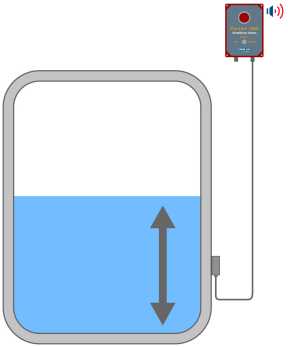
Level pro®

INSTRUCTION MANUAL



NC SERIES | Thru-Wall Level Switch

ICON™ PROCESS CONTROLS

Corrosion-Free
Instrumentation Equipment

Read carefully the instructions published in this manual before the first use of the sensor. Keep the manual at a safe place. The manufacturer reserves the right to implement changes without prior notice

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Product description

Through wall level switches NC30 Series level switches are intended for liquid (conductive and non-conductive) level detection on glass or plastic pipes, tubing and tanks. The sensor is equipped with high frequency technology which allows reliable operation even for sensing of the adherent electrically conductive medium. The sensitivity and modes (O - normally open or C - normally closed) of the switches can be easily set by placing magnetic pen on sensitive spot. Output performance - transistor output with open collector (PNP) or two wire electronic switch (S). This connection is done by means of two wires directly into a circuit with relay or to binary input of control system.

Features of variants

NC30-10 **Prismatic (refracted) electrode,** shape-adapted to be attached to the gauging pipe or other tube. The fixing of the sensor onto a pipe is provided by plastic straps.

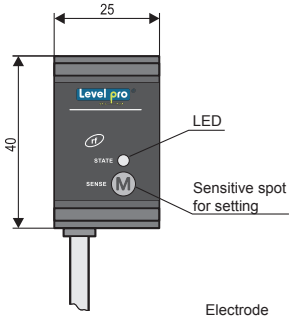
- **NC30-11** **Plannar electrode,** suitable for installation on flat surfaces (e.g. plastic or glass tanks). The sensor can be fixed with plastic straps or by double sided adhesive layer.

Technical specifications

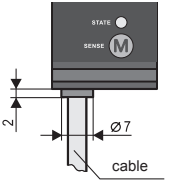
Supply voltage		6 ... 30 V DC
Supply current	– Output type P (OFF / ON state) – Output type S (OFF state)	Max. 0.6 / 7 mA Max. 0.6 mA
Switching current (Min. / Max.)	– Output type P (open collector PNP) – Output type S (two wire el. switch)	100 mA 3.3 / 40 mA
Remanent voltage - ON state	– Output type P (open collector PNP) – Output type S (two wire el. switch)	1.8 V 6.0 V
Max. switching frequency		1 Hz
Ambient temperature range		–20 ... +80°C
Temperature range at the tube or vessel surface Temperature range for using of double-side self adhesive tape		–20 ... +90°C –20 ... +60°C
Max. thickness of the vessel wall	– Conductive liquids – Non.conductive liquids with ε_r < 10*	8 mm 3 mm
Protection class		IP 67
Housing material		Plastic (PP)
Connection cable type (Variants „A“)	– Output type P – Output type S	PVC 3 x 0.34 mm² PVC 2 x 0.34 mm²
Weight (including 2 m cable)		Approx. 60 g

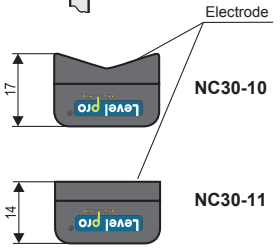
*) ε_r see “Table of dielectric constant“

Dimension drawings

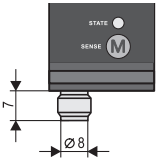


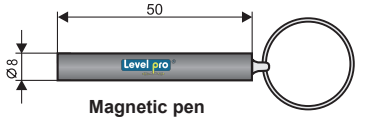
Variant"A"
with cable outlet





Variant "C"
with connector





Magnetic pen
PM–8

Recommended range of application

Detection of various types of liquids - water, disel, oil, cooling liquids, water solutions, some types of solvents. It is suitable for glass or plastic gauge-pipes, vessels, plastic container tanks, plastic tubs, pools, canisters, etc.

Unsuitable range of application

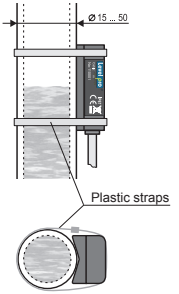
The sensor also is not intended for level measurement on the gauge-pipe and the container wall with antistatic treatment (partially electrically conductive).

Procedure for put sensor into operation

1. Installation

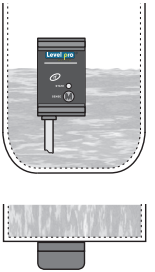
a) The sensor type **NC30-10,** which is intended to point level detection on **plastic or glass and gauge-tubes.**

The sensor is fixed to the gauge pipe or tube by means of two plastic straps (2.5 mm width). The cable should be vertically downwards oriented. The maximum wall thickness of the tube depends on the detected medium (see technical data), the maximum is 8 mm.



b) The sensor type **NC30-11** which is intended to thru-wall level sensing of liquids in **plastic or glass vessels with lat walls.**

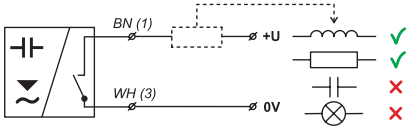
The sensor is installed on a clean and degreased surface of the vessel wall. The attachment is done by doublesides adhesive layer. Orientation of the sensor can be arbitrary. Maximum thickness of the vessel wall depends on the detected medium (see technical data), the maximum is 8 mm.



2. Electrical connection

a) The type of sensor **NC30-11-S**

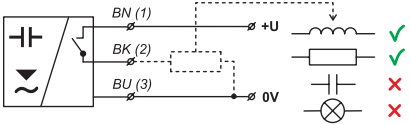
Positive pole (+U) of power supply is connected through a load (relay) to brown wire or pin connector No. 1, negative pole is connected to while wire or pin connector No.3.



Connection scheme of sensor with "S" type output

b) The type of sensor **NC30–11–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.2.



Connection scheme of sensor with "PNP" type output

Legend:

(1)... – Terminals number for variants with connector	WH – White
BN – Brown	BU – Blue

Note:

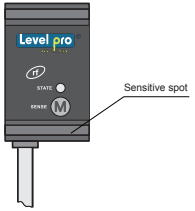
The sensor output is protected againts short circuits. Capacity loads and loads with low sleep resistance (bulb) the sensor evaluation as a short circuit. In case of high ambient electromagnetic interference, parallel conductors with power lines, or lines at distances greater than 30 m, we recommend to use shielded cable.

Electrical connection must be done in de-energized state!

For switching supply sources, it is necessary to check that the input is galvanically separated from the network side and that they are fitted with a filter suppressing the conforming interference (terminals + and – oscillate together towards the ground potential), or the interference is removed in another manner.

3. Sensor settings

The setting is done by placing of magnetic pen PM-8 to sensitive spot Ⓜ located on the front of the sensor. Short time attaching (up to 2 sec.) of the magnetic pen to the sensitive spot Ⓜ makes the sensor open. Long attach (at least 4 sec.) of the pen when the level is changed, defines closed state of the sensor. In this way the sensitivity for the measured medium and switching modes "**O**" (normally open) or "**C**" (normally closed) is set. When changing the fluid it is necessary to make the new setting.



a) Mode O (normally open)

1. Put the level of the measured medium in the state **below the lower edge** of the sensor in the tank or in the gauge-pipe.
2. Attach the magnetic pen PM-8 to the sensitive spot Ⓜ for **maximum 2 seconds**. When the LED goes out, the sensor is in the state open.
3. After removal of the magnetic pen check the status of orange lights:
   - If the LED doesn´t light or is flashing rapidly (0.2 s), go to step 4.
   - If the LED lights, you must repeat step 2 so as not to exceed the limit of 2 seconds attaching magnetic pen.
4. Put the level of the measured medium in the state **above the upper edge** of the sensor in the tank or in the gauge-pipe.
5. Attach the magnetic pen PM-8 to the sensitive spot Ⓜ for **minimum 4 seconds**. When the LED lights up, the sensor is in the state closed.
6. After removal of the magnetic pen check the status of orange lights:
   - If the LED lights, settings of the sensor is correct.
   - If the LED doesn´t light, the sensor was set incorrectly and you must repeat the procedure from step 1.
   - If the LED is flashing, the sensor didn´t recognize upper and lower limits. In this case, first verify that at the step 1 the level of the measured medium was below the lower edge of the sensor and at the step 3 the level of the measured medium was above the upper edge of the sensor. Then make sure that the thickness of the gauge-pipe wall or the tank wall does not exceed the limit specified in the Technical specifications (p. 2). If not, check there isn´t a thick layer of sediment on the inner wall of the tank or the gauge-pipe.

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).

b) Mode C (normally closed)

1. Put the level of the measured medium in the state **below the lower edge** of the sensor in the tank or in the gauge-pipe.
2. Attach the magnetic pen PM-8 on the sensitive spot Ⓜ for **minimum 4 seconds**. When the LED lights up, the sensor is in the state closed.
3. After removal of the magnetic pen check the status of orange lights:
   - If the LED lights or is flashing rapidly (0.2 s), go to step 4.
   - If the LED doesn´t light, you must repeat step 2 so as to observe the limit of 4 seconds attaching magnetic pen.
4. Put the level of the measured medium in the state **above the upper edge** of the sensor in the tank or in the gauge-pipe.
5. Attach the magnetic pen MP-8 to the sensitive spot Ⓜ for **maximum 2 seconds**. When the LED goes out, the sensor is in the state open.
6. After removal of the magnetic pen check the status of orange lights:
   - If the LED doesn´t light, settings of the sensor is correct.
   - If the LED lights, the sensor was set incorrectly and you must repeat the procedure from step 1.
   - If the LED is flashing, the sensor didn´t recognize upper and lower limits. In this case, first verify that at the step 1 the level of the measured medium was below the lower edge of the sensor and at the step 3 the level of the measured medium was above the upper edge of the sensor. Then make sure that the thickness of the gauge-pipe wall or the tank wall does not exceed the limit specified in the Technical specifications (p. 2). If not, check there isn´t a thick layer of sediment on the inner wall of the tank or the gauge-pipe.

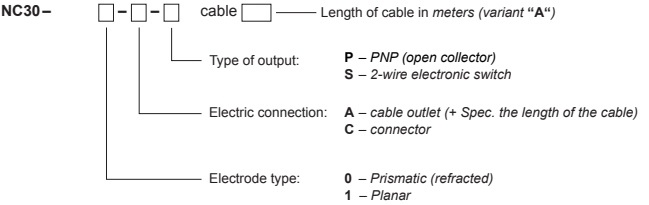
After this settings the sensor responds to the level immersion and emersion in the upper half of the sensing area and the **hysteresis** size 5 mm (1/8 of the distance between the bottom and the top of the sensor).

STATUS- Sensing

Indicator	Function
Orange LED	**Continuous light** – Sensor is closed (switched ON) **Dark** – Sensor is open (switched OFF) **Rapid lashing (period 0.2 sec.)*** – Unrecognized upper and lower limits of setting mistake **Slow lashing (period 0.8 sec.)** – Short circuit at sensor output

** Sensor with "S" type output, 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.*

Order code



Accessories

Standard - included in the level sensors price ***Optional - for extra charge***

- 2 pcs of Plastic straps 2,5 x 200 mm
- 1 pc of Double-side self adhesive tape (NC30)
- 1 pc of Magnetic pen PM–8

Safety, protections and compatibility

The level sensor is equipped with a protection against electric shock on electrode, polarity, overvoltage and short-term current overload on the output.

Electromagnetic compatibility is provided by conformity with standards ČSN EN 55022/B, ČSN EN 61326-1, ČSN EN 61000-4-2, ČSN EN 61000-4-3, ČSN EN 61000-4-4, ČSN EN 61000-4-6.

Warranty, Returns and Limitations

WARRANTY

Icon Process Controls Ltd warrants to the original purchaser of its products that such products will be free from defects in material and workmanship under normal use and service in accordance with instructions furnished by Icon Process Controls Ltd for a period of one years from the date of sale of such products. Icon Process Controls Ltd obligation under this warranty is solely and exclusively limited to the repair or replacement, at Icon Process Controls Ltd option, of the products or components, which Icon Process Controls Ltd examination determines to its satisfaction to be defective in material or workmanship within the warranty period. Icon Process Controls Ltd must be notified pursuant to the instructions below of any claim under this warranty within thirty (30) days of any claimed lack of conformity of the product. Any product repaired under this warranty will be warranted only for the remainder of the original warranty period. Any product provided as a replacement under this warranty will be warranted for the one year from the date of replacement.

RETURNS

Products cannot be returned to Icon Process Controls Ltd without prior authorization. To return a product that is thought to be defective, go to www.iconprocon.com, and submit a customer return (MRA) request form and follow the instructions therein. All warranty and non-warranty product returns to Icon Process Controls Ltd must be shipped prepaid and insured. Icon Process Controls Ltd will not be responsible for any products lost or damaged in shipment.

LIMITATIONS

This warranty does not apply to products which: 1) are beyond the warranty period or are products for which the original purchaser does not follow the warranty procedures outlined above; 2) have been subjected to electrical, mechanical or chemical damage due to improper, accidental or negligent use; 3) have been modified or altered; 4) anyone other than service personnel authorized by Icon Process Controls Ltd have attempted to repair; 5) have been involved in accidents or natural disasters; or 6) are damaged during return shipment to Icon Process Controls Ltd reserves the right to unilaterally waive this warranty and dispose of any product returned to Icon Process Controls Ltd where: 1) there is evidence of a potentially hazardous material present with the product; or 2) the product has remained unclaimed at Icon Process Controls Ltd for more than 30 days after Icon Process Controls Ltd has dutifully requested disposition. This warranty contains the sole express warranty made by Icon Process Controls Ltd in connection with its products. ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED. The remedies of repair or replacement as stated above are the exclusive remedies for the breach of this warranty. IN NO EVENT SHALL Icon Process Controls Ltd BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING PERSONAL OR REAL PROPERTY OR FOR INJURY TO ANY PERSON. THIS WARRANTY CONSTITUTES THE FINAL, COMPLETE AND EXCLUSIVE STATEMENT OF WARRANTY TERMS AND NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES OR REPRESENTATIONS ON BEHALF OF Icon Process Controls Ltd. This warranty will be interpreted pursuant to the laws of the province of Ontario, Canada.

If any portion of this warranty is held to be invalid or unenforceable for any reason, such finding will not invalidate any other provision of this warranty.

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