

## TMN 300 TB INOX

Microlectra bv.

www.microlectra.nl

info@microlectra.nl

### LEVEL MAGNETIC TRANSDUCERS



|                     |  |
|---------------------|--|
| Operating principle | When the float rises or falls by the guide tube due to the action of liquid, a succession of reed contacts is turned on or off generating an output proportional to the height of the level. |
| Difference          | A single model allows connection systems of 2, 3 or 4 wires.   |

|      |                        |   |
|------|------------------------|---|
| Body | Process connection     | Top screw 2" G. SS AISI316 (1.4401)<br>See other options in Table 1, page 2 |
|      | Guide tube length (TG) | 150..1000 mm (Ø12 mm)<br>1010..2500 mm (Ø13 mm)                             |
|      | Standard heights       | E = 15 mm / S = LR / LCP = See Table 1, page 2                              |
|      | Tube and stoppers      | SS AISI316 (1.4401)   |
|      | Temperature            | -20..+100 °C  |
|      | Protection             | IP67  |

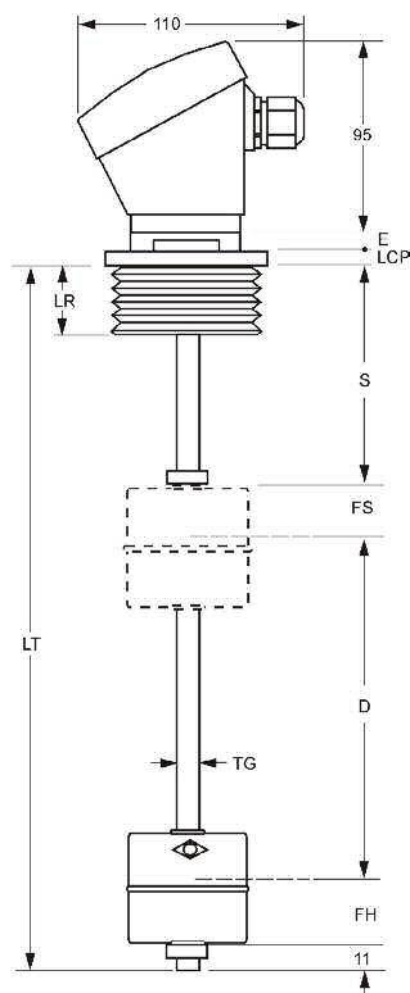
|       |               |   |  |
|-------|---------------|---|--|
| Float | Model         | Cylindrical, Ø52x52 mm. SS AISI316L (FCI604B13)<br>See other options in Table 2, page 2 |  |
|       | Pressure      | 15 K/cm <sup>2</sup>  |  |
|       | Density       | e < 0,6 g/cm <sup>3</sup>   |  |
|       | Temperature   | -40..+125 °C  |  |
|       | Dry zone (FS) | 20,8 mm   | Dimensions valid for a<br>fluid density of 1 g/cm <sup>3</sup> |
|       | Wet zone (FH) | 31,2 mm   |  |

|         |                       |  |
|---------|-----------------------|--|
| Housing | Electrical connection | Connection housing PBT. 64 x 95 x 110 mm |
|         | Protection            | IP67                                     |
|         | Temperature (Ta)      | -20..+80 °C                              |
|         | Cable gland           | M20 x 1,5 (IP68)                         |
|         | Ø Electric hose       | 6..12 mm                                 |

|        |                       |                      |
|--------|-----------------------|----------------------|
| Output | Measurement level     | 4..20 mA             |
|        | Measurement voltage   | 10..35 VDC           |
|        | Repeatability         | ± 1%                 |
|        | Step between readings | 10 mm. Optional 5 mm |

|        |                |  |                    |               |
|--------|----------------|--|--------------------|---------------|
| Supply | Supply voltage | 2 wires  | 10..35 VDC         | Terminal 3    |
|        |                | 3 wires  | 735 - 10..35 VDC   | Terminals 1-3 |
|        | 4 wires        | 024 - 24 VAC   | Terminals<br>A1-A2 |               |
|        |                | 048 - 48 VAC<br>110 - 110..125 VAC<br>230 - 220..240 VAC |                    |               |

### Dimensions



### Legend

|            |                           |
|------------|---------------------------|
| <b>E</b>   | Separation Process        |
| <b>S</b>   | Zone without measurement  |
| <b>LR</b>  | Thread length             |
| <b>TL</b>  | Total length              |
| <b>D</b>   | Measurement distance      |
| <b>TG</b>  | Guide tube                |
| <b>FS</b>  | Dry Float Zone            |
| <b>FH</b>  | Wet Float Zone            |
| <b>LCP</b> | Connection process height |

**Table 1: Process connection**

| Thread (Gas) | 1"   | 1"1/2 | 2"   |
|--------------|------|-------|------|
| e/c (mm)     | 39,8 | 50    | 39,8 |
| E (mm)       | 15   | 15    | 15   |
| LR (mm)      | 20   | 20    | 20   |
| LCP (mm)     | 0    | 11    | 4    |

**Table 2: Floats**

| Model             | F CPA07B14  | F CI602B13  | F CI604B13  |
|-------------------|-------------|-------------|-------------|
| Material          | PA          | SS AISI316L | SS AISI316L |
| Dimension (mm)    | Ø 29x50     | Ø 44x63     | Ø 52x52     |
| Pressure (kg/cm²) | 3           | 15          | 15          |
| Density (g/cm³)   | e > 0,6     | e > 0,72    | e > 0,6     |
| FS / FH (mm)      | 24,5 / 24,5 | 17 / 46     | 20,8 / 31,2 |

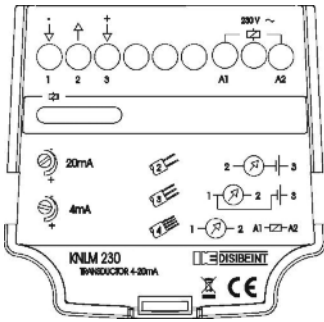
Although you can combine any float with any type of thread, it is desirable that the float be narrower than the width of the thread so that the sensor can be installed without disassembling. The columns of the two tables show the consistent combinations.

The FCPA07B14 float, made of polyamide, is recommended for oil. As a bonus, fits tight 1" G, size very common in the oil tanks, diesel, generator housings, etc.

| Reference Composition  | TMN 300 TB INOX   |              |            |     | P | F | R | LT | E | S |
|--|-------------------|--------------|------------|-----|---|---|---|----|---|---|
|  | Supply voltage    | 2/3 wires    | 10..35 VDC | 735 |   |   |   |    |   |   |
|  | 4 wires           | 24 VAC       | 024        |     |   |   |   |    |   |   |
|  |                   | 48 VAC       | 048        |     |   |   |   |    |   |   |
|  |                   | 110..125 VAC | 110        |     |   |   |   |    |   |   |
|  |                   | 220..240 VAC | 230        | *   |   |   |   |    |   |   |
| Process connection   | 1" G              |              | 06         |     |   |   |   |    |   |   |
|  | 1"1/2 G           |              | 08         |     |   |   |   |    |   |   |
|  | 2" G              |              | 10         | *   |   |   |   |    |   |   |
| Float  | FCPA607B14        |              | 56         |     |   |   |   |    |   |   |
|  | FCI602B13         |              | 15         |     |   |   |   |    |   |   |
|  | FCI604B13         |              | 20         | *   |   |   |   |    |   |   |
| * Standard values  | Step 5 mm         |              | 05         |     |   |   |   |    |   |   |
|  | Step10 mm         |              | 10         | *   |   |   |   |    |   |   |
| Dimensions E and S:<br>If not specified,<br>will be taken as null. | Total length (LT) |              | (mm)       |     |   |   |   |    |   |   |
|  | Distance (E)      |              | (mm)       |     |   |   |   |    |   |   |
|  | Distance (S)      |              | (mm)       |     |   |   |   |    |   |   |

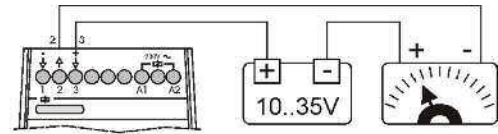
To compose a reference, select an option from each of the columns.  
 Example: TMN 300 TB INOX 230 P10 F20 R10 LT1500 E15 S75

## Connection and adjustment

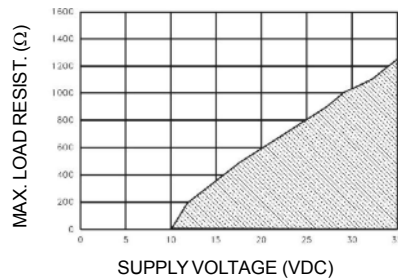


The sensor is preset from factory for a reading of 4-20 mA between the margins (D). If you want to calibrate again, connect it as shown in the diagram. Place the float at the bottom and set 4 mA in the instrument by the multiturn potentiometer [4mA]. Do the same with the potentiometer [20mA] placing the float on top.

|           |       |
|-----------|-------|
| Negative  | 1     |
| Output mA | 2     |
| Positive  | 3     |
| Supply AC | A1-A2 |



## Load resistance in the loop (Converter)

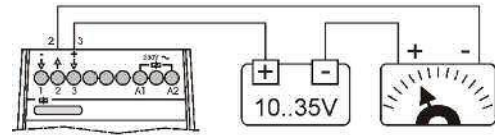


**Supply in AC:** The electronic circuit provides a voltage of 24 VDC to power the loop. The load resistor should not exceed 800 ohms.

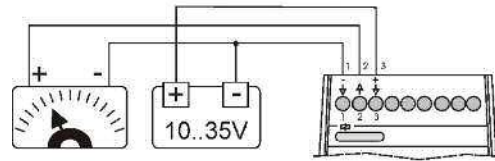
**Supply in DC:** The maximum load resistance that can withstand the current loop is a function of supply voltage and not exceed the values shown in the accompanying graph.

## Connexion examples

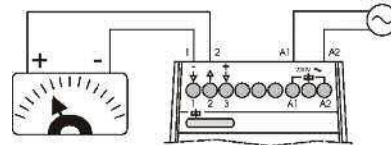
**2 wires:** Connect them to terminals 2 and 3 taking into account the polarity. A voltage source is required for supplying voltage to the current loop.



**3 wires:** Connect them to terminals 1, 2 and 3 taking into account the polarity. A voltage source is required for supplying voltage to the current loop.



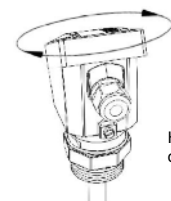
**4 wires:** The loop is connected to terminals 1 and 2 taking into account the polarity. The AC voltage is connected to terminals A1 and A2.



## Assembly conditions

### Handling

Do not use the housing to transport or to install the sensor in the tank. Once it is properly installed, you can rotate 350 degrees the head with the hand to place it in the adequate position.



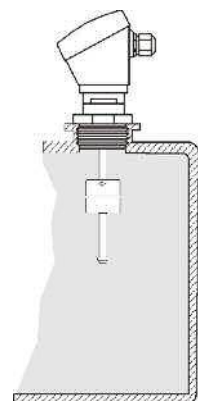
Housing box orientable

### Mounting position

The sensor must be mounted vertically. It should leave enough space on the vessel wall to prevent the float to touch it and avoid the proximity of magnetic or ferrous materials. We suggest to install the sensor away from the shaking elements, if any.

### Electric cable

Use an appropriate cable for the electrical conditions in the facility. It is desirable that the cable gland closes entirely over the wire and it is essential in the course of environmental humidity or when be installed outdoors. In these cases, make a loop in the cable to facilitate the removal of accumulated drops (see figure).



### Maintenance

In some cases, depending on the medium to control and time spent, can be deposited in the guide tube a layer of material which must be removed to avoid the obstruction of the movement of the float. To do this, proceed to clean and/or remove the sensor.

## Recommendations and examples to place an order

Determine the resolution you want in your measurement by choosing the appropriate step between readings. A smaller distance between readings, the better resolution you get.

The resulting measures are in function of the liquid density and of the float. Unless specified otherwise, the calculations are made based on the density of water,  $1 \text{ g/cm}^3$ .

Note that the measurement can never be done from the bottom of the tank because there are some unavoidable levels resulting from the construction of the sensor itself, corresponding to the end of the guide tube and the height where it housed the flotation level (see size chart on the first page to learn more).

It is not imperative that the sensor have the maximum internal height of the tank because the measurement distance can be placed wherever along the tube, taking into account the above. In any case, it is recommended that the total length of the sensor be somewhat lower than the maximum height inside the tank to prevent the tube become slightly curved and prevent the movement of the float.

You can determine a height (S) to set an area where there is no reading at all. In case you want to remove the head of the connection process (for reasons of high temperature, for example) may specify a dimension (E) exceeding the standard.

### Placing your order is essential the following information:

- Transition between readings,
- The length of the zone without measurement (S),
- The total length (TL)
- The supply voltage, if any
- The density of the liquid, if known and is different from  $1 \text{ g/cm}^3$

### Example

In a tank of 1500 mm usable height (LT) containing water, it's required to measure up to 90% capacity. The distance from the bottom of the nipple to the maximum filling height is 75 mm (S). You want a reading every 10 mm. Electrically, it will be used an existing 4-20 mA loop (2 wires).

### The data needed for their manufacture are:

- Step = 10 mm
- S = 75 mm
- LT = total length 1500 mm
- No external supply
- Liquid density, if other than  $1 \text{ g/cm}^3$

