

## ***CAPACITIVE SENSORS***

***NormLine,  
HC***

***Semiconductor  
&  
Solar cells,  
LCD, etc.***



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**CAPACITIVE SENSORS**

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(M18) KAS-70-A13-A-K-Y3-HC-NL /-S/- -80-

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Registration No.: 1327-01



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



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

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#### **Edition October 2011**

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

## 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  $\epsilon$ , 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)
- ⇒ Aluminum 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 & High Conductivity

Capacitive sensors, just like inductive and optical sensors are subject to a harmonized 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.

Sensing problems:

- ▶ Detection of conductive materials (e.g. washing-up liquids) through container-walls, Where residues remain on the container wall and the sensor does not switch off.
- ▶ Large sensing distances → advantageous for most of the applications → not for the detection of high conductive liquids.



The optimal sensor for this kind of application: HC-(high conductive) Sensor.

### Principle:

- ☞ Specific electrode assembly (semi-flush sensor)
- ☞ Modified oscillator frequency.

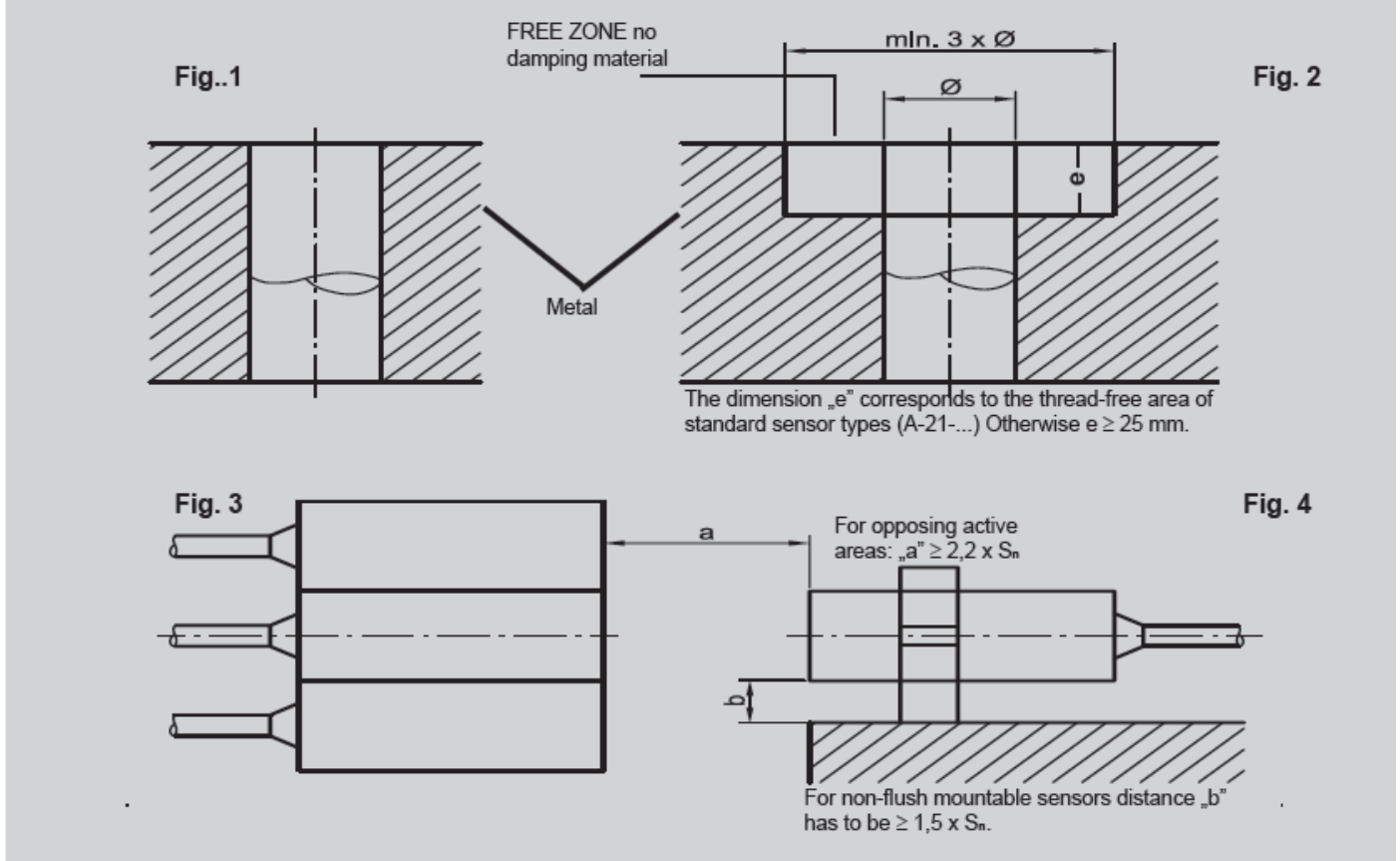
Residual that remain on the container wall can be tuned out with this model, therefore the sensor switches off when the container or bypass tube is empty and ignores the residual on the container wall.

Form build up within the tube or the container can also be ignored the these HC sensors, and so no longer presents a problem.

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

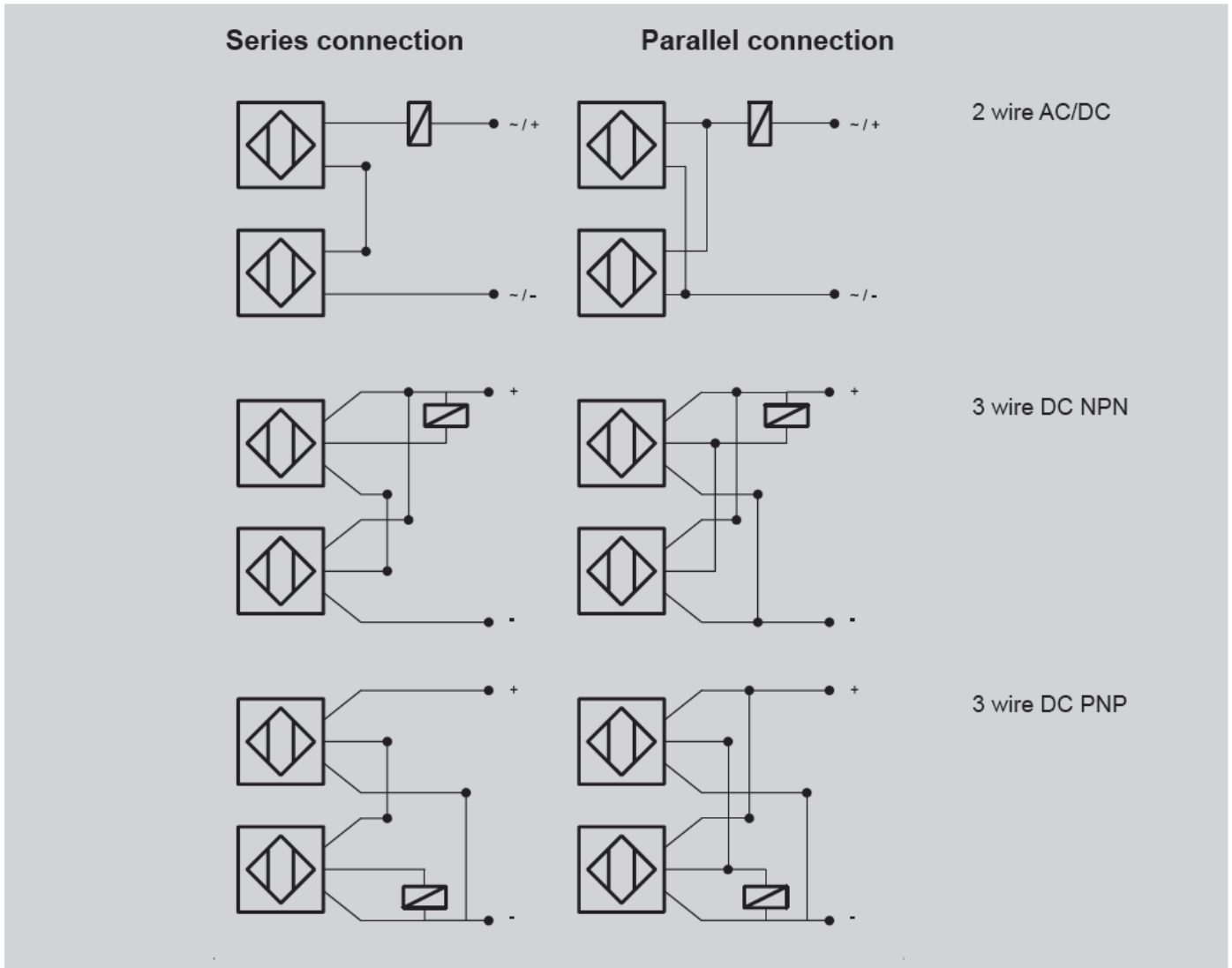


TECHNOLOGY

**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 localized 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



## 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	PA 6.6	PPO	PTFE	Brass
M5 x 0.5	-	-	-	-	-
M8 x 1	-	-	-	-	-
M12 x 1	1.5 Nm	1 Nm	1.4 Nm	0.2 Nm	16 Nm
M18 x 1	-	1.7 Nm	2.1 Nm	0.5 Nm	28 Nm
M22 x 1.5	12 Nm	6 Nm	7 Nm	1.4 Nm	32 Nm
M30 x 1.5	-	8 Nm	9 Nm	2.5 Nm	82 Nm
M32 x 1.5	-	12 Nm	13 Nm	3 Nm	150 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.

Tread:	M5x0.5	M8x1	M12x1	M18x1	M22x1.5	M30x1.5	M32x1.5
Screw-in length max.	3 mm	6 mm	8 mm	12 mm	12 mm	12 mm	12 mm

## TECHNICAL TERMS

Unless otherwise specified technical data is as follows: +24°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.

### *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 the 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  $-5^\circ\text{C}$ . 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 PEF cables are available.

### *Minimum sensing distance / $S_{min}$*

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

### *Maximum sensing distance / $S_{max}$*

The maximum possible sensing distance, which can be adjusted by potentiometer and which can be used effectively in practical applications with reference to a medium with  $\epsilon_r > 80$ . The sensors should only be used under 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 °C and rated voltage. Here the series variance is taken into consideration. Variation max. 10 %  $\pm$  of  $S_n \frac{1}{2}$ .

### *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 6 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  $S_n \frac{1}{2}$ .

### 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

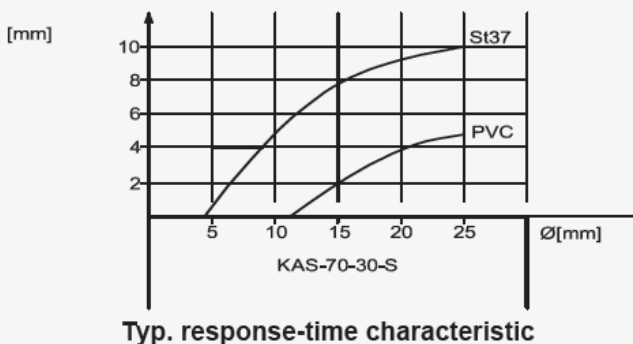
IP 65: Protection against contact with voltage-carrying parts, protection against ingress of dust and water jet.

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.

## 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 ISO630: 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  $\epsilon_r$  and can be worked out by means of the typical reduction factors: Sensing distance =  $S_n \times$  reduction factor.

Material	FE360	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

## 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 control gear, 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 control gear 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.**

**CE** - 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)

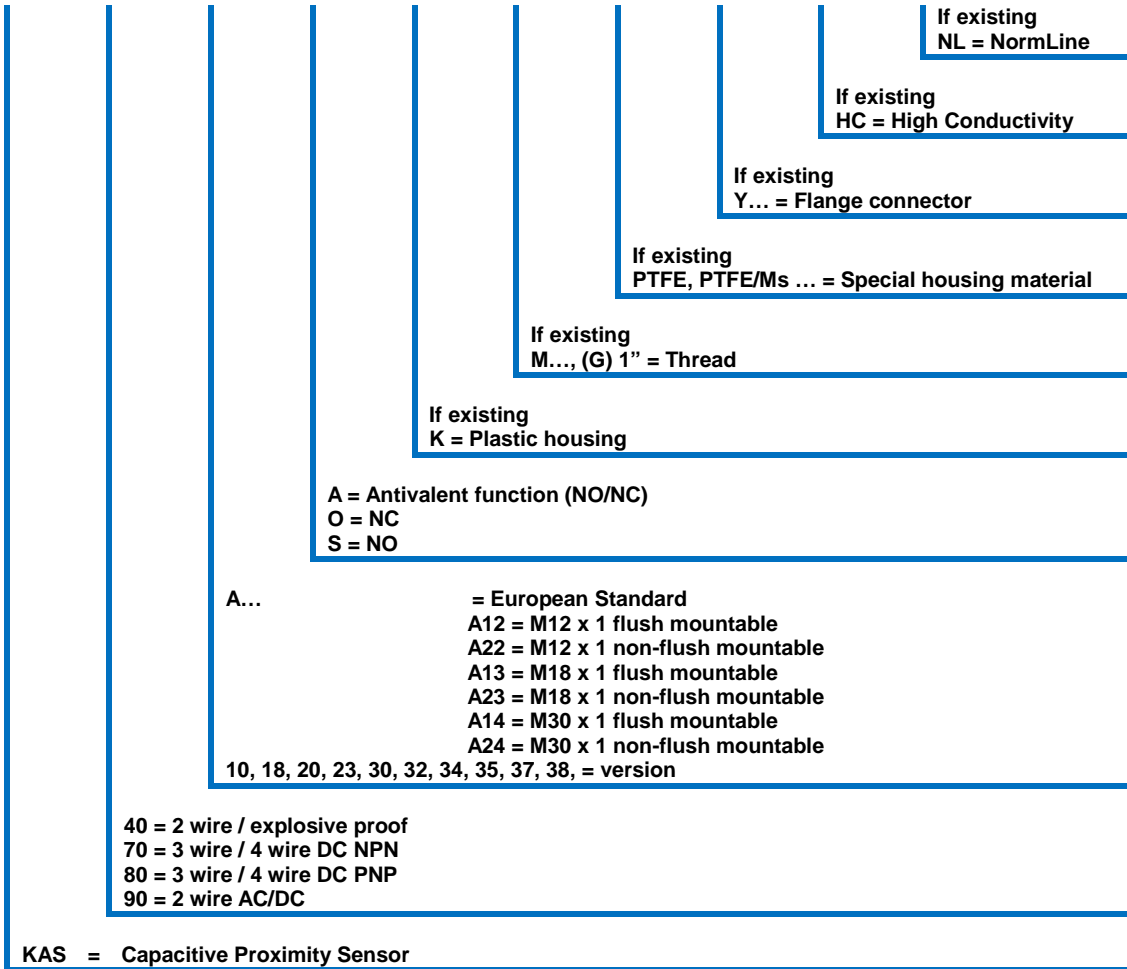
Directive 94/9/EG

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 ... HC - NL**

... - ... - ... - ... - ... - ... - ... - ... - ... - ...



## CAPACITIVE SENSORS HC-NL

Housing

M18 x 1

M18 x 1

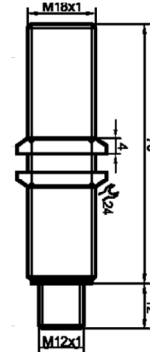
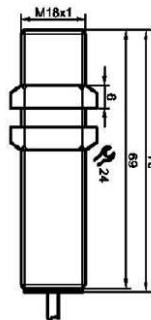
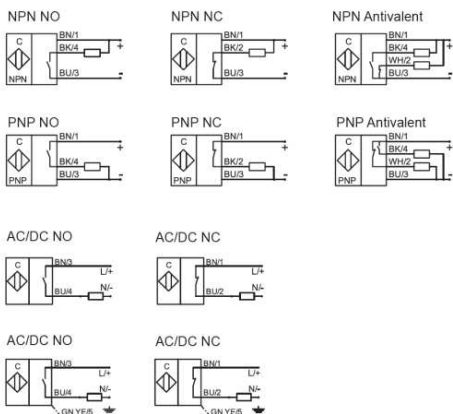
CE



**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 NPN antivalent	KAS-70-A13-A-HC-NL	KA9112
Type NPN normally open	KAS-70-A13-S-HC-NL	KA9111
Type PNP antivalent	KAS-80-A13-A-HC-NL	KA9212
Type PNP normally open	KAS-80-A13-S-HC-NL	KA9211
Type AC/DC normally open		
Type AC/DC normally closed		
Certificates	CE, RoHS, UL-CSA	CE, RoHS, UL-CSA
Operating voltage (UB)	12...30 V DC	12...30 V DC
Output current (Ie)	200 mA / 2 x 200 mA	200 mA / 2 x 200 mA
No load current (Io)	< 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 cable, PVC, 3 x 0.34 mm <sup>2</sup> PVC, 4 x 0.34 mm <sup>2</sup> for antivalent	Flange connector M12 x 1
Housing material	PA/PPO	PA/PPO
Active surface	PA/PPO	PA/PPO
Lid	PA/PPO	PA/PPO

\* With sealed potentiometer screw



Made in Korea

## CAPACITIVE SENSORS HC-NL

Housing

M18 x 1

M18 x 1

CE



**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-PTFE-HC-NL

KA9116

KAS-70-A13-A-PTFE-HC-NL  
(with protect)

KA9118

Type NPN normally open

KAS-70-A13-S-PTFE-HC-NL

KA9115

KAS-70-A13-S-PTFE-HC-NL  
(with protect)

KA9117

Type PNP antivalent

KAS-80-A13-A-PTFE-HC-NL

KA9216

KAS-80-A13-A-PTFE-HC-NL  
(with protect)

KA9218

Type PNP normally open

KAS-80-A13-S-PTFE-HC-NL

KA9215

KAS-80-A13-S-PTFE-HC-NL  
(with protect)

KA9217

Type AC/DC normally open

Type AC/DC normally closed

Certificates

CE, RoHS, UL-CSA

CE, RoHS, UL-CSA

Operating voltage (UB)

12...30 V DC

12...30 V DC

Output current (Ie)

200 mA / 2 x 200 mA

200 mA / 2 x 200 mA

No load current (Io)

< 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 68

Connection

2 m cable,  
PVC, 3 x 0.34 mm<sup>2</sup>  
PVC, 4 x 0.34 mm<sup>2</sup> for antivalent

2 m cable  
PEF, 3 x 0.25 mm<sup>2</sup>, PVDF protection set  
PEF, 4 x 0.25 mm<sup>2</sup>, PVDF protection set

Housing material

PTFE

PTFE

Active surface

PTFE

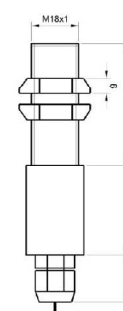
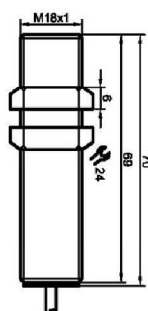
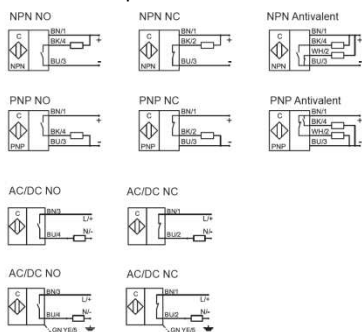
PTFE

Lid

PA/PPO

PTFE

\* With sealed potentiometer screw



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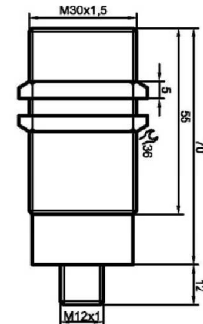
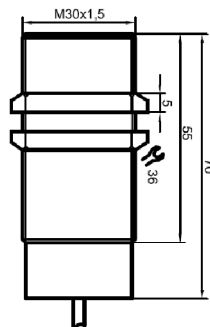
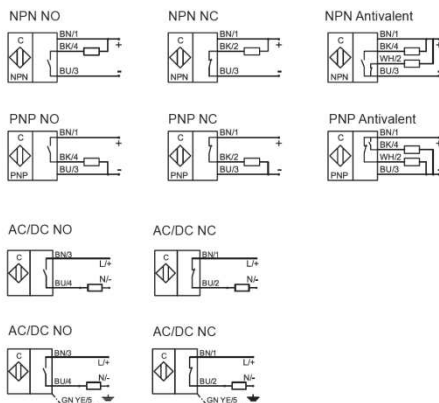
# CAPACITIVE SENSORS HC-NL

<b>Housing</b>	<b>M30 x 1.5</b>	<b>M30 x 1.5</b>
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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 NPN antivalent	KAS-70-A14-A-HC-NL	KA9732
Type NPN normally open	KAS-70-A14-S-HC-NL	KA9731
Type PNP antivalent	KAS-80-A14-A-HC-NL	KA9832
Type PNP normally open	KAS-80-A14-S-HC-NL	KA9831
Type AC/DC normally open		
Type AC/DC normally closed		
Certificates	CE, RoHS, UL-CSA	CE, RoHS, UL-CSA
Operating voltage (UB)	12...30 V DC	12...30 V DC
Output current (Ie)	200 mA / 2 x 200 mA	200 mA / 2 x 200 mA
No load current (I <sub>o</sub> )	< 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 cable, PVC, 3 x 0.75 mm <sup>2</sup> PVC, 4 x 0.5 mm <sup>2</sup> for antivalent	Plastic flange connector M12 x 1
Housing material	PA/PPO	PA/PPO
Active surface	PA/PPO	PA/PPO
Lid	PA/PPO	PA/PPO

\* With sealed potentiometer screw



**Made in Korea**

All specifications are subject to change without notice. (10/2011)

## CAPACITIVE SENSORS HC-NL

M30 x 1.5



M30 x 1.5



M30 x 1.5



Flush mountable

10 mm

2...20 mm

Type code

Art. No.

KAS-70-A14-A-Y5-HC-NL

KA9334

KAS-70-A14-S-Y5-HC-NL

KA9333

KAS-80-A14-A-Y5-HC-NL

KA9434

KAS-80-A14-S-Y5-HC-NL

KA9433

Flush mountable

10 mm

2...20 mm

Type code

Art. No.

KAS-70-A14-A-PTFE-HC-NL

KA9536

KAS-70-A14-S-PTFE-HC-NL

KA9535

KAS-80-A14-A-PTFE-HC-NL

KA9636

KAS-80-A14-S-PTFE-HC-NL

KA9635

Flush mountable

10 mm

2...20 mm

Type code

Art. No.

KAS-70-A14-A-PTFE-HC-NL  
(with protection)

KA9138

KAS-70-A14-S-PTFE-HC-NL  
(with protection)

KA9137

KAS-80-A14-A-PTFE-HC-NL  
(with protection)

KA9238

KAS-80-A14-S-PTFE-HC-NL  
(with protection)

KA9237

CE, RoHS, UL-CSA

12...30 V DC

200 mA / 2 x 200 mA

< 15 mA

-

50 Hz

-25...+70 °C

Yes

Yes

IEC 60947-5-2

IP 67\*

Metal flange connector M12 x 1

PA/PPO

PA/PPO

PA/PPO

CE, RoHS, UL-CSA

12...30 V DC

200 mA / 2 x 200 mA

< 15 mA

-

50 Hz

-25...+70 °C

Yes

Yes

IEC 60947-5-2

IP 67\*

2 m cable,  
PVC, 3 x 0.75 mm<sup>2</sup>  
PVC, 4 x 0.5 mm<sup>2</sup> for antivalent

PTFE

PTFE

PA/PPO

CE, RoHS, UL-CSA

12...30 V DC

200 mA / 2 x 200 mA

< 15 mA

-

50 Hz

-25...+70 °C

Yes

Yes

IEC 60947-5-2

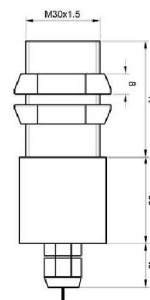
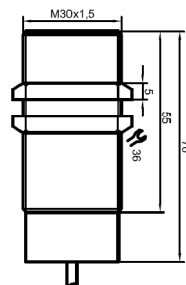
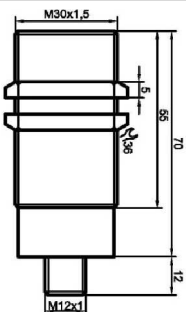
IP 68

2 m cable  
PEF, 3 x 0.25 mm<sup>2</sup>, PVDF protection set  
PEF, 4 x 0.25 mm<sup>2</sup>, PVDF protection set

PTFE

PTFE

PTFE



All specifications are subject to change without notice.(10/2011)

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## CAPACITIVE SENSORS

Housing

Rectangular

Rectangular-MINI

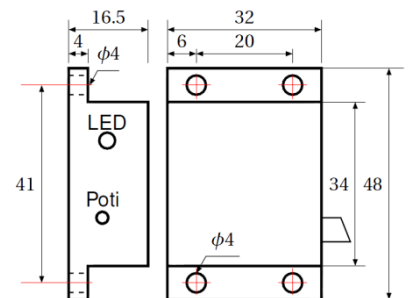
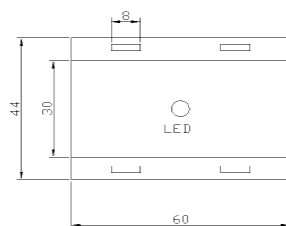
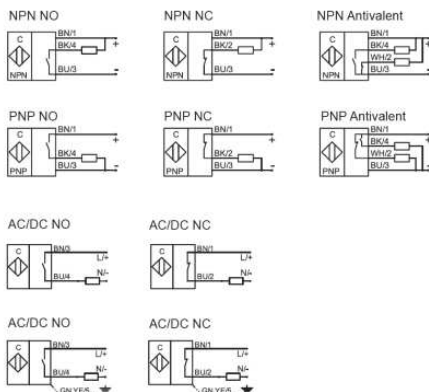
CE



**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 NPN normally closed		KAS-70-C15-O-HC-MINI KA9296
Type NPN normally open	KAS-70-C15-S-HC	KA9191
Type PNP normally closed		KAS-80-C15-O-HC-MINI KA9196
Type PNP normally open	KAS-80-C15-S-HC	KA9192
Type AC/DC normally open		
Type AC/DC normally closed		
Certificates	CE, RoHS, UL-CSA	CE, RoHS, UL-CSA
Operating voltage (UB)	12...30 V DC	12...30 V DC
Output current (Ie)	200 mA	200 mA
No load current (Io)	< 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 cable, PVC, 3 x 0.14 mm <sup>2</sup>	2 m cable PVC, 3 x 0.14 mm <sup>2</sup>
Housing material	MC	PVC
Active surface	MC	PVC
Lid	MC	PVC

\* With sealed potentiometer screw



All specifications are subject to change without notice.(10/2011)

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## SENSOR HOLDERS

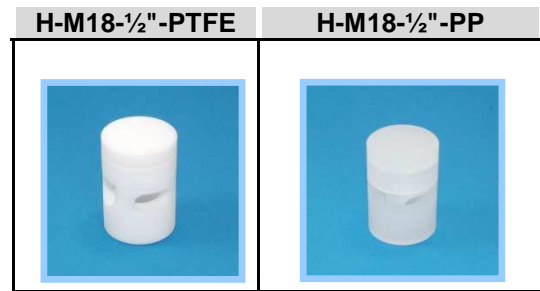
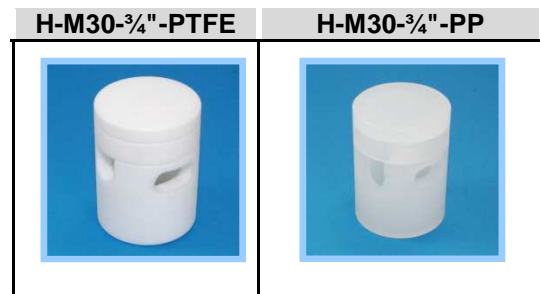


### Special Holder (without sensor)

For Sensor M30x1

- Type: **H-M30-1"-PP**
  - Tube size: 1"
  - Holder material: PP
- Art.-No. 196310

Article No.	Description	Material	Connection
196319	H-M18-1/2"-PTFE	PTFE	1/2" tube
196313	H-M18-1/2"-PP	PP	1/2" tube
196320	H-M18-Ø6.5-PTFE	PTFE	Ø6.5 tube
196314	H-M18-Ø6.5-PP	PP	Ø6.5 tube
196318	H-M30-1/2"-PTFE	PTFE	1/2" tube
196312	H-M30-1/2"-PP	PP	1/2" tube
196317	H-M30-3/4"-PTFE	PTFE	3/4" tube
196311	H-M30-3/4"-PP	PP	3/4" pipe
196420	H-M30-1"-PTFE	PTFE	1" pipe
196410	H-M30-1"-PP	PP	1" pipe
196316	H-M30-1"-PTFE	PTFE	1" tube

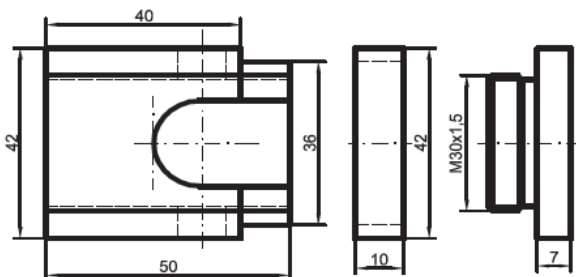


### Pipe & Tube size (outer diameter): ASTM

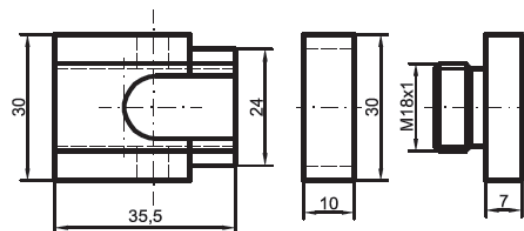
size	pipe	tube
1/2"	21.34 mm	12.70 mm
3/4"	26.67	19.05
1"	33.40	25.40
1 1/2"	48.26	38.10

## DIMENSIONS

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



### H-M18-6.5(5.0)...



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**FEMALE CONNECTORS**

Sensor Type	Female connector	Article No.	IP	Connection [mm <sup>2</sup> ]	Cable-length [m]	Version Connector
NAMUR 2-Wire		KA9521	67	2 x 0.25	2	Y3, Y5
NAMUR 2-Wire		KA9522	67	2 x 0.34	2	Y3, Y5
NAMUR 2-Wire		KA9523	67	2 x 0.25	5	Y3, Y5
NAMUR 2-Wire		KA9524	67	2 x 0.34	5	Y3, Y5
pnP/nPn 3-Wire		KA9531	67	3 x 0.25	2	Y3, Y5
pnP/nPn 3-Wire		KA9532	67	3 x 0.34	2	Y3, Y5
pnP/nPn 3-Wire		KA9533	67	3 x 0.25	5	Y3, Y5
pnP/nPn 3-Wire		KA9534	67	3 x 0.34	5	Y3, Y5
pnP/nPn 4-Wire		KA9541	67	4 x 0.25	2	Y3, Y5
pnP/nPn 4-Wire		KA9542	67	4 x 0.34	2	Y3, Y5
pnP/nPn 4-Wire		KA9543	67	4 x 0.25	5	Y3, Y5
pnP/nPn 4-Wire		KA9544	67	4 x 0.34	5	Y3, Y5
pnP/nPn 5-Wire		KA9551	67	5 x 0.25	2	Y3, Y5 Antivalent
pnP/nPn 5-Wire		KA9552	67	5 x 0.34	2	Y3, Y5 Antivalent
pnP/nPn 5-Wire		KA9553	67	5 x 0.25	5	Y3, Y5 Antivalent
pnP/nPn 5-Wire		KA9554	67	5 x 0.34	5	Y3, Y5 Antivalent

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