



Grown...to meet challenges

30+ years in Process Control Instrumentation

Rate of Flow Indicator

Version 2.1

'Sapcon ROF' series instruments are RISC processor based capacitance-type continuous level indicators with **inbuilt flow totalizer**. The instrument with inbuilt three-point switching is suitable for measuring the level of conductive and non conductive liquids, slurries, powdered and fine grained solids, and homogeneous compositions having a stable dielectric constant. Apart from level indication, this indicator offers switching functions for alarm annunciation and controlling the application at set point levels. The set points are independent of each other and are continuously configurable over the entire range.



Principle

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 in capacitance to measure the change in level of water. This level is then converted to 'Rate of Flow', depending on the weir type selected or K,n parameters entered for the equation for calculating the flow rate.

Approvals CE Marking, RoHS Compliance

Features

- Pulse coded transmission from sensor to controller / indicator unit, thus ensuring error free readings.
- Values of n for the equation $Q = K \cdot \text{Level}^n$ allowed in x.xx format, providing better precision.
- Allows better implementation of various flumes and triangular weir (which requires $n = 2.48$).
- Restriction of keeping $n = 0.5 - 1.5$ is removed.
- Built-in weir selection for rectangular suppressed, rectangular contracted, triangular and cipoletti weirs.
- Readings directly available in cusecs upon entering the weir length of rectangular and cipoletti weirs.
- Conventional $Q = K \cdot \text{Level}^n$ format is also present if built-in formulae are not required.
- Modified floating point arithmetic that allows better mathematical numerical conversion accuracy.
- Galvanically isolated 4-20mA output can support up to:
 - 1 Kilo Ohm external indicator / PLC / scanner load resistance when using 24 V external DC supply.
 - 750 Ohm when using built in galvanically isolated supply.
- Works on 24 V DC as well as 90 to 265 V AC supplies.
- Galvanically isolated 4-20 analog output can be coupled to 'Level' (Head) or 'Flow Rate' through parameter selection at site.
- 3 potential free relays allow single point / pump control switching for flow-rate / level allow 6 combinations of switching outputs.
- Built-in "time-aware" advanced totalizer eliminating the need of external hardware totalizer for quantity assessment.

Applications

- Measuring differential level In Open Channel
- Effluent treatment plants
- Water treatment plants
- Filtration stations

Manufacturing Level Instruments & Speed Monitoring Systems

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Technical Specifications

Electronics

Power Supply:	90 - 265 V AC, 50 / 60 Hz; 24 V DC
Power Consumption:	3 W
Cable Specification:	2-Core, resistance per core not to exceed 30 Ω, shielded twisted pair cables and cable lengths upto to 1000 meters supported with grounded cable shields
Zero% Range:	30 pF to 250 pF
100% Range:	10 pF to 4500 pF (Different from Zero %) Current: 4-20mA RL max: 700 Ω using internal isolated supply RL max: 1 KΩ for external loop supply of 24 V DC
Output:	3 potential-free relays with one set of potential-free change over contact per relay Contact Ratings: 6 A at 230 VAC 50/60 Hz for non-inductive loads
Indication:	Switching Hysteresis 1% in Single-point switching 1-98% selectable in pump control

Electronic Insert LDCM-111

Power Supply:	16 V DC at 5mA derived from Sensor Communication Interface of evaluation unit
Measuring Frequency:	250 KHz to 20 KHz; Reverse Frequency Measurement
Sensitivity:	10 counts per pF
Output:	Digitally encoded current (8 / 16 mA) pulse

System Description

Whenever the liquid flows through a hydraulic measuring device (weir), the level of the liquid in weir is directly proportional to the rate of flow. By knowing the constants of the weir, flow rate can be calculated by using the formula:

$$Q = K \cdot \text{Level}^n,$$

where Q is the rate of flow in cubic meters per hour, L is the level in meters, K and n are constants that depend on the hydraulic device.

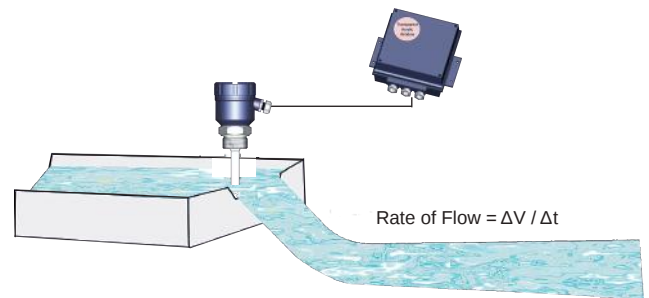


Figure 1: System Diagram of ROF

Special Feature

Sapcon 'Open Channel Flow' solutions are cost-effective. Instead of using separate evaluation units and sensors, we offer an integrated solution where one of the LOH sensors also serves the utility of an ROF sensors. This results in saving a sensor and an evaluation unit.

Why Sapcon

- Sapcon ~ Synonymous with Level Measurement.
- Pioneers in this field with over 32 years of expertise.
- Understanding your problems, always ready with solutions.
- Masters in customization.
- Offering accelerated delivery, saving your inventory costs.

Connect to us

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