Integrated Capacitive Angle-of-Rotation Transducers KE 09
Ex protection group-intrinsic safety EEx i...

Uses
Capacitive angle-of-rotation sensors are built into mechanical pointer-type measuring instruments when long-distance transmission of measured values is necessary as well as local display.

Advantages
● Tried and tested, non-wearing, capacitive sampling system
● High operating reliability owing to thick-film integrated circuit
● Suitable for 2-, 3- or 4-wire connection
● Intrinsically safe version
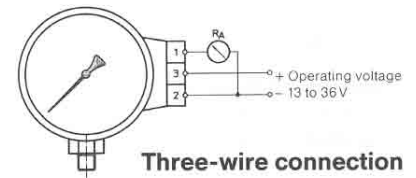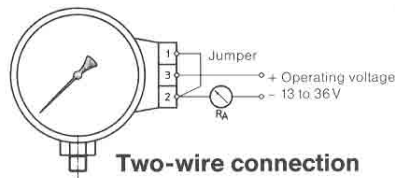 **EEx ib IIC T5 and T6** (zone 1)

Structure and function
The capacitive angle-of-rotation sensor is made up of the differential capacitor D and the electronics E.

The angle measured by the measuring instrument is transferred to the rotor of the differential capacitor via a mechanical coupler and converted to a capacitance change proportional to the angle.

Electrical connection

Two-wire connection   **Three-wire connection**

Technical Data

Measured variable	angle of rotation
Measuring principle	capacitive behaviour
Measuring accuracy	measuring instrument accuracy plus max. 0.5 % = worst case. A measuring instrument with a capacitive angle-of-rotation transducer is always calibrated after it has been installed so that the total measurement error can be kept as small as possible.
Operating voltage	24 V DC (15 to 30 V DC)
Effect of operating voltage	$\leq 0.2\%$ in specified operating voltage range
Residual ripple	$\leq 10\%$ pp
Max. current consumption	approx. 25 mA
Three-wire output	0 to 20 mA, 4 to 20 mA
Max. load	min. 750 ohms (see formula below)
Two-wire output	4 to 20 mA
Max. load	min. 750 ohms (see formula below)

Formula: $Ra \dfrac{Vb\,(V) - 12}{Ia\,(mA)}$ ohms   if Vb = 24 V DC then Ra = 600 ohms

Perm. ambient temperature	$-25°C$ to $+70°C$
Temperature influence	$0.5\%/10°K$
Explosion protection	the capacitive angle-of-rotation transducers can be used in hazardous areas in zone 1 if an intrinsically safe power supply is used (technical specifications = $Vb \leq 22$ V DC, $I\,k \leq 100$ mA)
Explosion protection group	intrinsic safety zone 1, EEx ib IIC T6, Ta $\leq 50°C$
PTB-No. (CENELEC)	Ex 81/2045 x
Internal self-inductance	$Li \leq 2$ mH
Internal self-capacitance	$Ci \leq 15$ mF
Electrical connection	cable connection box mounted on the side of the casing

Ordering Code

Contacts	**Type KE 01**	☐ ☐ ☐ ☐ ☐ ☐ **H** **2**

Slow-action contact .... ▷ S
Magnetic snap-action contact .... ▷ M
Inductive contact .... ▷ I

Contact function
Contact 1
Contact 1 closes .... ▷ 1
Contact 1 opens .... ▷ 2
Changeover contact 1 .... ▷ 3
Contact 2
Contact 2 not available .... ▷ 0
Contact 2 closes .... ▷ 1
Contact 2 opens .... ▷ 2
Contact 3
Contact 3 not available .... ▷ 0
Contact 3 closes .... ▷ 1
Contact 3 opens .... ▷ 2

Switching type
Standard with common electr. root .... ▷ A
Isolated circuits, max. 2 contacts .... ▷ B
Inductive contacts – isolated by system .... ▷ C

Contact/Contact material
With inductive contacts .... ▷ 0
Silver palladium AgPd 80/20 .... ▷ 1
Silver palladium, hard gold-plated .... ▷ 2

Design
Contact mounting with raised pointers

Torque
Coiled spring torque 0.0133 Nmm/90 $<°$

Resistance-Type Remote Sensor	**Type KE 07**	**A** ☐ ☐ **9** **0** **0** **0** **0**

Output
Resistance   5 – 100 – 5 ohms .... ▷ 0   7
              10 – 200 – 10 ohms .... ▷ 0   8
              Other values .... ▷ 0   9

Capacitive Angle-of-Rotation Transducer	**Type KE 09**	**0** ☐ ☐ **9** **0** **0** **0** **0**

Output
0 to 20 mA   Three-wire connection .... ▷ 5   1
4 to 20 mA   Two-wire connection .... ▷ 5   3
4 to 20 mA   Three-wire connection .... ▷ 5   5

Operating voltage 24 V DC