standard lead length / number			
-	Utilization category	according to IEC 60947-5-2	Г	OC 12
	<u> </u>	rotection according to 60529		IP 67
	Σοξίου οι ρ	Protection class		
	Permissible tora	ue without / with toothed disc		
	7 cmissione torqu	Weight		50 g
		***Cignt		<del></del>
		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.

#### Certifications

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

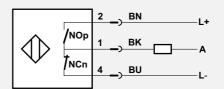


#### Safety Regulations

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

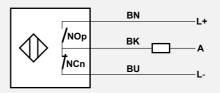




Plug

#### Wiring (2)

DC 3-poles, push-pull, outgoing lead





O M18 x 1; 82 mm PBT / CuZn nickel-plated -/1.0/-/- mm; flush -/0.5/-/- mm HAD-18mg82b1-5GT1 13.26-80-050 0 ... 20 kHz lead; 3 wires **Actuating direction →** M18x1 sensing face 1.5 S 24 ₽ Module 1 82.5 Switching distance s 1.2 8 0.9 0.6 0.3 Switching frequency 0 6 12 15 kHz x) position marking 10 ... <u>24</u> ... 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 BN



# **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 MaschineryOrdinance
9.GPSGV

ryce + 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.



# **Safety Elements**

# Standards, Functions and Possibilities



#### 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

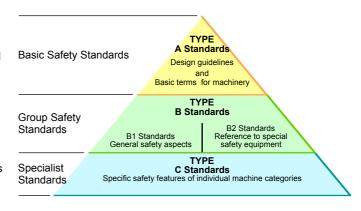
Enclosure/encasing of the hazardous area. Ensuring that accesses or interventions (e.g. for maintenance work or feeding in/removing workpieces) are only possible in the hazard-free state and that the machine or facility is brought safely into a hazard-free state when it is

3. Minimisation of the remaining risk by informing the user

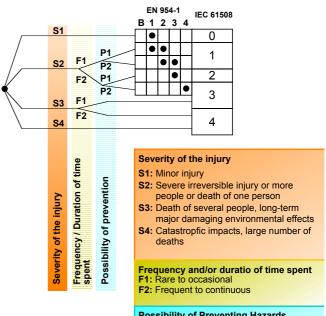
Highlighting of hazards in the operating instructions and instruction of the staff are both measures for reducing the remaining risk.

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:



#### Possibility of Preventing Hazards

P1: Possible under certain conditions

P2: Almost impossible

# 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 noncontacting. 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

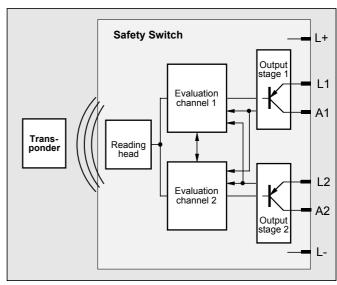
The different versions differ with regard to the Safety Rating as well as in design. Please find the Technical Data on the following pages.

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.

# **Non-Contacting SIDENT Safety Switch**

# **Mounting**



#### **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  $30^{\circ}$ , deviations by  $\pm 10\%$  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).

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.

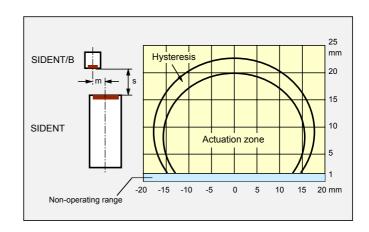
#### **Important Notes**

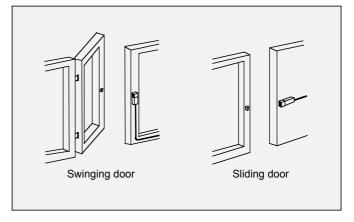
The products described here were developed in order to take over safety-related functions as part of an entire plant or a machine. A complete safety-related system usually contains sensors, evaluation units, signal devices and concepts for a safe disconnection.

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.





#### 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	<b>□ 40mm x 40 mm</b> ; 50 mm	
	Material of the s	sensing face / of the housing	PBT / PBT	
	Nominal switching distance,		20 mm, non-flush	
	Range	e secured switching distance	1 16.2 mm	
Type designation,	NO plu	s-switching 2 x NOp	SIDENT/III-40fq50n20-11Sh1C, 13.14-42 (1)	
Ref. no.				
(Wiring)				
N	Maximum switching frequency /		1 Hz / ≥ 0.5 s	
	Wiring (connec	tor or lead); number of wires	connector M12; 6 wires	
	Common Technical Data			
	y rating according to EN 954-1		40	
	actuating element SIDENT/B	6-digit number code	<u> </u>	
Hy	ysteresis of the switching point s	< 15%		
	Secured switching-off distance	35 mm	\$ <u> </u>	
	Structure	2-channel,	20 20 15.4	
	December 1	mutual monitoring	<u> </u>	
	Permisible ripple voltage		т т	
	Short-circuit-proof?	yes, clocking		
Prot	tected against polarity reversal?	yes	sensing face	
	Function indication	2 x GN for identification		
		1 x RD for fault	Ţ   !	
			30 - 30 -	
-	Certification of the BGFE:		4 + + + + +	
	Design Type Test certificate	07002	<u> </u>	
	GSTest Certificate		M12x1	
	GS Test Certificate	07004	<del></del>	
		Specific Technical Data		
	Permiss	sible operating voltage range	15 <u>24</u> 30 V DC	
	Curre	ent consumption without load	< 90 mA	
	Supply	voltage for the output stages	12 <u>24</u> 30 V DC, clockable	
	Permissible load current	per output with 40 °C / 70 °C	< 400 mA / < 200 mA	
	Voltage drop ov	er 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 recogni		> 150 ms, typically 185 ms	
		oval of the actuating element	> 75 ms, typically 100 ms	
	Time delay after su	pply of the operating voltage	ca. 2 s	
		Ambient temperature range	- 30 + 60 °C	
			-	
		Maximum lead length	300 m	
		P		
	9 :	etion according to IEC 60529	IP 67	
	Protective insulati	ion according to IEC 947	Protection class II	
		Weight	140 g	
		Recommended accessories	see chapter 12	
		Necommended 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

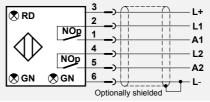
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

Subject to technical changes!

#### Wiring (1) DC 6-poles, plug RD RD NOp L2 NOp Α2 **⊗** GN **⊗** GN Optionally shielded Wiring (2)

Plug M12

# DC 6-poles, plug





Plug M23



□ 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
sensing face *)  M12x1  M12x1	sensing face *)  M23x1  M3  M23x1  M2
*) 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, clocakble
< 400 mA / < 200 mA ≤ 3 V DC	< 400 mA / < 200mA ≤ 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	<b>□ 40mm x 40 mm</b> ; 50 mm	
	Material of the	sensing face / of the housing	PBT / PBT	
	Nominal switching distance		20 mm, non-flush	
	<u> </u>	e secured switching distance	1 16.2 mm	
Type designation,		us-switching 2 x NOp	SIDENT/IV-40fg50n20-11Sh1C, 13.14-49 (1)	
Ref. no.		20 Cittlesmig 2 X 11 Cp	0.02.11.11.10.1400.120.110.110.	
N	Maximum switching frequency	/ Minimum damping period	1 Hz / ≥ 0.5 s	
		ctor or lead); number of wires	connector M12; 6 wires	
	0 (	,	·	
	<b>Common Technical Data</b>			
Safety	y rating according to EN 954-1	4	<del>                                     </del>	
Identification of the	actuating element SIDENT/B	6-digit number code	<del> </del>	
H	ysteresis of the switching point s	< 15%	<b>†</b> .     !	
	Secured switching-off distance	35 mm	\$ <del>\ \</del>	
	Structure	2-channel,		
		mutual monitoring	15.4	
	Permisible ripple voltage	≤ 15%	<b>A</b>	
	Short-circuit-proof?	yes, clocking		
Prot	tected against polarity reversal?	yes	anning for	
	Function indication	2 x GN for identification	sensing face	
		1 x RD for fault	<b>A</b>	
-			0.00 0.00	
			4	
			LED 6- Ø 5.5	
	Certification of the BGFE:		· · · · · · · · · · · · · · · · · · ·	
	Design type Test Certificate	06188	† <u>i</u> — M12x1	
	GS Test Certificate	06189		
		Specific Technical Data		
	Permis	sible operating voltage range	15 <u>24</u> 30 V DC	
		ent consumption without load	< 90 mA	
	Supply	voltage for the output stages	12 <u>24</u> 30 V DC, clockable	
		per output with 40 °C / 70 °C	< 400 mA / 200 mA	
	Voltage drop ov	er force-tripped output stage	≤ 3 V DC	
	5 '	at 100 mA load current	typically 1.75 V DC	
		at 400 mA load current	maximally 3 V DC	
	Operating time after recogni	ition of the actuating element	> 150 ms, typically 185 ms	
	Dropout delay after rem	oval of the actuating element	> 75 ms, typically 100 ms	
	Time delay after su	ipply of the operating voltage	ca. 2 s	
		Ambient temperature range	- 30 + 60 °C	
		Maximum lead length	300 m	
	Degree of prote	ction according to IEC 60529	IP 67	
	Protective insulat	ion 🔲 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 RD NOP 1 NOP 1 NOP 5 A2 Optionally shielded Wiring (2) DC 6-poles, Coninvers RC plug

NOp

**⊗** GN



L1

Α1

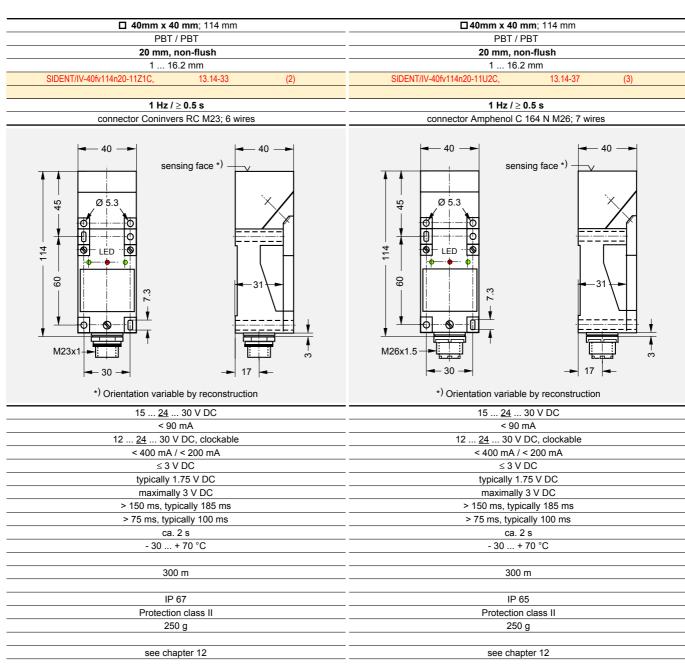
L2

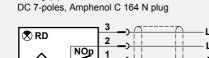
Α2

Plug M12

**⊗** GN







NOp **♥** GN

Wiring (3)



L2

Plug M26

# **Safety Switches**

# **Series SIDENT/IV**

	NACL COLOGIU	Design; length	40mm x 40 mm; 114 mm
		sensing face / of the housing	PBT / PBT
	Nominal switching distance		20 mm, non-flush
<b>T</b>	·	e secured switching distance	1 16.2 mm
Type designation, Ref. no.	NO plu	us-switching 2 x NOp	SIDENT/IV-40fv114n20-11Sh1C, 13.14-45 (1)
	Maniana and taking a financian	/ Minimum danning maniad	Alletone
	Maximum switching frequency	etor or lead); number of wires	1 Hz / ≥ 0.5 s
	wining (connec	tor or lead), number or wires	connector M12; 6 wires
	Common Technical Data		
Safet	ry rating according to EN 954-1	<u></u>	40 —
	e actuating element SIDENT/B		sensing face *)
	lysteresis of the switching point s		<b>† † †        </b>
	Secured switching-off distance		
		2-channel.	φ   Ø 5.3
	Structure	mutual monitoring	
	Permisible ripple voltage		
	Short-circuit-proof?		# 1 P I I I I I I I I I I I I I I I I I I
Pro	tected against polarity reversal?	ves, clocking	<u>+                                     </u>
110		2 x GN for identification	
	T direttori indication	1 x RD for fault	9
-		- XXX IOI IGUIT	
	Certification of the BGFE:		
	Design Type Test Certificate	06188	
-	GS Test Certificate		M12x1 + 1
			→ 30 → 17 →
			*) Orientation variable by reconstruction
		Specific Technical Data	
		sible operating voltage range	15 <u>24</u> 30 V DC
		ent consumption without load	< 90 mA
		voltage for the output stages	12 <u>24</u> 30 V DC, clockable
		per output with 40 °C / 70 °C	< 400 mA / < 200 mA
	Voltage drop ov	rer force-tripped output stage	≤ 3 V DC
		at 100 mA load current	typically 1.75 V DC
	Operating time ofter recess	at 400 mA load current tion of the actuating element	maximally 3 V DC
		oval of the actuating element	> 150 ms, typically 185 ms > 75 ms, typically 100 ms
	· · · · · · · · · · · · · · · · · · ·	pply of the operating voltage	ca. 2 s
	Time delay after so	Ambient temperature range	- 30 + 70 °C
		som tomperature range	
		Maximum lead length	300 m
-			
	Degree of prote	ction according to IEC 60529	
		ion 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







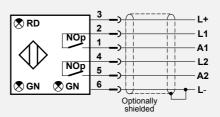
Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotechnics.

#### 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**

	Material of the se	Design; length ensing face / of the mounting	□ 22mm x 22 mm; 2 plastic / plastic	20 mm	O 10.8 mm; 14.5 Crastin / Crasti	
		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
Identificat	Common Technical Data  y rating according to EN 954-1 ition of the actuator SIDENT/B  Ambient temperature range otection according to IEC 60529 ulation  according to IEC 947	6-digit number code - 30 + 70 °C	bore holes Ø 3.5	<b>↑</b> 12 <b>↑</b>	Ø 10.8 -0,1	14.5 -0.2
	Certification of the BGFE: Design Type Test Certificate GS Test Certificate	03088 / 06188 / 07003 03089 / 06189 / 07004	07 -15 -	<b>↓</b> 52 <b>↓</b>		
		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

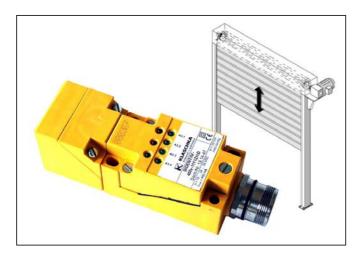
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

Subject to technical changes!




# 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 <u>not</u> 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 <u>one</u> 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 <u>not</u> 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

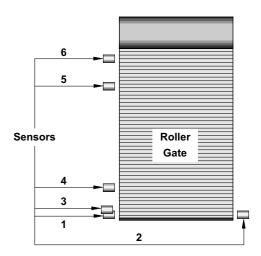
The safety-related position (gate closed) and position 1 of the not safety-related part are identical. For the direct activation of the frequency converters the positions 2 and position 3 are equipped with storage behaviour. When passing position 2 the output A3.2 obtains the status "High" and maintains 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)

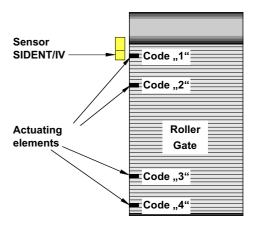
The two safety-related positions (gate closed in front and/or in the back) of the not safety-related part are identical. For the direct activation of the frequency converters the switchover positions 2 and 3 are equipped with storage behaviour. When passing position 2 the output A3.2 obtains the status "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:

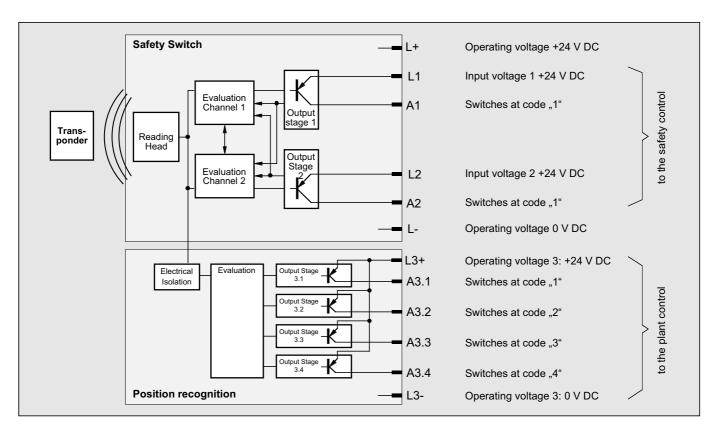
Conventional roller gate monitoring:



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.

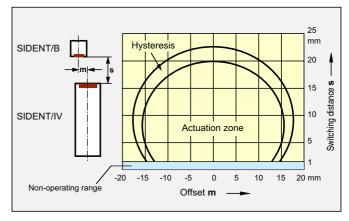
By the monitoring of the outputs a short-circuit between output and supply is recognised and a switching-on is prevented. In the event of short-circuit to earth or low voltage at one output, both outputs are switched-off. This results in short pulses on the non-faulty channel and, at the same time, constitutes 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  $30^\circ$  to each other, deviations by  $\pm$  10% from the standard values occur.



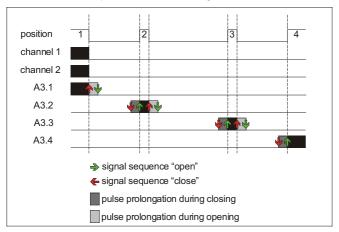
# Non-Contacting SIDENT/IV Roller- / Lift Gates and Windows

# **LED Display**

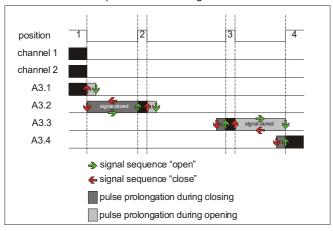
The status of the SIDENT/IV (actuated/not actuated) and possible error situations can be derived from the LED indication. Some possibilities are represented below (version with 4 positions)

Situation	LED CH1	LED CH2	LED error	LED <b>A3.1</b>	LED <b>A3.2</b>	LED <b>A3.3</b>	LED <b>A3.4</b>
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-)							

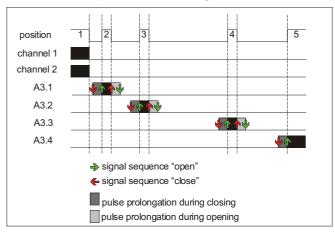
Signal sequence SIDENT/IV, ref. no. 13.14-47 for 4 positions without storage behaviour



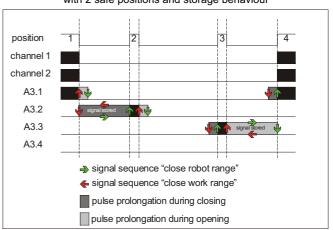
Signal sequence SIDENT/IV, ref. no. 13.14-47-201 for 4 positions with storage behaviour



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



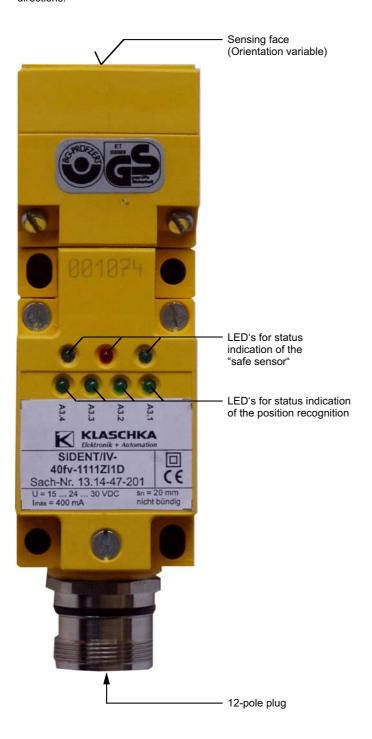
Signal sequence SIDENT/IV, ref. no. 13.14-47-202 with 2 safe positions and storage behaviour







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)	
N	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	

#### Safety rating according to EN 954-1 4 Identification of the actuating element SIDENT/B ... 6-digit number code

**Common Technical Data** 

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? / Prot. against polarity reversal? yes, clocking / yes

Function indication 2 x GN for identification

1 x RD for fault Permissible operating voltage range 15 ... 24 ... 30 V DC

Current consumption without load < 90 mA Voltage supply for output stages 12 ... 24 ... 30 V DC, clock.

Perm. output current per output with 40  $^{\circ}$ C / 70  $^{\circ}$ C < 400 mA / < 200 mA

Voltage drop over the force-tripped output stage  $\leq$  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

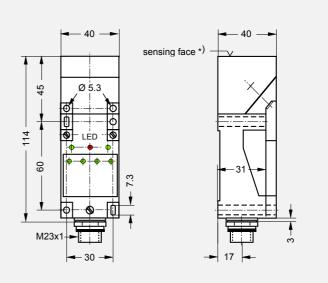
Ambient temperature range - 30 ... + 70 °C

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+
Current consumption without load
Voltage drop over the force-tripped output stage at 100 mA load current
Permissible output current per output with 40 °C / 70°C
Operating time after recognition of the actuating element
Dropout delay after removal of the actuating element
Storage behaviour
Time delay after supply of the operating voltage
Operating speed
Short-circuit-proof? / protected against polarity reversal?
Function indication
Max. lead length
Recommended accessories

15 <u>24</u> 30 V DC	15 <u>24</u> 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
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

#### 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.

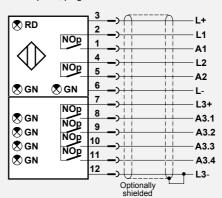
Design Type Test Certification 03088 **GS Test Certificate** 03089

#### 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

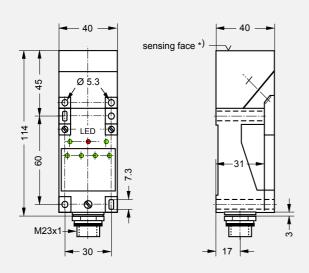


#### Plug M23





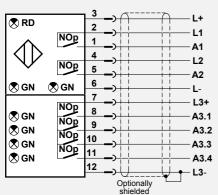
□ 40mm x 40 mm; 114 mm	☐ 40mm x 40 mm; 114 mm
PBT / PBT	PBT / PBT
20 mm, non-flush	20 mm, non-flush
1 16.2 mm	1 16.2 mm
SIDENT/IV-40fv-1111ZI1D, 13.14-47-201 (2)	SIDENT/IV-40fv-1111ZI1D, 13.14-47-202 (2)
1 Hz / ≥ 0.5 s	1 Hz / ≥ 0.5 s
connector M23: 12 wires	connector M23: 12 wires



## $^{\star)}$ Orientation variable by reconstruction

15 <u>24</u> 30 V DC	15 <u>24</u> 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 m	m: 20 mm	O 10.8 mm; 14	1 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-11fs14-401,	13.14-40-xxx
		Mounting instruction	preferably with one-v	way-screws	preferably to be glu	ed in place
	Common Technical Data					
Safety rating according to EN 954-1 4 (includes category 3)			<del>-</del> 22 —	-1	Ø 10.8 _{-0.1}	
Identification of the actuating element SIDENT/B 6-digit number code					→   <del>-</del>	
			1 1			<u> </u>
	Ambient temperature range	- 30 + 70 °C	8 1		Ę	14.5 -0.2
	otection according to IEC 60529		<b>↓</b>   <del>⊅</del>		<u> </u>	<del> </del>
Protective insi	ulation  according to IEC 947	Protection class II	7	_		<b>↑</b>
			bore holes Ø	3.5	Ø 10 _{-0.01}	
					0.01	
			A [::: 2	57		
-				1 1		
			8 +++-++	## <del>[</del>	(FZ)	
Certification of the BGFE:		<b>↓</b>   <del>□</del>	<u>                                     </u>			
Design Type Test Certificate 03088 / 06188 / 07003		15 -				
	GS Test Certificate	03089 / 06189 / 07004	<del>                                     </del>	1		
		Specific Technical Data				
		Weight	13 g		2 g	
Ref no	o. for transponder with safety posi	ition and switching position 1	13.14-30-00	01	13.14-40-0	01
	onder spare part with safety pos		13.14-30 <b>-001</b>		13.14-40- <b>001</b>	
		nent with switching position 2	13.14-30- <b>022</b>		13.14-40-0	
		nent with switching position 3	13.14-30- <b>032</b> 1:		13.14-40-0	
	Ţ Ţ	nent with switching position 4				
Only for SIDEN	Only for SIDENT 13.14-47-100 = Ref. no. for act. element with switch.pos. 1					
				12	13.14-40-0	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.

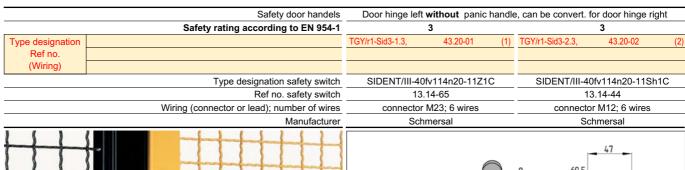
Subject to technical changes!



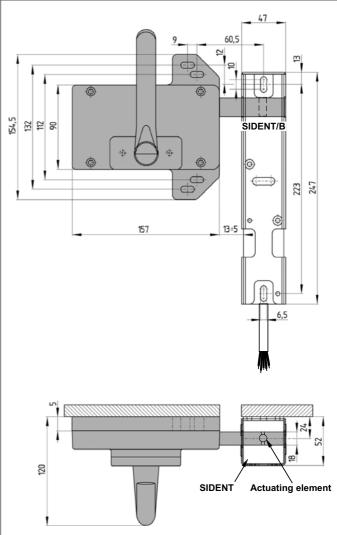
□ 10 mm x 3 mm; 25 mm	□ 5.9 mm x 3 mm; 12.1 mm	
plastic / plastic	plastic / plastic	
non-flush	non-flush	
SIDENT/B-10fs25-4O1, 13.14-64-xxx	SIDENT/B-6fs12-4O1, 13.14-66-xxx	
OIDEIVI7 <u>B 101323 40 1, 10.14 04 XXX</u>	OIDEIVI1B 01312 401, 10.14 00 XXX	 
to be alread in consolubly because of	to be alread to place consolirable.	
to be glued in unsolvably because of	to be glued in place unsolvably	 
manipulation danger	because of manipulation danger	
3	5.9	
1 g	0.8 g	 
13.14-64- <b>001</b>	13.14-66- <b>001</b>	
13.14-64- <b>002</b>	13.14-66- <b>002</b>	
13.14-64- <b>022</b>	13.14-66- <b>022</b>	 
13.14-64-032	13.14-66- <b>032</b>	 
13.14-64- <b>042</b>	13.14-66- <b>042</b>	 
· <del>· · · · · · · · · · · · · · · · · · </del>		 
13.14-64- <b>012</b>	13.14-66- <b>012</b>	
·		 

## **Safety Components**

## **Series Safety Door Handles with SIDENT**







#### 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







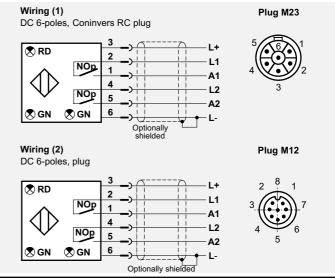
Certified by the German Association for Industrial Safety in Precision Mechanics and Electrotechnics.

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

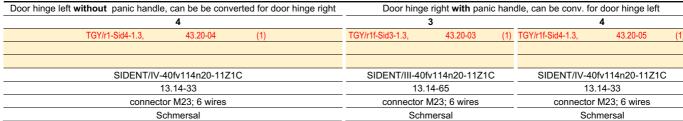
#### Safety Regulations

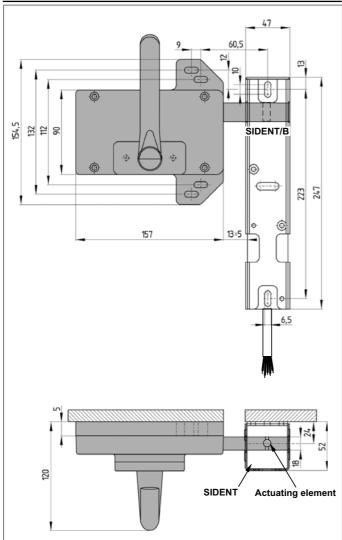
Connection, start-up and maintenance may only be accomplished by specialists or by instructed personnel.

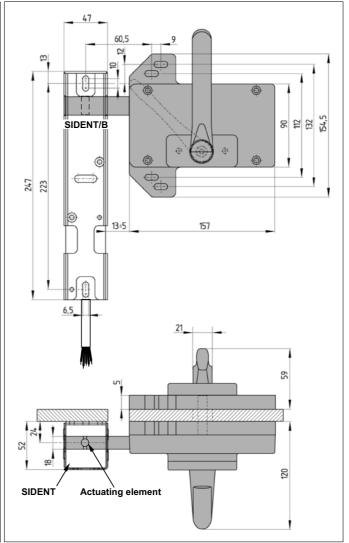
Subject to technical changes!











## **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  $\mu$ s 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  $^{\circ}\text{C}$  and +60  $^{\circ}$  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 metalcoated 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  $\mu m.$  In sorting plants, the metal foil detection sensor safely detects a CD-ROM or a SIM card in a padded envelope.

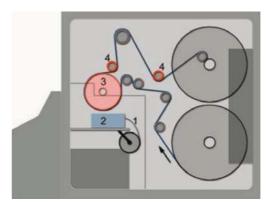
When using the sensor for **quantity counting**, for example in packaging machines, the response time of the sensor and thus the attainable highest counting speed play an important role. Having a response time of less than 50 us, the sensor detects parts with the diameter of that of a 1 Cent coin.

( = 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





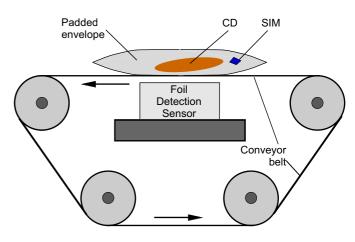
## **Foil Detection Sensor**

Switching distance as a function of the diameter of the object

# 

## **Application Example**

CD and SIM - detection in a padded envelope



#### **Foil Detection Sensors**

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

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

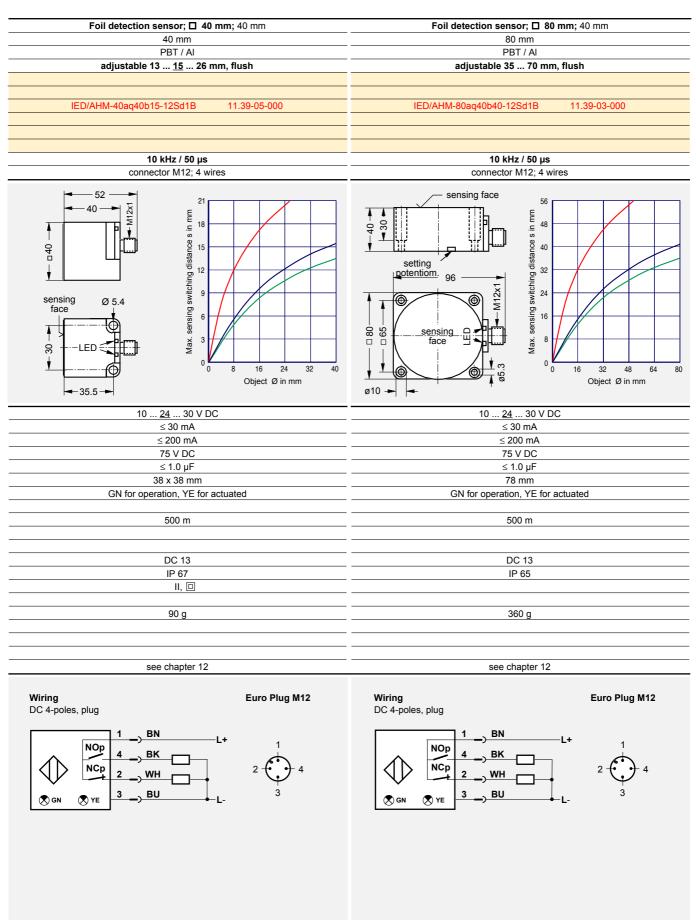
^{**) =} supply on request



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

-	Sonoor principles decigns height	Foil detection conserv O M20 v 4 5 mm
	Sensor principle; design; height; length	Foil detection sensor; O M30 x 1.5 mm 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
	(coo page non)	
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
	Willing (confined on load), Hamber of Wilco	Connector Witz, 1 Wilde
	Common Technical Data  Reduction factor 1 for all metals	c 14
	ysteresis of the switching point s < 15%	→ M30x1.5 ← E 12
	Permissible ripply voltage ≤ 10%	10130X1.5
-	Short-circuit-protection? yes, clocking	sensing face SW 36 LED from 4 sides visible visible
	ected against polarity reversal? yes	
		SW 36 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
	Itage drop over a closed contact ≤ 2.5 V DC  Ambient temperature range + 10 + 60 °C	g g g g g g g g g g g g g g g g g g g
	Ambient temperature range + 10 + 60 C	LED 98 88 6
Note		from 4
For values sn > 40	mm the ambient temperature range is insignificantly	sides vigible
reduced. This depo	ends a.o. on the adjusted switching distance and the	* 2 /
environmental cond	itioins. The adjustment of the switch should be done in a	M12x1 —
mounted condition.	With values sn > 70 mm a reliable function cannot be	T 0 0 2 4 6 8 10
guaranteed.		Object Ø in mm
	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
	2 containg taco	16.5 mm
	Function indication	YE for actuated
	Maximum lead length	500 m
Lead type	e / 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
		300 Map 100 12
	es with connectors: Please find the required connector with hapter 12 "Accessories". Order separately.	Wiring Euro Plug M12 DC 4-poles, plug
For proximity switch	es with connecting lead: The standard length is 2.0 m and/or	DO 7 poles, plug
	are marked at the end of the ref. no. by index -020 or -050. In	1 BN
=	engths are required, please indicate this in the ref. no	NOp L+ 1
_	gth10.0 m: Index -100, lead length 0.5 m: Index -005.	4 BK
	garager and the state of the st	NCp 2 WH 2 4
		3 80
		⊗ YE 3 → BU L-





## **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.

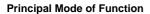
Tubes made of copper, aluminium, high-grade steel, steel or other suitable metals and metal alloys are used for the production of tube-machined parts, e.g. fittings, in tube-bending machines. The tube insertion frequently happens off a coil.

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.



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.

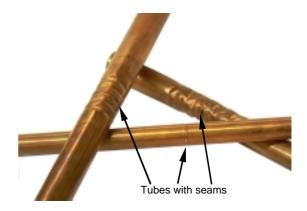
The output signal A can be processed in the PLC-control of the machine.

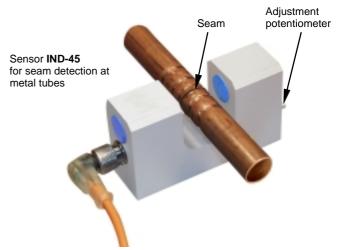
The voltage supply range of the sensor is 12 ... 24 ... 30 V DC.

#### 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.







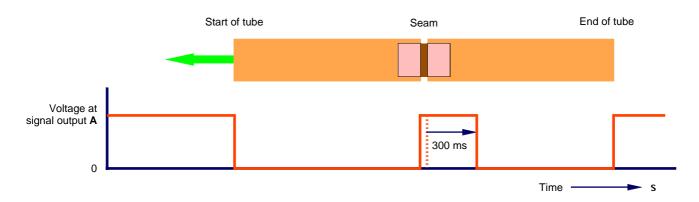
Tube-bending machine





#### IND Sensor for Seam Detection at Metal Tubes

Signal sequence



#### **IND Sensors for Seam Detection at Metal Tubes**

Ref. No.	Series	-1!		
	361163	diameter	Mounting	passage width
		in mm		in mm
15.16-01	Specific sensor	22 32	Mounted on	45
15.16-02	Specific sensor	12 22	Mounted on	33
-			15.16-01 Specific sensor 22 32	15.16-01 Specific sensor 22 32 Mounted on

^{**) =} supply on request

# Specific Sensors Seam Detection IND-45as, -33as

	Sens	or principle; design; length;	Seam de	etection; fork; 95 mm	
Width; height					
Material of the sensing face / of the housing				PBT / Al	
		vidth; applicable for tube-Ø	45 n	nm; 22 32 mm	
		Mounting dimensions (I x w)		85 x 22 mm	
			IND/A-45as95n2232-1Sd1A	15.16-01	(1)
Type designation,					
Ref. no.					
	Shortest temporal	distance between 2 seams		1.5 s	
		Wiring; number of wires	conne	ector M12; 4 wires	
	Common Technical Data		potentio- 42	₹30 ₹	22
	Suitability	for all non-ferromagnetic	LED	+	
Diib		metals			<del>                                    </del>
Permission	Permissible ripple of the operating voltage ≤ 10%				
- Dro	Short-circuit-proof? etected against polarity reversal?			<del>                                      </del>	
	oltage drop over a closed contact		95 -		
	Ambient temperature range		6 4 ++		85
	7 triblent temperature range	110100	<u>*                                   </u>		
		-	<b>↓  </b>		<b> </b>   •   •   •   •   •   •   •   •   •
		<u></u>	<del>*                                     </del>		<del>/                                      </del>
-		-	😜	4 x	.W4 😜
			25	<b>→</b> 15 <b>→</b>	
			<b>◄</b> 54.5 <b>►</b>		
		Specific Technical Data	34.0		
	Permis	sible operating voltage range	10 .	<u>24</u> 30 V DC	
	Curre		≤ 30 mA		
Load current for each output				≤ 200 mA	
			75 V DC		
Permissibly capacity at the output				≤ 1.0 µF	
Ø Sensing face			16.5 mm		
			<b>-</b> /		
		Function indication ?	Y	E for actuated	
-		Maxum lead length		500 m	
L ead type	e / standard lead length / number			300 111	
	e / Standard lead length / Hamber	or cores x lead cross section			
	Utilization category	according to IEC 60947-5-2		DC 13	
		type according to IEC 60529	IP 65		
		Protection class	30		
		Weight	350 g		
		Recommended accessories	s	ee chapter 12	
For proximity switche	es with connectors: Please find the	e required connector with			
lead connection in ch	napter 12 "Accessories". Order se	parately .	Wiring (1)		Euro plug M12
For proximity switche	es with lead connection: The stand	dard lead length is 2.0 m	DC 4-poles, plug		
	nd/or 5.0 m. Please indicate deviating lengths in the ref. no. index.			DN	
kamples: Lead length 10.0 m: Index -100, lead length 0.5 m: Index -005.			-) BNL+	1	
Liampies. Leau ieng	gui 10.0 III. IIIuex - 100, leau lengtr	I U.J III. IIIUEX -UUD.	NOp	DI/	
			( )   A 4 -	• <del>) BK</del>	2 ( ) 4
					$\mathbf{\psi}$
			<b>♦</b> YE 3	BU L-	3
			<b>V</b> • · · · ·		

#### Safety Regulations

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

Subject to technical changes!



	Elektronik + Automation
Seam detection; fork; 95 mm	
30 mm; 54.5 mm	
PBT / Al	
33 mm; 12 22 mm	
85 x 22 mm	
85 X 22 MM	
IND/A-33as95n1222-1Sd1A 15.16-02 (1)	
IND/A-33as95n1222-1Sd1A 15.16-02 (1)	
	_
1.5 s	
connector M12; 4 wires	
potentio-meter 42	
54.5 ─►	
10 <u>24</u> 30 V DC	
≤ 30 mA	
≤ 200 mA	
75 V DC	
≤ 1.0 μF	
16.5 mm	
YE for actuated	
500 m	
	_ <del>.</del>
DC 13	
IP 65	
350 g	<del>_</del> -
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  $\dots$  24  $\dots$  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  $u=0\dots 10\ V$  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



Valve position sensor installed (test)



Tappet

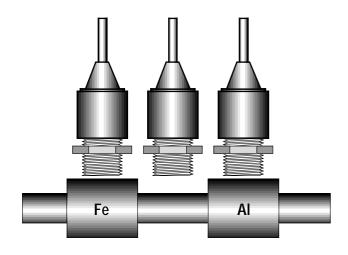


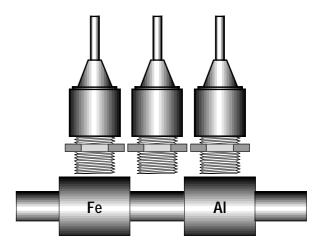


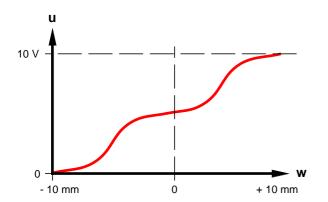


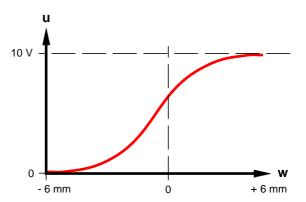
#### IVA Sensor for Position Detection for Valves with Double-Sided Action

#### Principal signal trace









## **IVA Valve Position Sensor**

			Travel	Mounting	Ø
Туре	Ref. No. Series	range		Sensing face	
			in mm		in mm
IVA-18ms41b±6-1Pkc1/1	13.31-01	valve position	± 6 ± 10	flush	16.5

## **Specific Sensors**

## **Valve Position Sensor IVA**

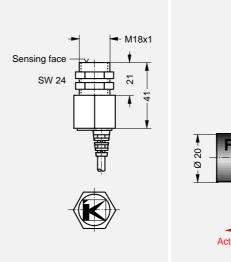


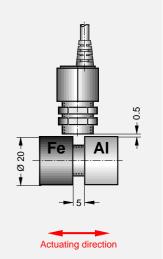
Sensor principle; design; length Valve position recognition; Ø M18 x 1; 41 mm Material of the sensing face / of the housing PBT / CuZn nickel-plated ± 7 mm; flush Path range; mounting Actuating distance a 0.5 mm IVA-18ms41b±6-1PKc1/1 13.31-01 Type designation (Wiring)

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) $\pm$ 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 <u>24</u> 30 V DC
Ø Sensing face	
Function indication	no
Manian un la a d'Incarda	
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	
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 (AI).

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

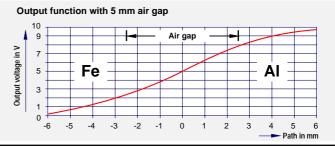
Proximity switches according to standard: DIN EN 60 947-5-2 (VDE 0660 Part 208). Manufactured according to DIN EN ISO 9001



#### Safety Regulations

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

Subject to technical changes!





	-	



#### **Connectors and Leads**

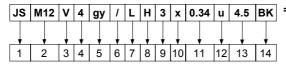
## Type Code and Ref. No.



#### **Code for the Type Designation**

Example of a type code

Consecuctive number



= 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 accessorie	es of connector	7	(J) L Sensor / actor accessories lead
2	Connector design F Panel connector M6 M6 connector M12 M12 connector V30 Connector Ø 30 mm	M5 M5 connector M8 M8 connector M18 M18 connector	8	Lead Type, material of lead jacket  N PVC H PVC radiation cross-linked P PUR Q PUR welding spark-proof T Teflon / special lead
	Y, Z Special connectors		9	Number of lead lines Example: 3 3-lines
3	Connector versions			- p
	<ul><li>E Built-in plug, straight</li><li>F Built-in plug, angled</li><li>G Built-in socket, straight</li></ul>	Snap-in locking (r):  W Male plug straight, r  X Male plug angled, r	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.
	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	Y Female plug straight, r	12	Shield u unshielded lead k coaxial lead s single shield t double shield v pairwise stranded without shield w pairwise stranded with shield x pairwise stranded with double shield
4	Pole number of connector Example: 4 4-poles		13	Diameter of lead jacket in mm Example: 3.5 3.5 mm
-			14	Colour of lead jacket
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		BK black GN green PK pink BN brown BU blue TQ turquoise RD red VT violet TR transpare 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 following 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

PK pink TQ turquoise TR transparent

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** 

## **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
		40	
socket M8 straight		010 M8x1	_ 16,5 8.3
socket M8 angled		*a O-Ring	
socket M8 angled with indicator			•
socket M12 straight	***	_08_	ШШ
socket M12 straight with indicator	•	3-polig 3 poles  1 = braun / brown 3 = blau / blue 4 = schwarz / black	3-polig 3 poles  1 = braun / brown 3 = blau / blue 4 = schwarz / black
		4-polig 4 poles	4-polig 4 poles
socket M12		4 - 2 1 - braun / brown	4 2 1 - brown / brown
angled with indicator		2 = well / white 3 = blau / blue 4 = schwarz / black	2 = weiß / white 3 = blau / blue 4 = schwarz / black
	*) 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
<del></del>	Material of lead jacket; lead colour	PVC; OG	PVC; OG
L	_ead 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
Degree of pro	otection 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
Ref.	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; ≤ 5 mΩ	13.97-06-020; -050; -100; -xxx 60 V; 4 A; ≤ 5 mΩ
	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; ≤ 5 mΩ PUR; BK	13.97-06-020; -050; -100; -xxx 1 60 V; 4 A; ≤ 5 mΩ PUR; BK
	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2	13.97-06-020; -050; -100; -xxx 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2
L	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; ≤ 5 mΩ PUR; BK	13.97-06-020; -050; -100; -xxx 60 V; 4 A; ≤ 5 mΩ PUR; BK
L	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  ead diameter; number of single lines x cross section  Number of LED's and colour	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2	13.97-06-020; -050; -100; -xxx 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm ²
L	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  stection acc. to IEC 60529 (in locked position); shield	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm*2 0 IP 67; unshielded	13.97-06-020; -050; -100; -xxx 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm ² 0 IP 67; unshielded
L	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  stection acc. to IEC 60529 (in locked position); shield	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm*2 0 IP 67; unshielded	13.97-06-020; -050; -100; -xxx 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm ² 0 IP 67; unshielded
L Degree of pro	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Direction acc. to IEC 60529 (in locked position); shield  Ambient temperature range	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm*2 0 IP 67; unshielded - 25 + 80 °C	13.97-06-020; -050; -100; -xxx ( 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2 0 IP 67; unshielded - 25 + 80 °C  JSM8V4 / LN4x0.25u5.00G
L Degree of pro	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Direction acc. to IEC 60529 (in locked position); shield  Ambient temperature range  Type designation *)  no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; $\leq$ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2 0 IP 67; unshielded - 25 + 80 °C  JSM8U4 / LN4x0.25u5.0OG 13.97-03-020; -050; -100; -xxx *) 30 V; 4 A; $\leq$ 5 mΩ	13.97-06-020; -050; -100; -xxx $^{\circ}$ 60 V; 4 A; ≤ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C  JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ
Degree of pro	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Direction acc. to IEC 60529 (in locked position); shield  Ambient temperature range  Type designation *)  no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; $\leq$ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2 0 IP 67; unshielded - 25 + 80 °C  JSM8U4 / LN4x0.25u5.0OG 13.97-03-020; -050; -100; -xxx *) 30 V; 4 A; $\leq$ 5 mΩ PVC; OG	13.97-06-020; -050; -100; -xxx $^{\circ}$ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C  JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ PVC; OG
Degree of pro	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Direction acc. to IEC 60529 (in locked position); shield  Ambient temperature range  Type designation *)  no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; $\leq$ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2 0 IP 67; unshielded - 25 + 80 °C  JSM8U4 / LN4x0.25u5.0OG 13.97-03-020; -050; -100; -xxx *) 30 V; 4 A; $\leq$ 5 mΩ PVC; OG 5,0 mm; 4 x 0.25 mm^2	13.97-06-020; -050; -100; -xxx $^{\circ}$ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C  JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ PVC; OG 5.0 mm; 4 x 0.25 mm^2
Degree of pro	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Direction acc. to IEC 60529 (in locked position); shield  Ambient temperature range  Type designation *)  No for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; $\leq$ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2 0 IP 67; unshielded - 25 + 80 °C  JSM8U4 / LN4x0.25u5.0OG 13.97-03-020; -050; -100; -xxx *) 30 V; 4 A; $\leq$ 5 mΩ PVC; OG 5,0 mm; 4 x 0.25 mm^2	13.97-06-020; -050; -100; -xxx \ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx \ 30 V; 4 A; ≤ 5 mΩ PVC; OG 5.0 mm; 4 x 0.25 mm^22 0
Degree of pro	Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; $\leq$ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2 0 IP 67; unshielded - 25 + 80 °C  JSM8U4 / LN4x0.25u5.0OG 13.97-03-020; -050; -100; -xxx *) 30 V; 4 A; $\leq$ 5 mΩ PVC; OG 5,0 mm; 4 x 0.25 mm^2 0 IP 67; unshielded	13.97-06-020; -050; -100; -xxx $^{\circ}$ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ PVC; OG 5.0 mm; 4 x 0.25 mm^22 0 IP 67; unshielded
Degree of pro	no. for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Direction acc. to IEC 60529 (in locked position); shield  Ambient temperature range  Type designation *)  No for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; $\leq$ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2 0 IP 67; unshielded - 25 + 80 °C  JSM8U4 / LN4x0.25u5.0OG 13.97-03-020; -050; -100; -xxx *) 30 V; 4 A; $\leq$ 5 mΩ PVC; OG 5,0 mm; 4 x 0.25 mm^2	13.97-06-020; -050; -100; -xxx  60 V; 4 A; ≤ 5 mΩ  PUR; BK  4.3 mm; 3 x 0.34 mm^22  0  IP 67; unshielded  - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG  13.97-07-020; -050; -100; -xxx  30 V; 4 A; ≤ 5 mΩ  PVC; OG  5.0 mm; 4 x 0.25 mm^22  0
Degree of pro	Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield	13.97-02-020; -050; -100; -xxx *) 60 V; 4 A; $\leq$ 5 mΩ PUR; BK 4.3 mm; 3 x 0.34 mm^2 0 IP 67; unshielded - 25 + 80 °C  JSM8U4 / LN4x0.25u5.0OG 13.97-03-020; -050; -100; -xxx *) 30 V; 4 A; $\leq$ 5 mΩ PVC; OG 5,0 mm; 4 x 0.25 mm^2 0 IP 67; unshielded	13.97-06-020; -050; -100; -xxx  60 V; 4 A; ≤ 5 mΩ  PUR; BK  4.3 mm; 3 x 0.34 mm^22  0  IP 67; unshielded  - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG  13.97-07-020; -050; -100; -xxx  30 V; 4 A; ≤ 5 mΩ  PVC; OG  5.0 mm; 4 x 0.25 mm^22  0  IP 67; unshielded
Degree of pro	Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Detection acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Detection acc. to IEC 60529 (in locked position); shield Ambient temperature range	13.97-02-020; -050; -100; -xxx *)  60 V; 4 A; $\leq$ 5 mΩ  PUR; BK  4.3 mm; 3 x 0.34 mm^2  0  IP 67; unshielded  - 25 + 80 °C   JSM8U4 / LN4x0.25u5.0OG  13.97-03-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ  PVC; OG  5,0 mm; 4 x 0.25 mm^2  0  IP 67; unshielded  - 25 + 80 °C	13.97-06-020; -050; -100; -xxx $^{\circ}$ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ PVC; OG 5.0 mm; 4 x 0.25 mm^22 0 IP 67; unshielded - 25 + 80 °C
Degree of pro	Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Direction acc. to IEC 60529 (in locked position); shield  Ambient temperature range  Type designation *)  Nominal voltage at 40 °C; contact resistance  Material of lead jacket; lead colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Lead diameter; number of single lines x cross section  Number of LED's and colour  Direction acc. to IEC 60529 (in locked position); shield  Ambient temperature range  Type designation *)  Type designation *)  Type designation *)  No for lead length 2 m; 5 m; 10 m; on request *)  Nominal voltage at 40 °C; contact resistance	13.97-02-020; -050; -100; -xxx *)  60 V; 4 A; $\leq$ 5 mΩ  PUR; BK  4.3 mm; 3 x 0.34 mm^22  0  IP 67; unshielded  - 25 + 80 °C   JSM8U4 / LN4x0.25u5.0OG  13.97-03-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ  PVC; OG  5,0 mm; 4 x 0.25 mm^22  0  IP 67; unshielded  - 25 + 80 °C  JSM8U4 / LP4x0.34u4.7BK  13.97-04-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ	13.97-06-020; -050; -100; -xxx \\ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx \\ 30 V; 4 A; ≤ 5 mΩ PVC; OG 5.0 mm; 4 x 0.25 mm^22 0 IP 67; unshielded - 25 + 80 °C  JSM8V4 / LP4x0.34u4.7BK 13.97-08-020; -050; -100; -xxx \\ 30 V; 4 A; ≤ 5 mΩ
Degree of pro	Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Type designation *) Type designation *) No for lead length 2 m; 5 m; 10 m; on request *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour	13.97-02-020; -050; -100; -xxx *)  60 V; 4 A; $\leq$ 5 mΩ  PUR; BK  4.3 mm; 3 x 0.34 mm^22  0  IP 67; unshielded  - 25 + 80 °C   JSM8U4 / LN4x0.25u5.0OG  13.97-03-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ  PVC; OG  5,0 mm; 4 x 0.25 mm^22  0  IP 67; unshielded  - 25 + 80 °C  JSM8U4 / LP4x0.34u4.7BK  13.97-04-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ  PUR; BK	13.97-06-020; -050; -100; -xxx \\ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx \\ 30 V; 4 A; ≤ 5 mΩ PVC; OG 5.0 mm; 4 x 0.25 mm^22 0 IP 67; unshielded - 25 + 80 °C  JSM8V4 / LP4x0.34u4.7BK 13.97-08-020; -050; -100; -xxx \\ 30 V; 4 A; ≤ 5 mΩ PUR; BK
Degree of pro	Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Type designation *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Material of lead jacket; lead colour Lead diameter; number of single lines x cross section	13.97-02-020; -050; -100; -xxx *)  60 V; 4 A; $\leq$ 5 mΩ  PUR; BK  4.3 mm; 3 x 0.34 mm^22  0  IP 67; unshielded  - 25 + 80 °C   JSM8U4 / LN4x0.25u5.0OG  13.97-03-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ  PVC; OG  5,0 mm; 4 x 0.25 mm^22  0  IP 67; unshielded  - 25 + 80 °C   JSM8U4 / LP4x0.34u4.7BK  13.97-04-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ  PUR; BK  4.7 mm; 4 x 0.34 mm^2	13.97-06-020; -050; -100; -xxx $^{\circ}$ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ PVC; OG 5.0 mm; 4 x 0.25 mm^22 0 IP 67; unshielded - 25 + 80 °C  JSM8V4 / LP4x0.34u4.7BK 13.97-08-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ PUR; BK 4.7 mm; 4 x 0.34 mm^2
Degree of pro	Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour Lead diameter; number of single lines x cross section Number of LED's and colour Lead diameter; number of single lines x cross section Number of LED's and colour Direction acc. to IEC 60529 (in locked position); shield Ambient temperature range  Type designation *) Type designation *) Type designation *) No for lead length 2 m; 5 m; 10 m; on request *) Nominal voltage at 40 °C; contact resistance Material of lead jacket; lead colour	13.97-02-020; -050; -100; -xxx *)  60 V; 4 A; $\leq$ 5 mΩ  PUR; BK  4.3 mm; 3 x 0.34 mm^22  0  IP 67; unshielded  - 25 + 80 °C   JSM8U4 / LN4x0.25u5.0OG  13.97-03-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ  PVC; OG  5,0 mm; 4 x 0.25 mm^22  0  IP 67; unshielded  - 25 + 80 °C  JSM8U4 / LP4x0.34u4.7BK  13.97-04-020; -050; -100; -xxx *)  30 V; 4 A; $\leq$ 5 mΩ  PUR; BK	13.97-06-020; -050; -100; -xxx $^{\circ}$ 60 V; 4 A; ≤ 5 mΩ PUR; BK  4.3 mm; 3 x 0.34 mm^22 0 IP 67; unshielded - 25 + 80 °C   JSM8V4 / LN4x0.25u5.0OG 13.97-07-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ PVC; OG 5.0 mm; 4 x 0.25 mm^22 0 IP 67; unshielded - 25 + 80 °C  JSM8V4 / LP4x0.34u4.7BK 13.97-08-020; -050; -100; -xxx $^{\circ}$ 30 V; 4 A; ≤ 5 mΩ PUR; BK



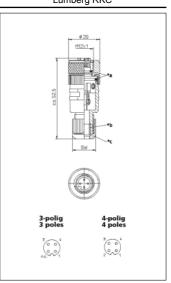
lead socket M8 with indicator	lead socket M12	lead socket M12 with indicator	lead socket M12 with indicator
angled; 3-poles	straight; 3- and 4-poles	straight; 3-poles	angled; 3- and 4-poles
TPU; self-extinguishing	TPU; self-extinguishing	TPU; self-extinguishing	TPU; self-extinguishing
CuZn nickel-plated	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
76.5	MIZst	Mt2xt .	26.5
*a O-Ring O-ring B Betriebsanzeige grün operation indicator green F Funktionsanzeige gelb function indicator yellow	100 to 10	D D D D D D D D D D D D D D D D D D D	14.5 14.5 16.5 16.5 16.5
	3-polig 3 poles	3-polig 3 poles	•a O-Ring
3-polig 3 poles  1 = braun / brown 3 = blau / blue 4 = schwarz / black	1 = braun / brown 2 = n.c. 3 = blau / blue 4 = schwarz / black	1 = braun / brown 2 = n.c. 3 = blau / blue 4 = schwarz / black	O-ring O-
A pnp-Schließer / pnp Normally open = gelb-grün / yellow-green	4-polig 4 poles	A pnp-Schließer / pnp Normally open = gelb-grün / yellow-green	A pnp-Schließer / pnp Normally open = gelb grün / yellow-green gelb-grün / yellow-green gelb-grün / Antivalent) /
1 • prayn / brown	1 = braun / brown	1) 0+ braun / brown	1)
4 schwarz / black	2 = weiß / white 3 = blau / blue 4 = schwarz / black	4) schwarz / black	3) 0-blas/blue 0 pg ge ge ge ge
3) blau / blue	4 = SCHWarz / Diack	s y · · · · · · · · · · · · · · · · · ·	Sonderbeichaltungen auf Anfrage / Special circuits on request
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 ID 67: upphialded	1 LED GN + 1 LED YE	1 LED GN + 1 LED YE
IP 67; unshielded - 25 + 80 °C	- 25 + 80 °C	IP 67; unshielded - 25 + 80 °C	- IP 67; unshielded - 25 + 80 °C
- 23 + 00 - 0			
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 PVC; OG		10 30 V DC; 4 A; ≤ 5 mΩ 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
	240 V; 4 A; ≤ 5 mΩ PUR welding spark-proof; OG		PUR welding spark-proof; OG
	240 V; 4 A; ≤ 5 mΩ  PUR welding spark-proof; OG  4.7 mm; 4 x 0.34 mm^2		PUR welding spark-proof; OG 4.7 mm; 4 x 0.34 mm^2
	240 V; 4 A; ≤ 5 mΩ  PUR welding spark-proof; OG  4.7 mm; 4 x 0.34 mm^2  0		PUR welding spark-proof; OG 4.7 mm; 4 x 0.34 mm^2 1 LED GN + 2 LED YE
	240 V; 4 A; ≤ 5 mΩ  PUR welding spark-proof; OG  4.7 mm; 4 x 0.34 mm^2		PUR welding spark-proof; OG 4.7 mm; 4 x 0.34 mm^2

## **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

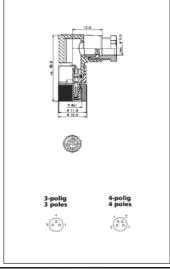


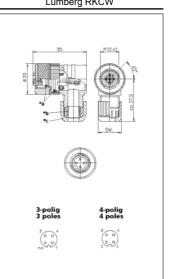




socket M8; screwable	socket M12; screwable
angled	angled
3-poles: JSM8V3; 13.98-03	3-poles: JSM12V3; 13.98-07
4-poles: JSM8V4; 13.98-04	4-poles: JSM12V4; 13.98-08
PBT / PBT / PA	PA / PA / PA
CuZn	CuZn nickel-plated
CuSn gold-plated	CuZn gold-plated
60 V (4-pol. 30 V); 4 A; ≤ 5 mΩ	240 V; 4 A; ≤ 5 mΩ
0	0
3.5 5.0 mm	3.0 6.5 mm
3 / 4 x 0.34 mm^2	3 / 4 x 0.34 mm^2
IP 67	IP 67
- 40 + 85 °C	- 25 + 90 °C
Lumberg RKMCW	Lumberg RKCW
	angled 3-poles: JSM8V3; 13.98-03 4-poles: JSM8V4; 13.98-04 PBT / PBT / PA CuZn CuSn gold-plated 60 V (4-pol. 30 V); 4 A; ≤ 5 mΩ 0 3.5 5.0 mm $3$ / 4 x 0.34 mm^2 IP 67 $-$ 40 + 85 °C

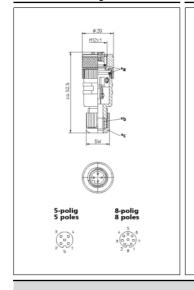


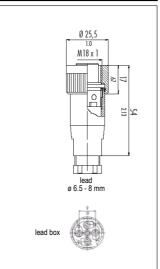


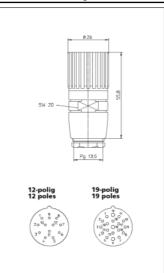


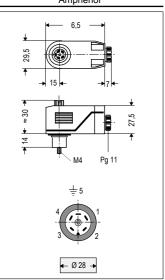


lead socket M12; screwable	lead socket M18; srewable	lead socket M23; solderable	socket V28; screwable
straight	straight	straight	angled
5-poles: JSM12U5; 13.98-09	4-poles: JSM18U4; 13.98-13	12-poles: JSM23U12; 13.98-15	5-poles: JSV28V5; 13.98-19
8-poles: JSM12U8; 13.98-10		19-poles: JSM23U19; 13.98-16	
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

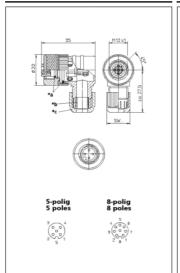


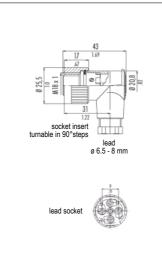


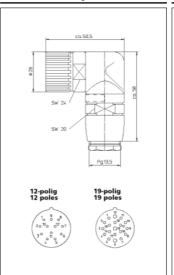




socket M12; screwable	socket M18; screwable	socket M23; solderable	
angled	angled	angled	
5-poles: JSM12V5; 13.98-11	4-poles: JSM18V4; 13.98-14	12-poles: JSM23V12; 13.98-17	
8-poles: JSM12V8; 13.98-12		19-poles: JSM23V19; 13.98-18	
PA -	PBT / PA / PA	CuZn nickel-plated / PBT / GF	
CuZn nickel-plated	CuZn	CuZn nickel-plated	
CuSn gold-plated	CuZn	CuZn gold-plated	
$\frac{1}{60 \text{ V (8-pol. } 30 \text{ V); 4 A (8-pol. } 2 \text{ A); } ≤ 5 \text{ m}\Omega}$	250 V; 5 A; ≤ 8 mΩ	240 V (19-pol. 120 V); 7.5 A; $\leq$ 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	



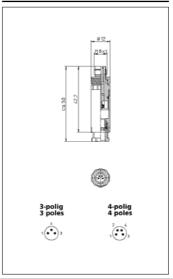


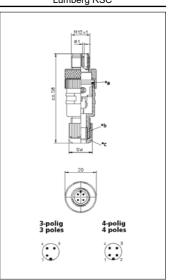


## Field Attachable Plugs and Adaptors

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

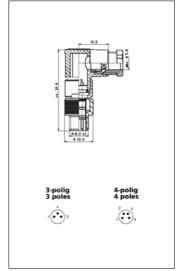


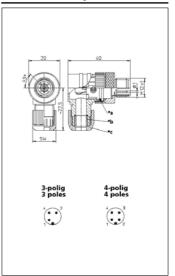




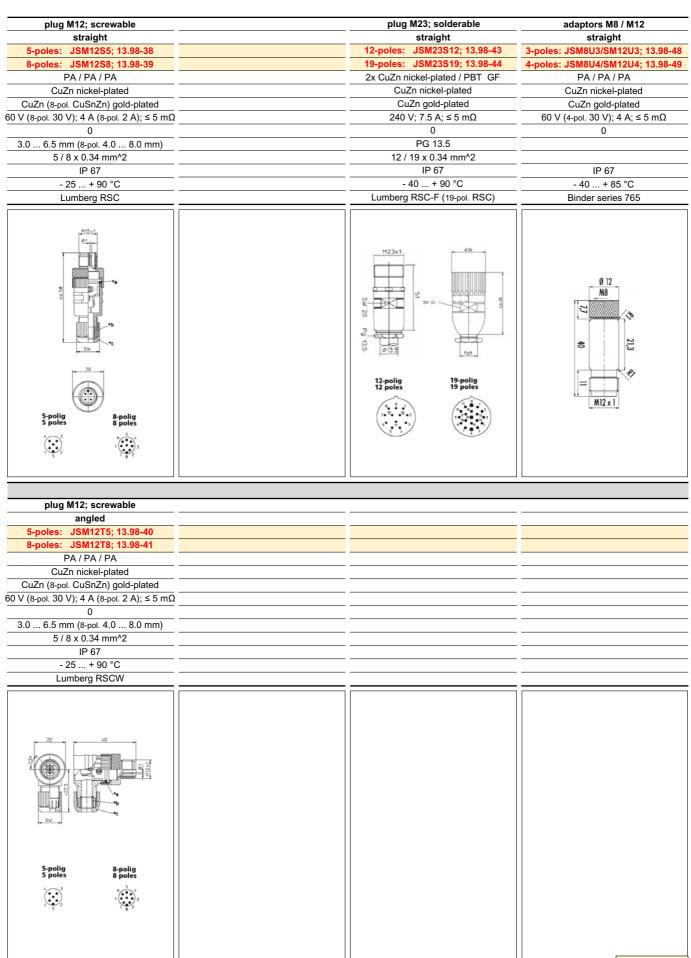
Connector; type of lead connection	plug M8; screwable	plug M12; screwable
Version	angled	angled
Pole number: Type designation; ref. no.	3-poles: JSM8T3; 13.98-32	3-poles: JSM12T3; 13.98-36
Pole number: Type designation; ref. no.	4-poles: JSM8T4; 13.98-33	4-poles: JSM12T4; 13.98-37
Material: Housing / 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











## **PVC - Leads Unshielded**



			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
13			Shield	unshielded	unshielded
			Line colours	BN, BK, BU	BN, BK, BU
	A				
			Type designation; ref. no.	JLN4x0.34u5.2OG; 13.98-72-xxxN	JLH4x0.34u5.2OG; 13.98-77-xxxH
			Jacket colour	OG	OG
	N		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
111			Line colours	BN, BK, WH, BU	BN, BK, WH, BU
13			<b>—</b>	II NEW 24-5 700 40 50 70	III III - 0 24 5 700 42 22 70
1	-		Type designation; ref. no.	JLN5x0.34u5.7OG; 13.98-73-xxxN	JLH5x0.34u5.7OG; 13.98-78-xxxH
100			Jacket colour	OG 5.7 mm	OG 5.7 mm
			Jacket diameter  Number of lines x cross section	5.7 mm 5 x 0.34 mm^2	5.7 mm 5 x 0.34 mm^2
	7				
		30	Shield Line colour	unshielded BN, WH, BU, BK, GY	unshielded BN, WH, BU, BK, GY
			Elile Coloui	BN, WH, BO, BK, GT	BN, WH, BO, BK, G1
(The			Type designation; ref. no.	JLN8x0.34u9.5BK; 13.98-74-xxxN	JLH8x0.34u9.5BK; 13.98-79-xxxH
1			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
		200	Type designation, set us		
			Type designation; ref. no.  Jacket colour		
			Jacket diameter		
			Number of lines x cross section		
			Shield		
			Line colours		
			Type designation; ref. no.		
ead- and	Line C	olours	Jacket colour		
ccording to	DIN IEC 60	0757	Jacket diameter		
		BIN	Number of lines x cross section		
	Abbrev.	DIN BK	Shield Line colours		
lack rown	sw br	BN	Line colouis		
ed	rt	RD	. ———		
range	or	OG	Type designation; ref. no.		
ellow	ge	YE	Jacket colour		
reen	gn	GN	Jacket diameter		
lue	bl	BU	Number of lines x cross section		
iolet	vi	VT	Shield		
rey	gr	GY	Line colours		
hite	ws	WH			
ink	rs	PK			
ırquoise	tk	TQ	Type designation; ref. no.		
ransparent	tp	TR	Jacket colour		
			Jacket diameter		
			Number of lines x cross section		
			Shield		
			Line colours		

## **PUR - Leads Unshielded**

transparent



			Material of the	PUR	PUR
			lead jacket	halogen-free	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	ВК
			Jacket diameter	3.5 mm	3.5 mm
Ambie	ent temperat	ure range	Number of lines x cross section	3 x 0.14 mm^2	3 x 0.14 mm^2
	- 40 + 85	°C	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	ВК	BK
			Jacket diameter	4.9 mm	5.0 mm
100			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
	1	a .	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
		100	Number of lines x cross section	4 x 0.34 mm^2	4 x 0.34 mm^2
			Shield	unshielded	unshielded
A.			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
	A		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
		1	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	ВК	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
		3	Type designation; ref. no.		
			Jacket colour		
			Jacket diameter		
			Number of lines x cross section		
100			Shield Line colours		_
			Line colours		_
	1				
			Type designation; ref. no.		
			Jacket colour		
			Jacket diameter		
			Number of lines x cross section		
			Shield Line colours		
l ead- an	d Line Co	olours	Line colours		-
	DIN IEC 60				
Colour	Abbrev.	DIN	Type designation; ref. no.		
black	SW	BK	Jacket colour		_
brown	br	BN	Jacket diameter		_
red	rt	RD	Number of lines x lead cross section Shield		_
orange	or	OG	Snield Line colours		-
yellow	ge	YE	Line colours		
green	gn	GN			-
olue	bl	BU	Type designation; ref. no.		
/iolet	vi	VT	Jacket colour		
grey	gr	GY	Jacket colour		
white	ws	WH	Number of lines x cross section		-
pink	rs	PK	Shield		
turquoise	tk	TQ	Line colours		_
transparent	tn	TR			_

## **Cordsets with M8- or M12-Connectors**

	Socket version; plug version  Connection type (screws or snap-ins)	M8 straight; M8 straight	M8 angled; M8 straight
	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 4 A
	Nominal current at 40 °C  LED indicator in the angled plug	4 A	1 x GN, 1 x YE
	Lead jacket / colours	PUR / BK	PUR / BK
Degr	ee of protection according to IEC 60529 (in locked position)	IP 67	IP 67
	Ambient temperature range	- 25 + 80 °C	- 25 + 80 °C
Pole	Manufacture no. socket / no. of lines x cross section / pole no. plug	Lumberg RSMV-RKMV 3 / 3 x 0.34 mm^2 / 3	Lumberg RSMV-RKMWV/LED  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
Pol	e no. socket/ no. of lines x cross section / pole no. plug		
	Type designation Ref. no.		
	Ref. IIU.		
Pole	e no. socket / no. of lines x cross section / pole no. plug		
	Type designation		
	Ref. no.		
Pole	e no. socket / no. of lines x cross section / pole no. plug		
	Type designation		
	Ref. no.		
Pole	e 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	3-polig 3 poles  1 = braun / brown 3 = blau / blue 4 = schwarz / black  1 = braun / brown 3 = blau / blue 4 = schwarz / black		
Socket M8 straight; Plug M12 traight Socket M8 angled; Plug M12straight	3-polig 3 poles  1 = braun / brown 3 = blau / blue 4 = schwarz / black  1		
	3-polig 3 poles  4-polig 4 poles  4-polig 4 poles  1 = braun / brown 2 = n.c. 3 = blau / blue 4 = schwarz / black  3 0 0 4 2 weiß / white 3 = blau / blue 4 = schwarz / black	<del>                                    </del>	<del>                                    </del>
Socket M12 straight; Plug M12 straight	5-polig 5 poles  1 = braun / brown 2 = weiß / white 3 = blau / blue 5 = grûn/gelb / green/yellow 5 = grên/gelb / green/yellow 5 = grên / green 5 = 5 = 5 = 5 = 5 = 5 = 5 = 5 = 5 = 5 =	37	37
	8-polig 8 poles  4		20
Socket M12 angled; Plug M12 straight	pnp Normally open = gelb-grün / yellow-green	Ø 9.7	99. 16,6



M9 anglod: M12 straight	M12 straight: M12 straight	M12 angled; M12 straight
		both sockets and plugs: screws
		TPU
		CuZn nickel-plated / CuSn gold-plated
		10-30 V DC
		4 A
		1 x GN, 1 x YE
		PUR / BK
		IP 67
		- 25 + 80 °C
		Lumberg RST-RKWT/LED
		3 / 3 x 0.34 mm^2 / 3
13.97-33-XXX	13.97-54-XXX	13.97-55-xxx
	4 / 4 × 0 24 mm 02 / 4	4 / 4 x 0.34 mm^2 / 4
		JSM12V4gy/LP4x0.34u4.7BK/SM12S4
	13.97-56-XXX	13.97-57-xxx
	13.97-58-xxx	
	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	
Ø 14.5 M 12 x 1	Ø 14.5 M 12 x 1	614.5 M12.X1
	## 13.97-53-xxx  ## 12x1  ## 12x1	both sockets and plugs: screws TPU CuZn nickel-plated / CuZn gold-plated 10-30 V DC 4 A A 1 x GN, 1 x YE PUR / BK PF 7 - 25 + 80 °C Lumberg RST-RKMWV/LED 3 / 3 x 0.34 mm²2 / 3 JSM8V3gy / LP3x0.34u4.3BK / SM1283 13.97-53-xxx   13.97-53-xxx   both sockets and plugs: screws TPU CuZn nickel-plated / CuSn gold-plated 3-4 pol. 240 V, 5 pol. 60 V, 6-8 pol. 30 V 3-5 pol. 4A, 6-8 pol. 2A PUR / BK PUR

## 2 Sockets with Lead

2 sockets M12, lead	Version
both sockets and plugs: screws	Connection type (screws or snap-ins)
TPU	Material: Housing / moulded body / contact carrier
CuZn nickel-plated / CuZn gold-plated	Flange and surface / contact material and surface
60 V	Nominal voltage
4 A	Nominal current at 40 °C
PUR / BK	Lead jacket / colours
IP 67	Degree of protection according to IEC 60529 (in locked position)
- 25 + 80 °C	Ambient temperature range
Lumberg ZV 2	Manufacture
2 x 3 / 4 x 0.25 mm^2	Number sockets x pole no. socket / no. of lines x cross section
JS2xM8G3 / LP3x0.25u4.0BK	Type designation
13.97-70-xxx	Ref. no.

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:

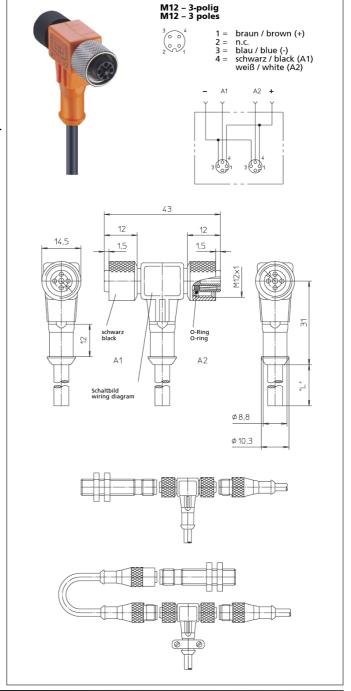
 Standard lead lengths
 2.0 m
 -020

 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.



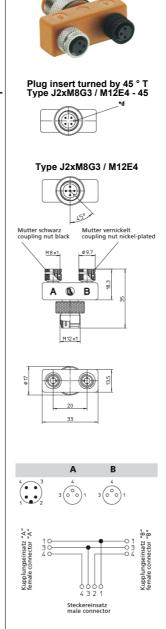
## **T-Connectors**

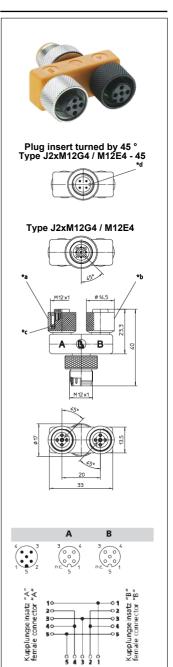


Version	2 sockets M8, 1 plug M12	2 sockets M12; 1 plug M12
Mode of connection (screws or snap-ins)	both sockets and plugs: screws	both sockets and plugs: screws
Material: Housing / moulded body / contact carrier	TPU	TPU
Flange and surface / contact material and surface	CuZn nickel-plated / CuZn gold-plated	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  $^{\circ}.$ 





Steckereinsatz male connector

## 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.:

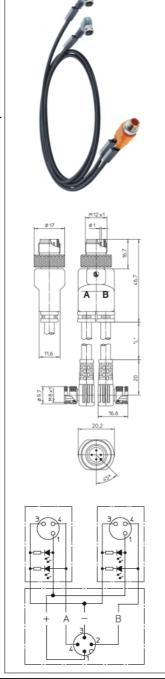
 Standard lead lengths
 1.0 m
 -010

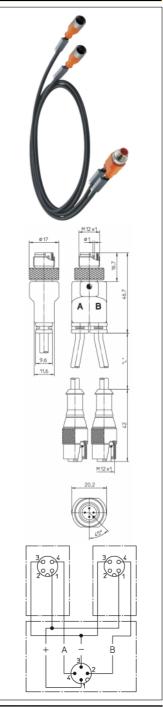
 1.5 m
 -015

 2.0 m
 -020

 Special lead lengths, e.g.
 0.6 m
 -006

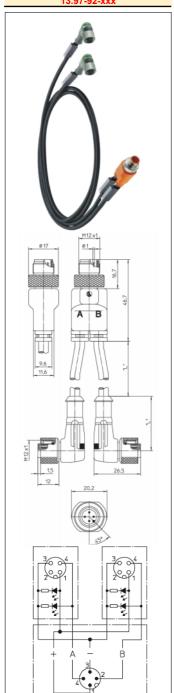
In case of deviating lead lengths please indicate this in the ref. no. when placing the order.

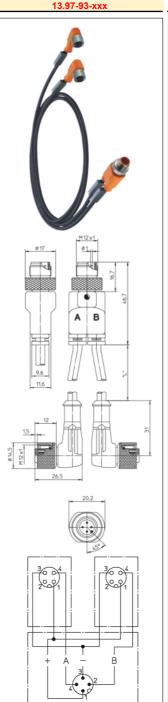


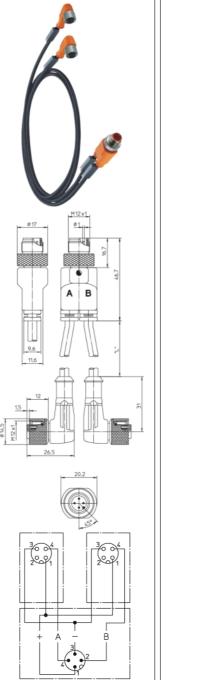




2 sockets M12 angled; plug M12 str.	2 sockets M12 angled; plug M12 str.
both plugs and socekts: screws	both plugs and socekts: screws
TPU	TPU
CuZn nickel-plated / CuSn gold-plated	CuZn nickel-plated / CuZn gold-plated
10-30 V DC	60 V
4 A per lead / 4 A max. in total	4 A per lead / 4 A max. in total
1 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
	·

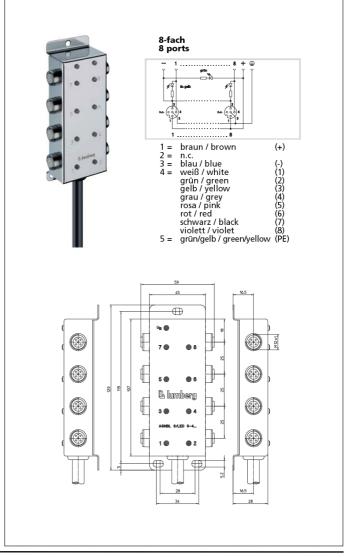






## **Distributors**

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.		





8/2/5		
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/grin / white/green (3) braun/grün / brown/green (4) weiß/gelb / white/yellow (5) gelb/braun / yellow/brown(6) weiß/grau / white/yellow (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 schwarz / black (7) violett / violet 5 = grün/gelb / green/yellow (PE)	
## A A B B B B B B B B B B B B B B B B B	30 22 22 22 23 24 25 25 25 25 25 25 25 25 25 25 25 25 25	