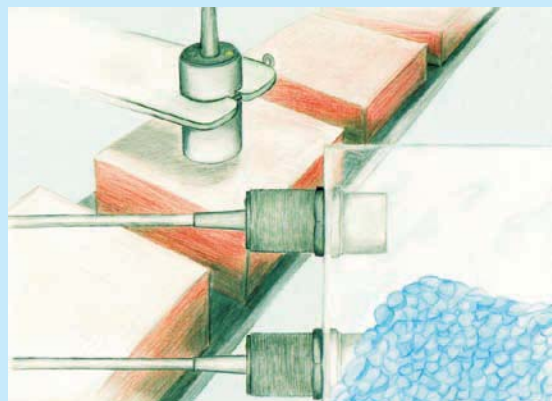


CAPACITIVE SENSORS KAS

NormLine





Registration No.: 1327-01



Testing laboratory accredited according to
DIN EN 45001 Reg.-No. DAT-P-048/95-00

For all transactions, the latest version of the „General Conditions of Sale and Delivery for Products and Services of the Electrical Industry ZVEI“ shall apply, along with the supplementary conditions „extended reservation of proprietary rights“, together with the supplements listed on our order confirmations and/or invoices.

All specifications are subject to change without notice. Reprint, even in part, only with our consent.

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With publication of this catalogue all former printed catalogues about RECHNER NormLine series capacitive sensors are invalid.

TABLE OF CONTENTS

CAPACITIVE SENSORS KAS *NormLine*

Pages

TECHNOLOGY	4 - 5
MOUNTING	6 - 7
TECHNICAL TERMS	7 - 8
ADJUSTMENT	9
APPLICATION EXAMPLES	10 - 11
NORMS	12
TYPE CODE	13
CAPACITIVE SENSORS <i>NormLine</i> DIMENSION M 12 x 1	14 - 15
CAPACITIVE SENSORS <i>NormLine</i> DIMENSION M 18 x 1	16 - 19
CAPACITIVE SENSORS <i>NormLine</i> DIMENSION M 30 x 1,5	20 - 25
CAPACITIVE SENSORS <i>NormLine</i> DIMENSION M 32 x 1,5	26 - 27
MOUNTING BLOCKS	28
PROTECTION CAPS AND SEALING SETS	29
FEMALE CONNECTORS	30
SENSOR HOLDER	31
TYPE SELECTION IN ARTICLE NUMBER ORDER	32 - 33
TYPE SELECTION IN TYPE DESCRIPTION ORDER	34 - 35

TECHNOLOGY

Capacitive sensors, our abbreviation KAS, contain a transistor oscillator which is actuated when a defined capacitance is exceeded by the approach of metals, non-metals or liquids. The smaller the dielectric permittivity ϵ_r , the closer one has to approach the medium. This effect is also apparent when detecting through non-metal materials, if the dielectric permittivity of the material to be detected is higher (approx. factor 5). Depending on the type the current change of the oscillator will be amplified to a streamlined output signal or output as a binary signal by a switching amplifier.

Output stages with **npn or pnp transistors** are available for **DC** operation.
A **transistor output** stage or FET-output is integrated for **AC** connection

The output switching functions are

NO, NC or change-over (antivalent),
similar to mechanical switches.

Electronic circuits, PLCs, relays or contactors can be activated directly by capacitive sensors. The current change in the oscillator is caused without physical contact by the approach of the actuating material to the active area. The damping of the oscillator is possible between the active surface and specified sensing distance ($S_n \pm 10\%$). The RECHNER capacitive sensors with 20-turn spindle potentiometer allow sensitivity adjustment greater or less than the nominal sensing distance. Under the best operating conditions (e.g. constant ambient conditions) a sensing distance up to the maximum specified value can be adjusted. The components of the KAS are mounted in plastic or metal casings and encapsulated with epoxy casting resin.

The plastics used for the housings are:

- ⇒ PA (polyamide) 6.6 glass-fibre reinforced
- ⇒ PA conductive (carboniferous)
- ⇒ PC (polycarbonate)
- ⇒ PEEK (polyetheretherketone) (FDA 21 CFR 177.2415)
- ⇒ PPO (polyphenylenoxide)
- ⇒ PTFE (polytetrafluor ethylene) (FDA 21 CFR 177.1550)
- ⇒ PVC (polyvinylchloride)
- ⇒ PVDF (Polyvinylidenfluoride) (FDA 21 CFR 177.2510)

And the metal housings are

- ⇒ brass / chrome or nickel-plated
- ⇒ VA stainless-steel, material No. 1.4301, No. 1.4305 or 1.4404 (FDA conforming)
- ⇒ Aluminium die-cast

By means of these measures all devices are insensitive to dirt, vibration (vibration stability: 30 g, 100...2000 Hz, 1 hour) and are watertight (depending on the type, up to IP 68). The choice of housings enables a wide range of applications, e.g. with aggressive media, in hot areas or in areas subjected to steam.

Only pre-tested electronic components, proven integrated circuits and hybrid circuits are used and produced with SMT. The standard constant ambient temperature permitted is -25 up to +70 °C, and up to 90 °C for brief periods. High-temperature types for use from -200 up to +250 °C are also included in our general product line.

With non-contact detection no physical actuating force is required for operation. There is no contact bounce, no sensor wear, no maintenance and the service life is independent of the switching frequency.

KAS can be used in machines, systems and vehicles for level monitoring of liquids or bulk material, and also through non-metal windows. Further more as limit switches, contact-less position switches for monitoring and positioning, as pulse generator for counting tasks, distance and speed measurements and for many other applications (for examples of applications: see page 10 and 11).

TECHNOLOGY - NormLine

Capacitive sensors, just like inductive and optical sensors are subject to a harmonised norm IEC 60947-5-2. All the main important technical data and features are stated within this norm. Meeting these standards makes life easy for the user with regard to selection and replacement of sensors. *NormLine* sensors guarantee a free trade in the common market, ensure excellent quality, and reduce down time in industry.



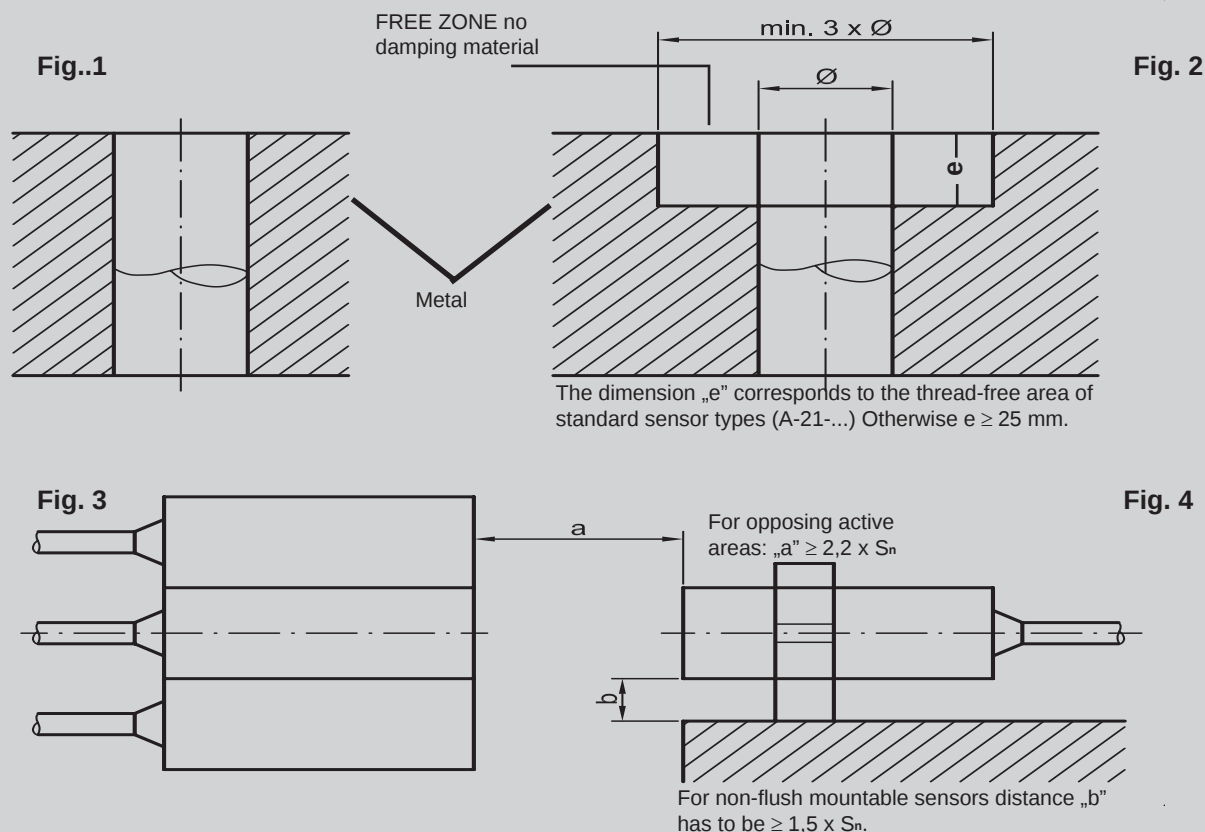
All these demands are met by *NormLine* sensors, the recommended types are ideal for standard applications, meeting international standards giving the user off the shelf items and latest technology for an economic price.

Where the application demands more from the sensor, such as use in high temperature areas, ATEX applications, pharmaceutical, chemical or food industry, please refer to our *high performance* standard series of high-tech capacitive sensors.

There are two different types of capacitive sensors:

- 1. For flush mounting in metal or other materials.** These sensors can be mounted close together (see Fig. 1 and 3) and are specially designed for contact-less detection of solids or liquids through non-metal containers (max. wall-thickness 4 mm)
- 2. For non-flush mounting in metal or other materials.** When mounting two or more sensors side by side a space / free zone must be provided (see Fig. 2 and 4). These sensors are designed for applications where the detecting material comes into contact with the active area of the sensor (e.g. level monitoring of bulk materials or liquids).

Mounting



TECHNOLOGY

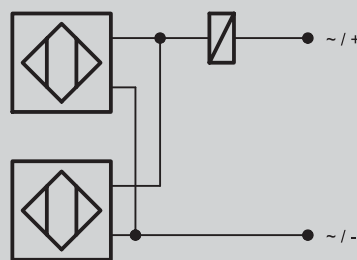
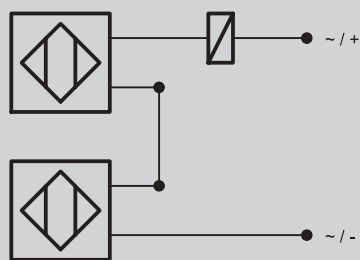
Wiring of the capacitive sensors should be routed separately or screened from heavy conductor lines, as in extreme cases inductive peak voltages can destroy the sensors despite the integrated protective circuit. Screened cable or twisted lines are recommended, especially for longer cable runs > 5 m. Direct control of electric light bulbs is to be avoided, because during the switch-on moment cold current is many times the rated current and can destroy the output stage of the sensor.

Units with strong localised field power, e. g. high power walkie-talkies, or noise sources in the lower frequency range, e.g. long, middle or short wave transmitters should not be operated close to the sensors, otherwise additional measures have to be taken in order to eliminate the false operation of the sensor.

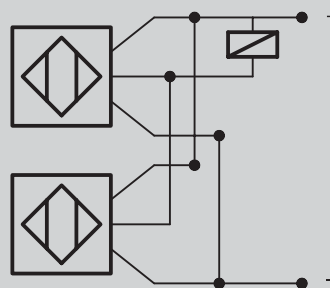
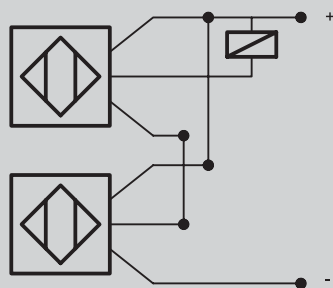
2- and 3-wire sensors with binary output can be used in series or parallel connection, similar to mechanical contacts. The type-typical voltage drop and the residual voltage U_d must be noted, and then be multiplied in accordance with the number of sensors for series connection, must be noted. In the case of parallel connection of sensors with thyristor output, the first switched output takes over the total load current.

Series connection

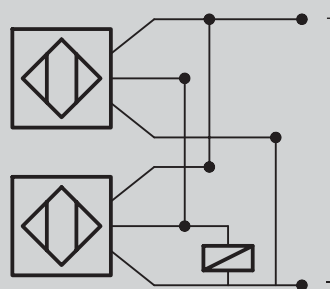
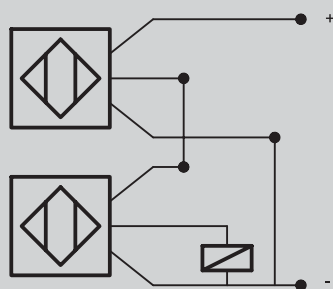
Parallel connection



2 wire AC/DC



3 wire DC NPN



3 wire DC PNP

MOUNTING

The material and version-dependent **maximum torque** should be taken into consideration in order, when mounting, to prevent damage to the threaded sleeves. The values listed in the table are based on the use of the nuts supplied with the sensors.

Thread	Housing Material					
	PVC	PPO	PA 6.6	PTFE	Brass	Stainless Steel
M 5 x 0.5	-	-	-	-	-	1.5 Nm
M 8 x 1	-	-	-	-	-	4.5 Nm
M 12 x 1	1.5 Nm	1 Nm	1 Nm	0.2 Nm	15 Nm	15 Nm
M 18 x 1	-	3 Nm	1.7 Nm	0.5 Nm	28 Nm	40 Nm
M 22 x 1.5	12 Nm	10 Nm	6 Nm	1.4 Nm	32 Nm	50 Nm
M 30 x 1.5	-	8 Nm	8 Nm	2.5 Nm	82 Nm	150 Nm
M 32 x 1.5	-	13 Nm	13 Nm	3 Nm	110 Nm	180 Nm
G 1"	-	-	-	2,5 Nm	-	-

Due to the permitted thread tolerances specified in German standard DIN 13, the **maximum screw-in length** for threaded sensors should be taken into consideration. Depending on that the length of the threaded block for screwing in proximity sensors should not exceed the following dimensions. In the case of larger threaded blocks we recommend drilling a blind hole in order to adhere to the maximum screw-in length.

Thread:	M 5 x 0.5	M 8 x 1	M 12 x 1	M18 x 1	M 22 x 1.5	M 30 x 1.5	M 32 x 1.5
Maximum length	3 mm	6 mm	8 mm	12 mm	12 mm	12 mm	12 mm

TECHNICAL TERMS

Unless otherwise specified technical data is as follows: +20°C,
 $U_B = 8 \text{ V DC}$ for KAS-40; $U_B = 24 \text{ V DC}$ for KAS-70 and KAS-80 and $U_B = 230 \text{ V AC}$ for KAS-90.

Operating sensing distance / S_a

Within the operating sensing distance the sensor operates reliably taking in to account all the possible tolerances. It lies between 0 and $0.81 \times S_n$.

Power up time delay

The time the sensor needs to be ready for operation after connecting the operating voltage. It is in the milliseconds range.

TECHNICAL TERMS

Housing materials

The application of the housing materials used is based on the technical specifications of the material and of the manufacturer. Even though RECHNER Sensors have far-reaching application experience concerning the use of different housing materials, the customer is responsible for checking in each case that the housing material is suitable for their application.

Cable

For the standard models PVC- or PUR-cable are used. One has to take into consideration that the cable should not be moved with ambient temperatures below -5°C . PVC is not suitable for use in applications with oil-based liquids or with UV-radiation. PUR is not suitable for continuous contact with water. For special application areas silicone or PTFE cables are available.

Minimum sensing distance / $S_{\min}$

The minimum possible sensing distance that can be adjusted by potentiometer and which can be used effectively in practical applications with reference to a medium with $\epsilon_r \geq 80$.

Maximum sensing distance / $S_{\max}$

The maximum possible sensing distance that can be adjusted by potentiometer and that can be used effectively in practical applications with reference to a medium with $\epsilon_r \geq 80$. The sensors should only be used with constant ambient conditions, such as constant temperature, no humidity, and no deposits on the active face of the sensor.

Nominal sensing distance / S_n

The characteristic value of a proximity sensor, without consideration of production tolerances and variations due to temperature and voltages.

Real sensing distance / S_r

The sensing distance determined at $+20^{\circ}\text{C}$ and rated voltage. Here the series variance is taken into consideration. Variation max. $10\% \pm$ of S_n .

Reduction factors

For materials other than metals (e.g. FE 360 or ST 37, Al, Cu) or water, the reduction factors shown in the table on page 9 should be taken into consideration.

Series- and parallel connection

It is possible to connect the proximity sensors in series or parallel. When considering this it must be taken into account that the voltage drops are added for series connection and the residual voltages for parallel connection. Under these circumstances it is advisable to operate a maximum of three sensors in a corresponding circuit.

Repeat accuracy of the switching point

The variation of the switching point of two successive measurements at constant ambient conditions.

Frequency of operating cycles

The maximum damping and un-damping cycles of the proximity sensor within one second. To ascertain the frequency of operating cycles a pulse / break ratio of 1 : 2 is used as a basis, at S_n .

Switching hysteresis

The difference between the switch-on and switch-off point of a proximity sensor, when approaching or moving away from the standard measuring plate.

Enclosure rating

IP 65: Protection against contact with voltage-carrying parts, protection against ingress of dust and water jet.

IP 67: Protection against contact with voltage-carrying parts, protection against ingress of dust and protection against ingress of water when the equipment is immersed in water, up to 1 m depths and for a period of 30 minutes.

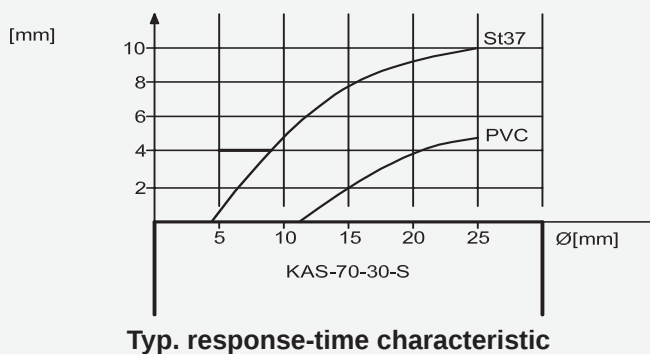
Temperature variation

The displacement of the switching point if the ambient temperature changes.

MOUNTING

The data of the **nominal sensing distance** are based on the measuring method according to DIN VDE 0660, Part 208. The respective nominal sensing distance is indicated with a tolerance of $\pm 10\%$. The **standard measurement plate** is square with a thickness of 1 mm and is made of carbon steel FE 360 (defined in ISO 630: 1980) with a smoothed surface and earthed. The side lengths are equal to the diameter of the active area of the KAS or equal to $3 \times S_n$, depending on which value is greater. With a different material or a smaller surface of the actuating element, the sensing distance is smaller.

Sensing distance



Adjustment of the sensing distance is made by means of a spindle potentiometer with the screwdriver provided. With pluggable sensors $\leq M 18 \times 1 / \varnothing 22$ the potentiometer is on the side.

For size $\geq M 30 \times 1.5 / \varnothing 30$:
 First open plastic tab.
 For size $< M 30 \times 1.5 / \varnothing 30$:
 First remove plastic sealing screw.



The possible sensing distance for a particular material is dependent on the dielectric permittivity ϵ_r and can be worked out by means of the typical reduction factors:

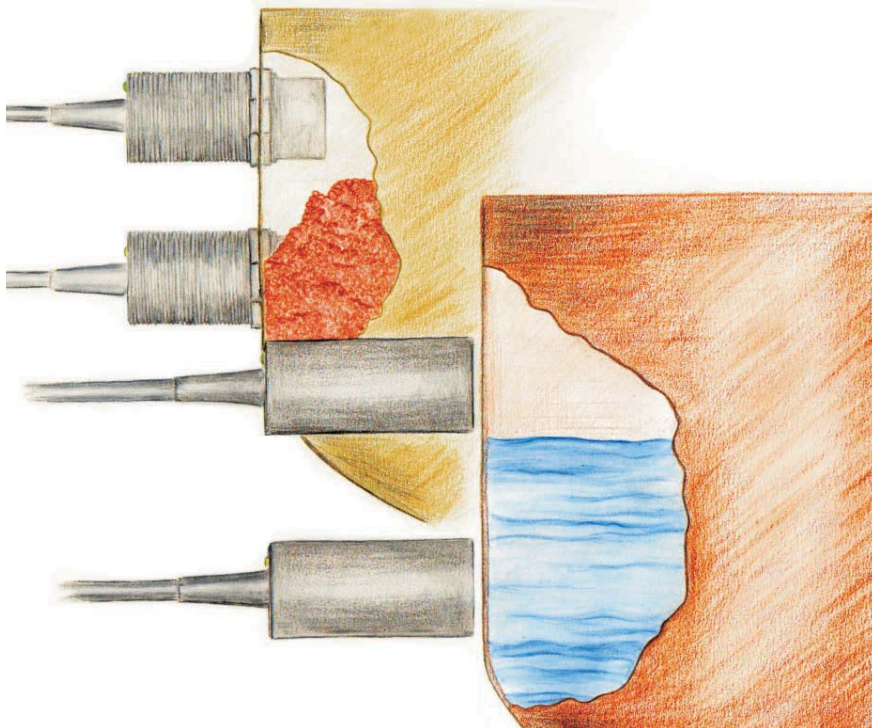
Sensing distance = $S_n \times$ reduction factor.

Material:	FE 360	St 37	Water	Wheat	Wood	Glass	Oil	PVC	PE	Ceramic
Reduction factor approx.	1	1	1	0,8	0,7	0,6	0,4	0,4	0,37	0,3

APPLICATION EXAMPLES

Capacitive proximity sensors (KAS) detect all products with a dielectric constant ϵ_r of 1,5. The lower the products dielectric constant, the closer the product has to be to the active area of the sensor. This means for non-flush mountable sensors that are in contact with the product to be detected, a sensor with large nominal sensing distance has to be selected.

Capacitive proximity sensors are used in machines, systems and vehicles for level monitoring of most different products. It is of no concern whether they are liquids, pastes or powders.



Level control of bulk materials and liquids

The level control can also be made through a non-metal container wall or non-metal windows (max. 4 mm) provided that the products dielectric constant is factor 5 higher than that of the wall.

Typical applications for *NormLine* Sensors are:

Level control of liquids:

- Water
- Waste water
- Oil and grass
- plus many more examples.

Level control of bulk materials:

- Granulate
- Pellets
- Chips
- Powder
- plus many more examples.

Further more they often are used as non-contact position switches for monitoring and positioning, such as a pulse generator for counting tasks, distance and speed measurements.

- Positioning
- Counting
- Level control on distance
- plus many more examples.



Counting of objects

APPLICATION EXAMPLES

Capacitive sensors are used in almost all branches

Capacitive sensors control filling conditions in large silos in the same way as in small packing units. They help during the quality assurance, with controlling the position, the number count or that a sample is complete.

Among others they are used for process control in the chemical industry, pharmaceutical industry and in the semiconductor industry.

In the **food/packaging industry** capacitive sensors detect;



- the level of grain, corn, rice.
- the level of flour and sugar
- the level of products within ATEX areas
- the filling conditions in filling systems, for example with the packing of chips or cereals, Muesli, etc..



In the agriculture industry capacitive sensors control automatic animal feeding systems and detect pet food and seed, etc.



In the plastic industry capacitive sensors are applied to the monitoring of pellets, granulates, flakes, chips, they are installed in hoppers, silos, tanks, mixing and dosing systems. Also there is no problem with recycled plastics, plastics with low dielectric constant and material mixtures.



In the wood industry capacitive sensors are used for position monitoring and control.

Capacitive sensors detect wood pellets or wood shreds in the production process and take care of the level control of the storage tanks, the hopper and feeding systems for wood heating systems.



NORMS

The products of Rechner Industrie-Elektronik GmbH are designed and checked in accordance with the standards and specifications, DIN - VDE - IEC, for electric and electronic instruments. For new and revised products the newest standards are always used.

Effective standards for proximity switches and sensors:

DIN VDE 0660 Part 208:
Low-voltage switchgear - additional requirements for inductive proximity switches.

DIN VDE 0660 Part 209
Low-voltage switchgear and controlgear, control switches - additional requirements for proximity switches used in safety-related applications.

DIN VDE 0660 Part 212 (Replaces DIN 19234)
Instrumentation and control technology - electrical position sensors - DC interface for position sensors and switching amplifiers

European Standards

EN 60947-5-2 Low Voltage Switchgear Part 5
Control circuit devices and switching elements, section 2: proximity switches

EN 60947-5-6
Control circuit devices and switching elements, proximity sensors - DC interface for proximity sensors and switching amplifiers (NAMUR)

International Standards

IEC 947-5-2 Low-voltage switchgear and controlgear Part 5
Control circuit devices and switching elements - Section 2, proximity switches

Norms for quality assurance (QS)

DIN ISO 9000-9004 (EN 29000-29 004)
Quality assurance (QA) for products and services

DIN ISO 9001
Quality assurance in design/development, production, installation and servicing

DIN ISO 9002
Quality assurance in production

DIN ISO 9003
Quality assurance for final testing only

DIN ISO 9004
Quality management and elements of a quality management system

RECHNER Industrie-Elektronik-GmbH is certified according to DIN ISO 9001:2000.



- Marking

The CE marking represents the manufacturer's confirmation that the identified product conforms to applicable standards and directives throughout Europe. The following regulations apply to the RECHNER products.

89/336/EWG
EMC Directive (EN 60 947-5-2)

73/23/EWG
Low-voltage Directive (compare with VDE 0160, product standard EN 60947-5-2)

Directive 94/9/EG
Equipment and Protection Systems designed for use in potentially explosive environments

RECHNER Industrie-Elektronik GmbH certifies the conformity of its products with each of the applicable directives in a Manufacturer's Declaration. In addition RECHNER has a laboratory accredited by DATech for testings according to IEC/EN 60947-5-2 and also an accredited EMC laboratory.

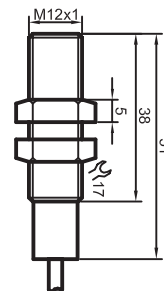
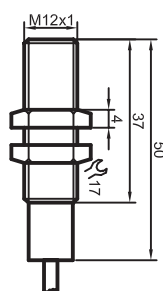
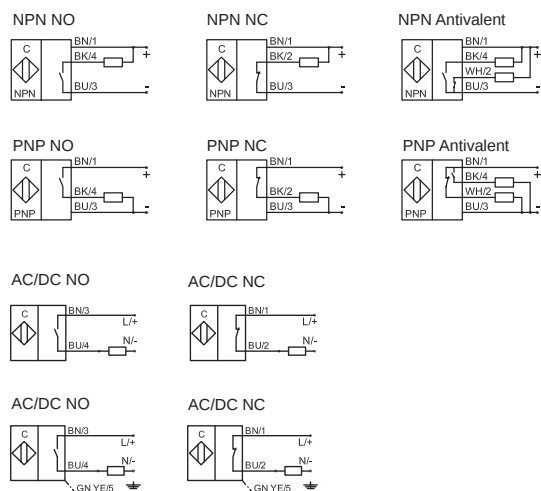
TYPE CODE KAS...NL

.....	
	If existing - NL = NormLine
	If existing 3D = With manufacturer declaration for ATEX zone 22 3G = With manufacturer declaration for ATEX zone 2
	If existing Y... = Flange connector
	If existing PTFE, PTFE/Ms,... = Special housing material
	If existing M..., (G)1" = Thread
	If existing K = Plastic housing
A	= Antivalent function (NO/NC)
Ö	= NC
S	= NO
A...	= European standard A12 = M12 x 1 flush mountable A22 = M12 x 1 non-flush mountable A13 = M18 x 1 flush mountable A23 = M18 x 1 non-flush mountable A14 = M30 x 1 flush mountable A24 = M30 x 1 non-flush mountable
10, 18, 20, 23, 30, 32, 34, 35, 37, 38,	= Version
70	= 3 wire / 4 wire DC NPN
80	= 3 wire / 4 wire DC PNP
90	= 2 wire AC/DC
KAS	= Capacitive Proximity Sensor

CAPACITIVE SENSORS NormLine

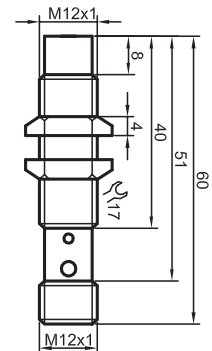
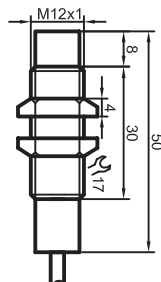
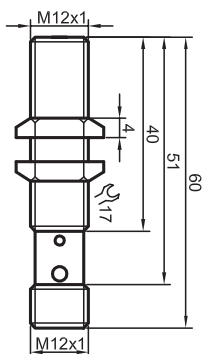
Housing	M 12 x 1		M 12 x 1	
				
		Flush mountable		Flush mountable
Sensing distance S_n ,	2 mm		2 mm	
Sensing distance min./max. adjustable	0,5...5 mm		0,5...5 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent	KAS-70-A12-A-NL	KA 0705	KAS-70-A12-A-K-NL	KA 0706
Type NPN normally open	KAS-70-A12-S-NL	KA 0673	KAS-70-A12-S-K-NL	KA 0707
Type PNP antivalent	KAS-80-A12-A-NL	KA 0671	KAS-80-A12-A-K-NL	KA 0708
Type PNP normally open	KAS-80-A12-S-NL	KA 0669	KAS-80-A12-S-K-NL	KA 0709
Type AC/DC normally open				
Type AC/DC normally closed				
Certificates	CE, RoHS, UL-CSA		CE, RoHS, UL-CSA	
Operating voltage (U_o)	12...30 V DC		12...30 V DC	
Output current (I_o)	200 mA / 2 x 200 mA		200 mA / 2 x 200 mA	
No load current (I_o)	< 15 mA		< 15 mA	
Load current min.	-		-	
Frequency of operating cycles max.	300 Hz		300 Hz	
Permitted ambient temperature	-25...+70 °C		-25...+70 °C	
LED display	Yes		Yes	
Protective circuit	Yes		Yes	
Norm	IEC 60947-5-2		IEC 60947-5-2	
Degree of protection IEC 60529*	IP 67*		IP 67*	
Connection	2 m PUR cable, 3 x 0,14 mm ² 4 x 0,14 mm ² for antivalent		2 m PUR cable 3 x 0,14 mm ² 4 x 0,14 mm ² for antivalent	
Housing material	VA No. 1.4305		PA/PPO	
Active surface	PA/PPO		PA/PPO	
Lid	PA/PPO		PA/PPO	

*With sealed potentiometer screw



Dimension M12 x 1

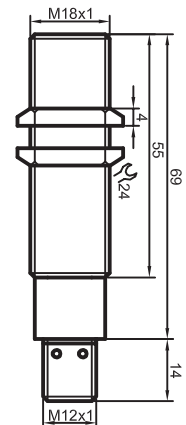
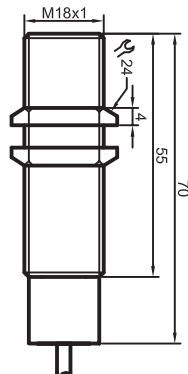
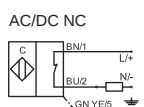
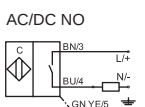
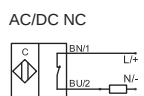
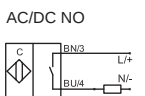
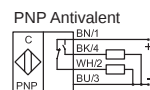
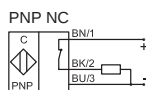
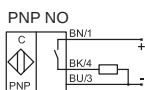
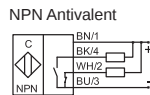
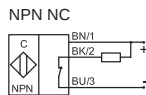
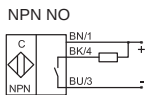
M 12 x 1		M 12 x 1		M 12 x 1	
					
Flush mountable		Non-flush mountable		Non-flush mountable	
2 mm		4 mm		4 mm	
0,5...5 mm		1...8 mm		1...8 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-70-A12-A-Y5-NL	KA 0710	KAS-70-A22-A-NL	KA 0711	KAS-70-A22-A-Y5-NL	KA 0715
		KAS-70-A22-S-NL	KA 0712		
KAS-80-A12-A-Y5-NL	KA 0670	KAS-80-A22-A-NL	KA 0713	KAS-80-A22-A-Y5-NL	KA 0716
		KAS-80-A22-S-NL	KA 0714		
CE, RoHS, UL-CSA		CE, RoHS, UL-CSA		CE, RoHS, UL-CSA	
12...30 V DC		12...30 V DC		12...30 V DC	
2 x 200 mA		200 mA / 2 x 200 mA		2 x 200 mA	
< 15 mA		< 15 mA		< 15 mA	
-		-		-	
300 Hz		50 Hz		50 Hz	
-25...+70 °C		-25...+70 °C		-25...+70 °C	
Yes		Yes		Yes	
Yes		Yes		Yes	
IEC 60947-5-2		IEC 60947-5-2		IEC 60947-5-2	
IP 67*		IP 67*		IP 67*	
Flange connector M 12 x 1		2 m PUR cable, 3 x 0,14 mm ² 4 x 0,14 mm ² for antivalent		Flange connector M 12 x 1	
VA No. 1.4305		VA No. 1.4305		VA No. 1.4305	
PA/PPO		PTFE		PTFE	
-		PA/PPO		-	



CAPACITIVE SENSORS NormLine

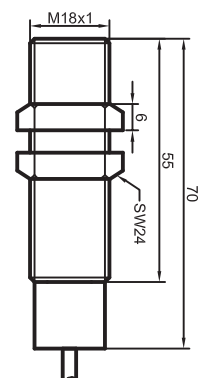
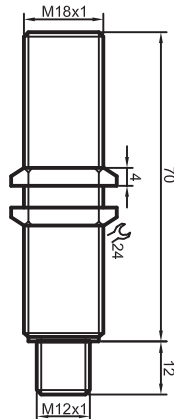
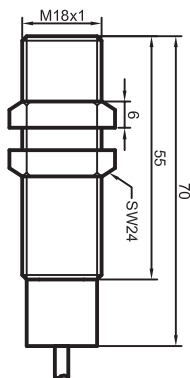
Housing	M 18 x 1		M 18 x 1	
				
Technical data	Flush mountable		Flush mountable	
Sensing distance S_n ,	5 mm		5 mm	
Sensing distance min./max. adjustable	1...8 mm		1...8 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent	KAS-70-A13-A-NL	KA 0718		
Type NPN normally open	KAS-70-A13-S-NL	KA 0672		
Type PNP antivalent	KAS-80-A13-A-NL	KA 0668	KAS-80-A13-A-Y5-NL	KA 0667
Type PNP normally open	KAS-80-A13-S-NL	KA 0666		
Type AC/DC normally open				
Type AC/DC normally closed				
Certificates	CE, RoHS, UL-CSA		CE, RoHS, UL-CSA	
Operating voltage (U_B)	12...30 V DC		12...30 V DC	
Output current (I_o)	200 mA / 2 x 200 mA		2 x 200 mA	
No load current (I_o)	< 15 mA		< 15 mA	
Load current min.	-		-	
Frequency of operating cycles max.	200 Hz		200 Hz	
Permitted ambient temperature	-25...+70 °C		-25...+70 °C	
LED display	Yes		Yes	
Protective circuit	Yes		Yes	
Norm	IEC 60947-5-2		IEC 60947-5-2	
Degree of protection IEC 60529*	IP 67*		IP 67*	
Connection	2 m cable, PUR, 3 x 0,34 mm ² PVC, 4 x 0,34 mm ² for antivalent		Flange connector M 12 x 1	
Housing material	Brass		Brass	
Active surface	PA/PPO		PA/PPO	
Lid	PA/PPO		-	

*With sealed potentiometer screw

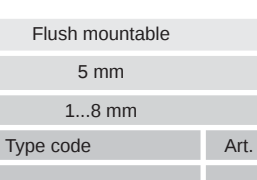
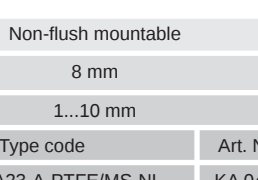


Dimension M18 x 1

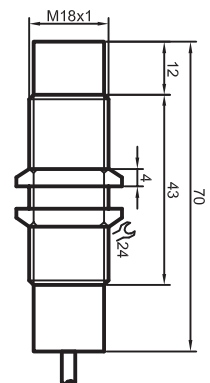
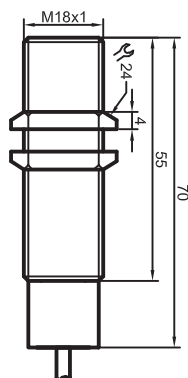
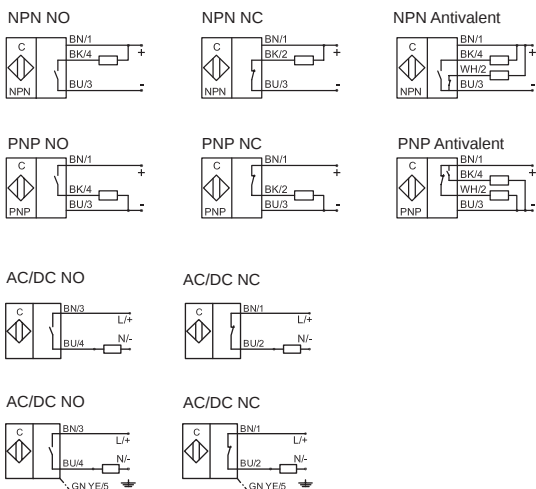
M 18 x 1		M 18 x 1		M 18 x 1	
					
Flush mountable		Flush mountable		Flush mountable	
5 mm		5 mm		5 mm	
1...8 mm		1...8 mm		1...8 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-70-A13-A-K-NL	KA 0637				
KAS-70-A13-S-K-NL	KA 0648	KAS-70-A13-S-K-Y3-NL	KA 0609		
KAS-80-A13-A-K-NL	KA 0680	KAS-80-A13-A-K-Y3-NL	KA 0607		
KAS-80-A13-S-K-NL	KA 0717				
				KAS-90-A13-S-NL	KA0634
				KAS-90-A13-Ö-NL	KA0724
CE, RoHS, UL-CSA		CE, RoHS, UL-CSA		CE, RoHS	
12...30 V DC		12...30 V DC		20...250 V AC/DC	
200 mA / 2 x 200 mA		200 mA / 2 x 200 mA		250 mA	
< 15 mA		< 15 mA		< 2,5 mA	
-		-		5 mA	
200 Hz		200 Hz		25 Hz	
-25...+70 °C		-25...+70 °C		-25...+70 °C	
Yes		Yes		Yes	
Yes		Yes		Yes	
IEC 60947-5-2		IEC 60947-5-2		IEC 60947-5-2	
IP 67*		IP 67*		IP 67*	
2 m cable, PUR, 3 x 0,34 mm ² PVC, 4 x 0,34 mm ² for antivalent		Flange connector M 12 x 1		2 m PUR cable, 2 x 0,34 mm ²	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		-		PA/PPO	



CAPACITIVE SENSORS NormLine

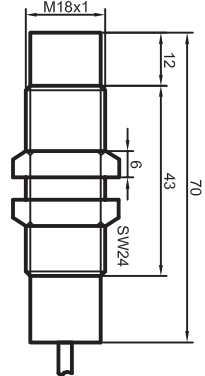
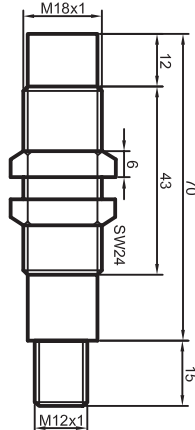
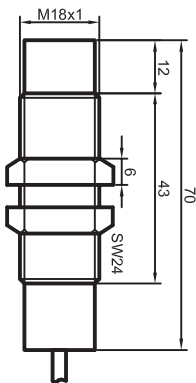
Housing	M 18 x 1		M 18 x 1	
				
				
Technical data	Flush mountable		Non-flush mountable	
Sensing distance S_n ,	5 mm		8 mm	
Sensing distance min./max. adjustable	1...8 mm		1...10 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent			KAS-70-A23-A-PTFE/MS-NL	KA 0437
Type NPN normally open				
Type PNP antivalent			KAS-80-A23-A-PTFE/MS-NL	KA0725
Type PNP normally open				
Type AC/DC normally open	KAS-90-A13-S-MS/PPO-NL	KA 0676		
Type AC/DC normally closed	KAS-90-A13-Ö-MS/PPO-NL	KA 0677		
Certificates	CE, RoHS		CE, RoHS, UL-CSA	
Operating voltage (U_o)	20...250 V AC/DC		12...30 V DC	
Output current (I_o)	250 mA		2 x 200 mA	
No load current (I_o)	< 2,5 mA		< 15 mA	
Load current min.	5 mA		-	
Frequency of operating cycles max.	25 Hz		50 Hz	
Permitted ambient temperature	-25...+70 °C		-25...+70 °C	
LED display	Yes		Yes	
Protective circuit	Yes		Yes	
Norm	IEC 60947-5-2		IEC 60947-5-2	
Degree of protection IEC 60529*	IP 67*		IP 67*	
Connection	2 m PUR cable, 3 x 0,34 mm ²		2 m cable, PVC 4 x 0,34 mm ²	
Housing material	Brass		Brass	
Active surface	PPO		PTFE	
Lid	PPO		PA/PPO	

*With sealed potentiometer screw



Dimension M18 x 1

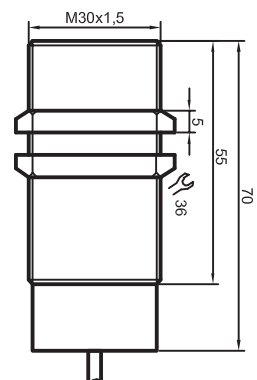
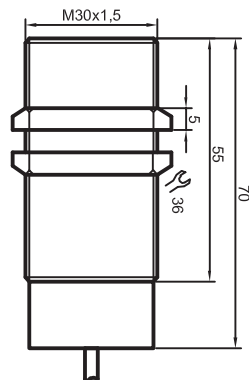
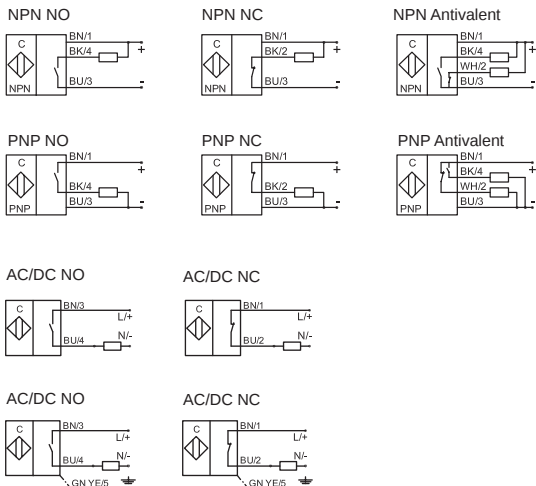
M 18 x 1		M 18 x 1		M 18 x 1	
					
Non-flush mountable		Non-flush mountable		Non-flush mountable	
8 mm		8 mm		8 mm	
1...10 mm		1...10 mm		1...10 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-70-A23-A-K-NL	KA 0362				
KAS-70-A23-S-K-NL	KA 0368				
KAS-80-A23-A-K-NL	KA 0325	KAS-80-A23-A-K-Y3-NL	KA 0445		
KAS-80-A23-S-K-NL	KA 0324				
				KAS-90-A23-S-NL	KA 0605
				KAS-90-A23-Ö-NL	KA 0606
CE, RoHS, UL-CSA		CE, RoHS, UL-CSA		CE, RoHS, UL-CSA	
12...30 V DC		12...30 V DC		20...250 V AC/DC	
200 mA / 2 x 200 mA		2 x 200 mA		250 mA	
< 15 mA		< 15 mA		< 2,5 mA	
-		-		5 mA	
50 Hz		50 Hz		25 Hz	
-25...+70 °C		-25...+70 °C		-25...+70 °C	
Yes		Yes		Yes	
Yes		Yes		Yes	
IEC 60947-5-2		IEC 60947-5-2		IEC 60947-5-2	
IP 67*		IP 67*		IP 67	
2 m cable PUR, 3 x 0,34 mm ² PVC, 4 x 0,34 mm ² for antivalent		Flange connector M 12 x 1		2 m PVC cable, 2 x 0,34 mm ²	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		-		PA/PPO	



CAPACITIVE SENSORS NormLine

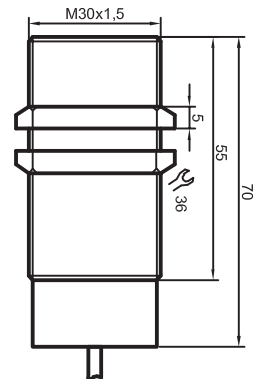
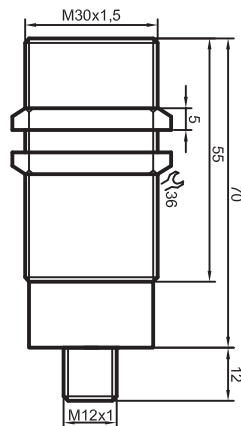
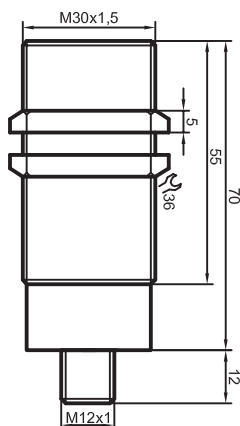
Housing	M 30 x 1,5		M 30 x 1,5	
				
Technical data	Flush mountable		Flush mountable	
Sensing distance S_n ,	10 mm		10 mm	
Sensing distance min./max. adjustable	2...20 mm		2...20 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent	KAS-70-A14-A-NL	KA 0719	KAS-70-A14-A-K-NL	KA 0555
Type NPN normally open	KAS-70-A14-S-NL	KA 0664	KAS-70-A14-S-K-NL	KA 0514
Type PNP antivalent	KAS-80-A14-A-NL	KA 0665	KAS-80-A14-A-K-NL	KA 0554
Type PNP normally open	KAS-80-A14-S-NL	KA 0663	KAS-80-A14-S-K-NL	KA 0720
Type AC/DC normally open				
Type AC/DC normally closed				
Certificates	CE, RoHS, UL-CSA		CE, RoHS, UL-CSA	
Operating voltage (U_B)	12...30 V DC		12...30 V DC	
Output current (I_o)	200 mA / 2 x 200 mA		200 mA / 2 x 200 mA	
No load current (I_o)	< 15 mA		< 15 mA	
Load current min.	-		-	
Frequency of operating cycles max.	150 Hz		150 Hz	
Permitted ambient temperature	-25...+70 °C		-25...+70 °C	
LED display	Yes		Yes	
Protective circuit	Yes		Yes	
Norm	IEC 60947-5-2		IEC 60947-5-2	
Degree of protection IEC 60529*	IP 67*		IP 67*	
Connection	2 m Kabel, PVC, 3 x 0,75 mm ² 4 x 0,5 mm ² for antivalent		2 m Kabel, PVC, 3 x 0,75 mm ² 4 x 0,5 mm ² for antivalent	
Housing material	Brass		PA/PPO	
Active surface	PA/PPO		PA/PPO	
Lid	PA/PPO		PA/PPO	

*With sealed potentiometer screw



Dimension M30 x 1,5

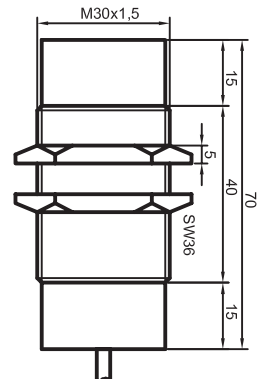
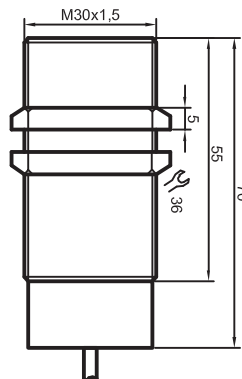
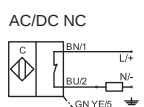
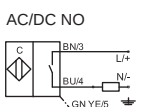
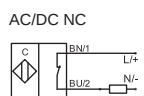
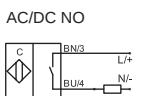
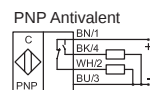
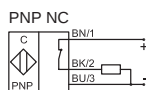
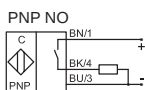
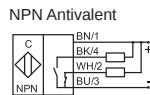
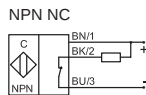
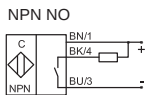
M 30 x 1,5		M 30 x 1,5		M 30 x 1,5	
					
Flush mountable		Flush mountable		Flush mountable	
10 mm		10 mm		10 mm	
2...20 mm		2...20 mm		2...20 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-80-A14-A-Y5-NL	KA 0660	KAS-80-A14-A-K-Y3-NL	KA 0574		
				KAS-90-A14-S-NL	KA 0603
				KAS-90-A14-Ö-NL	KA 0641
CE, RoHS, UL-CSA		CE, RoHS, UL-CSA		CE, RoHS	
12...30 V DC		12...30 V DC		20...250 V AC / DC	
2 x 200 mA		2 x 200 mA		330 mA	
< 15 mA		< 15 mA		< 3 mA	
-		-		5 mA	
150 Hz		150 Hz		25 Hz	
-25...+70 °C		-25...+70 °C		-25...+70 °C	
Yes		Yes		Yes	
Yes		Yes		Yes	
IEC 60947-5-2		IEC 60947-5-2		IEC 60947-5-2	
IP 67*		IP 67*		IP 67*	
Flange connector M 12 x 1		Flange connector M 12 x 1		2 m PVC cable, 2 x 0,75 mm ²	
Brass		PA/PPO		PA/PPO	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		PA/PPO		PA/PPO	



CAPACITIVE SENSORS NormLine

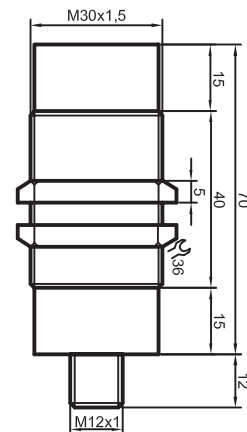
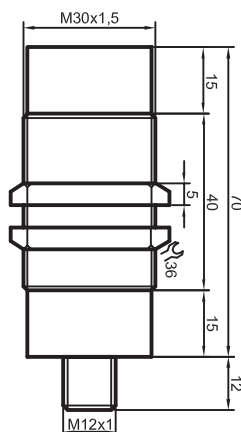
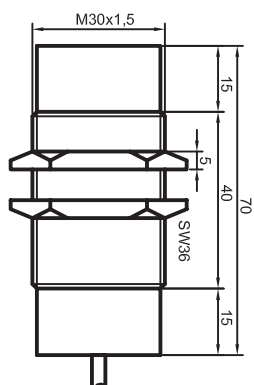
Housing	M 30 x 1,5		M 30 x 1,5	
				
Technical data	Flush mountable		Non-flush mountable	
Sensing distance S_n ,	10 mm		15 mm	
Sensing distance min./max. adjustable	2...20 mm		2...25 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent			KAS-70-A24-A-NL	KA 0360
Type NPN normally open			KAS-70-A24-S-NL	KA 0366
Type PNP antivalent			KAS-80-A24-A-NL	KA 0335
Type PNP normally open			KAS-80-A24-S-NL	KA 0334
Type AC/DC normally open	KAS-90-A14-S-MS/PPO-NL	KA 0674		
Type AC/DC normally closed	KAS-90-A14-Ö-MS/PPO-NL	KA 0675		
Certificates	CE, RoHS		CE, RoHS, UL-CSA	
Operating voltage (U_p)	20...250 V AC / DC		12...30 V DC	
Output current (I_o)	330 mA		200 mA / 2 x 200 mA	
No load current (I_o)	< 3 mA		< 15 mA	
Load current min.	5 mA		-	
Frequency of operating cycles max.	25 Hz		50 Hz	
Permitted ambient temperature	-25...+70 °C		-25...+70 °C	
LED display	Yes		Yes	
Protective circuit	Yes		Yes	
Norm	IEC 60947-5-2		IEC 60947-5-2	
Degree of protection IEC 60529*	IP 67*		IP 67*	
Connection	2 m PVC cable, 3 x 0,75 mm ²		2 m PVC cable, 3 x 0,75 mm ² 4 x 0,5 mm ² for antivalent	
Housing material	Brass		Brass	
Active surface	PA/PPO		PVC	
Lid	PA/PPO		PA/PPO	

*With sealed potentiometer screw



Dimension M30 x 1,5

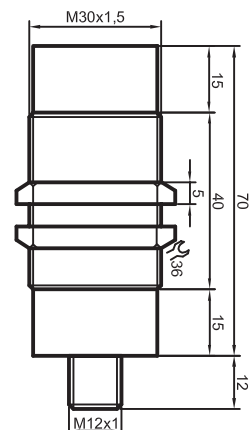
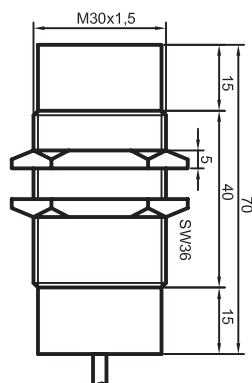
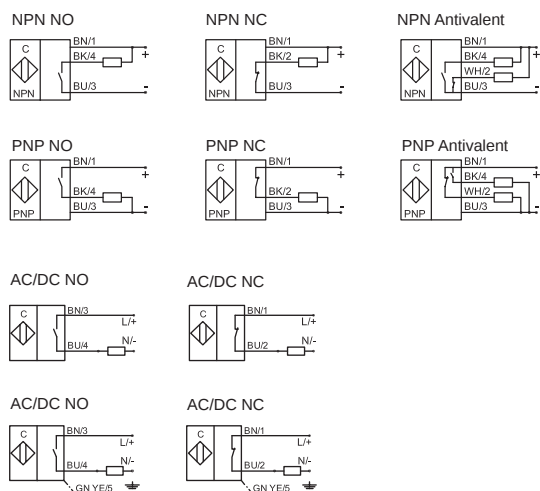
M 30 x 1,5		M 30 x 1,5		M 30 x 1,5	
					
Non-flush mountable		Non-flush mountable		Non-flush mountable	
15 mm		15 mm		15 mm	
2...25 mm		2...25 mm		2...25 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-70-A24-A-PTFE/MS-NL	KA 0414	KAS-70-A24-A-Y3-NL	KA 0365		
KAS-80-A24-A-PTFE/MS-NL	KA 0412	KAS-80-A24-A-Y3-NL	KA 0336	KAS-80-A24-A-PTFE/MS-Y3-NL	KA 0413
CE, RoHS, UL-CSA		CE, RoHS, UL-CSA		CE, RoHS, UL-CSA	
12...30 V DC		12...30 V DC		12...30 V DC	
2 x 200 mA		2 x 200 mA		2 x 200 mA	
< 15 mA		< 15 mA		< 15 mA	
-		-		-	
50 Hz		50 Hz		50 Hz	
-25...+70 °C		-25...+70 °C		-25...+70 °C	
Yes		Yes		Yes	
Yes		Yes		Yes	
IEC 60947-5-2		IEC 60947-5-2		IEC 60947-5-2	
IP 67*		IP 67*		IP 67*	
2 m PVC cable, 4 x 0,5 mm ²		Flange connector M 12 x 1		Flange connector M 12 x 1	
Brass		Brass		Brass	
PTFE		PVC		PTFE	
PA/PPO		PA/PPO		PA/PPO	



CAPACITIVE SENSORS NormLine

Housing	M 30 x 1,5		M 30 x 1,5	
				
Technical data	Non-flush mountable		Non-flush mountable	
Sensing distance S_n ,	15 mm		15 mm	
Sensing distance min./max. adjustable	2...25 mm		2...25 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent	KAS-70-A24-A-K-NL	KA 0364	KAS-70-A24-A-K-Y3-NL	KA 0351
Type NPN normally open	KAS-70-A24-S-K-NL	KA 0367		
Type PNP antivalent	KAS-80-A24-A-K-NL	KA 0327	KAS-80-A24-A-K-Y3-NL	KA 0333
Type PNP normally open	KAS-80-A24-S-K-NL	KA 0326		
Type AC/DC normally open				
Type AC/DC normally closed				
Certificates	CE, RoHS, UL-CSA		CE, RoHS, UL-CSA	
Operating voltage (U_B)	12...30 V DC		12...30 V DC	
Output current (I_o)	200 mA / 2 x 200 mA		2 x 200 mA	
No load current (I_o)	< 15 mA		< 15 mA	
Load current min.	-		-	
Frequency of operating cycles max.	50 Hz		50 Hz	
Permitted ambient temperature	-25...+70 °C		-25...+70 °C	
LED display	Yes		Yes	
Protective circuit	Yes		Yes	
Norm	IEC 60947-5-2		IEC 60947-5-2	
Degree of protection IEC 60529*	IP 67*		IP 67*	
Connection	2 m PVC cable, 3 x 0,75 mm ² 4 x 0,5 mm ² for antivalent		Flange connector M 12 x 1	
Housing material	PA/PPO		PA/PPO	
Active surface	PA/PPO		PA/PPO	
Lid	PA/PPO		PA/PPO	

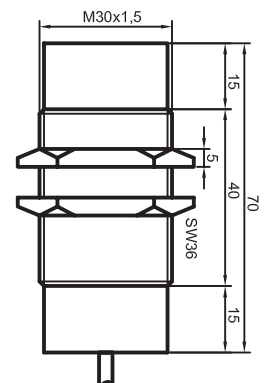
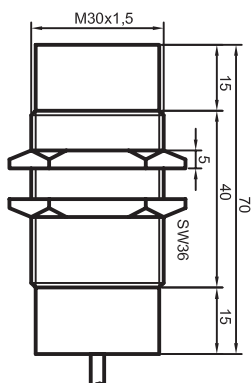
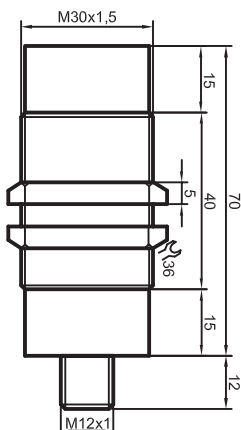
*With sealed potentiometer screw



Dimension M30 x 1,5

M 30 x 1,5		M 30 x 1,5		M30 x 1,5	
					
Non-flush mountable		Non-flush mountable		Non-flush mountable	
15 mm		15 mm		15 mm	
2...25 mm		2...20 mm		2...20 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-80-A24-A-K-Y3-3D-NL	KA 0734				
		KAS-90-A24-S-NL	KA 0523	KAS-90-A24-uC-S/Ö-NL	KA 0755
		KAS-90-A24-Ö-NL	KA 0524		
CE, RoHS, UL-CSA, ATEX, IECEx		CE, RoHS		CE, RoHS	
12...30 V DC		20...250 V AC/DC		20...250 V AC/DC	
2 x 200 mA		330 mA		330 mA	
< 15 mA		< 2,5 mA		< 2,5 mA	
-		5 mA		5 mA	
50 Hz		25 Hz		25 Hz	
-25...+70 °C		-25...+70 °C		-25...+70 °C	
Yes		Yes		Yes	
Yes		Yes		Yes	
IEC 60947-5-2		IEC 60947-5-2		IEC 60947-5-2	
IP 67*		IP 67*		IP 67*	
Flange connector M 12 x 1		2 m PVC cable, 2 x 0,75 mm²		2 m PVC cable, 2 x 0,75 mm² and 2 x 0.14 mm²	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		PA/PPO		PA/PPO	

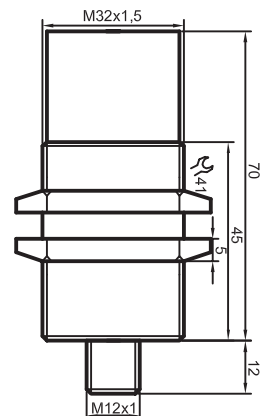
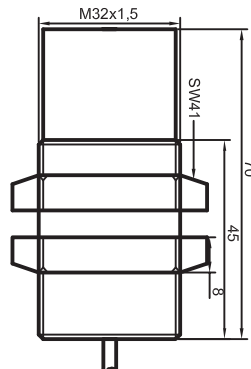
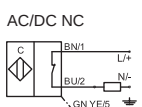
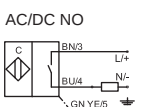
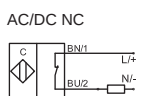
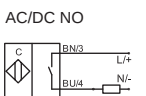
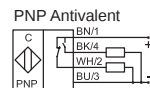
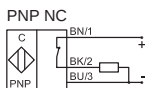
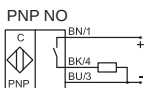
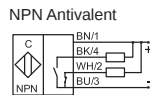
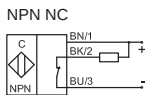
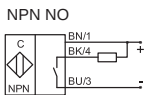
* NO and NC function selectable by means of a bridge.



CAPACITIVE SENSORS NormLine

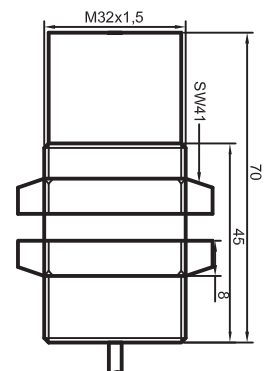
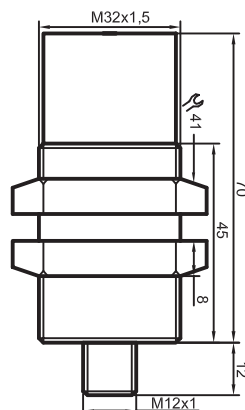
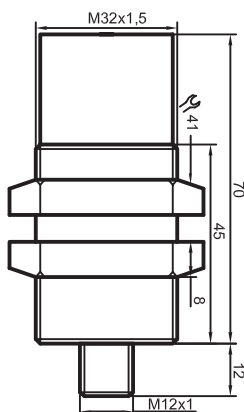
Housing	M 32 x 1,5		M 32 x 1,5	
				
				
Technical data	Non-flush mountable		Non-flush mountable	
Sensing distance S_n ,	20 mm		20 mm	
Sensing distance min./max. adjustable	2...30 mm		2...30 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent	KAS-70-35-A-M32-NL	KA 0727	KAS-70-34-A-M32-PTFE/MS-Y3-NL	KA 0722
Type NPN normally open	KAS-70-35-S-M32-NL	KA 0452		
Type PNP antivalent	KAS-80-35-A-M32-NL	KA 0440	KAS-80-34-A-M32-PTFE/MS-Y3-NL	KA 0721
Type PNP normally open	KAS-80-35-S-M32-NL	KA 0726		
Type AC/DC normally open				
Type AC/DC normally closed				
Certificates	CE, RoHS, UL-CSA		CE, RoHS, UL-CSA	
Operating voltage (U_B)	12...30 V DC		12...30 V DC	
Output current (I_o)	200 mA / 2 x 200 mA		2 x 200 mA	
No load current (I_o)	< 15 mA		< 15 mA	
Load current min.	-		-	
Frequency of operating cycles max.	50 Hz		50 Hz	
Permitted ambient temperature	-25...+70 °C		-25...+70 °C	
LED display	Yes		Yes	
Protective circuit	Yes		Yes	
Norm	IEC 60947-5-2		IEC 60947-5-2	
Degree of protection IEC 60529*	IP 67*		IP 67*	
Connection	2 m PVC cable, 3 x 0,75 mm ² 4 x 0,5 mm ² for antivalent		Flange connector M 12 x 1	
Housing material	PA/PPO		Brass	
Active surface	PA/PPO		PTFE	
Lid	PA/PPO		PA	

*With sealed potentiometer screw



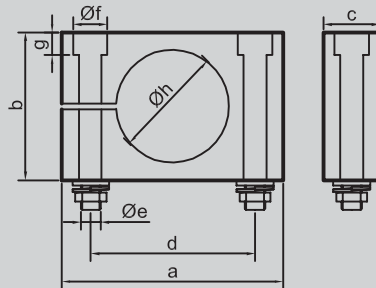
Dimension M32 x ,15

M 32 x 1,5		M 32 x 1,5		M 32 x 1,5	
					
Non-flush mountable		Non-flush mountable		Non-flush mountable	
20 mm		20 mm		20 mm	
2...30 mm		2...30 mm		3...25 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-80-35-A-M32-Y3-NL	KA 0417	KAS-80-35-A-M32-Y3-3D-NL	KA 0429		
				KAS-90-32-S-M32-NL	KA 0629
CE, RoHS, UL-CSA		CE, RoHS, UL-CSA, ATEX, IECEx		CE, RoHS	
12...30 V DC		12...30 V DC		20...250 V AC/DC	
2 x 200 mA		2 x 200 mA		330 mA	
< 15 mA		< 15 mA		< 2,5 mA	
		-		5 mA	
50 Hz		50 Hz		25 Hz	
-25...+70 °C		-25...+70 °C		-25...+70 °C	
Yes		Yes		Yes	
Yes		Yes		Yes	
IEC 60947-5-2		IEC 60947-5-2		IEC 60947-5-2	
IP 67*		IP 67*		IP 67*	
Flange connector M 12 x 1		Flange connector M 12 x 1		2 m PVC cable, 2 x 0,75 mm ²	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		PA/PPO		PA/PPO	
PA/PPO		PA/PPO		PA/PPO	



MOUNTING BLOCKS

Dimension:



Art.-No.	Block No.	$\varnothing$ Sensor [mm]	a	b	c	d	$\varnothing e$	$\varnothing f$	g	$\varnothing h$	Nuts
190150	131	10	30	20	10	20	4,3	8	4,5	10	M4
190200	132	11	30	20	10	20	4,3	8	4,5	11	M4
190250	133	20	45	30	15	30	5,3	9	6	20	M5
190300	134	22	45	30	15	30	5,3	9	6	22	M5
190350	135	30	60	45	15	45	5,3	9	6	30	M5
190400	136	32	60	45	15	45	5,3	9	6	32	M5
190450	137	34	60	45	15	45	5,3	9	6	34	M5
190030	138	40	80	65	15	65	5,3	9	6	40	M5
190050	139	50	80	65	15	65	5,3	9	6	50	M5
190100	140	64	95	80	15	80	5,3	9	6	64	M5

Dimensions „a” to „h” in mm

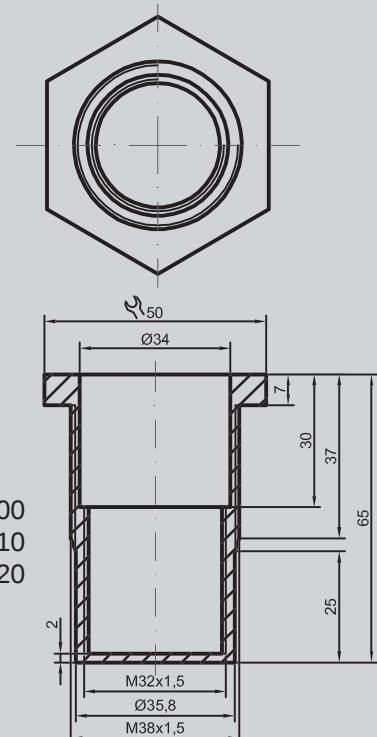
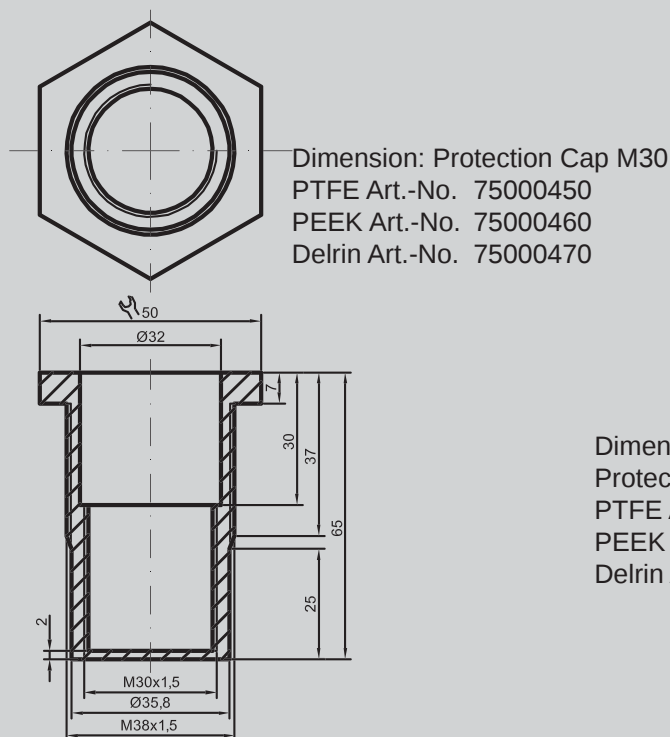
PROTECTION CAPS AND PROTECTION SETS

Protection Caps M30/M32 PTFE



PROTECTION CAP

The PTFE protection cap (PEEK and Delrin are also available) is designed for applications where the detected material is highly abrasive, e.g. granules. It is a protection cap for the front cap of the sensor. In the case of damage due to abrasion one only has to change the protection cap and the sensor remains in good condition.



Protection Set M32



PROTECTION SET

The PTFE protection set M32 x 1.5 consists of an internally threaded cover, a Pg9-screwing for cable entry and a rubber gasket between the cover and the sensor. This protection cover serves as improvement to the degree of protection, against infiltration of liquids, for example in applications where the sensor is totally immersed in liquids. The resistance of the material still needs to be checked.

The thread of the sensor has to be sealed, for example with PTFE sealing-tape. The protection cover has to be screwed totally up to the end, and then the Pg-screw has to be fixed.

Protection Set M18 Art.-No. 196305
Protection Set M30 Art.-No. 196302
Protection Set M32 Art.-No. 196301

FEMALE CONNECTORS

Sensor	Female connector		Article No.	LED	IP	Connection	Cable-length	Sensor + Length	Version
Type	No.	Fig.		Green/ yellow		[mm ²]	[m]	[mm]	Connector
pnP/nPn	9		191500	-	67	4 x 0,75/ Pg 9 clampable	-	28	Y3, Y5 antivalent
AC/DC	9a		191550	-	67	4 x 0,75/ Pg 9 clampable	-	28	Y1
pnP/nPn	16		191900	-	67	4 x 0,34	2,5	17	Y3, Y5
pnP/nPn	18		192000	-	67	3 x 0,34	5	35	Y3, Y5
pnP	21		192150	+	67	3 x 0,34	5	18	Y3, Y5
nPn	22		192200						
pnP/nPn	36		192900	-	67	4 x 0,25	5	31	Y3, Y5 antivalent
pnP/nPn	38		193000	-	67	4 x 0,25	5	17	Y3, Y5 antivalent
pnP/nPn	45		193210	-	67	3 x 0,25	5	29	Y7, Y8
pnP	46		193220	+	67	3 x 0,25	5	12	Y7, Y8
pnP/nPn	47		193230	-					
pnP/nPn	49a		193345	-	68	5 x 0,25	2	20	Y10
pnP/nPn AC/DC	50		193350	-	67	5 x 0,25	2	18	Y1, Y9
pnP/nPn	57a		193385		67	4 x 0,34	5	18	Y3, Y5 antivalent
NAMUR	58a		193386		67	2 x 0,34	5	18	Y3, Y5

SENSOR HOLDER



Sensor holder for tube mounting

- Housing material PP or PTFE
- Sensor holder for optimal tube mounting, e. g. for level control on bypass tubes
- Mechanically very solid
- Suitable for sensors in M18 x 1 (H-M18...) or M30 x 1.5 (H-M30...) body

Art.-No.	Description	Material	Connection
196310	H-M30-1"-PP	PP	1" Tube
196311	H-M30-3/4"-PP	PP	3/4" Tube
196312	H-M30-1/2"-PP	PP	1/2" Tube
196313	H-M18-1/2"-PP	PP	1/2" Tube
196314	H-M18-6.5-PP	PP	D. 6.5 Tube
196315	H-M18-5.0-PP	PP	D. 5.0 Tube
196316	H-M30-1"-PTFE	PTFE	1" Tube
196317	H-M30-3/4"-PTFE	PTFE	3/4" Tube
196318	H-M30-1/2"-PTFE	PTFE	1/2" Tube
196319	H-M18-1/2"-PTFE	PTFE	1/2" Tube
196320	H-M18-6.5-PTFE	PTFE	D. 6.5 Tube
196321	H-M18-5.0-PTFE	PTFE	D. 5.0 Tube



Holder for Sensor M30 - tube 3/4", PTFE



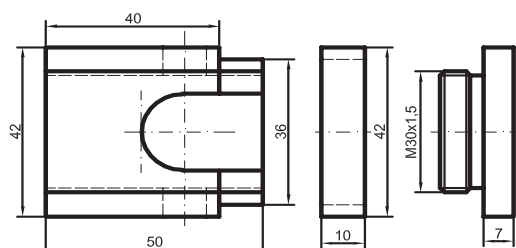
Holder for Sensor M30 - tube D 5.0, Nylon



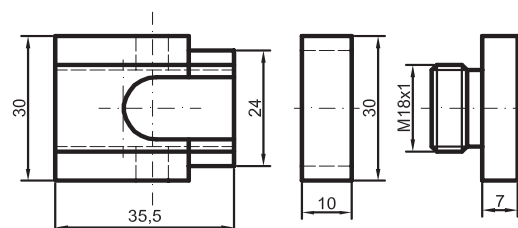
Holder for Sensor M18 - tube D.6.5, Nylon

DIMENSIONS

H-M30-3/4"(1/2")...



H-M18-6.5(5.0)...



TYPE SELECTION IN ARTICLE NUMBER ORDER

Art.-No.	Type	Page
190030	Mounting block Nr. 138	28
190050	Mounting block Nr. 139	28
190100	Mounting block Nr. 140	28
190150	Mounting block Nr. 131	28
190200	Mounting block Nr. 132	28
190250	Mounting block Nr. 133	28
190300	Mounting block Nr. 134	28
190350	Mounting block Nr. 135	28
190400	Mounting block Nr. 136	28
190450	Mounting block Nr. 137	28
191500	Female connector No. 9	30
191550	Female connector No. 9a	30
191900	Female connector No. 16	30
192200	Female connector No. 21	30
192200	Female connector No. 22	30
192900	Female connector No. 36	30
193000	Female connector No. 37	30
193210	Female connector No. 45	30
193220	Female connector No. 46	30
193230	Female connector No. 47	30
193345	Female connector No. 49a	30
193350	Female connector No. 50	30
193385	Female connector No. 57a	30
193386	Female connector No. 58a	30
196301	Sealing set M32	29
196302	Sealing set M30	29
196305	Sealing set M18	29
196310	H-M30-1"-PP	31
196311	H-M30-3/4"-PP	31
196312	H-M30-1/2"-PP	31
196313	H-M18-1/2"-PP	31
196314	H-M18-6.5-PP	31
196315	H-M18-5.0-PP	31
196316	H-M30-1"-PTFE	31
196317	H-M30-3/4"-PTFE	31
196318	H-M30-1/2"-PTFE	31
196319	H-M18-1/2"-PTFE	31
196320	H-M18-6.5-PTFE	31
196321	H-M18-5.0-PTFE	31
75000400	Protection cover M32	29

Art.-No.	Type	Page
75000410	Protection cover M32	29
75000420	Protection cover M32	29
75000450	Protection cover M30	29
75000460	Protection cover M30	29
75000470	Protection cover M30	29
KA0324	KAS-80-A23-S-K-NL	19
KA0325	KAS-80-A23-A-K-NL	19
KA0326	KAS-80-A24-S-K-NL	24
KA0327	KAS-80-A24-A-K-NL	24
KA0333	KAS-80-A24-A-K-Y3-NL	24
KA0334	KAS-80-A24-S-NL	22
KA0335	KAS-80-A24-A-NL	22
KA0336	KAS-80-A24-A-Y3-NL	23
KA0351	KAS-70-A24-A-K-Y3-NL	24
KA0360	KAS-70-A24-A-NL	22
KA0362	KAS-70-A23-A-K-NL	19
KA0364	KAS-70-A24-A-K-NL	24
KA0365	KAS-70-A24-A-Y3-NL	23
KA0366	KAS-70-A24-S-NL	22
KA0367	KAS-70-A24-S-K-NL	24
KA0368	KAS-70-A23-S-K-NL	19
KA0412	KAS-80-A24-A-PTFE/MS-NL	23
KA0413	KAS-80-A24-A-PTFE/MS-Y3-NL	23
KA0414	KAS-70-A24-A-PTFE/MS-NL	23
KA0417	KAS-80-35-A-M32-Y3-NL	27
KA0429	KAS-80-35-A-M32-Y3-3D-NL, ATEX	27
KA0437	KAS-70-A23-A-PTFE/MS-NL	18
KA0440	KAS-80-35-A-M32-NL	26
KA0445	KAS-80-A23-A-K-Y3-NL	19
KA0452	KAS-70-35-S-M32-NL	26
KA0514	KAS-70-A14-S-K-NL	20
KA0523	KAS-90-A24-S-NL	25
KA0524	KAS-90-A24-Ö-NL	25
KA0554	KAS-80-A14-A-K-NL	20
KA0555	KAS-70-A14-A-K-NL	20
KA0574	KAS-80-A14-A-K-Y3-NL	21
KA0603	KAS-90-A14-S-NL	21
KA0605	KAS-90-A23-S-NL	19
KA0606	KAS-90-A23-Ö-NL	19

TYPE SELECTION IN ARTICLE NUMBER ORDER

Art.-No.	Type	Page
KA0607	KAS-80-A13-A-K-Y3-NL	17
KA0609	KAS-70-A13-S-K-Y3-NL	17
KA0629	KAS-90-32-S-M32-NL	27
KA0634	KAS-90-A13-S-NL	17
KA0637	KAS-70-A13-A-K-NL	17
KA0641	KAS-90-A14-Ö-NL	21
KA0648	KAS-70-A13-S-K-NL	17
KA0660	KAS-80-A14-A-Y5-NL	21
KA0663	KAS-80-A14-S-NL	20
KA0664	KAS-70-A14-S-NL	20
KA0665	KAS-80-A14-A-NL	20
KA0666	KAS-80-A13-S-NL	16
KA0667	KAS-80-A13-A-Y5-NL	16
KA0668	KAS-80-A13-A-NL	16
KA0669	KAS-80-A12-S-NL	14
KA0670	KAS-80-A12-A-Y5-NL	15
KA0671	KAS-80-A12-A-NL	14
KA0672	KAS-70-A13-S-NL	16
KA0673	KAS-70-A12-S-NL	14
KA0674	KAS-90-A14-S-MS/PPO-NL	22
KA0675	KAS-90-A14-Ö-MS/PPO-NL	22
KA0676	KAS-90-A13-S-MS/PPO-NL	18
KA0677	KAS-90-A13-Ö-MS/PPO-NL	18
KA0680	KAS-80-A13-A-K-NL	17
KA0705	KAS-70-A12-A-NL	14
KA0706	KAS-70-A12-A-K-NL	14
KA0707	KAS-70-A12-S-K-NL	14
KA0708	KAS-80-A12-A-K-NL	14
KA0709	KAS-80-A12-S-K-NL	14
KA0710	KAS-70-A12-A-Y5-NL	15
KA0711	KAS-70-A22-A-NL	15
KA0712	KAS-70-A22-S-NL	15
KA0713	KAS-80-A22-A-NL	15
KA0714	KAS-80-A22-S-NL	15
KA0715	KAS-70-A22-A-Y5-NL	15
KA0716	KAS-80-A22-A-Y5-NL	15
KA0717	KAS-80-A13-S-K-NL	17
KA0718	KAS-70-A13-A-NL	16
KA0719	KAS-70-A14-A-NL	20
KA0720	KAS-80-A14-S-K-NL	20

Art.-No.	Type	Page
KA0721	KAS-80-34-A-M32-PTFE-MS-Y3-NL	26
KA0722	KAS-70-34-A-M32-PTFE/MS-Y3-NL	26
KA0724	KAS-90-A13-Ö-NL	17
KA0725	KAS-80-A23-A-PTFE/MS-NL	18
KA0726	KAS-80-35-S-M32-NL	26
KA0727	KAS-70-35-A-M32-NL	26
KA0734	KAS-80-A24-A-K-Y3-3D-NL, ATEX	25
KA0755	KAS-90-A24-üC-S/Ö-NL	25

TYPE SELECTION IN TYPE CODE ORDER

Art.-No.	Type	Page
75000450	Protection cover M30	29
75000460	Protection cover M30	29
75000470	Protection cover M30	29
75000400	Protection cover M32	29
75000410	Protection cover M32	29
75000420	Protection cover M32	29
196305	Sealing set M18	29
196302	Sealing set M30	29
196301	Sealing set M32	29
196313	H-M18-1/2"-PP	31
196319	H-M18-1/2"-PTFE	31
196315	H-M18-5.0-PP	31
196321	H-M18-5.0-PTFE	31
196314	H-M18-6.5-PP	31
196320	H-M18-6.5-PTFE	31
196310	H-M30-1"-PP	31
196316	H-M30-1"-PTFE	31
196312	H-M30-1/2"-PP	31
196318	H-M30-1/2"-PTFE	31
196311	H-M30-3/4"-PP	31
196317	H-M30-3/4"-PTFE	31
191900	Female connector No. 16	30
192200	Female connector No. 21	30
192200	Female connector No. 22	30
192900	Female connector No. 36	30
193000	Female connector No. 37	30
193210	Female connector No. 45	30
193220	Female connector No. 46	30
193230	Female connector No. 47	30
193345	Female connector No. 49a	30
193350	Female connector No. 50	30
193385	Female connector No. 57a	30
193386	Female connector No. 58a	30
191500	Female connector No. 9	30
191550	Female connector No. 9a	30
KA0727	KAS-70-35-A-M32-NL	26
KA0452	KAS-70-35-S-M32-NL	26
KA0706	KAS-70-A12-A-K-NL	14
KA0705	KAS-70-A12-A-NL	14
KA0710	KAS-70-A12-A-Y5-NL	15

Art.-No.	Type	Page
KA0707	KAS-70-A12-S-K-NL	14
KA0673	KAS-70-A12-S-NL	14
KA0637	KAS-70-A13-A-K-NL	17
KA0718	KAS-70-A13-A-NL	16
KA0648	KAS-70-A13-S-K-NL	17
KA0609	KAS-70-A13-S-K-Y3-NL	17
KA0672	KAS-70-A13-S-NL	16
KA0555	KAS-70-A14-A-K-NL	20
KA0719	KAS-70-A14-A-NL	20
KA0514	KAS-70-A14-S-K-NL	20
KA0664	KAS-70-A14-S-NL	20
KA0711	KAS-70-A22-A-NL	15
KA0715	KAS-70-A22-A-Y5-NL	15
KA0712	KAS-70-A22-S-NL	15
KA0362	KAS-70-A23-A-K-NL	19
KA0437	KAS-70-A23-A-PTFE/MS-NL	18
KA0368	KAS-70-A23-S-K-NL	19
KA0364	KAS-70-A24-A-K-NL	24
KA0351	KAS-70-A24-A-K-Y3-NL	24
KA0360	KAS-70-A24-A-NL	22
KA0414	KAS-70-A24-A-PTFE/MS-NL	23
KA0365	KAS-70-A24-A-Y3-NL	23
KA0367	KAS-70-A24-S-K-NL	24
KA0366	KAS-70-A24-S-NL	22
KA0722	KAS-70-34-A-M32-PTFE/MS-Y3-NL	26
KA0440	KAS-80-35-A-M32-NL	26
KA0429	KAS-80-35-A-M32-Y3-3D-NL, ATEX	27
KA0417	KAS-80-35-A-M32-Y3-NL	27
KA0726	KAS-80-35-S-M32-NL	26
KA0708	KAS-80-A12-A-K-NL	14
KA0671	KAS-80-A12-A-NL	14
KA0670	KAS-80-A12-A-Y5-NL	15
KA0709	KAS-80-A12-S-K-NL	14
KA0669	KAS-80-A12-S-NL	14
KA0680	KAS-80-A13-A-K-NL	17
KA0607	KAS-80-A13-A-K-Y3-NL	17
KA0668	KAS-80-A13-A-NL	16
KA0667	KAS-80-A13-A-Y5-NL	16

TYPE SELECTION IN TYPE CODE ORDER

Art.-No.	Type	Page
KA0717	KAS-80-A13-S-K-NL	17
KA0666	KAS-80-A13-S-NL	16
KA0554	KAS-80-A14-A-K-NL	20
KA0574	KAS-80-A14-A-K-Y3-NL	21
KA0665	KAS-80-A14-A-NL	20
KA0660	KAS-80-A14-A-Y5-NL	21
KA0720	KAS-80-A14-S-K-NL	20
KA0663	KAS-80-A14-S-NL	20
KA0713	KAS-80-A22-A-NL	15
KA0716	KAS-80-A22-A-Y5-NL	15
KA0714	KAS-80-A22-S-NL	15
KA0325	KAS-80-A23-A-K-NL	19
KA0445	KAS-80-A23-A-K-Y3-NL	19
KA0725	KAS-80-A23-A-PTFE/MS-NL	18
KA0324	KAS-80-A23-S-K-NL	19
KA0327	KAS-80-A24-A-K-NL	24
KA0333	KAS-80-A24-A-K-Y3-NL	24
KA0335	KAS-80-A24-A-NL	22
KA0412	KAS-80-A24-A-PTFE/MS-NL	23
KA0413	KAS-80-A24-A-PTFE/MS-Y3-NL	23
KA0336	KAS-80-A24-A-Y3-NL	23
KA0734	KAS-80-A24-A-K-Y3-3D-NL, ATEX	25
KA0326	KAS-80-A24-S-K-NL	24
KA0334	KAS-80-A24-S-NL	22
KA0721	KAS-80-34-A-M32-PTFE/MS-Y3-NL	26
KA0629	KAS-90-32-S-M32-NL	27
KA0677	KAS-90-A13-Ö-MS/PPO-NL	18
KA0724	KAS-90-A13-Ö-NL	17
KA0676	KAS-90-A13-S-MS/PPO-NL	18
KA0634	KAS-90-A13-S-NL	17
KA0675	KAS-90-A14-Ö-MS/PPO-NL	22
KA0641	KAS-90-A14-Ö-NL	21
KA0674	KAS-90-A14-S-MS/PPO-NL	22
KA0603	KAS-90-A14-S-NL	21
KA0606	KAS-90-A23-Ö-NL	19
KA0605	KAS-90-A23-S-NL	19
KA0524	KAS-90-A24-Ö-NL	25
KA0523	KAS-90-A24-S-NL	25
KA0755	KAS-90-A24-uC-S/Ö-NL	25
190150	Mounting block Nr. 131	28

Art.-No.	Type	Page
190200	Mounting block Nr. 132	28
190250	Mounting block Nr. 133	28
190300	Mounting block Nr. 134	28
190350	Mounting block Nr. 135	28
190400	Mounting block Nr. 136	28
190450	Mounting block Nr. 137	28
190030	Mounting block Nr. 138	28
190050	Mounting block Nr. 139	28
190100	Mounting block Nr. 140	28

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