



Capacitance Rate of Flow Indicator

# MPROF

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**Introduction:**

'Sapcon ROF' series instruments are RISC Processor based Capacitance type Continuous Level Indicators with built in Three Point Switching. The instrument is suitable for measuring the level of conductive or non conductive liquids, slurries and powdered or fine grained solids homogeneous composition having a stable dielectric constant. Apart from level indication, the built in three point electronic level limit switch offers the switching functions for alarm annunciation and/or control application at the set point levels. The set points are independent of each other and are continuously configurable over the entire range.

**Features:**

- \* Latest RISC Core Microcontroller Technology.
- \* Selectable Display for ROF/Level/ROF%/Level%
- \* Built-in Equations along with Custom  $Q=Kh^n$  for various weir types
- \* Multipurpose 5 digit Seven Segment LED Display for best resolution and better viewing from distance.
- \* Two wire Pulse Coded Digital Communication from Sensor to Evaluation unit. Supporting as much as 1 KM distance between Sensor and Evaluation Unit with shielded two core cables.
- \* Three Independent Potential Free relays providing flexibility of selecting three independent switch points.
- \* Galvanically Isolated True Two Wire 4-20mA Proportional to 0% and 100% level/ROF is available for remote indication purposes.
- \* Two wire implementation solves the malfunction problems that occurs with various PLC 4-20 input interfaces and thus better suits for higher end automation.
- \* 4-20mA Loop can handle 700 Ohm Loop Resistance with Internal Isolated Supply.  
The loop resistance can be 1K Ohm for External DC Supply of 24 Volts.

**Principle of Operation:**

In an application, the measuring electrode (sense probe) is provided with a stilling tube which forms a capacitor. The amount of capacitance of this capacitor is governed by the level of water between the two electrodes (sense probe & stilling tube).

ROF measures the Change of Capacitance to measure the Change of Level of the water. This level is then converted to the Rate of Flow, depending on the weir type selected or K,n parameter entered for the equation for calculating Flow Rate.



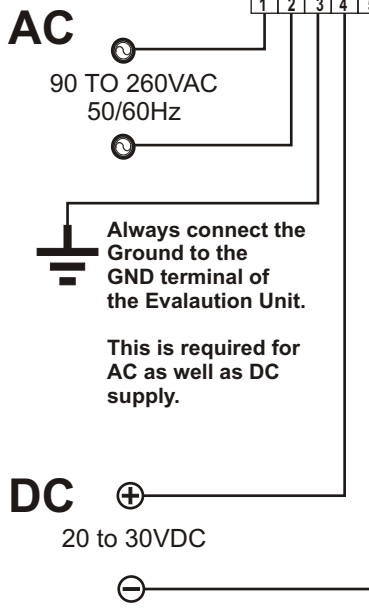
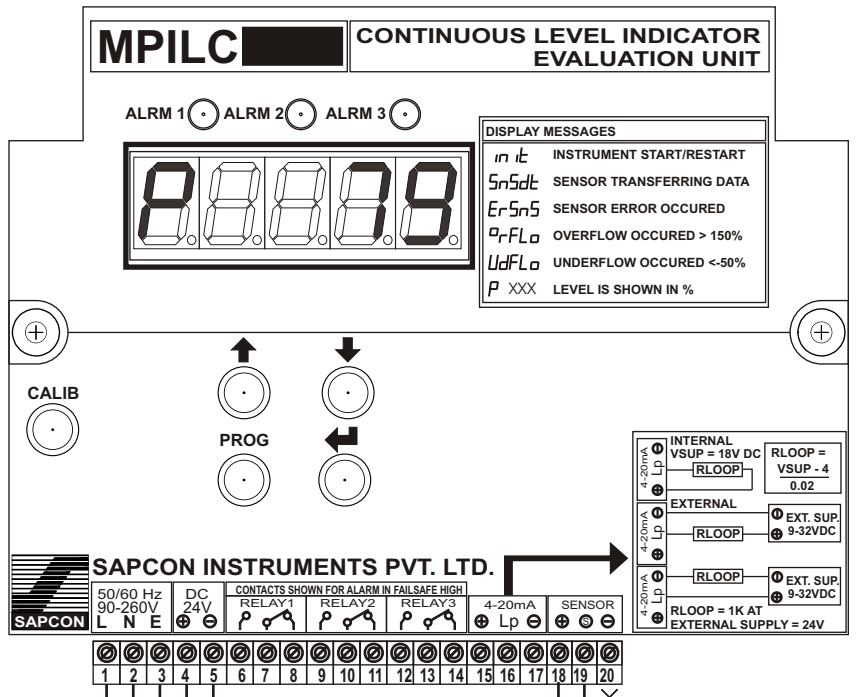
**Evaluation Unit:**

<b>Housing</b>	Cast Aluminum, Weather Proof, Stoving Enamel Painted. Suitable for Back Panel / Wall Mounting.
<b>Cable Entries</b>	3 Numbers of $\frac{1}{2}$ " / $\frac{3}{4}$ " BSP/NPT/ Double Compression.
<b>Operating Ambient Temperature</b>	-20 °C to +60 °C
<b>Power Supply</b>	Universal Mains 90 to 265 VAC, 50/60Hz and 24VDC (@ 3 Watt)
<b>Sensor to Evaluation Unit Cable</b>	2-Core; Resistance per core not to exceed 30 Ohms. Use of Shielded Twisted Pair Cables is recommended for long runs of cable. Cable Lengths of 1000 Meters are thus supported with Grounded Cable Shields.
<b>Zero% Range</b>	30pf to 250pf
<b>100% Range</b>	10pf to 4500pf (Difference from Zero%)
<b>Outputs</b>	Current 4 to 20mA. RL max = 700 Ohm using internal Isolated Supply. RL max = 1K Ohm for external loop supply of 24VDC.  3 Potential Free relays with One set of Potential Free Change Over Contact per Relay.  Contact Ratings : 6 Amp @ 230VAC 50/60 Hz for non-inductive loads.
<b>Indication</b>	Continuous: -50% to 150% digitally on $\frac{1}{2}$ " Seven Segment Display Switching: 5 mm Red LEDs' for Alarm Indication.
<b>Switching Hysteresis</b>	1% in Single Point Switching, 1 to 98% selectable in Pump Control.
<b>Fail Safe Select Set Point Select</b>	Field Selectable thru Interactive Relay Configuration Menu.
<b>Dimensions</b>	Refer Enclosed Drawings
<b>Weight</b>	2.3 Kg Approx.

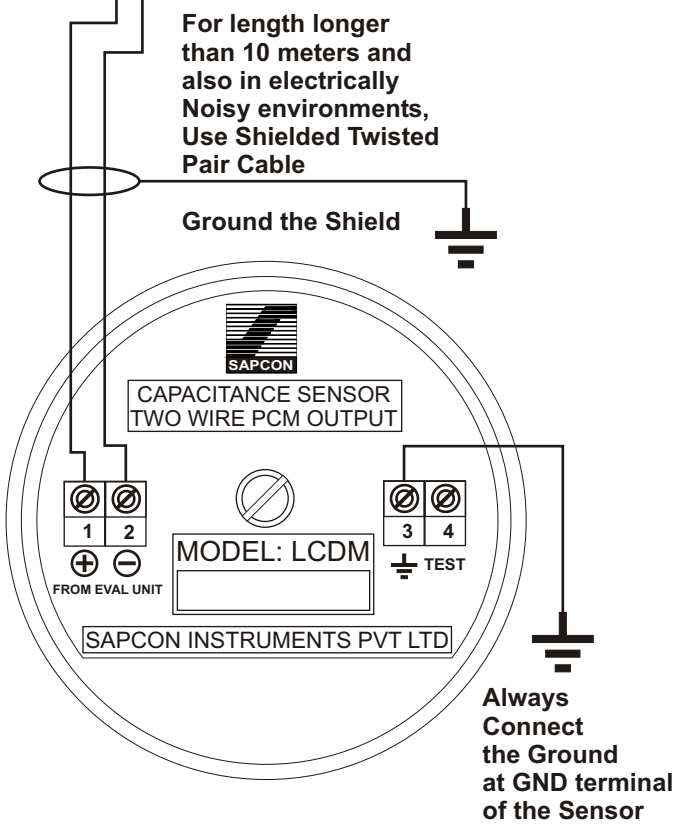
**Electronic Insert - LDC117, LCDM 111:**

<b>Housing</b>	Plastic, potted with epoxy resin.
<b>Power Supply</b>	16VDC @ 5mA derived from Sensor Communication Interface of Evaluation Unit.
<b>Measuring Frequency</b>	250Khz to 20Khz. Reverse Frequency Measurement.
<b>Operating Ambient Temperature</b>	-20 °C to +60 °C
<b>Sensitivity</b>	10 counts per pF
<b>Output</b>	Digitally Encoded Current (5mA-8mA) Pulse.

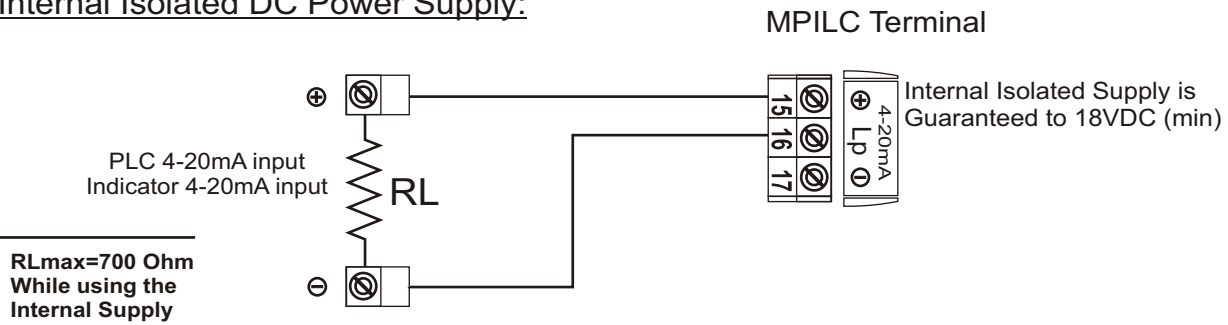




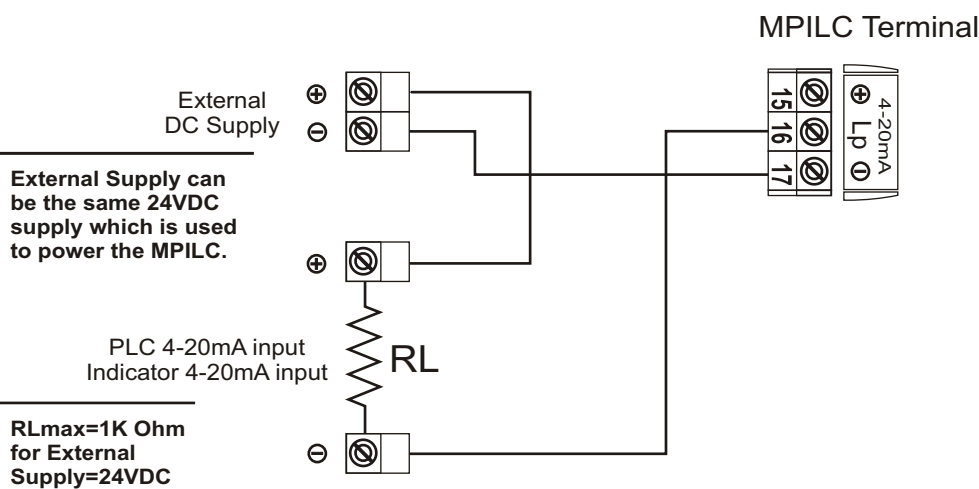
Either AC or DC supply should be used.



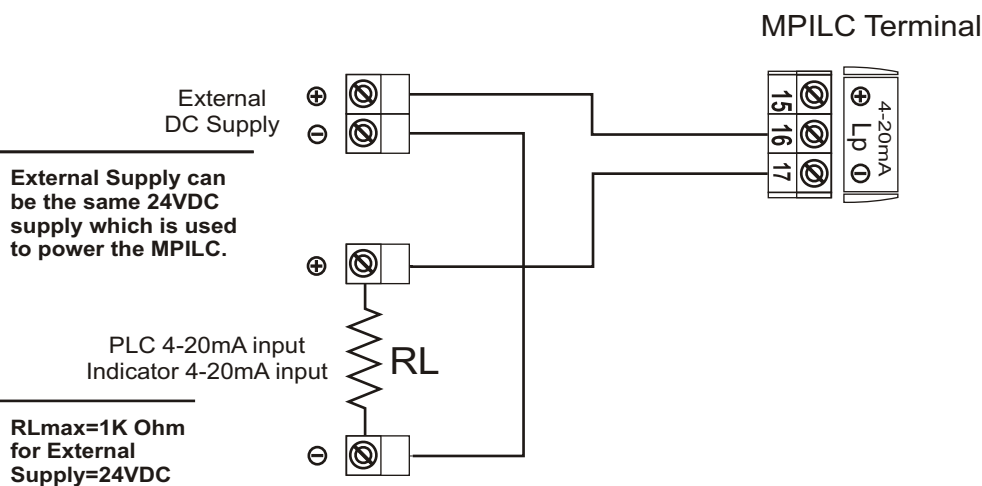
Internal Isolated DC Power Supply:



External DC Power Supply (RL to Lp):



External DC Power Supply (RL to Negative):



**Loop Resistance = ( Loop Supply Voltage – 4 ) ÷ 0.02 (Ohm)**