

CAPACITIVE SENSORS KAS-NORMLINE

**RECHNER
SENSORS**





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

All specifications are subject to change without notice. (16.01.2020)

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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 its dielectric permittivity ϵ_r , the closer the medium has to be approached. This effect can also be achieved by 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 similar to mechanical switches

Normally open NO
Normally closed NC
Change-over (Antivalent) (NO + NC)

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.

By means of the following 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 contactless 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.

TECHNOLOGY

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.

The following housing materials are used:

Short description	Material	FDA - No.	Contact with food permitted	Traceability according to. EU 1935/2004
PA	Polyamide 6.6, glasfibre reinforced	No	No	No
PC	Polycarbonate	FDA 21 CFR 177.1580	Yes	No
PEEK	Polyetheretherketone	FDA 21 CFR 177.2415	Yes	Yes
POM	Polyoxymethylene	No	No	No
PP	Polypropylene	FDA 21 CFR 177.1520	Yes	No
PPO	Polyphenylenoxide	No	No	No
PTFE	Polytetrafluorethylene	FDA 21 CFR 177.1550	Yes	Yes
PVC	Polyvinylchloride	No	No	No
PVDF	Polyvinylidenfluoride	FDA 21 CFR 177.2510	Yes	No
AL	Aluminium	No	No	No
MS	Brass / chrome or nickel plated	No	No	No
VAA	Stainless steel VA, material No. 1.4301 (AISI 304)	No	No	No
VAb	Stainless steel VA, material No. 1.4305 (AISI 303)	No	No	No
VAc	Stainless steel VA, material No. 1.4404 (AISI 316L)	FDA conform	Yes	No

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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.

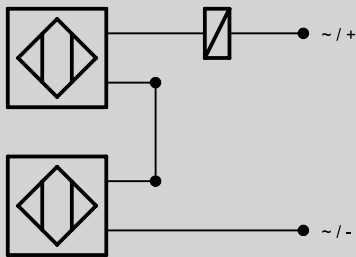
Units with strong near field power, e. g. high power walkie-talkies, or noise sources in the lower frequency range, e.g. long, middle or short wave transmitters should not be operated close to the sensors or additional measures have to be taken in order to eliminate incorrect operation.

TECHNOLOGY

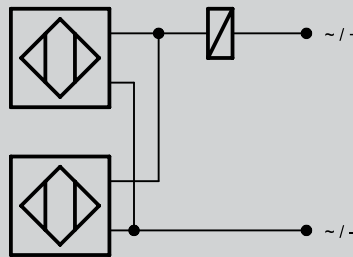
Series connection or parallel connection

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 , which must be multiplied in accordance with the number of sensors for series connection, must be noted. In the case of parallel connection of sensors with thyristor output, the first switched output takes over the total load current.

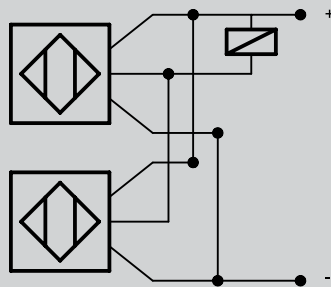
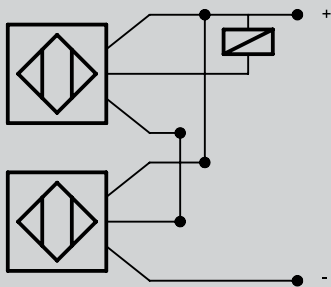
Series connection



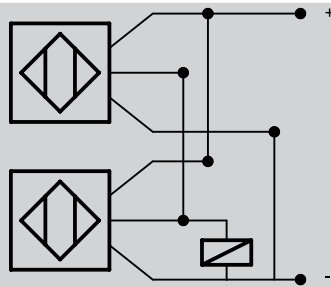
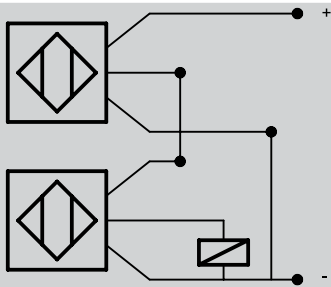
Parallel connection



2 wire AC / DC



3 wire DC NPN



3 wire DC PNP

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ADJUSTMENT

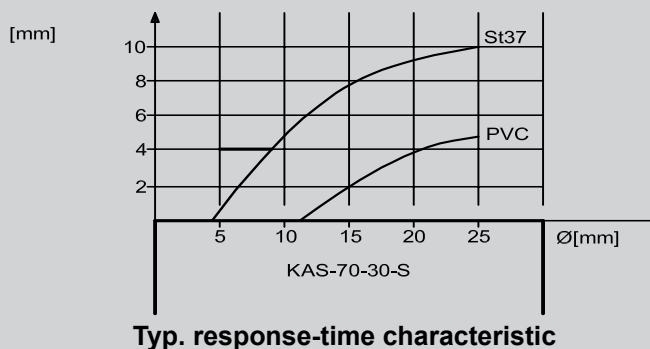
Capacitive sensors with analog output 4...20 mA/0...10 V or inverted

Analog capacitive sensors are equipped with a 20-turn spindle potentiometer. This allows adjustment of an application specific operating range between the **minimum distance "0 mm"** and the type-typical maximum value. Consequently, the full output current range (4...20 mA) is always present, regardless of the required measuring distance. The analog sensors of series 80 are designed with a 2-colour LED which facilitates adjustment. Within the operating range of 4...20 mA the LED is green. In the undamped state the output current value is > 20 mA and moves with the reduction of the object distance toward 4 mA (value at total damping approx. 2.5 mA).

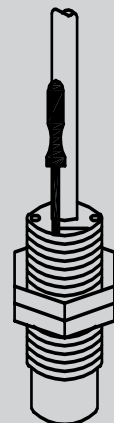
Nominal sensing distance (Sn) - measurement according to DIN VDE 0660, Part 208

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 plug-gable sensors $\leq M 18 \times 1 / \varnothing 22$ the potentiometer is on the side.



For size M 30 x 1.5 / Ø 30:
First open plastic tab.
For size > M 30 x 1.5 / Ø 30:
First remove plastic sealing screw.

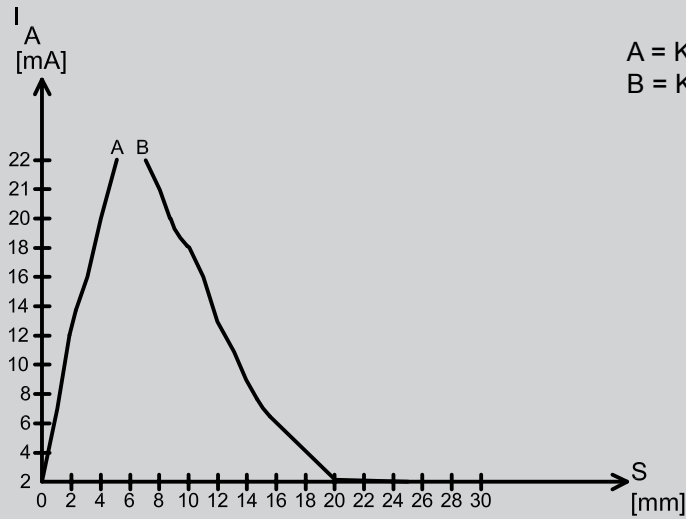
The possible sensing distance for a particular material is dependent on the dielectric permittivity ϵ_r and can be worked out by means of the typical reduction factors:

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

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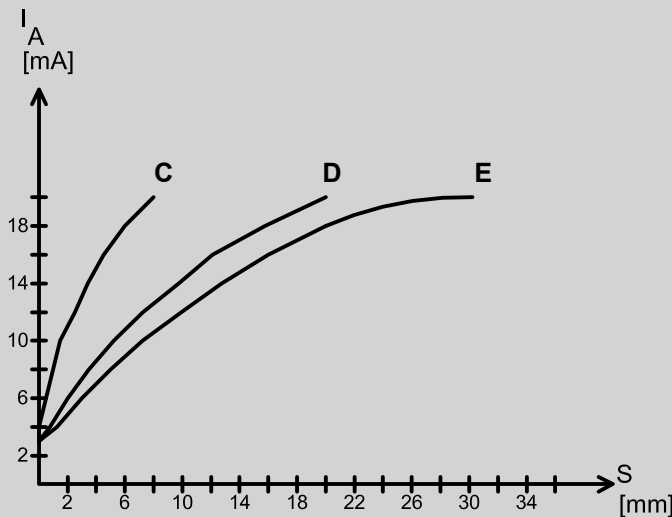
TYPICAL CURVES



Typ. curve of 2 wire analog sensors

A = KAS-40-A13-IL, ATEX
B = KAS-40-A24-IL-M30-V2A-StEx, ATEX

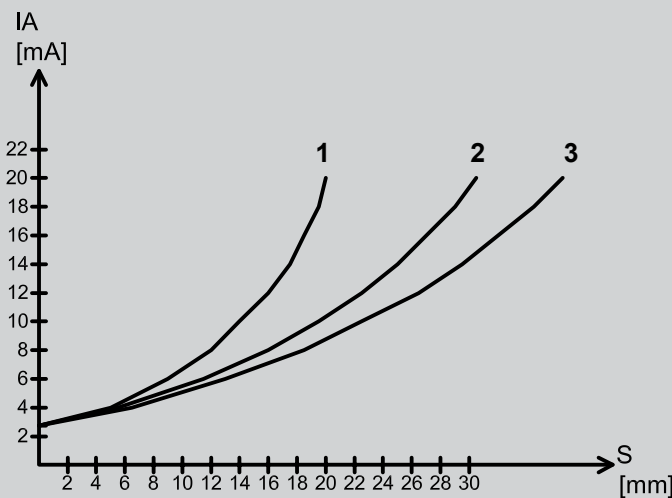
Parameter:
 $T_u = 25\text{ °C}$, $U_B = 12\text{ V DC}$
Actuator
Steel St 37, 1 mm thick,
square, side length to
3 x diameter of the active
area, earthed.



Typ. curve of 3 wire analogue sensors

C = KAS-80-A13-IL
D = KAS-80-A14-IL
E = KAS-80-30-IL(-M32)

Parameter:
 $T_u = 25\text{ °C}$, $U_B = 24\text{ V DC}$
Actuator
Steel St 37, 1 mm thick,
square, side length to
3 x diameter of the active
area, earthed.



3 wire analogue sensors with different adjustments

KAS-80-34-IL-M32-PTFE/MS
1 = Adjustment 20 mm
2 = Adjustment 30 mm
3 = Adjustment 36 mm

Parameter:
 $T_u = 25\text{ °C}$, $U_B = 24\text{ V DC}$
Actuator
Steel St 37, 1 mm thick,
square, side length to
3 x diameter of the active
area, earthed.

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MOUNTING

Flush mounting or non-flush mounting types

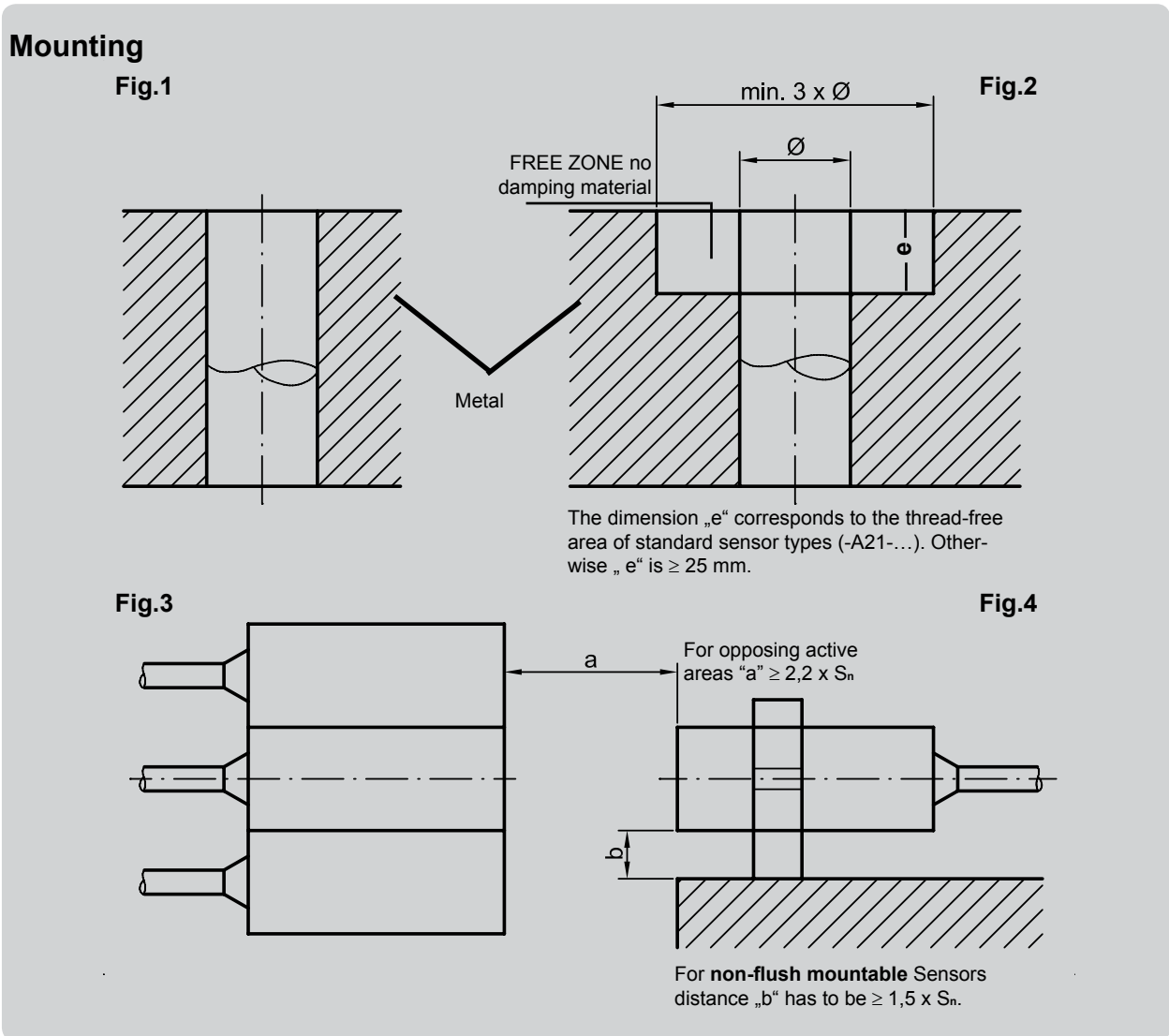
There are two different types of capacitive sensors:



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).



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MOUNTING

Maximum Torque

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

Housing Material						
Thread	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	-	-

Threaded sensors - maximum screw-in length

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

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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 into 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 °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, which 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, which can be adjusted by potentiometer and which can be used effectively in practical applications with reference to a medium with $\epsilon_r \geq 80$. 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 .

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 .

TECHNICAL TERMS

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.

Temperature variation

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

Degree of protection according to IEC 60529

	1. Digit: Protection against solids		2. Digit: Protection against water	
IP	0	No protection	0	No protection against water
IP	1	Protection against solid foreign bodies $\varnothing > 50$ mm	1	Protection against vertical water drops
IP	2	Protection against solid foreign bodies $\varnothing > 12,5$ mm	2	Protection against diagonal water drops (up to a 15° angle)
IP	3	Protection against solid foreign bodies $\varnothing > 2,5$ mm	3	Protection against spray water
IP	4	Protection against solid foreign bodies $\varnothing > 1$ mm	4	Protection against splashing water
IP	5	Protection against harmful dust deposits, dust protected	5	Protection against water jet
IP	6	Protection against contact with voltage-carrying parts. Protection against penetration of dust	6	Protection against strong water jet
			7	Protection against ingress of water when the equipment is immersed in water, up to 1 m depths and for a period of 30 minutes
			8	Protection against ingress of water when the equipment is immersed in water, under conditions determined from the manufacturer.
			9	Protection against ingress of water during high pressure or steam cleaning under defined conditions

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SERIES

Capacitive sensors - series 40

The **series 40** contains capacitive 2-wire proximity signal generators according to NAMUR DIN 60947-5-6, also StEx-Versions for use in zone 20 (dust explosion protection). These sensors can be mounted in explosion hazardous areas when they are connected to approved isolating switching amplifiers with intrinsically safe control circuit [EExia] or [EExib], our series N-132. Depending on the isolating switching amplifier selected the NAMUR-sensors of this series can be used up to zone 0 (StEx-Versions also for zone 20). The data specified in the certificate of conformity of the selected isolating switching amplifier must be taken into consideration. The 2-wire analog sensors of this series can also be used in zone 0 if they are connected to an ATEX-certificated amplifier, such as our series N-132.

Transistor amplifier - series 120

The transistor amplifier of our **series 120** has been designed especially for use with **our capacitive NAMUR mini-sensors (e.g. KAS-40-6/15-N, KAS-40-A11-N, KAS-40-18/5-N)**. All sensors according to NAMUR are connectable (provided that the cable diameter corresponds to the connector), our **series IAS-30...** and **KAS-40...** The sensing distance is adjustable by means of a potentiometer, this also applies to capacitive sensors that have no adjustment on the body. The antivalent outputs (NO and NC function) are overload protected and are available as pnp or npn output. The strong PA 6.6 housing may be mounted with additional units side by side and is equipped with a two- colour LED display that monitors stand-by (green) operating condition (yellow). Sensor and amplifier may be connected by a plug contact (female connector is enclosed).

Capacitive sensors - series 70

The **series 70** contains capacitive 3-wire or 4-wire proximity sensors with NPN digital output with NO, NC or antivalent function (NO and NC). Electronic circuits, PLC's, relays and our power supplies of series 130 can be activated directly. The sensors are reverse-polarity protected, overload-protected and have electronic short-circuit protection. StEx-versions with ATEX and IECEx certification for applications in zone 20, sensors for ambient temperatures up to +100 °C or for products with very high static charge complete the scope of the standard versions.

Capacitive sensors - series 80

The **series 80** contains capacitive 3-wire or 4-wire proximity sensors with PNP digital output with NO, NC or antivalent function (NO and NC). Electronic circuits, PLC's, relays and our power supplies of series 130 can be activated directly. The sensors are reverse-polarity protected, overload-protected and have electronic short-circuit protection. StEx-versions with ATEX and IECEx certification for applications in zone 20, sensors for ambient temperatures up to +100 °C or for products with very high static charge complete the scope of the standard versions.

Capacitive sensors - series 2000

The **series 2000 quattro⁺** contains capacitive 3-wire DC proximity sensors with **four output-functions, NPN-NO** and **PNP-NC** or, after resetting of the coding switch, **NPN-NC** and **PNP-NO**. Electronic circuits, PLC's and relays can be directly activated. Different housing materials are available, such as PA or PPO, PTFE, PTFE / brass or PTFE / VA. This series is completed by a version for medium temperatures up to **+160 °C**.

SERIES

Capacitive sensors - series 90

The **series 90** contains capacitive 2-wire AC / DC proximity sensors with thyristor digital output or FET-stage with NO and NC function. AC relays, conductors and solenoid valves can be directly activated. PLCs with AC inputs can also be connected so long as the minimum load current is taken into consideration. The sensors have a protective circuit against high induction voltages.

Capacitive sensors - series 1000

The **series 1000 duo**^{~2} contains capacitive 2-wire a.c.-d.c. proximity sensors with NO and NC-function. The supply voltage range of 20...250 V AC / DC allows for applications in electronic circuits, PLC's as well as for conductors with AC supply voltage. The output functions (NO or NC) can be determined by means of a coding switch.

Increased requirements to the sensor

For **increased requirements** for the permitted ambient temperature range of our capacitive proximity sensors, we offer the series **up to +100 °C** with integrated electronics as a 3-Wire DC version (see series 70 and 80). The sensors are available with housings made of PTFE, PTFE / VA or PTFE / brass.

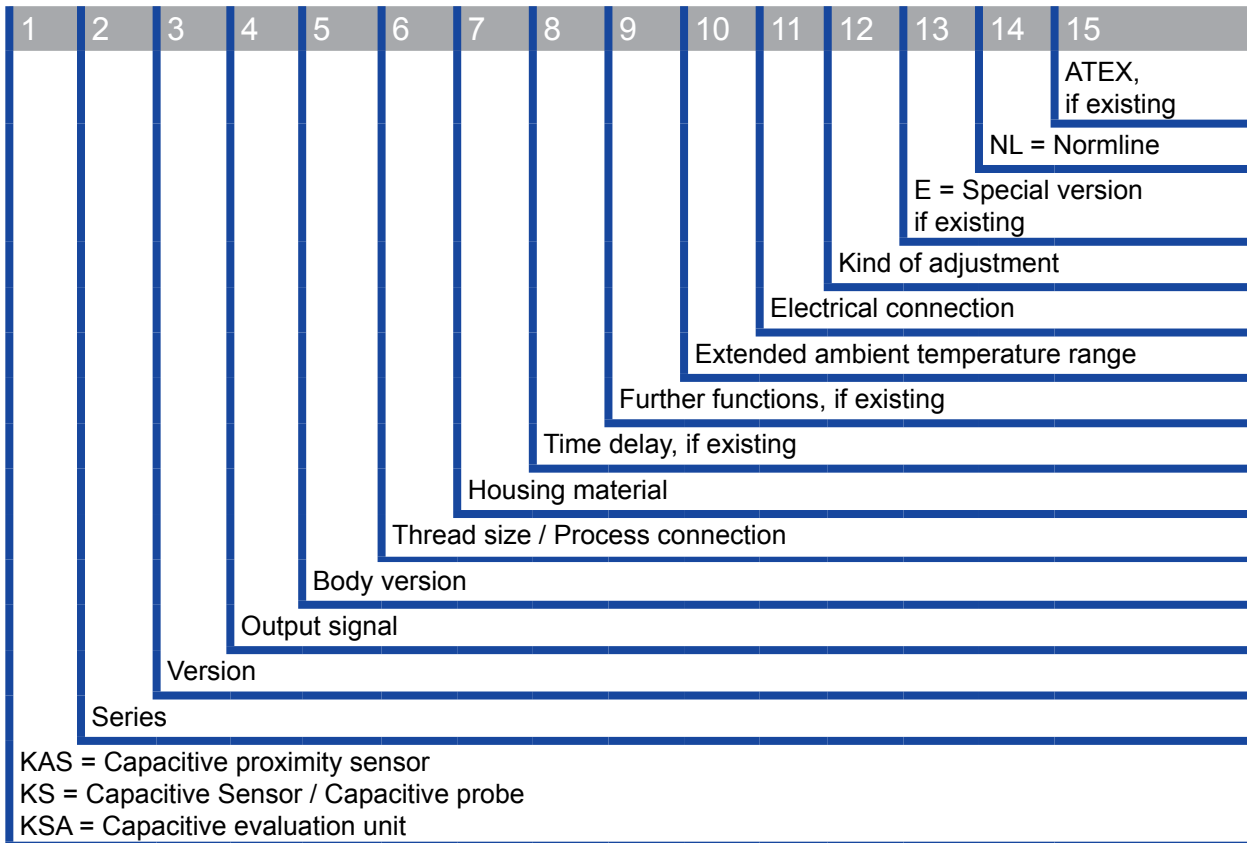
Sensors with quattro⁺³ are available for **temperatures up to +160 °C (medium)** (see series 2000). Here too housing materials of PTFE and VA are used as standard.

For extreme ambient or product-temperature conditions, our series 250 (see series 250) or "KXS-Extreme" are available with **high temperature sensors up to +250 °C** and remote electronics (please ask for the KXS catalogue). The sensors of our series 250 are integrated in PTFE or PTFE / VA housings. The FEP-coated sensor cable, in the lengths 2 m and 5 m, is the connection to the evaluation unit and may also be used under high-temperature conditions. The evaluation unit is connected to the sensor by means of a plug-in connector. On the sensor side the cable is permanently cast in or equipped with a temperature-resistant plug-in-connector (...Y-version). The sensing distance for high temperature sensors can be adjusted on the evaluation unit and the switching state is displayed by a LED. The sensing distance adjustment should be made at operating temperature. Here the maximum specified sensing distance and the temperature drive must be taken into consideration.

TYPE CODE

Example:

KAS - 80 - 35 - A - M32 - PTFE/VA - 100C - Z02 - 1



Position 2

Serie	Output	Supply voltage
40	NAMUR DIN 60947-5-6, ATEX	DC
42	NAMUR DIN 60947-5-6, ohne ATEX	DC
70	NPN	DC
80	PNP	DC
7080	NPN / PNP	DC
83	PNP	DC
90	FET output	AC / DC
95	Relay output	AC / DC
250	High-temperature evaluation unit, probe	Evaluation unit AC / DC, Probe passive
700	Level Master NPN	DC
701	Level Master NPN XS	DC
800	Level Master PNP	DC
801	Level Master PNP XS	DC
1000	Thyristor output	AC / DC
2000	NPN/PNP selectably via change-over switch	DC

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TYPE CODE

Position 3

Value	Body size (Ø = mm)	Cylindrical	Mounting version	Special length (mm)
A11	M8 x 1	Yes	Flush	-
A21	M8 x 1	Yes	Non-flush	-
A21/63	M8 x 1	Yes	Non-flush	63
A12	M12 x 1	Yes	Flush	-
A22	M12 x 1	Yes	Non-flush	-
A13	M18 x 1	Yes	Flush	-
A23	M18 x 1	Yes	Non-flush	-
A14	M30 x 1,5	Yes	Flush	-
A14/40	M30 x 1,5	Yes	Flush	40
A24	M30 x 1,5	Yes	Non-flush	-
A24/50	M30 x 1,5	Yes	Non-flush	50
A24/90	M30 x 1,5	Yes	Non-flush	90
6/15	Ø 6	Yes	Flush	15
6.3/20	Ø 6,3	Yes	Flush	15
6.5/20	Ø 6,5	Yes	Non-flush	20
M8/15	M8 x 1	Yes	Flush	15
M8/25	M8 x 1	Yes	Non-flush	26
M10/70	M10 x 1,5	Yes	Non-flush	70
10	Ø 11	Yes	Flush	-
14	Ø 11	Yes	Non-flush	-
M16	M16 x 1,5	Yes	Non-flush	-
G1/4	G1/4"	Yes	Non-flush	-
G3/8	G3/8"	Yes	Non-flush	-
G1/2	G1/2"	Yes	Non-flush	-
G3/8/35	G3/8"	Yes	Non-flush	35
G3/8/50	G3/8"	Yes	Non-flush	50
G3/8	G3/8"	Yes	Non-flush	150
R3/8/35	R3/8"	Yes	Non-flush	35
18	Ø 18	Yes	Flush	-
18/4	Ø 18	Yes	Flush	4
M18/50	M18 x 1	Yes	Non-flush	50
M18/150	M18 x 1	Yes	Non-flush	150
20	Ø 20	Yes	Flush	-
20	Ø 22	Yes	Flush	-
20	M22 x 1,5	Yes	Flush	-
20/5	Ø 20	Yes	Flush	5
20/137	Ø 20	Yes	Non-flush	137
23	Ø 20	Yes	Non-flush	-
23	Ø 22	Yes	Non-flush	-
23	M22 x 1,5	Yes	Non-flush	-
23/170	Ø 22	Yes	Non-flush	170

Position 3

Value	Body size (Ø = mm)	Cylindrical	Mounting version	Special length (mm)
26/105	Ø 15	Yes	Non-flush	105
26/113	Ø 26	Yes	Non-flush	113
26/160	Ø 15	Yes	Non-flush	160
26/200	Ø 26	Yes	Non-flush	200
26/240	Ø 26	Yes	Non-flush	240
26/300	Ø 26	Yes	Non-flush	300
26/400	Ø 26	Yes	Non-flush	400
26/416	Ø 26	Yes	Non-flush	416
26/445	Ø 26	Yes	Non-flush	445
30	Ø 30	Yes	Flush	-
30/10	Ø 30	Yes	Flush	10
30/50	Ø 30	Yes	Flush	50
30/40	Ø 30	Yes	Flush	40
30EM/15	Ø 30	Yes	Flush	-
30/60	Ø 30	Yes	Flush	60
35	Ø 32	Yes	Non-flush	-
35	M32 x 1,5	Yes	Non-flush	-
35/22	Ø 38	Yes	Non-flush	22
35/50	M32 x 1,5	Yes	Non-flush	50
37	Ø 34	Yes	Flush	-
38	Ø 34	Yes	Non-flush	-
40	Ø 40	Yes	Flush	-
41	Ø 40	Yes	Non-flush	-
50	Ø 50	Yes	Flush	-
53	Ø 50	Yes	Non-flush	-
61	Ø 64	Yes	Non-flush	-
C20	46 x 74,5	Quader	Non-Flush	-
C30EM/8	34 x 34	Quader	Flush	-
C40/30	120 x 80 x 30	Quader	Flush	-
C41/30	120 x 80 x 30	Quader	Non-flush	-
P50	Paddle	Smart-paddle	Non-flush	-
BB	50 x 50 x 26	Quader	Non-flush	-
B	46,6 x 74,5 x 30	Quader	Non-flush	-
BXL	110 x 70 x 40	Quader	Non-flush	-

All specifications are subject to change without notice. (16.01.2020)

TYPE CODE

Position 4	
Value	Output signal
A	Antivalent (NO + NC)
S	Normally open (NO)
Ö	Normally closed (NC)
P	Normally open / Normally closed changeable
N	NAMUR
IL4/UL0	Analogue output 4...20 mA/0...10 V
IL20/UL10	Analogue output 20...4 mA/10...0 V
IL4	Analogue current output 4...20 mA
IL20	Analogue current output 20...4 mA
1CO	Micro controller, 1 Change-over contact
1COR	Micro controller, 1 Change-over contact
X	Passiv

Position 5	
Value	Thread / Process connection
M8	M8 x 1
M12	M12 x 1
M14	M14 x 1
M16	M16 x 1
M18	M18 x 1
M22	M22 x 1,5
M30	M30 x 1,5
M32	M32 x 1,5
G1/2	G1/2"
G3/4	G3/4"
G1	G1"
G11/2	G1 1/2"
NPT1/4	NPT 1/4"
R3/8	R3/8"
PFM22	M22 x 1,5
PFM30	M30 x 1,5
TRI	Triclamp
PFS1	Fit PFS1
PFS2	Fit PFS2
F30	Fit F30

All specifications are subject to change without notice. (16.01.2020)

TYPE CODE

Position 6

Material	Active surface	Housing
Ceramic/VAb	Ceramics	Stainless steel No. 1.4305 (AISI 303)
LCP	Liquid crystal polymer	Liquid crystal polymer
LCP/VAb	Liquid crystal polymer	Stainless steel No. 1.4305 (AISI 303)
PA	Polyamide 6.6. glass-fibre reinforced	Polyamide 6.6. glass-fibre reinforced
PA/MS	Polyamide 6.6. glass-fibre reinforced	Brass nickel
PA/VAb	Polyamide 6.6. glass-fibre reinforced	Stainless steel No. 1.4305 (AISI 303)
PBT/MS	Polybutyleneterephthalate	Brass nickel
PC	Polycarbonate	Polycarbonate
PEEK	Polyetheretherketone FDA 21 CFR 177.2415	Polyetheretherketone FDA 21 CFR 177.2415
PEEK/VAA	Polyetheretherketone FDA 21 CFR 177.2415	Stainless steel No. 1.4301 (AISI 304)
PEEK/VAb	Polyetheretherketone FDA 21 CFR 177.2415	Stainless steel No. 1.4305 (AISI 303)
PEEK/VAc	Polyetheretherketone FDA 21 CFR 177.2415	Stainless steel No. 1.4404 (AISI 316L)
POM	Polyoxymethylene	Polyoxymethylene
PP	Polypropylene	Polypropylene
PPO	Polyphenylenoxide	Polyphenylenoxide
PPO/MS	Polyphenylenoxide	Brass nickel
PPO/VAb	Polyphenylenoxide	Stainless steel No. 1.4305 (AISI 303)
PTFE	Polytetrafluoroethylene FDA 21 CFR 177.1550	Polytetrafluoroethylene FDA 21 CFR 177.1550
PTFE/AL	Polytetrafluoroethylene FDA 21 CFR 177.1550	Aluminium
PTFE/VAA	Polytetrafluoroethylene FDA 21 CFR 177.1550	Stainless steel No. 1.4301 (AISI 304)
PTFE/VAb	Polytetrafluoroethylene FDA 21 CFR 177.1550	Stainless steel No. 1.4305 (AISI 303)
PTFE/VAc	Polytetrafluoroethylene FDA 21 CFR 177.1550	Stainless steel No. 1.4404 (AISI 316L)
PTFE/MS	Polytetrafluoroethylene FDA 21 CFR 177.1550	Brass nickel
PVC	Polyvinylchloride	Polyvinylchloride
PVC/MS	Polyvinylchloride	Brass nickel
PVC/VAb	Polyvinylchloride	Stainless steel No. 1.4305 (AISI 303)
PVDF	Polyvinylidene fluoride	Polyvinylidene fluoride

All specifications are subject to change without notice. (16.01.2020)

TYPE CODE

Position 7

Value	Time delay
No indication	No time delay
OND	Switch-on delay
OFD	Switch-off delay
TD	Time delay (switch-on delay / switch-off delay)
TDE	Time delay, special version

Position 8

Value	More properties
EST	Protection against electrostatic discharge
G	For highly adhesive products
HC	Products with a high dielectric constant or conductivity
IOL	IO-Link

Position 9

Value	Advanced temperature range
No indication	No advanced temperature range
90C	90°C
100C	100°C
120C	120°C
150C	150°C
160C	160°C
180C	180°C
250C	250°C

Position 10

Value	Electrical connection
Z0E	Special cable length
Z01	1 m connection cable
Z02	2 m connection cable
Z03	3 m connection cable
Z04	4 m connection cable
Z05	5 m connection cable
Z10	10 m connection cable
Y1	Flange connector M 12 x 1, AC, 2 Pin
Y3	Flange connector M 12 x 1 (Plastic), DC, 4 Pin
Y5	Flange connector M 12 x 1 (Metal), DC, 4 Pin
Y9	Flange connector M 12 x 1, AC, 3 Pin
Y10	Flange connector M 12 x 1, DC, 5 Pin
Y7	Flange connector M 8 x 1, DC, 3 Pin
Y8	Flange connector M 8 x 1, DC, 4 Pin
Y5C	Coupling plug M 12 x 1, DC, 4 Pin
Y7C	Coupling plug M 8 x 1, DC, 3 Pin
Y8C	Coupling plug M 8 x 1, DC, 4 Pin
YEC	Coupling plug special housing
Y12	Flange connector M 8 x 1 (Metal), DC, 4 Pin
Y20	Connection to evaluation unit / Sensor Y20
Y21	Connection to evaluation unit / Sensor Y21
KL	Terminal connection

Position 11

Value	Sensitivity adjustment
1	Potentiometer
0	Fix adjusted, no adjustment possible
ET	Easyteach with button
ETM	EasyTeach by Magnet
ETW	EasyTeach by Wire
MaG	Mount and Go, fix adjusted
CMaG	Customer Mount and Go, fix adjusted

Position 12

Value	Special version
E	Special version
EBC	C-housing (PA) for separate evaluation unit
BS	Blue Sense
Leak	LEAK-Sensor

Position 13

Value	Device family
NL	NormLine
HP	HighPerformance
No indication	-

Position 14

Value	Device for use in areas with the risk of explosion
StEx	For ATEX zone 20
3D	With manufacturer declaration for ATEX zone 22
3G	With manufacturer declaration for ATEX zone 2
3D3G	With manufacturer declaration for ATEX zone 22 and 2
StEx3G	For ATEX zone 20 With manufacturer declaration for ATEX zone 2 (gas)

All specifications are subject to change without notice. (16.01.2020)

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.

CAPACITIVE SENSORS *NormLine*

	Pages
CAPACITIVE SENSORS <i>NormLine</i> DIMENSION M 12 x 1	21 - 23
CAPACITIVE SENSORS <i>NormLine</i> DIMENSION M 18 x 1	24 - 27
CAPACITIVE SENSORS <i>NormLine</i> DIMENSION M 30 x 1,5	28 - 33
CAPACITIVE SENSORS <i>NormLine</i> DIMENSION M 32 x 1,5	34 - 35

CAPACITIVE SENSORS NormLine

Housing

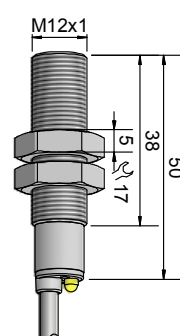
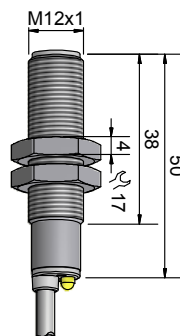
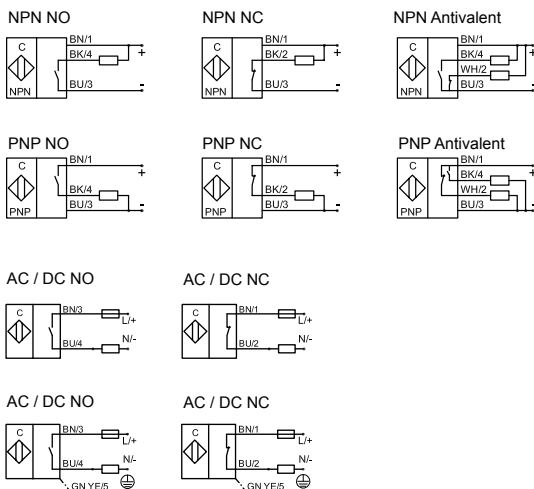
M 12 x 1

M 12 x 1



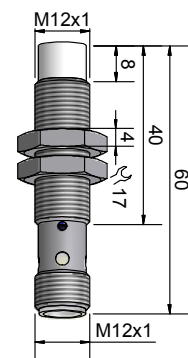
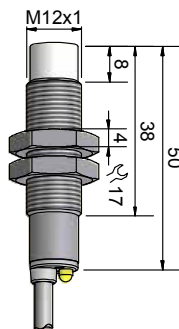
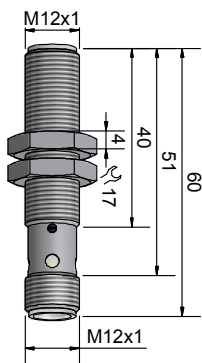
Technical data	Flush mountable		Flush mountable	
Sensing distance S_n , [mm]	2 mm		2 mm	
Sensing distance min. / max. [mm] adjustable	0.5...5 mm		0.5...5 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent (NO / NC)	KAS-70-A12-A-M12-PTFE/VAb-Z02-1-NL	KA 0705	KAS-70-A12-A-M12-PPO-Z02-1-NL	KA 0706
Type NPN normally open (NO)	KAS-70-A12-S-M12-PTFE/VAb-Z02-1-NL	KA 0673		
Type PNP antivalent (NO / NC)	KAS-80-A12-A-M12-PTFE/VAb-Z02-1-NL	KA 0671	KAS-80-A12-A-M12-PPO-Z02-1-NL	KA 0708
Type PNP normally open (NO)	KAS-80-A12-S-M12-PTFE/VAb-Z02-1-NL	KA 0669	KAS-80-A12-S-M12-PPO-Z02-1-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

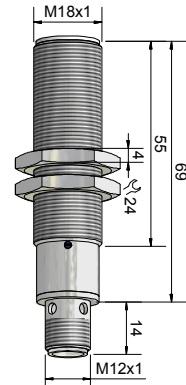
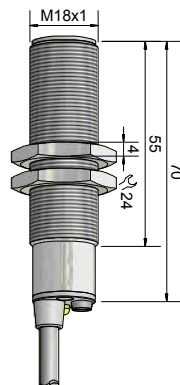
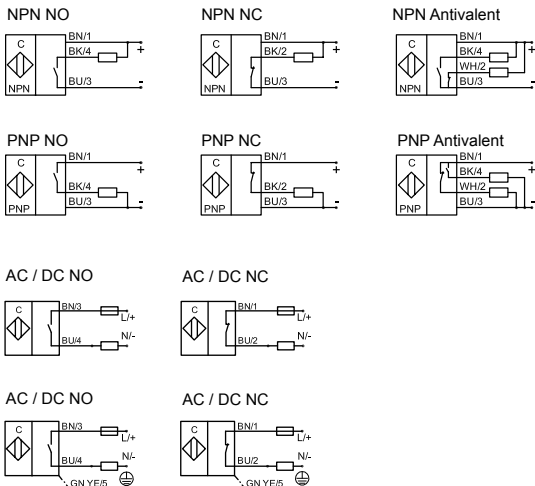
M 12 x 1		M 12 x 1		M 12 x 1	
					
Flush mountable		Non-flush mountable		Non-flush mountable	
2 mm		4 mm		4 mm	
0.5...5 mm		1...8 mm		1...8 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-70-A12-A-M12-PPO/VAb-Y5-1-NL	KA 0710	KAS-70-A22-A-M12-PTFE/VAb-Z02-1-NL	KA 0711	KAS-70-A22-A-M12-PTFE/VAb-Y5-1-NL	KA 0715
		KAS-70-A22-S-M12-PTFE/VAb-Z02-1-NL	KA 0712		
KAS-80-A12-A-M12-PPO/VAb-Y5-1-NL	KA 0670	KAS-80-A22-A-M12-PTFE/VAb-Z02-1-NL	KA 0713	KAS-80-A22-A-M12-PTFE/VAb-Y5-1-NL	KA 0716
		KAS-80-A22-S-M12-PTFE/VAb-Z02-1-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

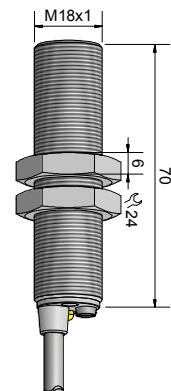
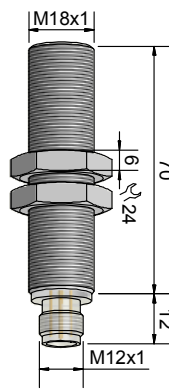
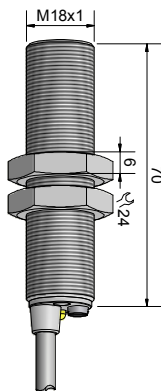
Housing	M 18 x 1	M 18 x 1
		
Technical data	Flush mountable	Flush mountable
Sensing distance S_n , [mm]	5 mm	5 mm
Sensing distance min. / max. [mm] adjustable	1...8 mm	1...8 mm
	Type code	Art. No.
Type NPN antivalent (NO / NC)	KAS-70-A13-A-M18-PPO/MS-Z02-1-NL	KA 0718
Type NPN normally open (NO)	KAS-70-A13-S-M18-PPO/MS-Z02-1-NL	KA 0672
Type PNP antivalent (NO / NC)	KAS-80-A13-A-M18-PPO/MS-Z02-1-NL	KA 0668
Type PNP normally open (NO)	KAS-80-A13-S-M18-PPO/MS-Z02-1-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

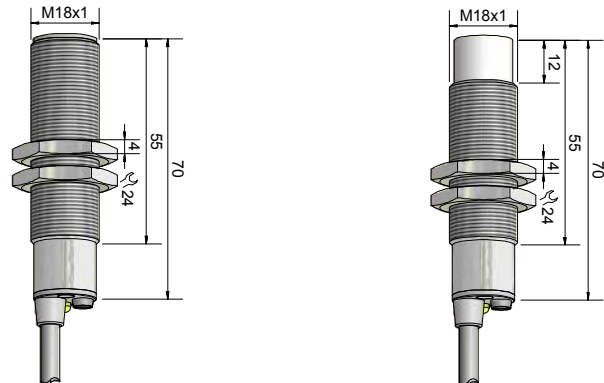
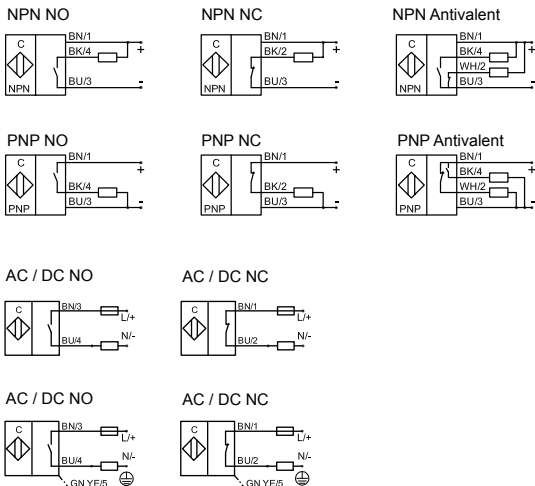
M 18 x 1		M 18 x 1		M 18 x 1	
					
Flush mountable		Flush mountable		Flush mountable	
5 mm		5 mm		5 mm	
1...8 mm		1...8 mm		1...8 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-70-A13-A-M18-PPO-Z02-1-NL	KA 0637				
KAS-70-A13-S-M18-PPO-Z02-1-NL	KA 0648	KAS-70-A13-S-M18-PPO-Y3-1-NL	KA 0609		
KAS-80-A13-A-M18-PPO-Z02-1-NL	KA 0680	KAS-80-A13-A-M18-PPO-Y3-1-NL	KA 0607		
KAS-80-A13-S-M18-PPO-Z02-1-NL	KA 0717				
				KAS-90-A13-S-M18-PPO-Z02-1-NL	KA0634
				KAS-90-A13-Ö-M18-PPO-Z02-1-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-M18-PTFE/MS-Z02-1-NL KA 0437
Type NPN normally open (NO)		
Type PNP antivalent (NO / NC)		KAS-80-A23-A-M18-PTFE/MS-Z02-1-NL KA0725
Type PNP normally open (NO)		
Type AC / DC normally open (NO)	KAS-90-A13-S-M18-PPO/MS-Z02-1-NL KA 0676	
Type AC / DC normally closed (NC)	KAS-90-A13-Ö-M18-PPO/MS-Z02-1-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



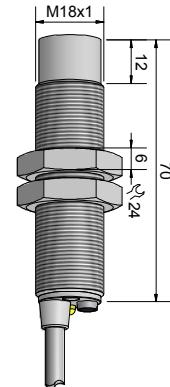
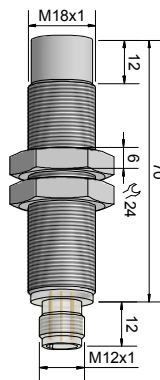
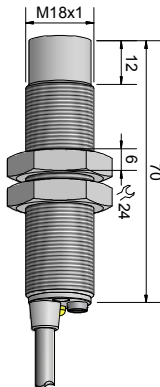
Dimension M 18 x 1

M 18 x 1

M 18 x 1

M 18 x 1

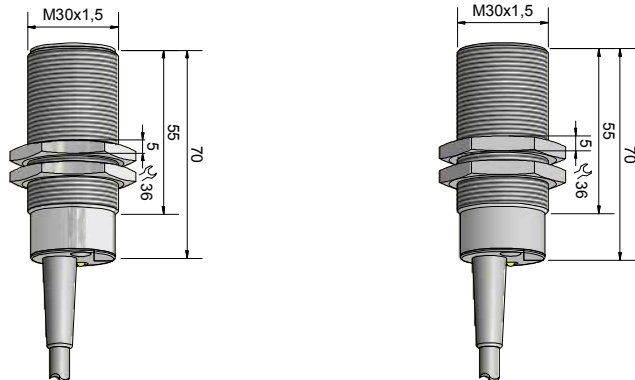
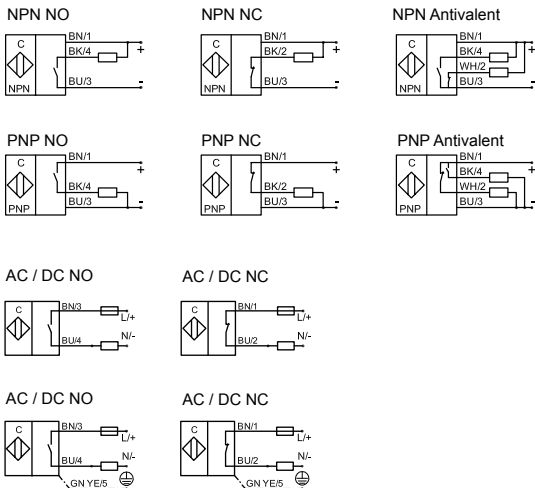

Non-flush mountable		Non-flush mountable		Non-flush mountable	
8 mm		8 mm		8 mm	
1...10 mm		1...10 mm		1...10 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-70-A23-A-M18-PPO-Z02-1-NL	KA 0362				
KAS-70-A23-S-M18-PPO-Z02-1-NL	KA 0368				
KAS-80-A23-A-M18-PPO-Z02-1-NL	KA 0325	KAS-80-A23-A-M18-PPO-Y3-1-NL	KA 0445		
KAS-80-A23-S-M18-PPO-Z02-1-NL	KA 0324				
				KAS-90-A23-S-M18-PPO-Z02-1-NL	KA 0605
				KAS-90-A23-Ö-M18-PPO-Z02-1-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	Flush mountable
Sensing distance S_m , [mm]	10 mm	10 mm
Sensing distance min. / max. [mm] adjustable	2...20 mm	2...20 mm
	Type code	Art. No.
Type NPN antivalent (NO / NC)	KAS-70-A14-A-M30-PPO/MS-Z02-1-NL	KA 0719
Type NPN normally open (NO)	KAS-70-A14-S-M30-PPO/MS-Z02-1-NL	KA 0664
Type PNP antivalent (NO / NC)	KAS-80-A14-A-M30-PPO/MS-Z02-1-NL	KA 0665
Type PNP normally open (NO)	KAS-80-A14-S-M30-PPO/MS-Z02-1-NL	KA 0663
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	200 mA / 2 x 200 mA
No load current (I_o)	< 15 mA	< 15 mA
Load current min.	-	-
Frequency of operating cycles max.	150 Hz	150 Hz
Permitted ambient temperature	-25...+70 °C	-25...+70 °C
LED display	Yes	Yes
Protective circuit	Yes	Yes
Norm	IEC 60947-5-2	IEC 60947-5-2
Degree of protection IEC 60529*	IP 67*	IP 67*
Connection	2 m Kabel, PVC, 3 x 0.75 mm ² 4 x 0.5 mm ² for antivalent	2 m Kabel, PVC, 3 x 0.75 mm ² 4 x 0.5 mm ² for antivalent
Housing material	Brass	PA / PPO
Active surface	PA / PPO	PA / PPO
Lid	PA / PPO	PA / PPO

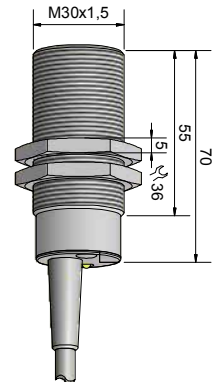
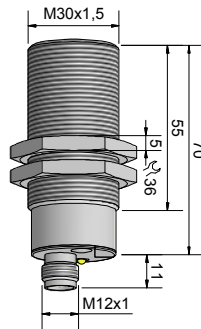
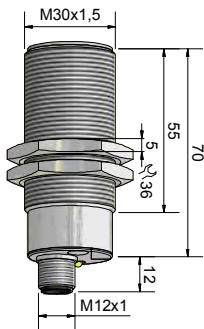
*With sealed potentiometer screw






All specifications are subject to change without notice. (16.01.2020)

Dimension M 30 x 1.5

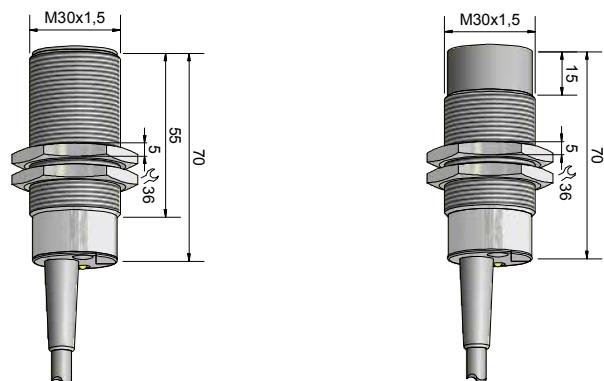
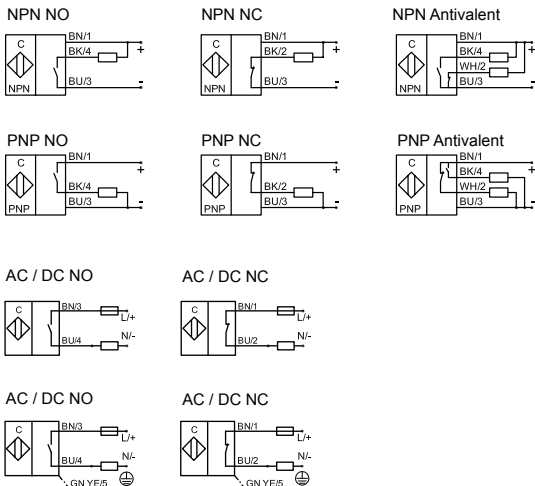
M 30 x 1.5		M 30 x 1.5		M 30 x 1.5	
					
Flush mountable		Flush mountable		Flush mountable	
10 mm		10 mm		10 mm	
2...20 mm		2...20 mm		2...20 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-80-A14-A-M30-PPO/MS-Y5-1-NL	KA 0660	KAS-80-A14-A-M30-PPO-Y3-1-NL	KA 0574		
				KAS-90-A14-S-M30-PPO-Z02-1-NL	KA 0603
				KAS-90-A14-Ö-M30-PPO-Z02-1-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

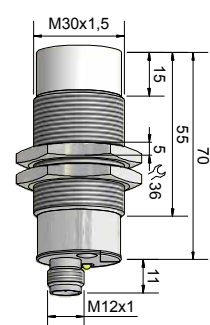
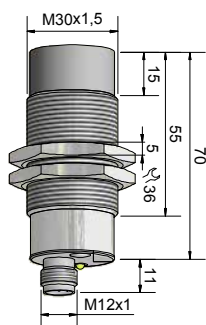
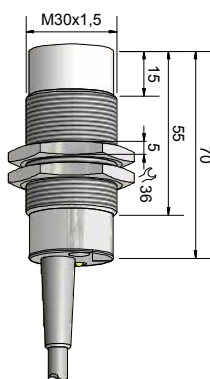
Housing	M 30 x 1.5		M 30 x 1.5	
				
Technical data	Flush mountable		Non-flush mountable	
Sensing distance S_n , [mm]	10 mm		15 mm	
Sensing distance min. / max. [mm] adjustable	2...20 mm		2...25 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent (NO / NC)			KAS-70-A24-A-M30-PPO/MS-Z02-1-NL	KA 0360
Type NPN normally open (NO)			KAS-70-A24-S-M30-PPO/MS-Z02-1-NL	KA 0366
Type PNP antivalent (NO / NC)			KAS-80-A24-A-M30-PPO/MS-Z02-1-NL	KA 0335
Type PNP normally open (NO)			KAS-80-A24-S-M30-PPO/MS-Z02-1-NL	KA 0334
Type AC / DC normally open (NO)	KAS-90-A14-S-M30-PPO/MS-Z02-1-NL	KA 0674		
Type AC / DC normally closed (NC)	KAS-90-A14-Ö-M30-PPO/MS-Z02-1-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

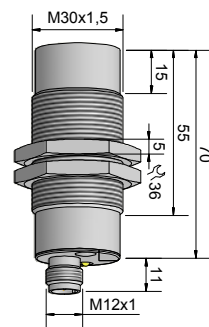
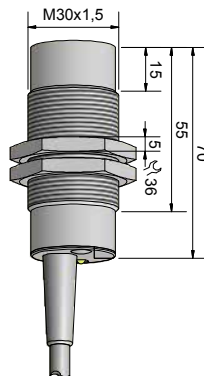
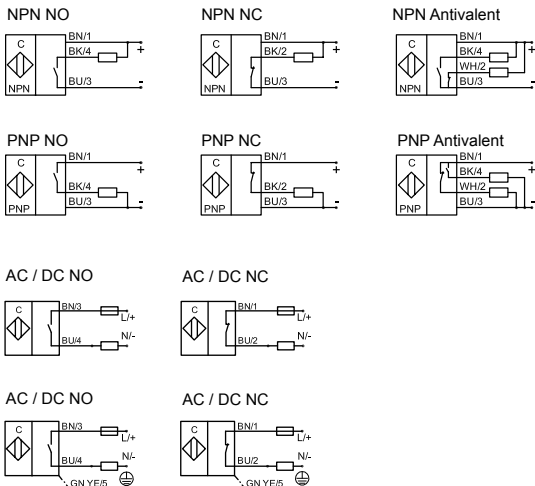
M 30 x 1.5		M 30 x 1.5		M 30 x 1.5	
					
Non-flush mountable		Non-flush mountable		Non-flush mountable	
15 mm		15 mm		15 mm	
2...25 mm		2...25 mm		2...25 mm	
Type code	Art. No.	Type code	Art. No.	Type code	Art. No.
KAS-70-A24-A-M30-PTFE/MS-Z02-1-NL	KA 0414	KAS-70-A24-A-M30-PPO/MS-Y3-1-NL	KA 0365		
KAS-80-A24-A-M30-PTFE/MS-Z02-1-NL	KA 0412	KAS-80-A24-A-M30-PPO/MS-Y3-1-NL	KA 0336	KAS-80-A24-A-M30-PTFE/MS-Y3-1-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	
				
Technical data	Non-flush mountable		Non-flush mountable	
Sensing distance S_m , [mm]	15 mm		15 mm	
Sensing distance min. / max. [mm] adjustable	2...25 mm		2...25 mm	
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent (NO / NC)	KAS-70-A24-A-M30-PPO-Z02-1-NL	KA 0364	KAS-70-A24-A-M30-PPO-Y3-1-NL	KA 0351
Type NPN normally open (NO)	KAS-70-A24-S-M30-PPO-Z02-1-NL	KA 0367		
Type PNP antivalent (NO / NC)	KAS-80-A24-A-M30-PPO-Z02-1-NL	KA 0327	KAS-80-A24-A-M30-PPO-Y3-1-NL	KA 0333
Type PNP normally open (NO)	KAS-80-A24-S-M30-PPO-Z02-1-NL	KA 0326		
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.	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 ² 4 x 0.5 mm ² for antivalent		Flange connector M 12 x 1	
Housing material	PA / PPO		PA / PPO	
Active surface	PA / PPO		PA / PPO	
Lid	PA / PPO		PA / PPO	

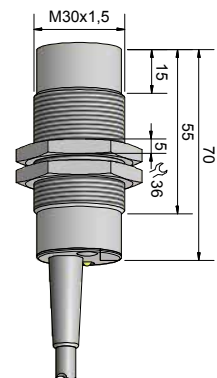
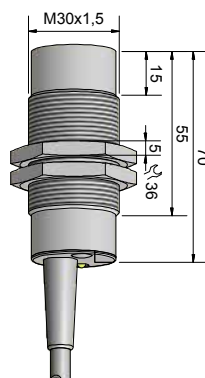
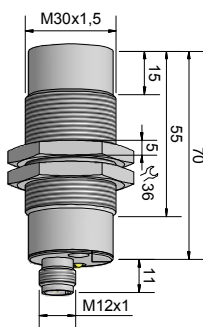
*With sealed potentiometer screw



Dimension 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-M30-PPO-Z02-1-NL	KA 0523	KAS-90-A24-P-PPO-M30-Z02-1-NL	KA 0755
		KAS-90-A24-Ö-M30-PPO-Z02-1-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	

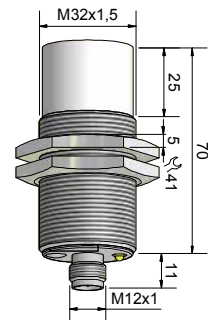
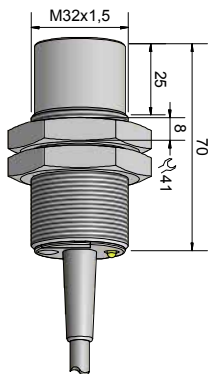
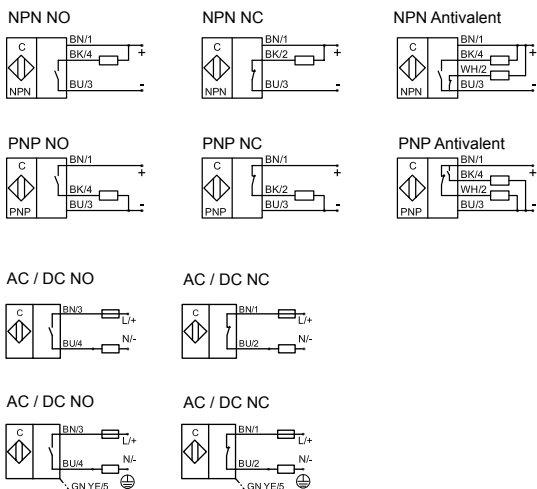
* NO and NC function selectable by means of a bridge.






CAPACITIVE SENSORS NormLine

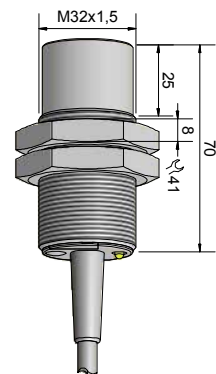
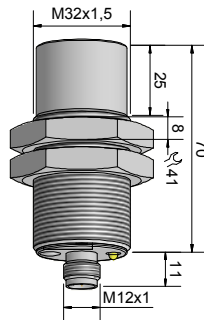
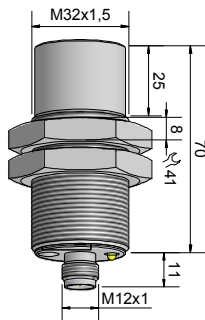
Housing	M 32 x 1.5	M 32 x 1.5		
				
Technical data	Non-flush mountable	Non-flush mountable		
Sensing distance S_n , [mm]	20 mm	20 mm		
Sensing distance min. / max. [mm] adjustable	2...30 mm	2...30 mm		
	Type code	Art. No.	Type code	Art. No.
Type NPN antivalent (NO / NC)	KAS-70-35-A-M32-PPO-Z02-1-NL	KA 0727	KAS-70-35-A-M32-PTFE/MS-Y3-1-NL	KA 0722
Type NPN normally open (NO)	KAS-70-35-S-M32-PPO-Z02-1-NL	KA 0452		
Type PNP antivalent (NO / NC)	KAS-80-35-A-M32-PPO-Z02-1-NL	KA 0440	KAS-80-35-A-M32-PTFE/MS-Y3-1-NL	KA 0721
Type PNP normally open (NO)	KAS-80-35-S-M32-PPO-Z02-1-NL	KA 0726		
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.	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 ² 4 x 0.5 mm ² for antivalent		Flange connector M 12 x 1	
Housing material	PA / PPO		Brass	
Active surface	PA / PPO		PTFE (FDA 21 CFR 177.1550)	
Lid	PA / PPO		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-PPO-Y3-1-NL	KA 0417	KAS-80-35-A-M32-Y3-3D-NL	KA 0429		
				KAS-90-35-S-M32-PPO-Z02-1-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	

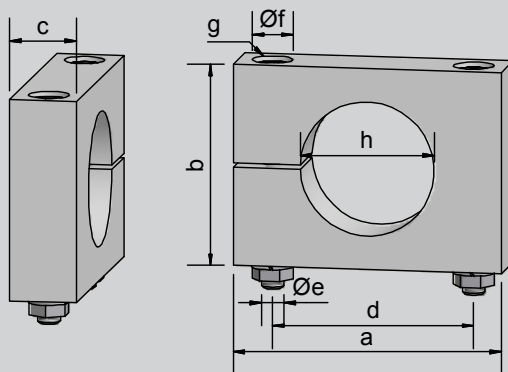


ACCESORIES

	Pages
Mounting blocks	38
Protection caps and protection sets	39
Female connectors	40
Sensor holder	41

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

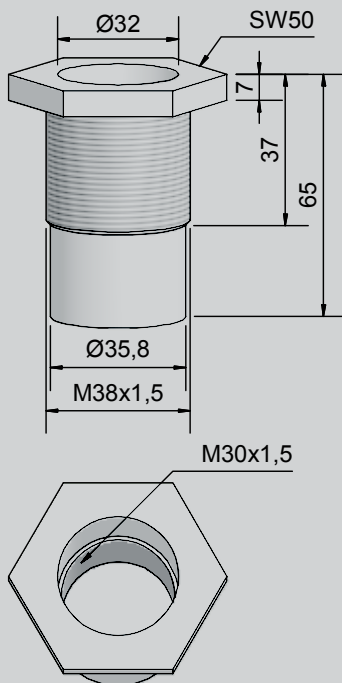
PROTECTION CAPS AND PROTECTION SETS

Protection Caps M30 / M32 PTFE

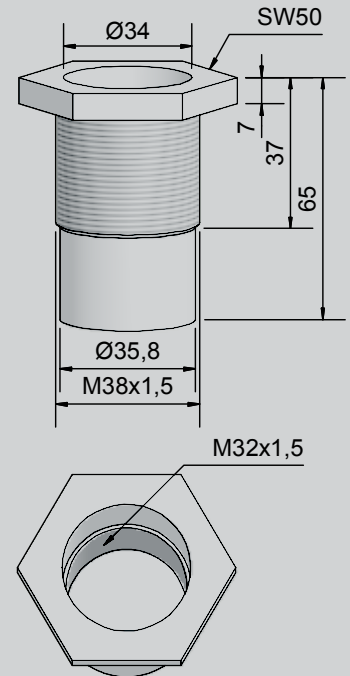


PROTECTION CAP

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

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.

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



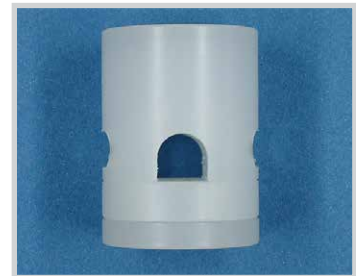
Sensor holder for tube mounting

- 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



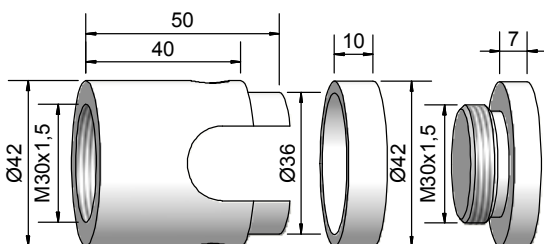
Holder for Sensor M30 - tube D 5.0, Nylon



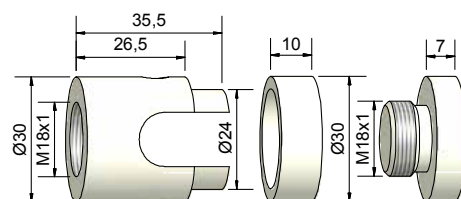
Holder for Sensor M18 - tube D.6.5, Nylon

DIMENSIONS

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



H-M18-6.5(5.0)...



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190250	Mounting block No. 133	38
190300	Mounting block No. 134	38
190350	Mounting block No. 135	38
190400	Mounting block No. 136	38
190450	Mounting block No. 137	38
190500	Protection cover M32	39
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190504	Protection cover M30	39
190505	Protection cover M30	39
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191550	Female connector No. 9a	40
191910	Female connector No. 16a	40
192200	Female connector No. 21	40
192200	Female connector No. 22	40
192900	Female connector No. 36	40
193000	Female connector No. 37	40
193210	Female connector No. 45	40
193220	Female connector No. 46	40
193230	Female connector No. 47	40
193345	Female connector No. 49a	40
193350	Female connector No. 50	40
193385	Female connector No. 57a	40
193386	Female connector No. 58a	40
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KA0364	KAS-70-A24-A-M30-PPO-Z02-1-NL	32
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KA0641	KAS-90-A14-Ö-M30-PPO-Z02-1-NL	29
KA0648	KAS-70-A13-S-M18-PPO-Z02-1-NL	25
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KA0663	KAS-80-A14-S-M30-PPO/MS-Z02-1-NL	28
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KA0680	KAS-80-A13-A-M18-PPO-Z02-1-NL	25
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KA0677	KAS-90-A13-Ö-M18-PPO/MS-Z02-1-NL	26
KA0603	KAS-90-A14-S-M30-PPO-Z02-1-NL	29
KA0674	KAS-90-A14-S-M30-PPO/MS-Z02-1-NL	30
KA0641	KAS-90-A14-Ö-M30-PPO-Z02-1-NL	29
KA0675	KAS-90-A14-Ö-M30-PPO/MS-Z02-1-NL	30
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All specifications are subject to change without notice. (16.01.2020)

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