

CPK-C-23



- capacitive level sensors
- for level detection of electrically conductive and non-conductive liquids
- compact miniature performance for direct mounting to vessels, tanks, sumps and tubes
- easy setting by means of magnetic pen
- high temperature performance available
- outputs S / PNP
- LED state indication



Capacitive level sensors (switches) **CPK-C-23** are designed for limit level detection of electrically conductive and non-conductive liquids in vessels, reservoirs, sumps, pipes, tanks, etc. The sensitivity of the sensor can be easily set by placing magnetic pen on sensitive spot.

The process coupling at the housing can be with metric thread (M18x1.5; M20x1.5), pipe thread (G3/8"; G1/2") or sealing thread (NPT 1/2–14). Output performances - transistor output with open collector (PNP) and two wire electronic switch (S) output.

There are next performances available:

N: Normal,

E: Extended temperature range,

NT: High temperature variant.

RANGE OF APPLICATION

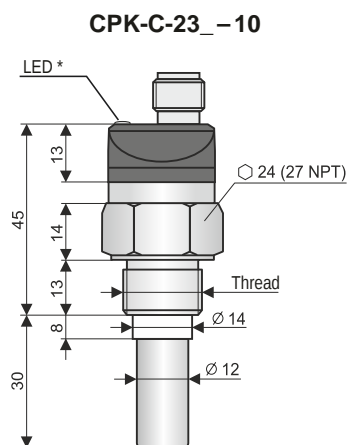
Detection of various types of liquids: water, oils, coolants, water solutions, etc. Suitable for metal vessels, containers, tanks, sumps, pipes. Suitability for non-metallic containers (glass, plastic containers, etc.) please consult with the manufacturer.

VARIANTS OF LEVEL SENSORS

CPK-C-23_-10	Uncoated short bar electrode , for sensing the level of electrically non-conductive liquids (oil, crude oil products). Assembly into a side wall of vessel or into a pipe. Electrode length 30 mm.
CPK-C-23_-11	Fully coated short bar electrode , for sensing the level of non-aggressive electrically conductive liquids (water, water solutions). Electrode insulation from PP material, assembly into a side wall of vessel or into a pipe. Electrode length 30 mm.
CPK-C-23_-12	Fully coated short bar electrode , for sensing the level of electrically conductive liquids (various chemicals, moderately aggressive water solutions). Higher temperature resistance compared to variant "11". Electrode insulation from FEP material. Assembly into a side wall of vessel or into a pipe. Electrode length 30 mm.
CPK-C-23_-20	Partially coated rod electrode , for sensing the level of electrically conductive and non-conductive liquids, partially resistant against fume condensation in the sensed area. Electrode insulation from FEP material. Installation from above, on shorter electrodes (max. 200 mm) also from the side. Electrode length from 50 mm to 1 m.
CPK-C-23_-21	Fully coated rod electrode, universal use , for sensing the level of electrically conductive liquids. Resistant against fume condensation and partially resistant against spraying media. Electrode insulation from FEP material. Installation from above, on shorter electrodes (max. 200 mm) also from the side. Electrode length from 50 mm to 1 m.
CPK-C-23_-30	Dismountable uncoated rod electrode , for sensing the level of conductive or non-conductive liquids. Installation from above, on shorter electrodes (max. 200 mm) also from the side. Electrode length from 50 mm to 1 m.

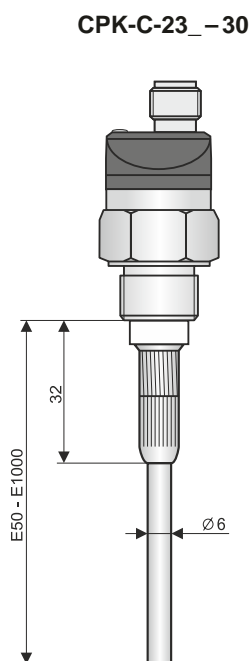
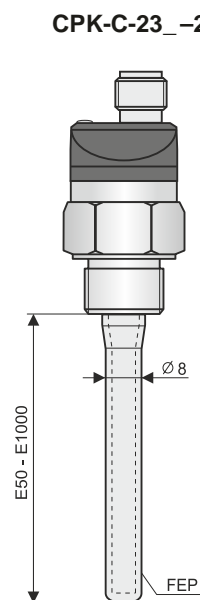
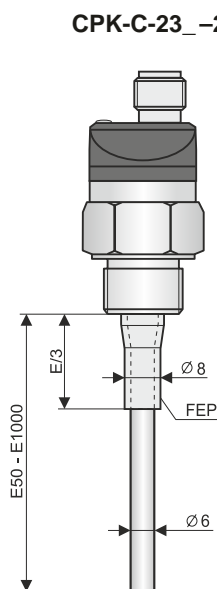
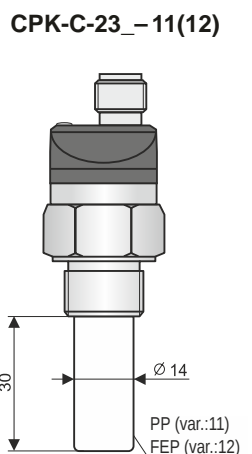


DIMENSION DRAWINGS

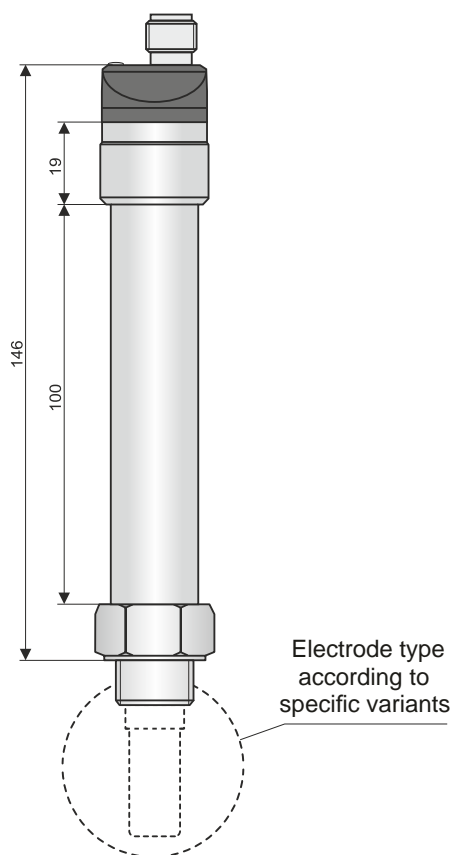


Types of threads:

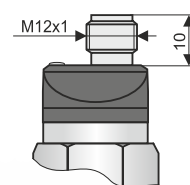
G 3/8"
M18x1,5
M20x1,5
1/2-14 NPT



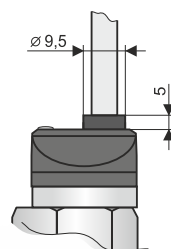
**High temperature variants
(CPK-C-23NT-10; 12; 20; 21; 30)**



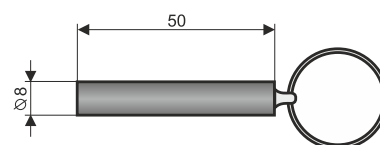
**Variant „C“ with connector
(outside CPK-C-23E*)**



**Variant „A“
with cable outlet**



Magnetic pen



* Variant „E“ without LED state indicator

Technical specifications		
Supply voltage		6 ... 30 V DC
Supply current	– output type P – output type S	max. 0,6 / 7 mA (OFF / ON state) max. 0,6 mA (OFF state)
Switched current	– output type P – output type S	max. 100 mA 3,3 mA / 40 mA (min. / max.)
Remanent voltage - ON state	– output type P – output type S	1,8 V 6,0 V
Output time delay		0,1 s
Protection class		IP68 (0,1 MPa)
Cable (for cable outlet performance)	CPK-C-23N, NT CPK-C-23E	PVC 2x 0,34 mm ² (3x 0,34 mm ² – output P) silicone 2x 0,5 mm ²
Weight (with 2 m cable and 30 mm electrode)	CPK-C-23N, E CPK-C-23NT	cca. 45 g cca. 190 g

Process connection		
Type	Size	Marking
Metric thread	M18 x 1,5	M18
Metric thread	M20 x 1,5	M20
Pipe thread (BSP)	G 3/8"	G3/8
Pipe thread (BSP)	G 1/2"	G1/2
Sealing thread	NPT 1/2–14	NPT

Output type	
Output	Variants
S („S“)	N, E, NT
PNP („P“)	N, E, NT

Material performance		
Sensor part	Variants	Material
Housing	All variants	Plastic PP
Process coupling	All variants	Stainless steel W. Nr. 1.4305 (AISI 303)
Electrode	All variants	Stainless steel W. Nr. 1.4305 (AISI 303)
Electrode insulation	CPK-C-23_–11	Plastic PP
Electrode insulation	CPK-C-23_–12, 20, 21	Plastic FEP

Working areas and area classification (EN 60079-10–1)	
CPK-C-23N	Basic performance for non-explosive areas.
CPK-C-23E	Extended temperature performance for non-explosive areas.
CPK-C-23NT	High-temperature basic performance for non-explosive areas.



Temperature and pressure resistance

Variant (Performance)	Temperature tp	Temperature tm	Temperature ta	Max. operating pressure for temperature tp				
				to 30°C	to 85°C	to 105°C	to 130°C	to 150°C
CPK-C-23N-10	-25°C ... +105°C	-25°C ... +105°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	–	–
CPK-C-23E-10	-25°C ... +120°C	-25°C ... +120°C	-25°C ... +105°C	8 MPa	6 MPa	5 MPa	–	–
CPK-C-23NT-10	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	4 MPa	3 MPa
CPK-C-23N-11	-10°C ... +105°C	-10°C ... +105°C	-10°C ... +80°C	7 MPa	5 MPa	4 MPa	–	–
CPK-C-23E-11	-10°C ... +105°C	-10°C ... +105°C	-10°C ... +105°C	7 MPa	5 MPa	4 MPa	–	–
CPK-C-23N-12	-25°C ... +105°C	-25°C ... +105°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	–	–
CPK-C-23E-12	-25°C ... +120°C	-25°C ... +120°C	-25°C ... +105°C	8 MPa	6 MPa	5 MPa	–	–
CPK-C-23NT-12	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	4 MPa	3 MPa
CPK-C-23N-20	-25°C ... +105°C	-30°C ... +150°C *	-20°C ... +80°C	3 MPa	2,5 MPa	2 MPa	–	–
CPK-C-23E-20	-25°C ... +120°C	-30°C ... +150°C *	-25°C ... +105°C	3 MPa	2,5 MPa	2 MPa	–	–
CPK-C-23NT-20	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	3 MPa	2,5 MPa	2 MPa	1,5 MPa	1 MPa
CPK-C-23N-21	-25°C ... +105°C	-30°C ... +150°C *	-20°C ... +80°C	3 MPa	2,5 MPa	2 MPa	–	–
CPK-C-23E-21	-25°C ... +120°C	-30°C ... +150°C *	-25°C ... +105°C	3 MPa	2,5 MPa	2 MPa	–	–
CPK-C-23NT-21	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	3 MPa	2,5 MPa	2 MPa	1,5 MPa	1 MPa
CPK-C-23N-30	-25°C ... +105°C	-30°C ... +150°C *	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	–	–
CPK-C-23E-30	-25°C ... +120°C	-30°C ... +150°C *	-25°C ... +105°C	8 MPa	6 MPa	5 MPa	–	–
CPK-C-23NT-30	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	4 MPa	3 MPa

* Valid for top mounting (in vertical position)

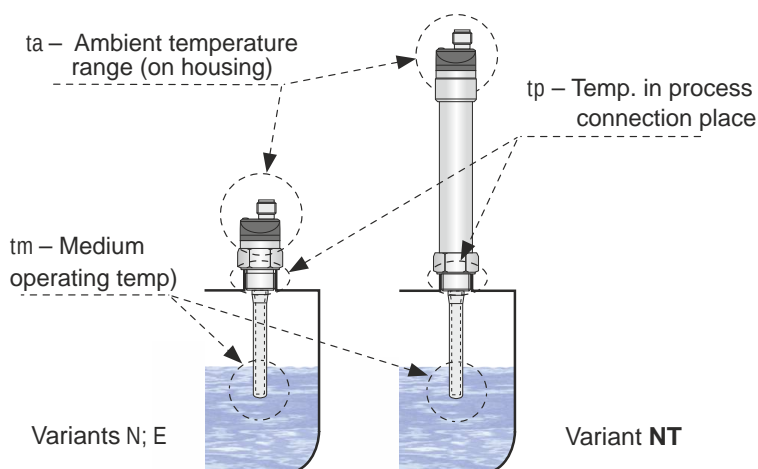


Illustration of areas for temperature measurement

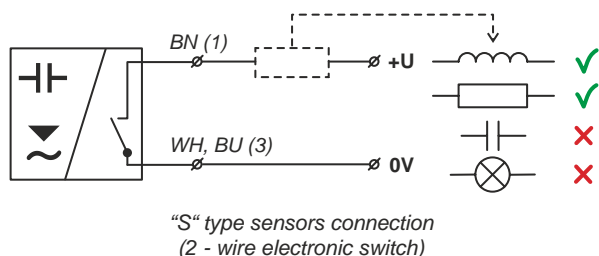
ELECTRICAL CONNECTION

For "A" variant with the fixed cable, the individual color cores of the connecting cable are connected to the respective terminals of the related equipment (supply unit).

For "C" variant with the connector, the cable can be supplied with the sensor (length 2 or 5 m), fitted with the pressed connector socket or dismountable connector socket without the cable (see accessories), the connector is not part of the sensor. In this case the cable is connected to the inside pins of the socket according to Fig.

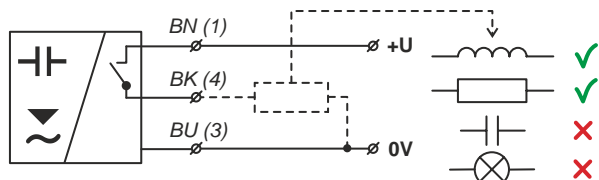
The sensor with related equipment is interconnected by a suitable three-core (P variation) or two-core (S variation) cable. If using a dismountable connector socket, the outside diameter of the cable is a maximum of 6 mm.





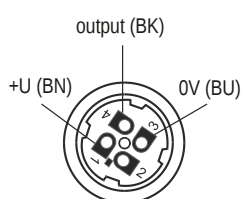
Type **CPK-C-23_ _ _ -S_ _**

The positive power terminal +U is connected via a load (e.g. a relay) to the brown wire, or connector pin no.1, the negative terminal to the white wire (configuration "N" and "NT") or to the blue wire (configuration "E") or to connector pin No.3.



Type **CPK-C-23_ _ _ -P_ _**

Positive pole (+ U) of power supply is connected to brown wire or pin connector No. 1, negative pole is connected to blue wire or pin connector No. 3. Load (relay) is connected to black wire or pin connector No. 4.



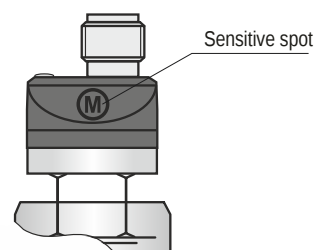
Inside of the connector socket

Legend:

- (1...4) – terminals number for variants with connector
 BN – brown
 WH – white
 BK – black
 BU – blue

SETTINGS

The settings are done by touching a magnetic pen MP – 8 on the sensitive spot (M) located on the front-side of the sensor. By touching with the magnetic pen for a short time (max. 2 sec) on the sensitive spot (M), the sensor will open, holding down the magnetic pen for longer (min. 4 sec) the sensor will close. In this way, the sensitivity to the measured medium and the switching modes (O, C) are set.



mode O

(switches when submerged)

On an empty or partially filled tank (level below the bottom edge of the sensor), touch the sensitive area (M) for 1 sec with the magnetic pen (the sensor will open). When the tank fills up above the top edge of the sensor, touch the sensitive area (M) for 5 sec. with the magnetic pen (the sensor will close).

mode C

(unswitches when submerged)

On an empty or partially filled tank (level below the bottom edge of the sensor), touch the sensitive area (M) for 5 sec with the magnetic pen (the sensor will close). When the tank fills up above the top edge of the sensor, touch the sensitive area (M) for 1 sec. with the magnetic pen (the sensor will open).

On installations from above, it is necessary during detection of **non-conductive** liquids using sensors **CPK-C-23_–20; –30** and during detection of **conductive** and **non-conductive** liquids using sensor **CPK-C-23_–21** to set the limits for closing and opening with the electrode submerged in the medium.

The closing and opening limits are shifted closer to the state with a submerged electrode.

The CPK-C-23E range of sensors is made without a signal LED indicator. To check the correctness of settings, it is necessary to connect a connected device or a load and to use it to receive information about the opened / closed status of the sensor.

FACTORY DEFAULT SETTINGS:

Sensors **CPK-C-23_–10; –20; –30** have factory default settings for detecting mineral oils, **CPK-C-23_–11; –12; –21** for detecting drinking water. Switching is set to mode "O" (the sensor will close when submerged).

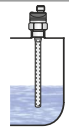

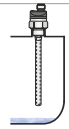



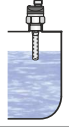

FUNCTION AND STATUS INDICATION


(only with LED state indicator variant)


In the following table are the types of inputs and the respective statuses (ON/ OFF) in the case of a maximum and minimum level sensing. The signalling of the status of the sensor is indicated by the orange LED located on the upper area of the sensor beside the connector (cable).

Indicator	Function
Orange LED	Continuous light – Sensor is closed (switched ON) Dark – Sensor is open (switched OFF) Rapid flashing (period 0.2 s) – error setting * Slow flashing (period 0.8 s) – short circuit at sensor output

* Limit setting for closing (opening) on the same level or impossibility of differentiate between closing level and opening level (low permittivity of the medium).

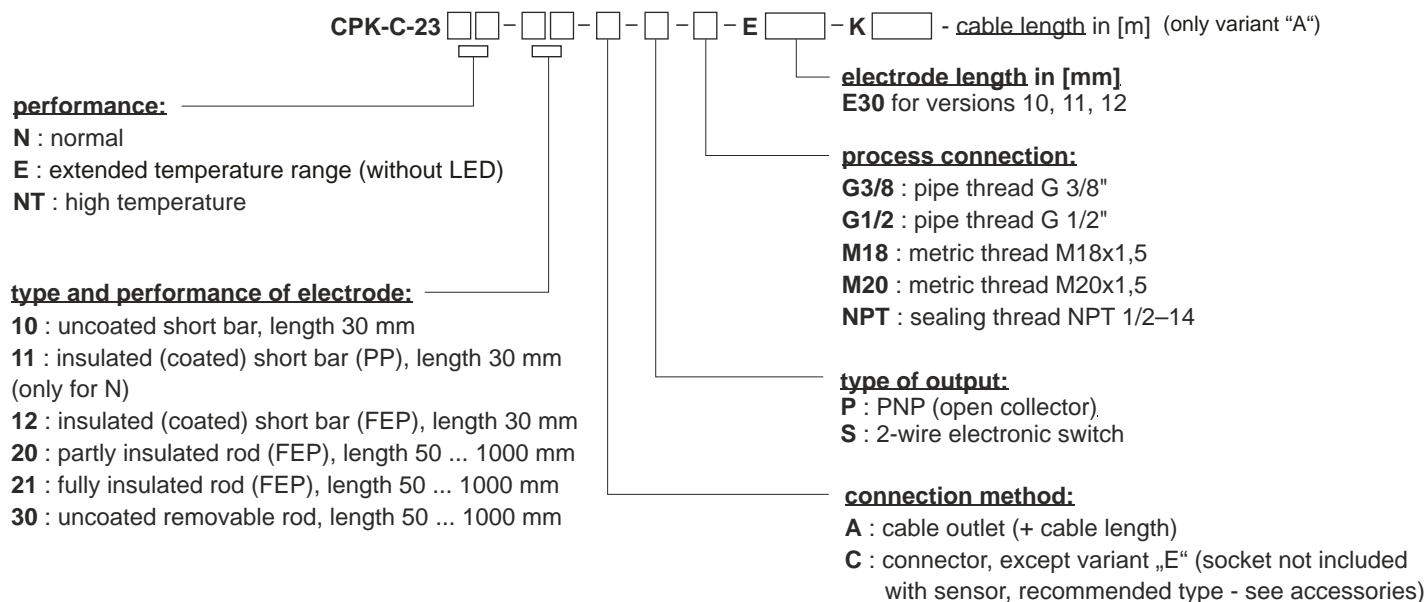
	Level state	Mode	Type of sensor	Output state	LEDindicator *
Minimum level sensing		O	CPK-C-23_ _ _ _ _P_ _ CPK-C-23_ _ _ _ _S_ _	CLOSED	 (Shine)
		O	CPK-C-23_ _ _ _ _P_ _ CPK-C-23_ _ _ _ _S_ _	OPEN	 (Dark)
Maximum level sensing		C	CPK-C-23_ _ _ _ _P_ _ CPK-C-23_ _ _ _ _S_ _	CLOSED	 (Shine)
		C	CPK-C-23_ _ _ _ _P_ _ CPK-C-23_ _ _ _ _S_ _	OPEN	 (Dark)

 Sensor with type output „S“ and „R“ for each flash of the LED switches its output on for approx. 3 ms. This period is sufficiently short to avoid unwanted switching of relay contacts. For binary inputs, we recommend to set the filter so as not to respond to pulses shorter than 3 ms.

 For security reasons, we recommend to set the mode O (normally open, sensor closes when immersed) for minimum level detection. Any failure of the sensor or wiring is equally apparent as the emergency level state. Analogously – for the maximum level detection is recommended to set the mode C (normally closed, sensor opens when immersed).



ORDER CODE



CORRECT SPECIFICATION EXAMPLES

CPK-C-23N-10-A-S-G3/8-K5

(**N**) normal performance; (**10**) uncoated short bar electrode 30 mm; (**A**) cable outlet with 5 m fixed cable; (**S**) 2-wire electronic switch; (**G3/8**) process connection with pipe thread G3/8", (**K5**) cable length 5m.

CPK-C-23E-30-A-S-G1/2-E450-K10

(**E**) performance for extended temperature range; (**30**) uncoated removable rod electrode; (**A**) cable outlet with 10 m fixed cable; (**S**) 2-wire electronic switch; (**G1/2**) process connection with pipe thread G1/2"; (**E450**) electrode length 450 mm, (**K10**) cable length 10m.

CPK-C-23NT-20-C-S-M18-E320

(**NT**) performance for high temperature; (**20**) partly insulated rod electrode (FEP); (**C**) electrically connection with connector; (**S**) 2-wire electronic switch; (**M18**) process connection with metric thread M18x1.5; (**E320**) electrode length 320 mm.

ACCESSORIES

standard - included in the level sensor price

- 1 pcs. magnetic pen
- 1 pcs. seal (asbestos free) (Klingerit) *

optional - for a surcharge - (see catalogue sheet of accessories)

- cable (over the standard length 2m)
- non-detachable connector M12 (variants N, NT) with cable length 2 or 5 m.
- detachable connector M12 with outlet PG7 (variants N, NT)
- normal steel (ON) or stainless steel (NN) welding flange
- stainless steel fixing nut UM-18x1,5
- various types of seals (PTFE, Al, etc.)

SAFETY, PROTECTIONS AND COMPATIBILITY

The level sensor is equipped with protection against electric shock on the electrode, reverse polarity, output current overload, short circuit and against current overload on output.

Protection against dangerous contact is provided by low safety voltage according to 33 2000-4-41. Electromagnetic compatibility is provided by conformity with standards EN 55011 / B, EN 61326-1, EN 61000-4-2 (8 kV), -4-3 (10 V/m), -4-4 (2 kV), -4-5 (1 kV) and -4-6 (10 V).

