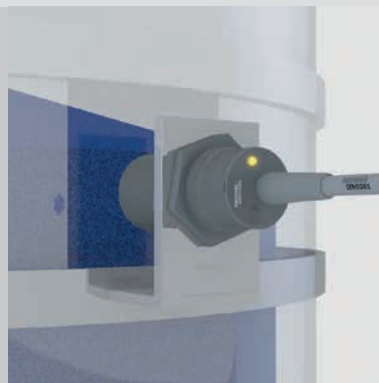


***CAPACITIVE
SENSORS
KAS***

NormLine





Registration No.: 1327-01



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.

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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.



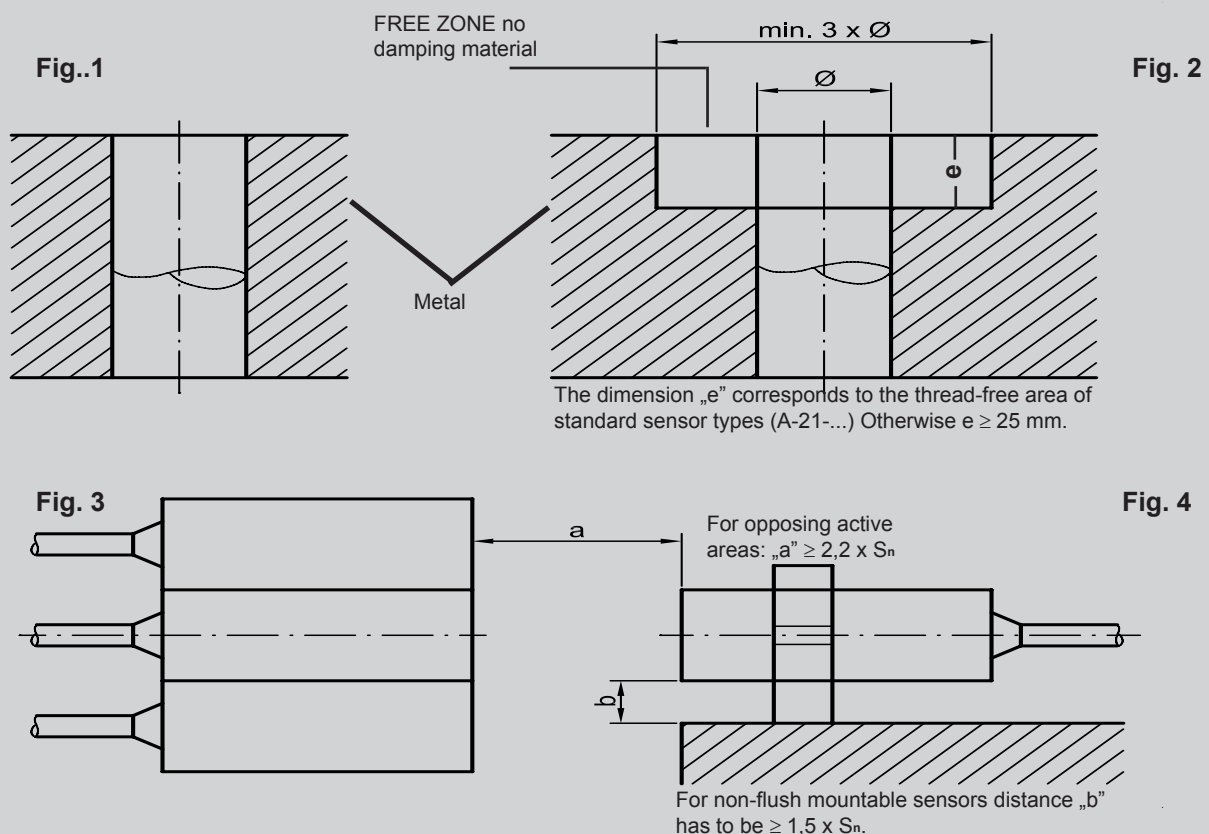
All these demands are met by *NormLine* sensors, the recommended types are ideal for standard applications, meeting international standards giving the user off the shelf items and latest technology for an economic price.

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:

- 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)
- 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

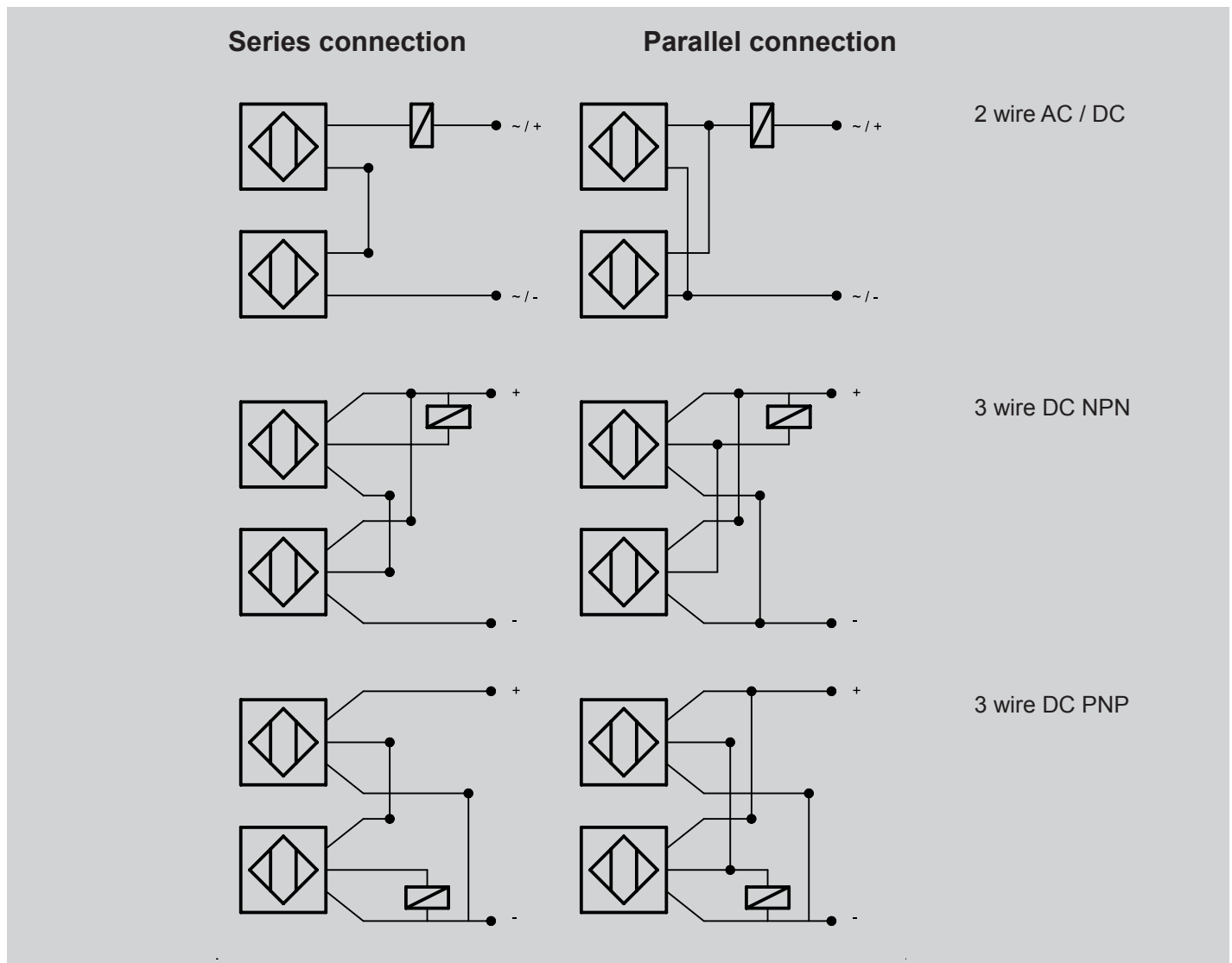


TECHNOLOGY

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.



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 | M 18 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.

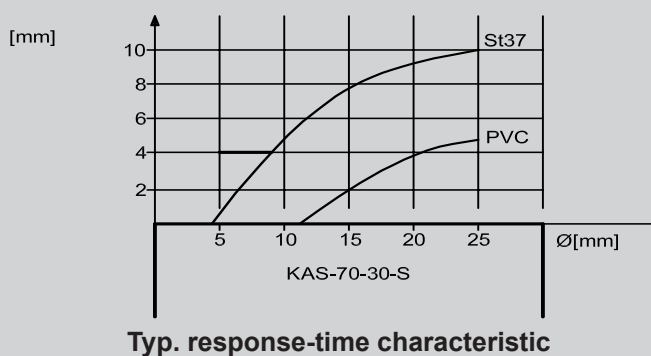
Temperature variation

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

MOUNTING

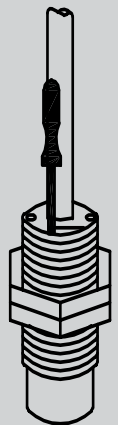
The data of the **nominal sensing distance** are based on the measuring method according to DIN VDE 0660, Part 208. The respective nominal sensing distance is indicated with a tolerance of $\pm 10\%$. The **standard measurement plate** is square with a thickness of 1 mm and is made of carbon steel FE 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.

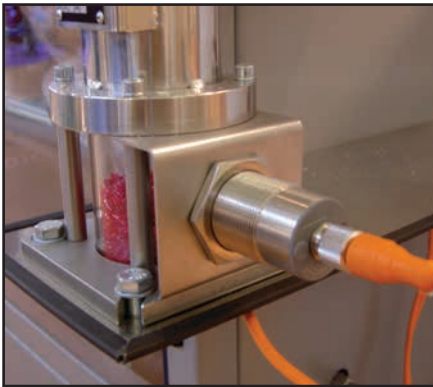
| Material: | FE 360 | St 37 | Water | Wheat | Wood | Glass | Oil | PVC | PE | Ceramic |
|--------------------------|--------|-------|-------|-------|------|-------|-----|-----|------|---------|
| Reduction factor approx. | 1 | 1 | 1 | 0,8 | 0,7 | 0,6 | 0,4 | 0,4 | 0,37 | 0,3 |

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.

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.



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 9001:2008.

 - 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.

2014/30/EU
EMC Directive (EN 60 947-5-2)

2014/35/EU
Low-voltage Directive (compare with VDE 0160, product standard EN 60947-5-2)

Directive 2014/34/EU
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 DAkkS for testings according to IEC/EN 60947-5-2 and also an accredited EMC laboratory.

TYPE CODE KAS...NL

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)

S = Normally open function (NO)

Ö = Normally closed function (NC)

A...

= European standard

A12 = M 12 x 1 flush mountable

A22 = M 12 x 1 non-flush mountable

A13 = M 18 x 1 flush mountable

A23 = M 18 x 1 non-flush mountable

A14 = M 30 x 1 flush mountable

A24 = M 30 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

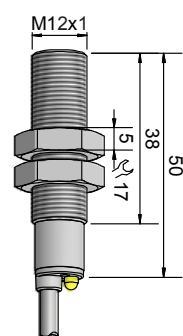
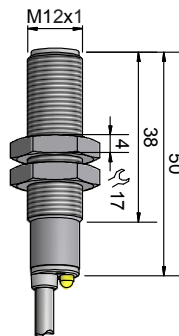
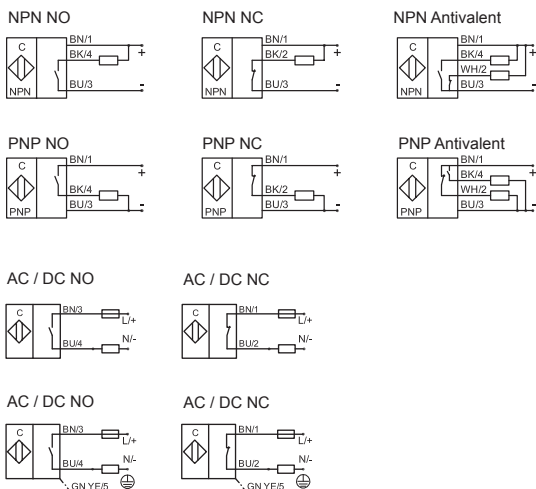
M 12 x 1

CE



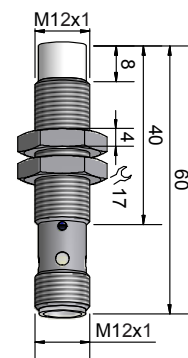
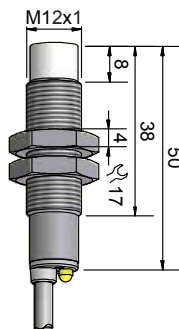
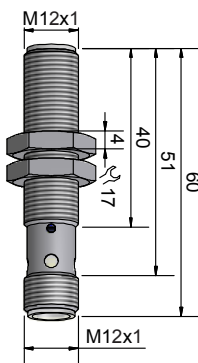
| Technical data | Flush mountable | | Flush mountable | |
|--|---|----------|---|----------|
| Sensing distance S_n , [mm] | 2 mm | | 2 mm | |
| Sensing distance min. / max. [mm] adjustable | 0.5...5 mm | | 0.5...5 mm | |
| | Type code | Art. No. | Type code | Art. No. |
| Type NPN antivalent (NO / NC) | KAS-70-A12-A-NL | KA 0705 | KAS-70-A12-A-K-NL | KA 0706 |
| Type NPN normally open (NO) | KAS-70-A12-S-NL | KA 0673 | | |
| Type PNP antivalent (NO / NC) | KAS-80-A12-A-NL | KA 0671 | KAS-80-A12-A-K-NL | KA 0708 |
| Type PNP normally open (NO) | KAS-80-A12-S-NL | KA 0669 | KAS-80-A12-S-K-NL | KA 0709 |
| Type AC / DC normally open (NO) | | | | |
| Type AC / DC normally closed (NC) | | | | |
| Certificates | CE, RoHS, UL-CSA | | CE, RoHS, UL-CSA | |
| Operating voltage (U_g) | 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 cable, PUR, 3 x 0.14 mm ² 4 x 0.14 mm ² for antivalent | | 2 m cable, PUR, 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 M 12 x 1

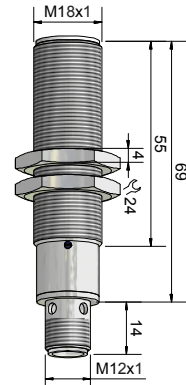
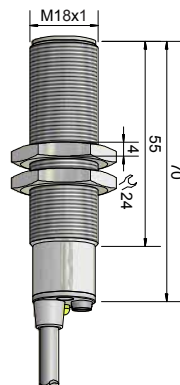
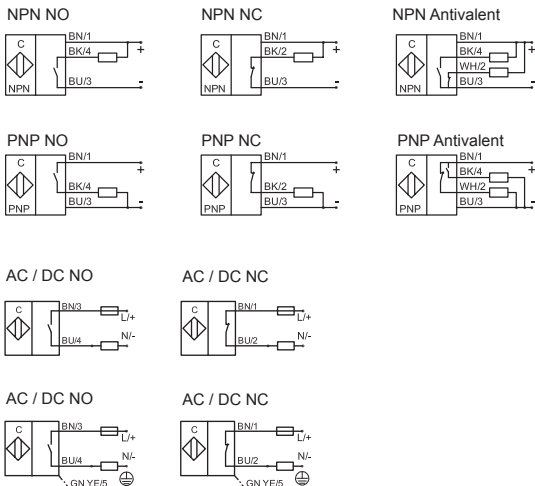
| M 12 x 1 | | M 12 x 1 | | M 12 x 1 | |
|---|----------|---|----------|---|----------|
|  | |  | |  | |
| Flush mountable | | Non-flush mountable | | Non-flush mountable | |
| 2 mm | | 4 mm | | 4 mm | |
| 0.5...5 mm | | 1...8 mm | | 1...8 mm | |
| Type code | Art. No. | Type code | Art. No. | Type code | 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 cable, PUR, 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 (FDA 21 CFR 177.1550) | | PTFE (FDA 21 CFR 177.1550) | |
| - | | PA / PPO | | - | |



CAPACITIVE SENSORS NormLine

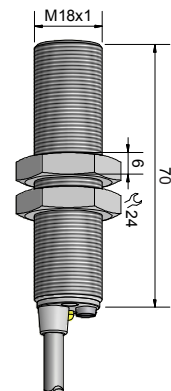
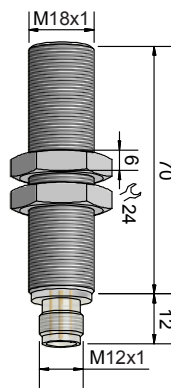
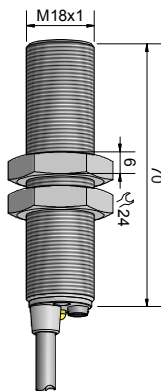
| Housing | M 18 x 1 | M 18 x 1 |
|--|--|---------------------------|
| |  | |
| |  | |
| Technical data | Flush mountable | Flush mountable |
| Sensing distance S_n , [mm] | 5 mm | 5 mm |
| Sensing distance min. / max. [mm] adjustable | 1...8 mm | 1...8 mm |
| | Type code | Art. No. |
| Type NPN antivalent (NO / NC) | KAS-70-A13-A-NL | KA 0718 |
| Type NPN normally open (NO) | KAS-70-A13-S-NL | KA 0672 |
| Type PNP antivalent (NO / NC) | KAS-80-A13-A-NL | KA 0668 |
| Type PNP normally open (NO) | KAS-80-A13-S-NL | KA 0666 |
| Type AC / DC normally open (NO) | | |
| Type AC / DC normally closed (NC) | | |
| 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 M 18 x 1

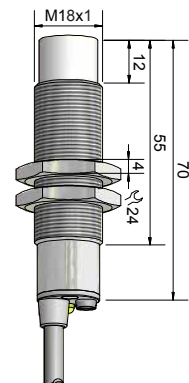
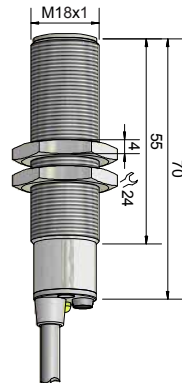
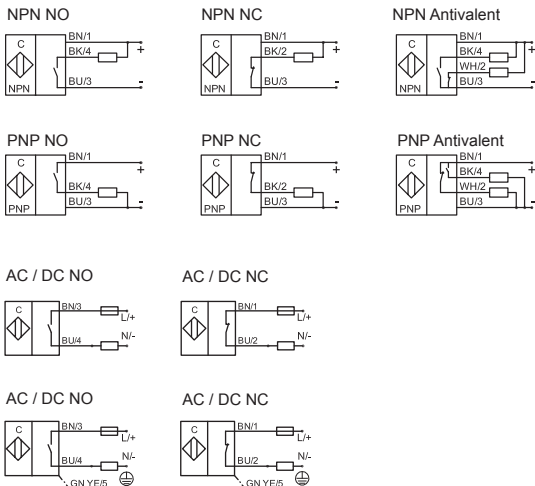
| M 18 x 1 | | M 18 x 1 | | M 18 x 1 | |
|--|----------|---|----------|---|----------|
|  | |  | |  | |
| Flush mountable | | Flush mountable | | Flush mountable | |
| 5 mm | | 5 mm | | 5 mm | |
| 1...8 mm | | 1...8 mm | | 1...8 mm | |
| Type code | Art. No. | Type code | Art. No. | Type code | Art. 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, UL-CSA | |
| 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 (ETL = +60 °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 cable, PUR 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

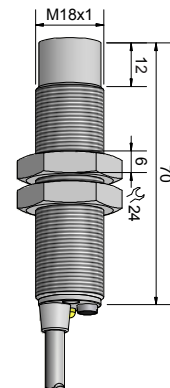
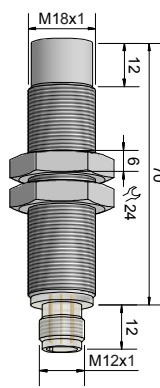
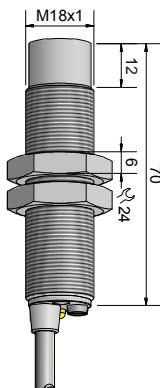
| Housing | M 18 x 1 | M 18 x 1 |
|--|--|---|
| |  | |
| |  | |
| Technical data | Flush mountable | Non-flush mountable |
| Sensing distance S_n , [mm] | 5 mm | 8 mm |
| Sensing distance min. / max. [mm] adjustable | 1...8 mm | 1...10 mm |
| | Type code | Art. No. |
| Type NPN antivalent (NO / NC) | | KAS-70-A23-A-PTFE/MS-NL KA 0437 |
| Type NPN normally open (NO) | | |
| Type PNP antivalent (NO / NC) | | KAS-80-A23-A-PTFE/MS-NL KA0725 |
| Type PNP normally open (NO) | | |
| Type AC / DC normally open (NO) | KAS-90-A13-S-MS/PPO-NL KA 0676 | |
| Type AC / DC normally closed (NC) | KAS-90-A13-Ö-MS/PPO-NL KA 0677 | |
| Certificates | CE, RoHS, UL-CSA | CE, RoHS, UL-CSA |
| Operating voltage (U_B) | 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 (ETL = +60 °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 | 2 m cable, PVC, 4 x 0.34 mm ² |
| Housing material | Brass | Brass |
| Active surface | PPO | PTFE (FDA 21 CFR 177.1550) |
| Lid | PPO | PA / PPO |

*With sealed potentiometer screw



Dimension M 18 x 1

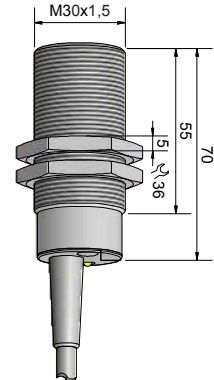
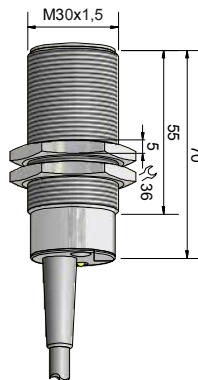
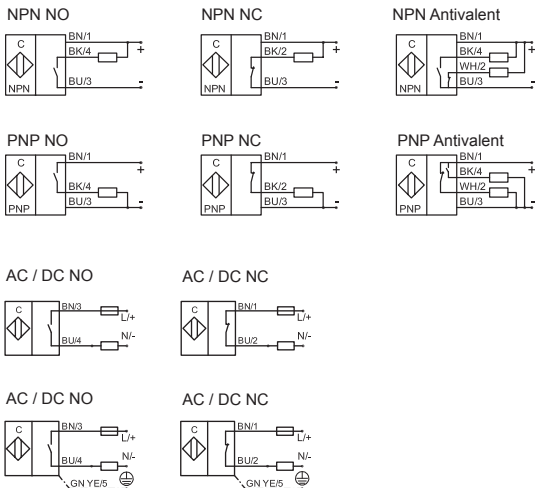
| M 18 x 1 | | M 18 x 1 | | M 18 x 1 | |
|--|----------|---|----------|---|----------|
|  | |  | |  | |
| Non-flush mountable | | Non-flush mountable | | Non-flush mountable | |
| 8 mm | | 8 mm | | 8 mm | |
| 1...10 mm | | 1...10 mm | | 1...10 mm | |
| Type code | Art. No. | Type code | Art. No. | Type 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 (ETL = +60 °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 cable, PVC, 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

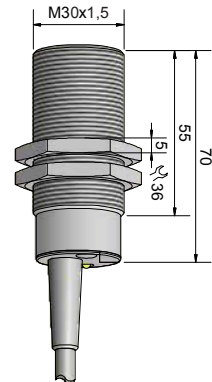
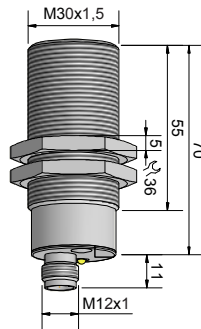
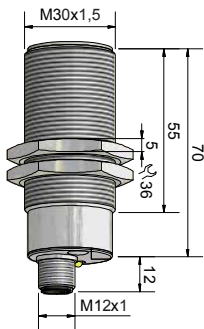
| Housing | M 30 x 1.5 | M 30 x 1.5 |
|--|---|--|
| |  | |
| |  | |
| |  | |
| Technical data | Flush mountable | |
| Sensing distance S_n , [mm] | 10 mm | |
| Sensing distance min. / max. [mm] adjustable | 2...20 mm | |
| | Type code | Art. No. |
| Type NPN antivalent (NO / NC) | KAS-70-A14-A-NL | KA 0719 |
| Type NPN normally open (NO) | KAS-70-A14-S-NL | KA 0664 |
| Type PNP antivalent (NO / NC) | KAS-80-A14-A-NL | KA 0665 |
| Type PNP normally open (NO) | KAS-80-A14-S-NL | KA 0663 |
| Type AC / DC normally open (NO) | | |
| Type AC / DC normally closed (NC) | | |
| Certificates | CE, RoHS, UL-CSA | |
| Operating voltage (U_B) | 12...30 V DC | |
| Output current (I_o) | 200 mA / 2 x 200 mA | |
| No load current (I_o) | < 15 mA | |
| Load current min. | - | |
| Frequency of operating cycles max. | 150 Hz | |
| Permitted ambient temperature | -25...+70 °C | |
| LED display | Yes | |
| Protective circuit | Yes | |
| Norm | IEC 60947-5-2 | |
| Degree of protection IEC 60529* | 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 | |
| Active surface | PA / PPO | |
| Lid | PA / PPO | |

*With sealed potentiometer screw



Dimension M 30 x 1.5

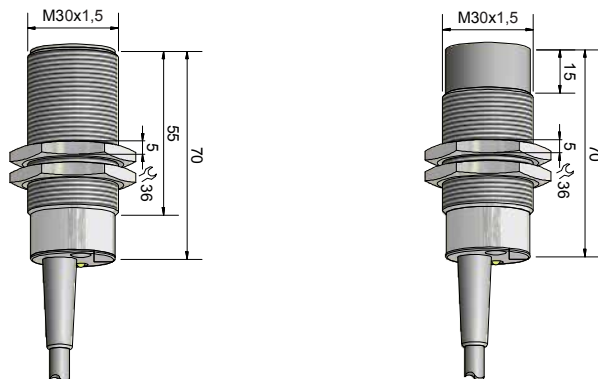
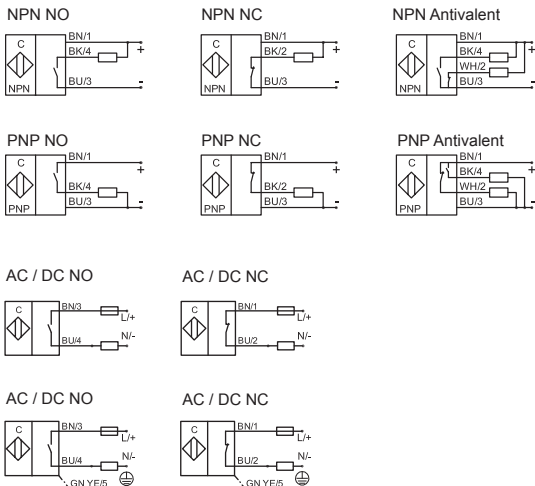
| M 30 x 1.5 | | M 30 x 1.5 | | M 30 x 1.5 | |
|---|----------|---|----------|---|----------|
|  | |  | |  | |
| Flush mountable | | Flush mountable | | Flush mountable | |
| 10 mm | | 10 mm | | 10 mm | |
| 2...20 mm | | 2...20 mm | | 2...20 mm | |
| Type code | Art. No. | Type code | Art. No. | Type 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, UL-CSA | |
| 12...30 V DC | | 12...30 V DC | | 20...250 V AC / DC | |
| 2 x 200 mA | | 2 x 200 mA | | 330 mA (ETL = 250 mA) | |
| < 15 mA | | < 15 mA | | < 3 mA | |
| - | | - | | 5 mA | |
| 150 Hz | | 150 Hz | | 25 Hz | |
| -25...+70 °C | | -25...+70 °C | | -25...+70 °C (ETL = +60 °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 cable, PVC, 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

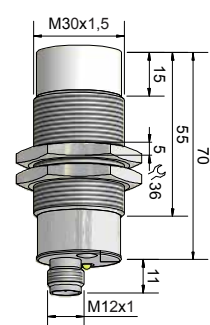
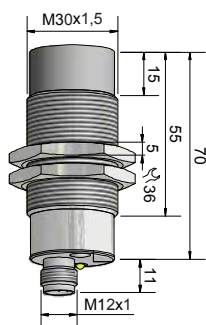
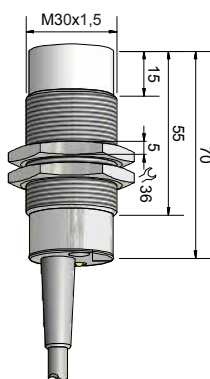
| Housing | M 30 x 1.5 | | M 30 x 1.5 | |
|--|---|----------|---|----------|
| |  | |  | |
| | | |  | |
| Technical data | Flush mountable | | Non-flush mountable | |
| Sensing distance S_n , [mm] | 10 mm | | 15 mm | |
| Sensing distance min. / max. [mm] adjustable | 2...20 mm | | 2...25 mm | |
| | Type code | Art. No. | Type code | Art. No. |
| Type NPN antivalent (NO / NC) | | | KAS-70-A24-A-NL | KA 0360 |
| Type NPN normally open (NO) | | | KAS-70-A24-S-NL | KA 0366 |
| Type PNP antivalent (NO / NC) | | | KAS-80-A24-A-NL | KA 0335 |
| Type PNP normally open (NO) | | | KAS-80-A24-S-NL | KA 0334 |
| Type AC / DC normally open (NO) | KAS-90-A14-S-MS/PPO-NL | KA 0674 | | |
| Type AC / DC normally closed (NC) | KAS-90-A14-Ö-MS/PPO-NL | KA 0675 | | |
| Certificates | CE, RoHS, UL-CSA | | CE, RoHS, UL-CSA | |
| Operating voltage (U_B) | 20...250 V AC / DC | | 12...30 V DC | |
| Output current (I_o) | 330 mA (ETL = 250 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 (ETL = +60 °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, PVC, 3 x 0.75 mm ² | | 2 m cable, PVC, 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 M 30 x 1.5

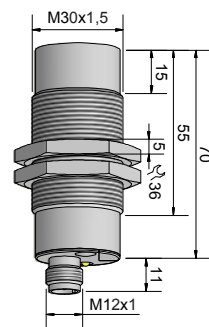
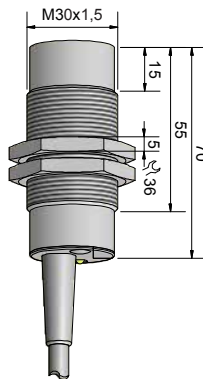
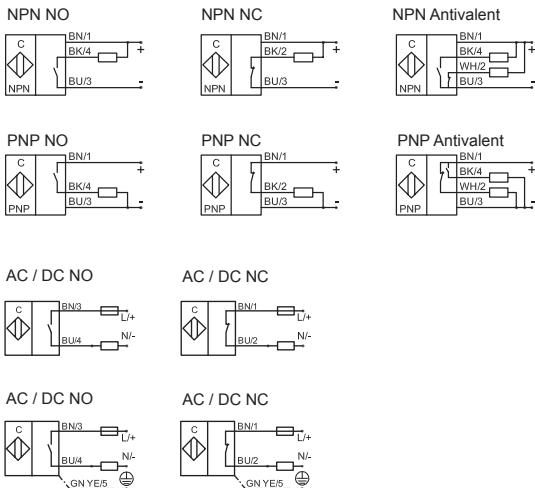
| M 30 x 1.5 | | M 30 x 1.5 | | M 30 x 1.5 | |
|---|----------|---|----------|---|----------|
|  | |  | |  | |
| Non-flush mountable | | Non-flush mountable | | Non-flush mountable | |
| 15 mm | | 15 mm | | 15 mm | |
| 2...25 mm | | 2...25 mm | | 2...25 mm | |
| Type code | Art. No. | Type code | Art. 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 cable, PVC, 4 x 0.5 mm ² | | Flange connector M 12 x 1 | | Flange connector M 12 x 1 | |
| Brass | | Brass | | Brass | |
| PTFE (FDA 21 CFR 177.1550) | | PVC | | PTFE (FDA 21 CFR 177.1550) | |
| PA / PPO | | PA / PPO | | PA / PPO | |



CAPACITIVE SENSORS NormLine

| Housing | M 30 x 1.5 | M 30 x 1.5 |
|--|--|---|
| CE |  |  |
| Technical data | Non-flush mountable | |
| Sensing distance S_n , [mm] | 15 mm | |
| Sensing distance min. / max. [mm] adjustable | 2...25 mm | |
| | Type code | Art. No. |
| Type NPN antivalent (NO / NC) | KAS-70-A24-A-K-NL | KA 0364 |
| Type NPN normally open (NO) | KAS-70-A24-S-K-NL | KA 0367 |
| Type PNP antivalent (NO / NC) | KAS-80-A24-A-K-NL | KA 0327 |
| Type PNP normally open (NO) | KAS-80-A24-S-K-NL | KA 0326 |
| Type AC / DC normally open (NO) | | |
| Type AC / DC normally closed (NC) | | |
| Certificates | CE, RoHS, UL-CSA | |
| Operating voltage (U_B) | 12...30 V DC | |
| Output current (I_o) | 200 mA / 2 x 200 mA | |
| No load current (I_o) | < 15 mA | |
| Load current min. | - | |
| Frequency of operating cycles max. | 50 Hz | |
| Permitted ambient temperature | -25...+70 °C | |
| LED display | Yes | |
| Protective circuit | Yes | |
| Norm | IEC 60947-5-2 | |
| Degree of protection IEC 60529* | IP 67* | |
| Connection | 2 m cable, PVC, 3 x 0.75 mm ² 4 x 0.5 mm ² for antivalent | Flange connector M 12 x 1 |
| Housing material | PA / PPO | |
| Active surface | PA / PPO | |
| Lid | PA / PPO | |

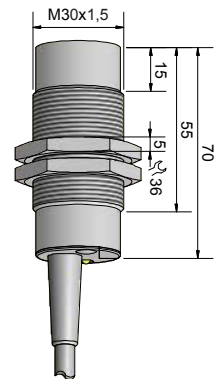
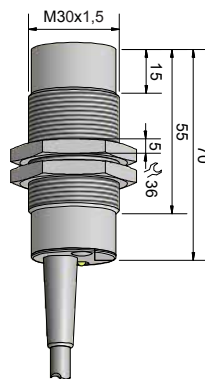
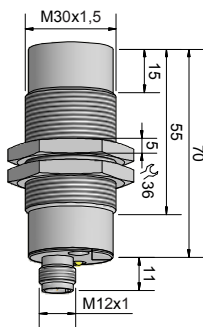
*With sealed potentiometer screw





Dimension M 30 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...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 | | CE, RoHS, UL-CSA | | CE, RoHS | |
| 12...30 V DC | | 20...250 V AC / DC | | 20...250 V AC / DC | |
| 2 x 200 mA | | 330 mA (ETL = 250 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 (ETL = +60 °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 cable, PVC, 2 x 0.75 mm ² | | 2 m cable, PVC, 2 x 0.75 mm ² and 2 x 0.14 mm ² | |
| PA / PPO | | PA / PPO | | PA / PPO | |
| PA / PPO | | PA / PPO | | PA / PPO | |
| PA / PPO | | PA / PPO | | PA / PPO | |

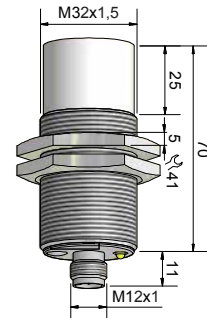
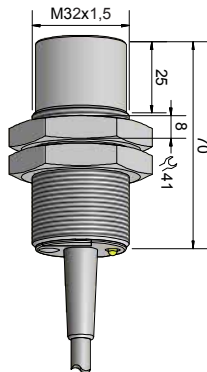
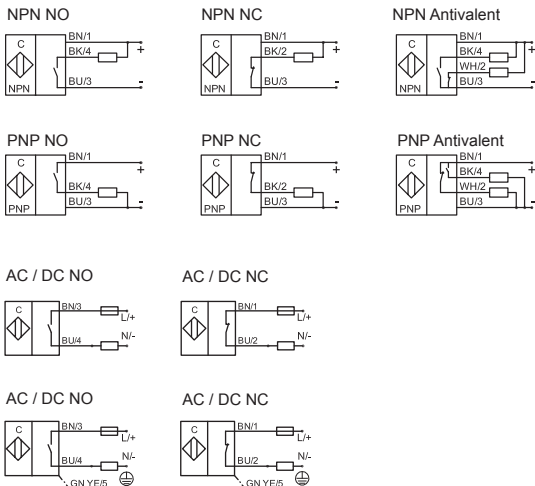
* NO and NC function selectable by means of a bridge.






CAPACITIVE SENSORS NormLine

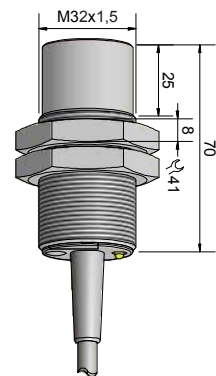
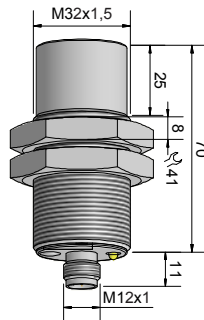
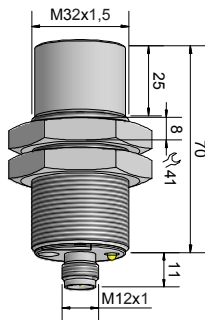
| Housing | M 32 x 1.5 | M 32 x 1.5 |
|--|---|---|
| |  |  |
| |  | |
| Technical data | Non-flush mountable | |
| Sensing distance S_n , [mm] | 20 mm | |
| Sensing distance min. / max. [mm] adjustable | 2...30 mm | |
| | Type code | Art. No. |
| Type NPN antivalent (NO / NC) | KAS-70-35-A-M32-NL | KA 0727 |
| Type NPN normally open (NO) | KAS-70-35-S-M32-NL | KA 0452 |
| Type PNP antivalent (NO / NC) | KAS-80-35-A-M32-NL | KA 0440 |
| Type PNP normally open (NO) | KAS-80-35-S-M32-NL | KA 0726 |
| Type AC / DC normally open (NO) | | |
| Type AC / DC normally closed (NC) | | |
| Certificates | CE, RoHS, UL-CSA | |
| Operating voltage (U_B) | 12...30 V DC | |
| Output current (I_o) | 200 mA / 2 x 200 mA | |
| No load current (I_o) | < 15 mA | |
| Load current min. | - | |
| Frequency of operating cycles max. | 50 Hz | |
| Permitted ambient temperature | -25...+70 °C | |
| LED display | Yes | |
| Protective circuit | Yes | |
| Norm | IEC 60947-5-2 | |
| Degree of protection IEC 60529* | IP 67* | |
| Connection | 2 m cable, PVC, 3 x 0.75 mm ² 4 x 0.5 mm ² for antivalent | Flange connector M 12 x 1 |
| Housing material | PA / PPO | |
| Active surface | PA / PPO | |
| Lid | PA / PPO | |

*With sealed potentiometer screw



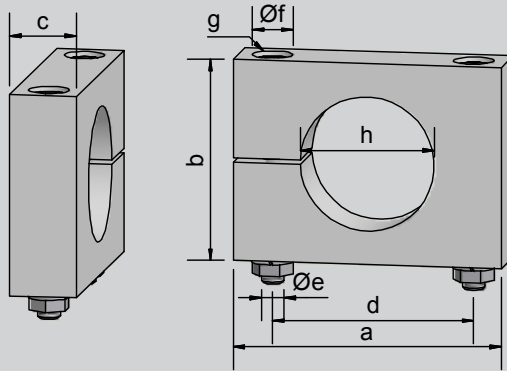
Dimension M 32 x 1.5

| 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 | | CE, RoHS, UL-CSA | |
| 12...30 V DC | | 12...30 V DC | | 20...250 V AC / DC | |
| 2 x 200 mA | | 2 x 200 mA | | 330 mA (ETL = 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 (ETL = +60 °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 cable, PVC, 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. | Ø Sensor [mm] | a | b | c | d | Ø e | Ø f | g | Ø 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, Material PA

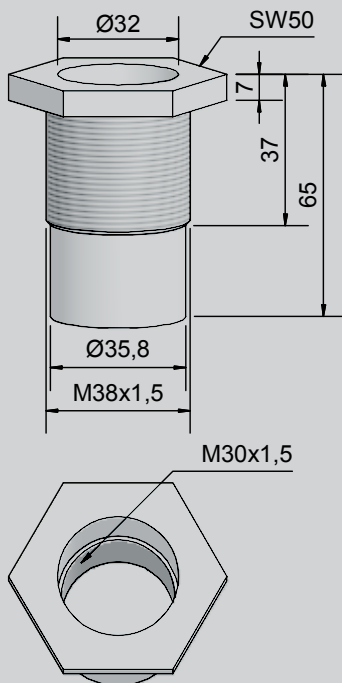
PROTECTION CAPS AND PROTECTION SETS

Protection Caps M30 / M32 PTFE

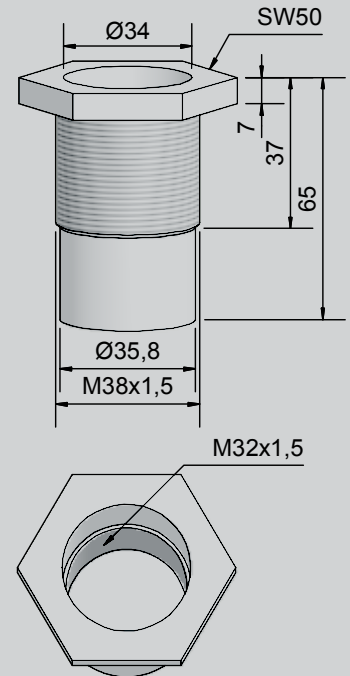


PROTECTION CAP

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.



Dimension: Protection Cap M30
 PTFE Art.-No. 190503
 PEEK Art.-No. 190504
 Delrin Art.-No. 190505



Dimension: Protection Cap M32
 PTFE Art.-No. 190500
 PEEK Art.-No. 190501
 Delrin Art.-No. 190502

Protection Set M32
















PROTECTION SET

The PTFE protection set M 32 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 Type | Female connector | | Article No. | LED Green/ yellow | IP | Connection [mm ²] | Cable- length [m] | Sensor + Length [mm] | Version Connector |
|--------------------|------------------|---|-------------|-------------------------|----|----------------------------------|-------------------------|-------------------------------|----------------------|
| | No. | Fig. | | | | | | | |
| 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 | 16a |  | 191910 | - | 67 | 4 x 0.34 | 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



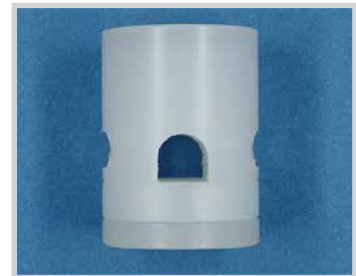
Sensor holder for tube mounting

- 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

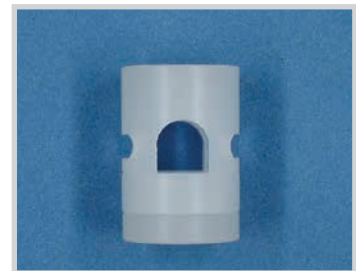
| Art.-No. | Description | Material | Connection |
|----------|-----------------|----------|-------------|
| 196310 | H-M30-1"-PP | PP | 1" Tube |
| 196311 | H-M30-3/4"-PP | PP | 3/4" Tube |
| 196312 | H-M30-1/2"-PP | PP | 1/2" Tube |
| 196313 | H-M18-1/2"-PP | PP | 1/2" Tube |
| 196314 | H-M18-6.5-PP | 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 |
| 196325 | H-M32-3/4"-PP | PP | 3/4" Tube |
| | | | |



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



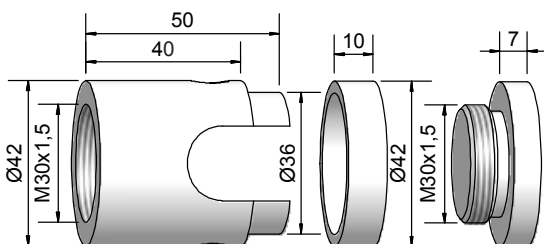
Holder for Sensor M30 - tube D 5.0, Nylon



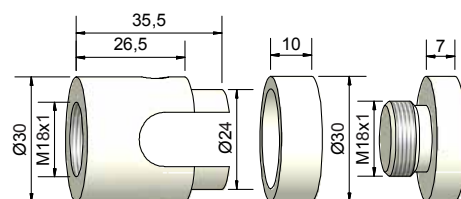
Holder for Sensor M18 - tube D.6.5, Nylon

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 No. 138 | 28 |
| 190050 | Mounting block No. 139 | 28 |
| 190100 | Mounting block No. 140 | 28 |
| 190150 | Mounting block No. 131 | 28 |
| 190200 | Mounting block No. 132 | 28 |
| 190250 | Mounting block No. 133 | 28 |
| 190300 | Mounting block No. 134 | 28 |
| 190350 | Mounting block No. 135 | 28 |
| 190400 | Mounting block No. 136 | 28 |
| 190450 | Mounting block No. 137 | 28 |
| 190500 | Protection cover M32 | 29 |
| 190501 | Protection cover M32 | 29 |
| 190502 | Protection cover M32 | 29 |
| 190503 | Protection cover M30 | 29 |
| 190504 | Protection cover M30 | 29 |
| 190505 | Protection cover M30 | 29 |
| 191500 | Female connector No. 9 | 30 |
| 191550 | Female connector No. 9a | 30 |
| 191910 | Female connector No. 16a | 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 |

| Art.-No. | Type | Page |
|----------|-----------------------------------|------|
| 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 |
| 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 |
| 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 |
|----------|--------------------------|------|
| 191910 | Female connector No. 16a | 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 |
| 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 |
| 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 |
| 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 |

| Art.-No. | Type | Page |
|----------|--------------------------------|------|
| 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 |
| 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 |

TYPE SELECTION IN TYPE CODE ORDER

| Art.-No. | Type | Page |
|----------|-------------------------------|------|
| 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 No. 131 | 28 |
| 190200 | Mounting block No. 132 | 28 |
| 190250 | Mounting block No. 133 | 28 |
| 190300 | Mounting block No. 134 | 28 |
| 190350 | Mounting block No. 135 | 28 |
| 190400 | Mounting block No. 136 | 28 |
| 190450 | Mounting block No. 137 | 28 |
| 190030 | Mounting block No. 138 | 28 |
| 190050 | Mounting block No. 139 | 28 |
| 190100 | Mounting block No. 140 | 28 |
| 190503 | Protection cover M30 | 29 |

| Art.-No. | Type | Page |
|----------|----------------------|------|
| 190504 | Protection cover M30 | 29 |
| 190505 | Protection cover M30 | 29 |
| 190500 | Protection cover M32 | 29 |
| 190501 | Protection cover M32 | 29 |
| 190502 | Protection cover M32 | 29 |
| 196305 | Sealing set M18 | 29 |
| 196302 | Sealing set M30 | 29 |
| 196301 | Sealing set M32 | 29 |

SENSORS FOR INDUSTRIAL AUTOMATION

OVERVIEW OF THE RECHNER-SENSORS CATALOGUES:

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