

## Capacitive level transmitter / -switch incl. temperature control LCC2



- Developed for oil containers with highly disturbed level of fill
- No moving parts
- Automatic recognition of different types of oil via reference capacitance
- Temperature control can be integrated
- Switching output (push-pull) and analog output (4..20 mA or 0..10 V)
- Parameters can be programmed in order to achieve best possible adaptation to the application
- Simple adjustment
- Thread or flange fastening
- Compact size

### Characteristics

The capacitive LCC2 oil measurer and switch monitors the level of the oil, even in containers with heavily mobile oil surfaces (compressors, engine oil sumps, gearboxes...).

The LCC2 measures the level in relationship to a reference structure at the end of the probe. As a result, levels are correctly detected with oil changes (different viscosity, at different temperatures or in the case of ageing of the oil) without recalibration.

An influence of the measurement from the container wall is to be disregarded by means of earthing (shielding on plug).


The programmable filter calculates the running average, and thus reduces the variations in the output signal without negatively affecting the accuracy.

The hysteresis of the switching point can also be adjusted by setting parameters.

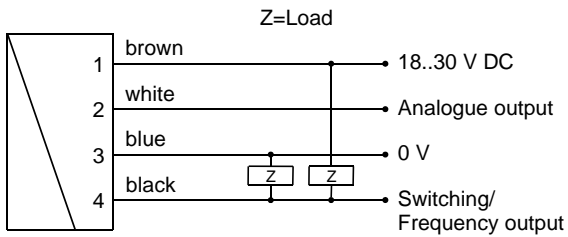
The electronics belong to the class of intelligent sensors from HONSBERG, and thus enable the use of the ECI-1 interface (configurator). The USB-compatible interface enables the adjustment of numerous parameters for adaptation to the application.

The devices are delivered pre-configured according to customer wishes.

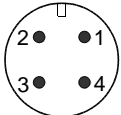
### Technical data

<b>Sensor</b>	Capacitive	
<b>Mechanical Connection</b>	G1 thread with two fastening nuts (screw flange as accessory)	
<b>Metering range</b>	200, 400, 600 mm (others on request)	
<b>Measurement uncertainty</b>	±1 % full scale value	
<b>Reproducibility</b>	±1 mm	
<b>Pressure resistance</b>	PN 5 bar (with sealed sensor)	
<b>Long term stability</b>	±1 mm after 100,000 cycles (0..100 % of level)	
<b>Temperature dependency</b>	±0.005 mm/ 1 K	
<b>Medium temperature</b>	-20..+85 °C (optionally 100°C)	
<b>Ambient temperature</b>	-20..+ 60 °C	
<b>Supply voltage</b>	18..30 V DC (regulated)	
<b>Current requirement at rest</b>	15 mA	
<b>Analog Output</b>	0..10 V or 4..20 mA	
<b>Switching output</b>	Push-Pull, 100 mA max. resistant to short circuits, reversed polarity protected	
<b>LED (view from 4 sides)</b>	yellow <b>On</b> = oil is within range <b>Flashing</b> = 10 % above min. level <b>Off</b> = oil is below min. level or > temperature limit (max. 95 °C) or defective. <b>Flickering</b> = with switchpoint programming with magnet. 2 x flashing confirms successful programming.	
<b>Ingress protection</b>	IP 67	
<b>Materials medium-contact</b>	Housing	CW614N nickelled
	O-ring	FKM (EPDM optional)
	Sensor	(NBR) FR4 (epoxy resin + fibreglass), gold-plated Cu
	Casting	Bectron PK 4342
<b>Materials non-medium-contact</b>	Housing	CW614N nickelled
	O-ring	NBR
	Plug	PA6.6
<b>Weight</b>	Sensor: 200 mm long 0.2 kg without flange Tube length: + 0.05 kg / 200 mm Flange: + 0.15 kg	
<b>Conformity</b>	CE 	

## Wiring



Connection example: PNP NPN

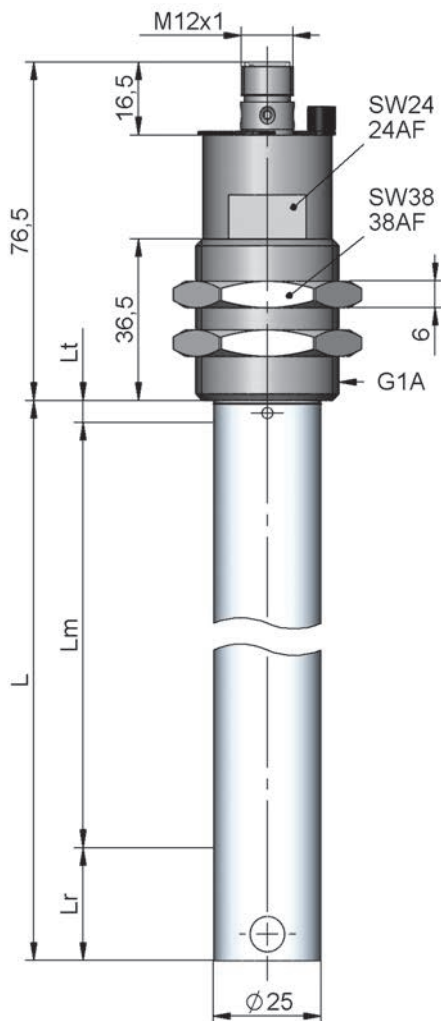


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

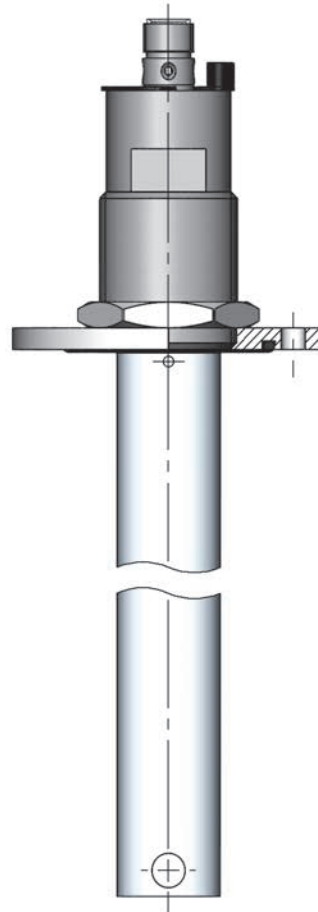
The push-pull output of the frequency or pulse output version can as desired be switched as a PNP or an NPN output.

## Dimensions

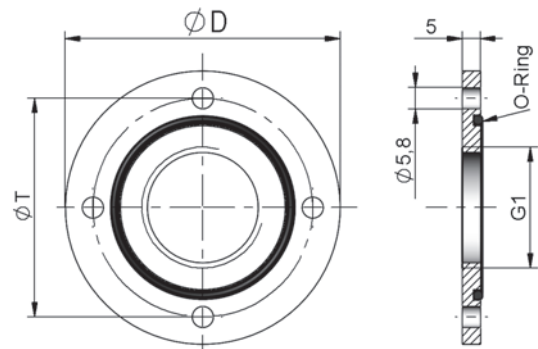


L = installation length (see ordering code),  
 L<sub>m</sub> = metering range (L-Lt-Lr) Standard 0 – 100%  
 Lt = Dead zone 10 mm  
 L<sub>r</sub> = Reference zone 26 mm  
 (always in the same medium as the measuring zone)  
 L<sub>min</sub> = 10

LCC2 with flange



Standard flange dimensions



D= 75  
 T= 60  
 C1= Tank hole 34 – 40 mm

## Installation

The threaded version can be either directly screwed into (G1") a hole (34 mm) or fastened using two supplied nuts.

Alternatively, a screw-on flange can be fastened on the thread, which is also made specifically for the customer. In order to achieve a tight seal the flange must be made with a suitable thread seal on the LCC2 unit. The container must have a suitable sealing surface on which the O-ring seals the flange. The flange must be free of contamination and mechanical damage. Bolts should be tightened only enough for the flange to abut against the housing wall.

A magnet clip is used for programming the switching point - if this is desired - or for programming an offset to the start or full scales. Equally, the analog full scale may alternatively be programmed with the clip.

The clip can be inserted onto the plug connection or can be removed as a key.

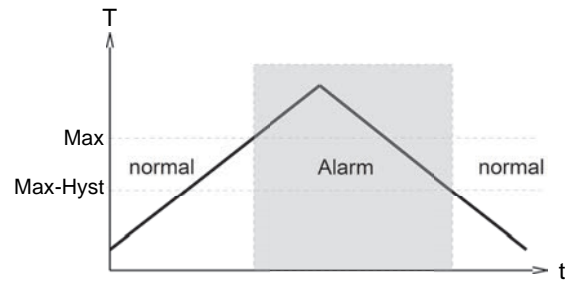
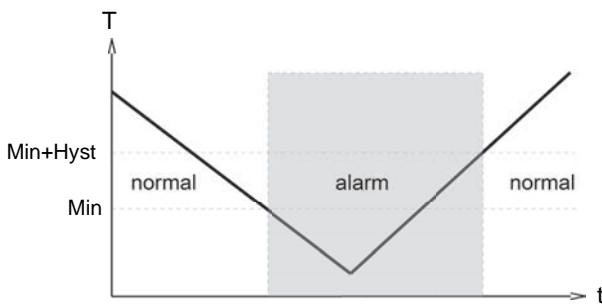
The location to which to apply the clip for one second is marked on the label.



If the programmable switching point is desired:

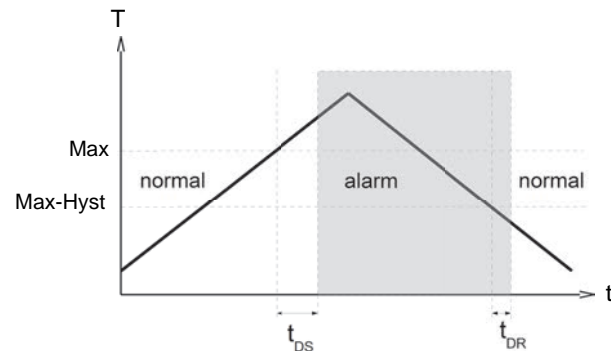
- Set the level to the switching value or to the value from which the offset was desired.
- Hold the magnet against the marking.
- LED flickers
- Remove the magnet from the marking. Two LED pulses acknowledge successful programming.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



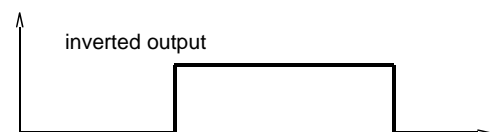
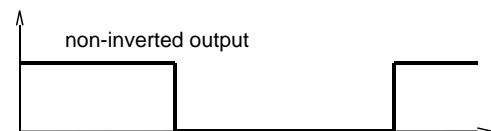
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

A changeover delay time ( $t_{DS}$ ) can be applied to switching to the alarm state. One switch-back delay time ( $t_{DR}$ ) of several can likewise be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A PowerOn delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

### Ordering code

LCC2 -   
 LCC2 -

O=Option

<b>1. Form</b>		
B	Straight form (installation from above) with protective tube	
<b>2. Connection</b>		
H	Screw-in thread	
<b>3. Installation length L</b>		
200	200 mm (Lm= 164 mm)	
400	400 mm (Lm= 364 mm)	
600	600 mm (Lm= 564 mm)	
<b>4. Output signal</b>		
I	Current output 4..20 mA	
U	Voltage output 0..10 V	
<b>5. Switching function</b>		
L	Minimum switch	
H	Maximum switch	
<b>6. Programming</b>		
N	Cannot be programmed (no teaching)	
P	<input type="radio"/>	Programmable (teaching possible)
<b>7. Switching output level</b>		
O	Standard	
I	Inverted	
<b>8. Electrical connection</b>		
S	For round plug connector M12x1, 4-pole	

### Options

**Filter time**  sec  
**Special range for analogue output:**  mm  
 <= Metering range (Standard=Metering range)  
**Switching delay** (from Normal to Alarm)  s  
**Switchback delay** (from Alarm to Normal)  s  
**Power-on delay** (After connecting the supply, time during which the switching output is not activated)  s  
**Switching output fixed** (< Lm)  mm  
**Special hysteresis** (standard= 5mm)  mm  
**Temperature monitoring** max. 100 °C  °C  
 (Standard = 90 °C)

If the field is not completed, the standard setting is selected automatically.

### Accessories

flange



incl. O-ring (cannot be lost). For the dimensions, refer to Dimensions.

FL-LCC2 -   
 FL-LCC2 -  -

<b>1. Outside diameter</b>	75	Ø 75 mm
<b>2. Connection material</b>	M	CW614N nickelled
<b>3. Perforation</b>	4	Quadruple perforation
<b>4. Pitch diameter</b>	60	Ø 60 mm

- Customer-specific flange on request
- Round plug connector / cable (KB...)
- Device configurator ECI-1