DISIBEINT

NCPR TB INOX / NCPRI TB INOX

CONDUCTIVE ELECTRODES WITH BUILT-IN AMPLIFIER

	Application	Level control for general application in conductive liquids with preferred use in conductive tanks (see other possibilities in page 5).
	Operating principle	The sensor uses the own process connection fitting as the common electrode and the rods for detecting the liquid contained into the tank where the level is to be controlled. The detection of that level provokes the action of a relay integrated into the sensor main body. A time can be set to delay the detection in tanks equiped with shakers or with turbulences. In order to adapt easily to the tank characteristics, it can be set the state of the contacts of the relay.
	Operating mode	It depends on the number of electrodes: · With1 electrode: Detection of 1 unique level point (amplifier KNPA). See page 2. · With 2 electrodes: Detection of max/min levels (amplifier KNCA). See page 3.
Sensor	Process connection	Top screw 1" G. Stainless steel AISI316
	Electrode	Stainless steel AISI316. Rod ø5 mm. (For the 1/2"G connection, only 1 electrode is allowed).
	Electrode length	1000 mm.
	Volt./Curr. in electrodes	5 V_{pp} / 4 mA (in shortcircuit)
	Process temperature	-20..+70 ºC. For other temperatures, please consult.
	Process pressure	5 Kg/cm^2
	Sensitivity	Adjustable between 1..100 KΩ (1000 μs..10 μs) (See attached table).
	Electrodes insulation	The models referenced NCPRI are supplied with a protective insulation of Poliolefine (PE) or PTFE to assure the detection in the set detection points.
Main head	Material and dimensions	PBT. 64 x 95 x 110 mm
	Housing protection	IP67
	Temperature	-20..+50 ºC
	Cable gland	M20 x 1,5 (IP68)
Output	Type	SPDT relay 6A/250VAC
	Response time	· At power on: 800 ms · At liquid detection: 500 ms
	Timing	Adjustable between 0..9 s. It can be set when detecting, undetecting or at whichever of both situations.

Sensibility ranges

Sensitivity	Detecting (≤ kohm)	Undetecting (≥ kohm)
0	1	2
1	6	12
2	12	24
3	17	34
4	23	46
5	28	56
6	34	68
7	39	78
8	45	90
9	50	100

REFERENCE		PROCESS CONNECTION						VOLTAGE		ELECTRODE					
NCPR	Level sensor	**TB**	Top screw	**I**	Stainless steel AISI316	**P04**	1/2"G	**024**	24 VAC	**1 E**	1 Electrode			**1000**	1000 mm
NCPRI	Level sensor (insulated electrode)					**P06**	1"G	**048**	48 VAC	**2 E**	2 Electrodes (1"G, only)	**L**	PE		
								110	110..125 VAC			**T**	PTFE		
								230	220..240 VAC						
								901	15..70 VAC/DC						
								902	60..240 VAC/DC						

To compose a reference, select one option of each one of the columns. Example: **NCPR TBI P06 024 1E L1000**

NCPR TB INOX

1 Electrode

Control of 1 level

Start-up and adjustment

Prior to start working with the sensor NCPR, it must be adjusted for getting a right operation. Adjustments can be modified whenever required. It must be taken into account that the behaviour of the device can be different whether the adjustments are done while the electrodes are in touch or not with the liquid.

Be sure that the options selector is right positioned. Each time that it is moved to a new option, the Ⓟ led flashes twice indicating that the option has been correctly reached.

Default values

The sensor is adjusted by default with values that can be used in a large number of applications. When pressing the push-button PROG the led Ⓟ turns on. Keep the push-button pressed until the led Ⓟ turns off (3 seconds), indicating that the default values have been reset (they are framed with ☐ at the left column).

Sensitivity adjustment

5

When accessing to this option, the led Ⓟ emits as many flashes as the adjusted sensitivity value, between 0 and 9. Each time the push-button PROG is pressed, the sensitivity value increases in 1, except when the value is 9 that moves to 0. If it is pressed longer than 3 seconds, the sensitivity value moves to 0.

See the table “Sensitivity ranges” at the first page to relate each digit with its ohmic value.

State of the relay contacts

(Relay NO ( ): led Ⓟ OFF; Relay NC ( ): led Ⓟ ON). When accessing to this option, the led Ⓟ shows the actual state of the adjustment. Each time the push-button PROG is pressed, it is reversed the state of the relay contacts.

WARNING: This option modifies the state of the relay and this could provoke undesired effects in the case that any device be connected to the contacts of the relay.

Timing type

(Detecting ( ): led Ⓟ OFF; Undetecting ( ): led Ⓟ OFF; Detecting and undetecting ( ): led Ⓟ flashing). When accessing to this option, the led Ⓟ shows the actual state of the adjustment. Each time the push-button PROG is pressed, it is moved to the next timing type in a cyclic way.

Time

1s

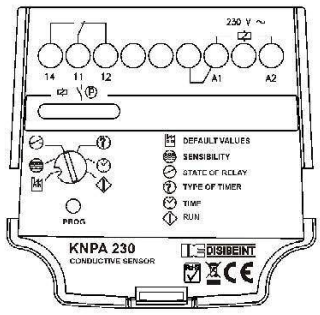
When accessing to this option, the led Ⓟ emits as many flashes as the number of seconds adjusted in the timer, between 0 and 9 seconds. Each time the push-button PROG is pressed, the time value increases in 1 second, except when the value is 9 that moves to 0.

If it is pressed longer than 3 seconds, the time value moves to 0.

Run

Normal operation mode.

The state of the led Ⓟ matches with the state of the relay contact (led ON = relay ON).



Assembly conditions

Electrodes: The top screw acts as common electrode. This must be specially noted when assembling in pipes made with non-conductive material or when assembling at the bottom of the tank.

The main electrode can be cut to reach the required detection height. During the cutting process, be careful in preserving the housing of mechanical stress that may damage the binding of the electrode with the electronic circuitry.

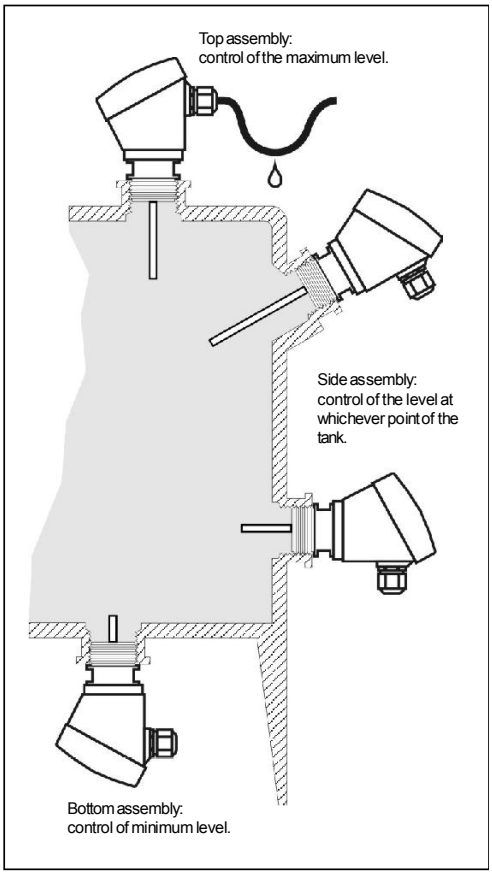
Mounting position: The sensor can be mounted in any position. Remember the previous comments about the common electrode.

Metallic or conductive tanks: When assembling the sensor to a conductive tank, the electrical conductivity between both elements must be kept. It can be used sealings composed by cooper, aluminium, etc. It is not recommended to use teflon tape.

Non-conductive tanks: When assembling the sensor to a non-conductive tank, remember that the sensor will measure the conductivity between the main electrode and the threaded top screw.

Handling: Do not use the housing to screw the sensor into the fitting. Use a tool 40 mm wide at the steel part on the thread. Once tighted, you can turn the housing 350º with your hand until it be placed in the right position.

Electrical connection: Use a cable according with the load the relay will manage. It is convenient that the cable gland completely tight the cable of the electrical connection, and it becomes essential in the event of humidity or when installed outdoor. In these cases, make a loop in the cable to facilitate the removal of accumulated drops (see figure).



NCPR TB INOX

2 Electrodes

Max/Min level control

Start-up and adjustment

Prior to start working with the sensor NCPR, it must be adjusted for getting a right operation. Adjustments can be modified whenever required. It must be taken into account that the behaviour of the device can be different whether the adjustments are done while the electrodes are in touch or not with the liquid.

Be sure that the options selector is right positioned. Each time that it is moved to a new option, the Ⓟ led flashes twice indicating that the option has been correctly reached.

Default values

The sensor is adjusted by default with values that can be used in a large number of applications. When pressing the push-button PROG the led Ⓟ turns on. Keep the push-button pressed until the led Ⓟ turns off (3 seconds), indicating that the default values have been reset (they are framed with ☐ at the left column).

Sensitivity adjustment

5

When accessing to this option, the led Ⓟ emits as many flashes as the adjusted sensitivity value, between 0 and 9. Each time the push-button PROG is pressed, the sensitivity value increases in 1, except when the value is 9 that moves to 0. If it is pressed longer than 3 seconds, the sensitivity value moves to 0.

See the table “Sensitivity ranges” at the first page to relate each digit with its ohmic value.

State of the relay contacts

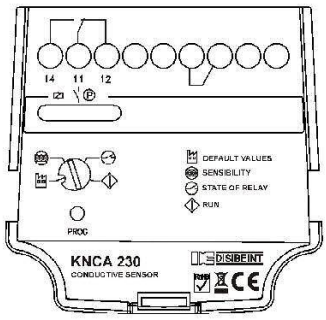
(Relay NO ( ): led Ⓟ OFF; Relay NC ( ): led Ⓟ ON). When accessing to this option, the led Ⓟ shows the actual state of the adjustment. Each time the push-button PROG is pressed, it is reversed the state of the relay contacts.

WARNING: This option modifies the state of the relay and this could provoke undesired effects in the case that any device be connected to the contacts of the relay.

Run

Normal operation mode.

The state of the led Ⓟ matches with the state of the relay contact (led ON = relay ON).



Assembly conditions

Electrodes: The top screw acts as common electrode. The electrodes for maximum and minimum level can be cut to reach the required detection height. It is not required to identify specifically the electrode for maximum or the one for minimum because the amplifier KNCA determine them by itself according to its height.
During the cutting process, be careful in preserving the housing of mechanical stress that may damage the binding of the electrode with the electronic circuitry.

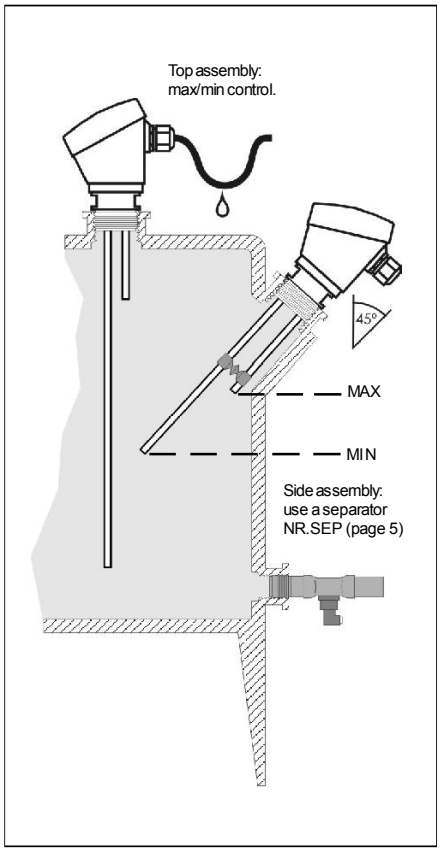
Mounting position: Preferably, assembly the sensor in vertical position. If it is assembled in the side of the tank, it is recommended to do it with an angle not higher than 45º as well as to use an electrodes separator to avoid the contact between them (consult the accessories in page 5).

Metallic or conductive tanks: When assembling the sensor to a conductive tank, the electrical conductivity between both elements must be kept. It can be used sealings composed by cooper, aluminium, etc. It is not recommended to use teflon tape.

Non-conductive tanks: When assembling the sensor to a non-conductive tank, remember that the sensor will measure the conductivity between the main electrode and the threaded top screw.

Handling: Do not use the housing to screw the sensor into the fitting. Use a tool 40 mm wide at the steel part on the thread. Once tighted, you can turn the housing 350º with your hand until it be placed in the right position.

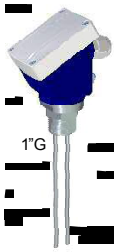
Electrical connection: Use a cable according with the load the relay will manage. It is convenient that the cable gland completely tight the cable of the electrical connection, and it becomes essential in the event of humidity or when installed outdoor. In these cases, make a loop in the cable to facilitate the removal of accumulated drops (see figure).



Model

NCPR TB INOX 1E
NCPRI TB INOX 1E

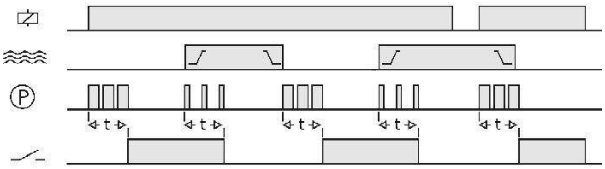
· *1 Electrode*
· *Amplifier KNPA*



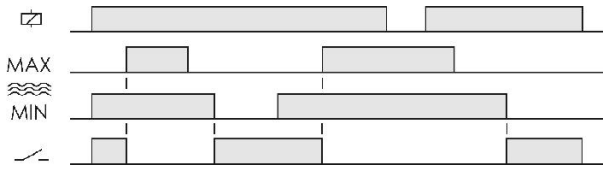
NCPRI TB INOX 2E
NCPRI TB INOX 2E

· *2 Electrodes*
· *Amplifier KNCA*

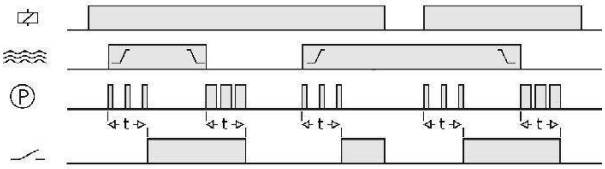
Operating diagrams



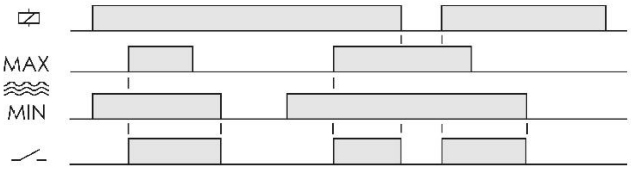
Simulation: Control of maximum level or filling
Relay contacts: NC
Timing type: Detecting and undetecting
Time: Any value greater than 0



Simulation: Control for filling
Relay contacts: NC



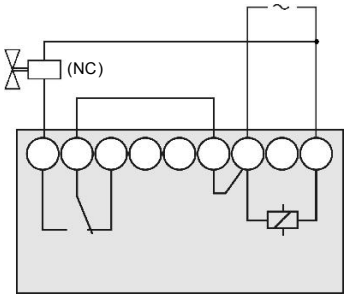
Simulation: Control of minimum level or emptying
Relay contacts: NO
Timing type: Detecting and undetecting
Time: Any value greater than 0



Simulation: Control for emptying
Relay contacts: NO

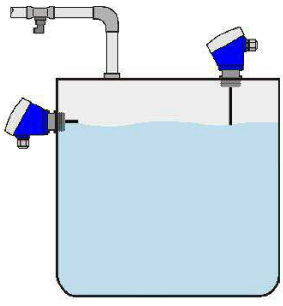
Example of wiring connection

Control of maximum level or filling control using a sensor with 1 electrode and the amplifier KNPA.

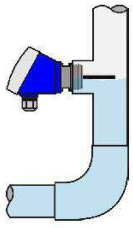


Filling control using a sensor with 2 electrodes and the amplifier KNCA.

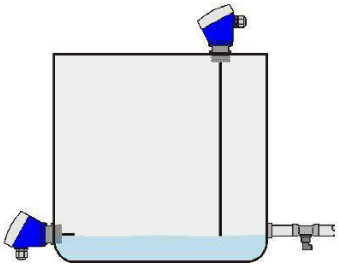
Installation examples



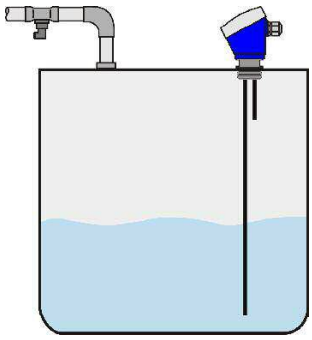
Detection of maximum level



Detection of liquid inside the pipes

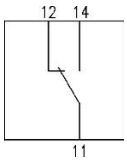
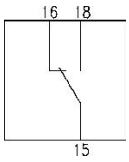


Detection of minimum level

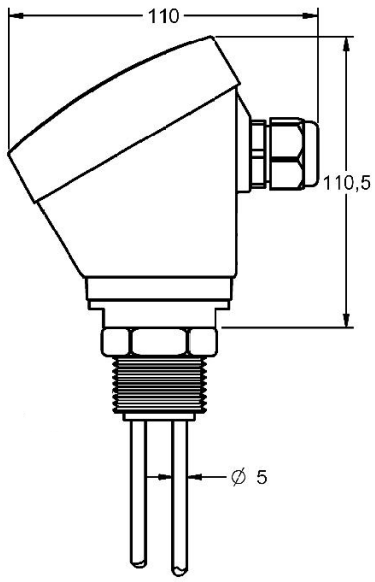


Detection of maximum and minimum level

Output relay

		KNCA	KNPA
			
Resistive load	AC	6 A / 250 V	
	DC	0,2 A / 200 V 6 A / 24 V	
Inductive load	AC	3 A / 250 V	
	DC	3 A / 24 V	
Mechanical life		> 30 x 10^6 operations	
Max. mechanical operations		72.000 operations / hour	
Electrical life at full load		360 operations / hour	
Contact material		AgNi 0.15	
Maximum voltage		400 VAC	
Operating voltage		400 VAC	
Volt. between changeovers		1000 VAC	
Voltage between contacts		1000 VAC	
Voltage coil/contact		4000 VAC	
Distance coil/contact		8 mm	
Isolation resistance		> 10^4 MΩ	

Dimensions



Constructive and enviromanetal data

	KNCA / KNPA
Voltage phase-neutral	300 V
Overvoltage category	III
Shocking voltage	4 kV
Pollution degree	2
Protection class	IP 20
Storing temperature	-50..+85ºC
Operating temperature	-20..+50ºC
Humidity	30..85% HR
Housing	Cycoloy - Light Grey
Socket	Lexan - Light Grey
Leds window	Lexan - Transparent
Buttons and terminal blocks	Technyl - Dark Blue
Terminals	Nickled brass
Norms	Designed and manufactured under EEC standards. Directive for electromagnetic compatibility 2004/108/EEC. Directive for low voltage 2006/95/EEC. Plastics: UL 91 V0

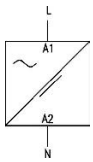
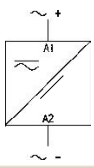
Insulation

	Poliolefine PE	PTFE
Application	Electrodes protection against possible contacts among them.	
Colour	Grey	White
External diameter (approx.)	6 mm	7 mm
Temperature	+70ºC	+140ºC
Models	NCPRI TB ... L	NCPRI TB ... T

Accessories

	NR.SEP/P	NR.SEP/T
		
Application	Electrodes separator	
Material	PVC	PTFE
Colour	Red	White
Electrode diameter	5 mm	

Supply voltage

	KNCA / KNPA	
	AC 	AC/DC 
Galvani isolation	Yes	Yes
Frequency	50 / 60 Hz	-
Operating margins	±10..-15%	-
Positive	-	Terminal A1
Protected polarity	-	Yes

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