



## Instructions Manual



**1. WORKING PRINCIPLE**

The LD61N level switch is based on the variation of the natural resonant frequency of a vibrating fork, when it comes into contact with a liquid.

This variation is detected by the internal electronics and is used to determine the state of the output .

**2. RECEPTION**

The LD61N level detectors are supplied ready for installation and operation.

They are supplied packed for their protection during storage and haulage.



To handle the detectors, they should always be held by the head, never by the vibrating fork.

The vibrating fork should not be modified or bent, as this can damage the detector beyond repair.

**3. INSTALLATION**

The LD61N level switch can be mounted in any position. The more usual insertion points are shown in the figure 1.

In positions 1 the LD61N acts as a maximum level detector. In positions 2 the LD61N acts as a minimum level detector and in position 3 it acts as an empty pipe detector (for example, to protect a pump).

If the LD61N is installed in a horizontal position it is recommended to install it with the tines vertical to avoid accumulation of substances, especially in the case of high viscosity liquids.

To indicate the position of the tines the LD61N has a round mark on two of the flats of the nut. These marks should be in a vertical position when the detector is installed in a horizontal position.

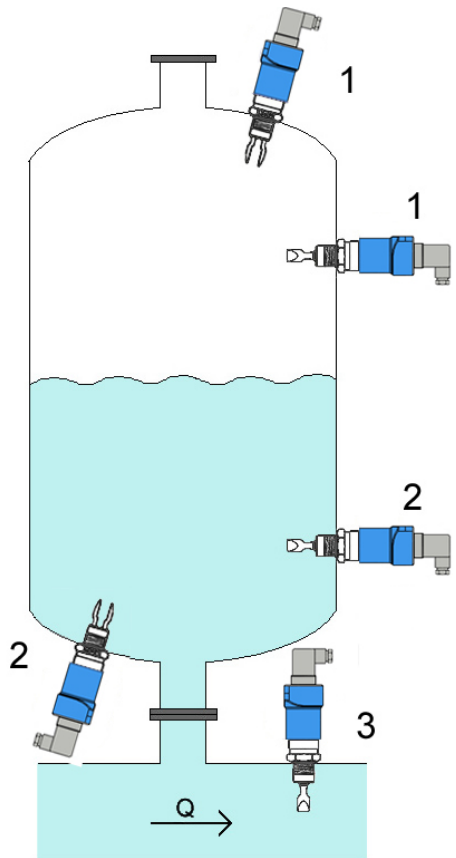
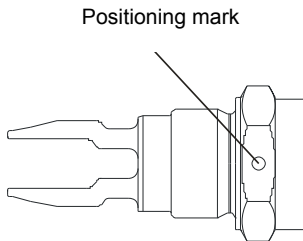


Figure 1

In the same way, when the detector is installed where there is flow, the position must be taken into account. The flat part of the tines must be aligned parallel with the flow direction as shown in figure 1.

If the viscosity is high, the tines must be kept away from other objects (such as the wall of the tank). In these cases it is preferable to install a longer detector (figure 2).

The cable gland should be situated on the lower side of the connector. If it is necessary, the position of the connector can be changed by 90° or 180°. To do this, open the connector and rotate. This operation must be done with the power disconnected.

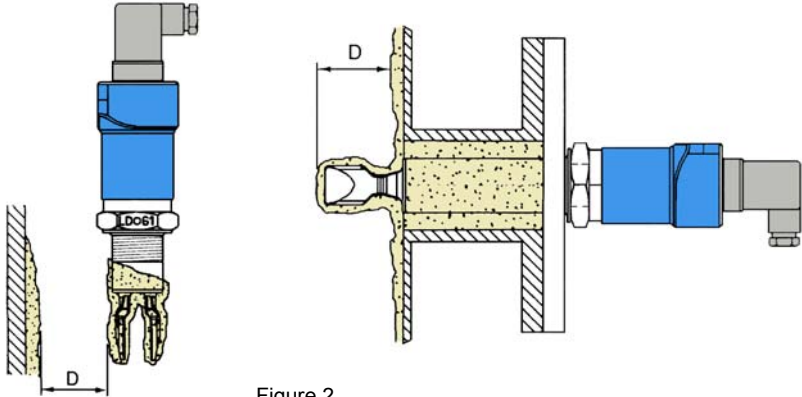
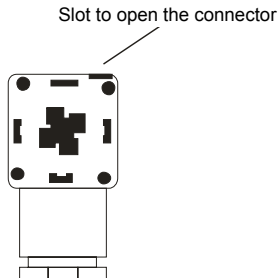


Figure 2

#### 4. ELECTRICAL CONNECTION

The LD61N can be installed as a detector of minimum or maximum level. The electrical connection is made by means of a DIN 43650-A connector with a PG9 cable gland. Multiple conductor cable with sections about 0,5 mm<sup>2</sup> should be used.

To open the connector, remove the centre screw and prise open using a small screwdriver in the slot shown in the following drawing (looking at the female connector from the contact side).

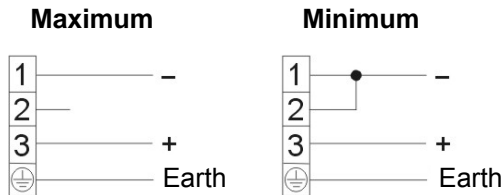


Once the connector is opened, pass the cables through the cable gland and screw in the cables in their positions, depending on the desired working mode, as explained below.

The working mode (maximum or minimum detection) is given depending on how the cables are connected (see next page).

When the LD61N is connected for **maximum** level detection, the current of the NAMUR circuit is “high” ( $> 2.1 \text{ mA}$ ) when the sensor is not in contact with the fluid (level below the sensor), and “low” ( $< 1.2 \text{ mA}$ ) when the sensor is immersed.

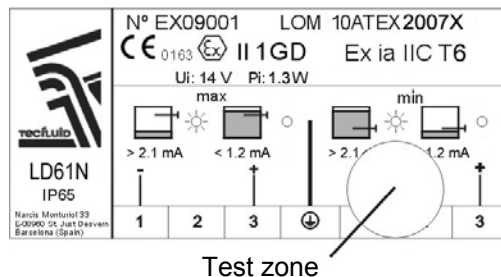
When the LD61N is connected for **minimum** level detection, the current of the NAMUR circuit is “high” ( $> 2.1 \text{ mA}$ ) when the sensor is in contact with the fluid (level above the sensor), and “low” ( $< 1.2 \text{ mA}$ ) when the sensor is not immersed.



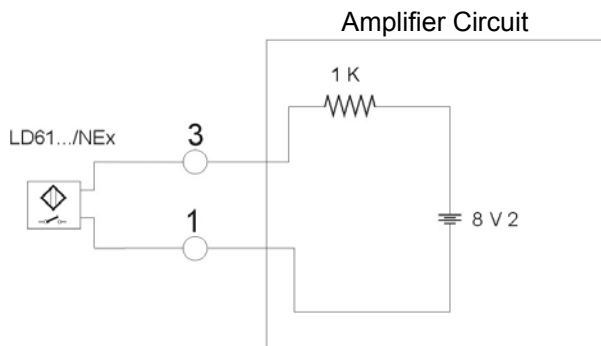
The LD61N incorporates a LED that indicates the current output state. With the LED ON, the output current is high ( $> 2.1 \text{ mA}$ ).

## 5. OPERATION TEST

The operation of the installation can be checked by placing a magnet in the zone shown in the following figure. This magnet will change the output to the opposite state. In this way the correct installation of the instrument can be checked without having to change the level in the tank. At the same time, the bi-colour LED will indicate the change of state of the output.



## 6. OPERATION OF A NAMUR CIRCUIT



A NAMUR device is a sensor that indicates the different detection states by means of the current value supplied by an amplifier circuit connected to the NAMUR device.

In addition to being able to indicate the two states ON/OFF (presence/absence of the physical phenomena to detect), it can indicate alarm states with respect to the device

operation and the amplifier circuit can detect the state of the connection line to the NAMUR device.

In the NAMUR LD61N device, the four possible stable states are the following:

1. **Open circuit:** It occurs when the connection between the amplifier circuit and the NAMUR device is broken. The output current of the amplifier circuit will be **equal or less than 0.05 mA**.
2. **OFF state of the NAMUR device:** The output current of the amplifier circuit will be **from 0.35 mA to 1.2 mA**.
3. **ON state of the NAMUR device:** The output current of the amplifier circuit will be **from 2.1 mA to 6.03 mA**.
4. **Short circuit:** It occurs when there is a short circuit in the connection between the amplifier circuit and the NAMUR device. The output current of the amplifier circuit will be **more than 7.45 mA**. The resistance between terminals will be less than 100 Ohms.



**NOTE:** the current values are calculated by using a nominal voltage value of 8.2V and an amplifier output resistance of 1k, and the limits for the resistance between terminals specified in the standard (from 100 to 360 Ohms).

## 6. MAINTENANCE

The working life of the vibrating fork depends basically on the abrasive characteristics of the product used.

The LD61N detector only needs maintenance when the product, which can adhere to the tines, will not let the detector change to a non detection state. In these cases the tines must be cleaned.

### 6.1 Cleaning



To clean the tines, a brush suitable for removing the incrustated product must be used. You should not try to knock off the adhered product from the tines.

During the cleaning process, be careful not to apply force against the tines as this can bend them and damage the detector beyond repair.

## 7. TECHNICAL CHARACTERISTICS

<b>Materials:</b>	Fork: EN 1.4404 (AISI 316L). Others on demand. Housing: Polycarbonate.
<b>Process connection:</b>	Threads G1 (BSP), 1" NPT, DIN 11851, Clamp ISO 2852
<b>Model:</b>	NAMUR (IEC60947-5-6, EN50227)

<b>Switching time:</b>	≈ 1s
<b>Hysteresis:</b>	± 2 mm with H <sub>2</sub> O
<b>Operation limits:</b>	Viscosity: up to 10.000 cSt Density: > 0.6 kg / l Process temperature (liquid): -30 ... 115°C Ambient temperature: -5 ... 40°C Standard pressure: PN25

<b>Ingress Protection:</b>	IP65
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**Power supply:**

Minimum voltage: 8 VDC

Maximum voltage: 14 VDC

Consumption: From 0.7 mA to 2.3 mA, depending on the state "ON/OFF"

Conforms with the 2006/95/CE Directive

Conforms with the 2002/96/CE Directive

Conforms with the 2004/108/CE Directive

Conforms with the 97/23/CE Directive

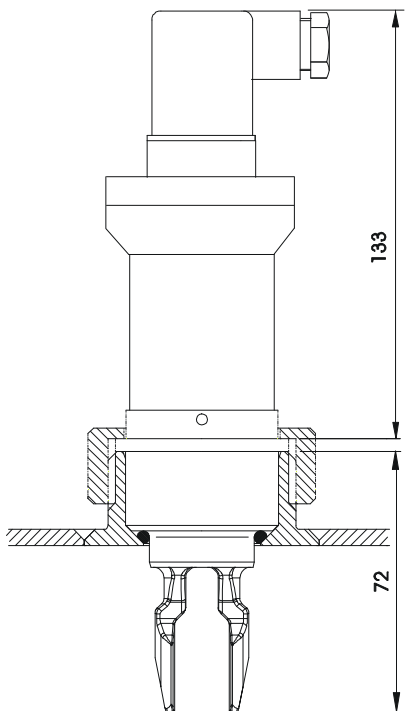
Conforms with the 94/9/CE Directive



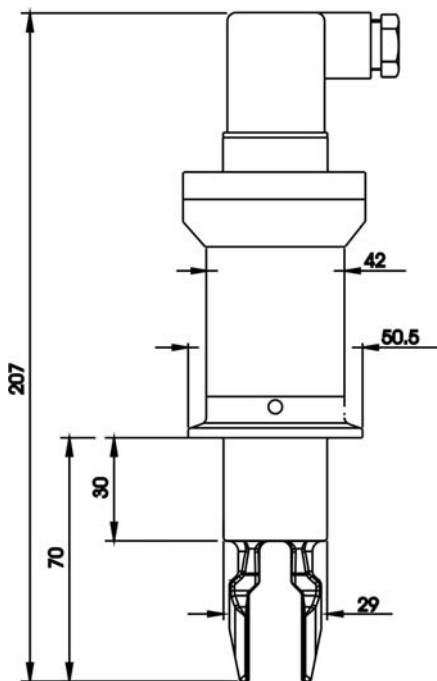
This equipment is considered as being a pressure accessory and **NOT** a safety accessory as defined in the 97/23/CE directive, Article 1, paragraph 2.1.3.

**Dimensions:**

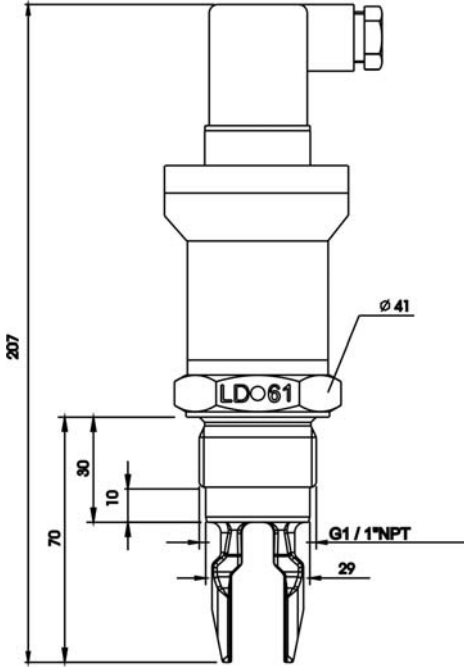
**TF DIN405 Rd52x1/6**



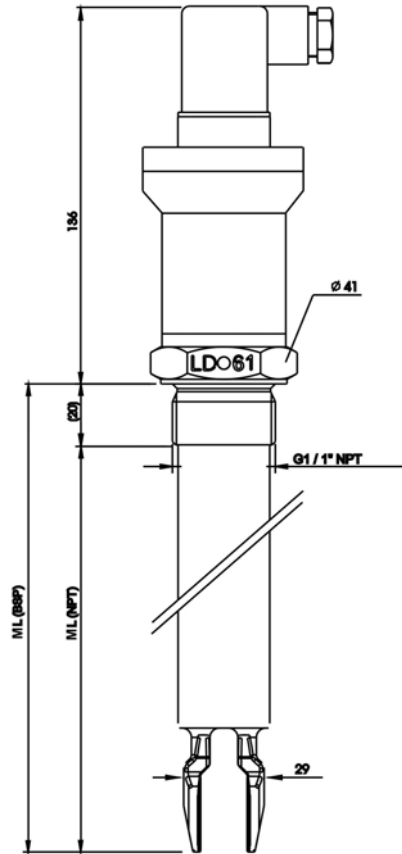
**Clamp (ISO 2852)**



**G1 or 1" NPT thread**



**LD61N ML**



**7.1 Safety characteristics**

Given that this instrument is group II, it is intended for use in places likely to become endangered by explosive atmospheres, but not in mines. The category is 1G, that is, it is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists are present continuously, for long periods or frequently.



**NOTE:** This instrument can not be installed in places with impact risk. Special caution should be exercised in the installation and use to prevent any impact or fall of the device.

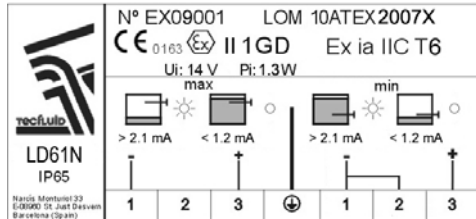
**7.2 Exi parameters**

Marking	Ex ia IIC T4	Ex ia IIC T6
Specific parameters	Ui : 14 V Pi : 1.3 W	Ui : 14 V Pi : 1.3 W

## 8. MARKING

The marking of the equipment shows the following characteristics:

- Manufacturer
- Model
- Serial number (year of construction and number)
- CE marking
- Intrinsic safety marking
- Notified body
- Electrical parameters
- Manufacturer address



## WARRANTY

Tecfluid S.A. GUARANTEES ALL ITS PRODUCTS FOR A PERIOD OF 24 MONTHS, after consignment, against all defects in materials and workmanship.

This warranty does not cover failures which can be imputed to misuse, use in an application different to that specified in the order, the result of service or modification by un-authorized persons, bad handling or accident.

This warranty is limited to cover the repair or replacement defective parts which have not been damaged by misuse.

This warranty is limited to the repair of the equipment and all further and eventually following damages are not covered by this warranty.

Any consignment of equipment to our factory or distributor must be previously authorised. The consignment should be done with the equipment well packed, clean of any liquids, grease or hazardous materials. Tecfluid S.A. will not accept any responsibility for damage done during transport.

Together with the equipment, a note should be enclosed indicating the failure observed, the name, address and telephone number of the sender.

## SHIPPING

In the event of damages during shipping, claim directly to the carrier over a period of less than 24 hours. Tecfluid is not responsible for any damage caused during the shipment of material.

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