SAPCON

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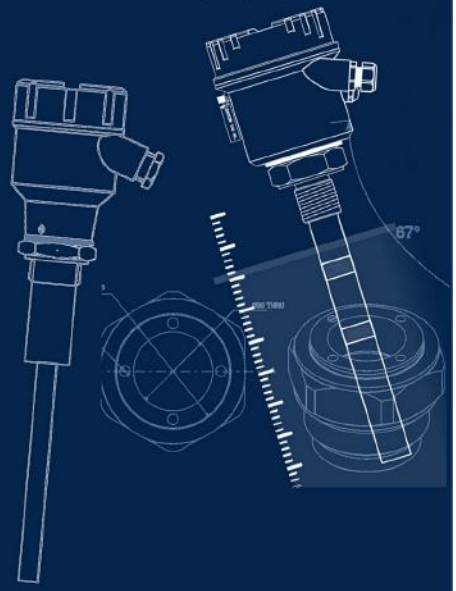
INSTRUCTION MANUAL

RATE OF FLOW

Level Sensor

Version 2.1



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Revision History

Revision	Date	Author(s)	Description
1.0	20 Mar 2014	RND	First Version Editing
1.1	15 Oct 2014	MRK	Applications Revision
1.2	10 Jun 2015	RND	Features Revision
1.3	26 Dec 2015	RND	Specs Revision
1.4	07 Jul 2016	RND	Specs Revision
2.0	08 Jan 2017	BRND	Revised Format
2.1	17 Sep 2017	BRND	Branding Revisions

[1]

[1]

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- The images shown in this manual may differ from the actual instrument / housing in terms of dimensions, color and design. Please refer to GA drawings for dimensional details.
- Values (of performance) described in this manual were obtained under ideal testing conditions. Hence, they may differ under industrial environment and settings.

General Instructions

- Instrument shouldn't block the material filling inlet.
- Secure the cover of housing tightly. Tighten the cable glands. For side mounting, the cable glands should point downwards.
- For side mounting, provide a baffle to prevent the material from falling on the probe.
- When handling forks, do not lift them using their tines. While using them with solids, ensure that material size is less than 10mm.
- Deforming the shape of the tines may interfere with the fork's operating frequency.
- Make all electrical connections as instructed in the manual. Don't power on the device before verifying the connections.

1 Introduction

'Sapcon ROF' series instruments are RISC Processor based ultrasonic 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.

Figure 1: ROF

2 Operating 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 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.

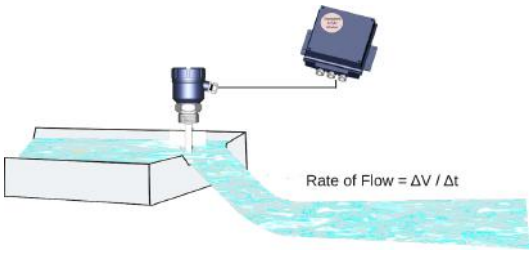


Figure 2: System Diagram

3 System Description

4 Features

- Latest RISC Core Micro-controller Technology.
- Selectable display for ROF/Level/ROF%/Level%.
- Built-in 'Time Aware' totalizer function.
- Built-in equations along with Custom Q=Khn̂ 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 4-20 mA 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.
- 4-20 mA 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.

5 Technical Specifications

5.1 Evaluation Unit

For specifications of evaluation unit, please refer to Table1.

PARAMETER	VALUE
Housing	Cast Aluminum, Weather Proof, Stoving Enamel Painted.Suitable for Back Panel / Wall Mounting.
Cable Entries	3 Numbers of 1"2 / 3"4 BSP/NPT/ Double Compression.
Operating Ambient Temperature	$-20°C$ to $+60°C$
Power Supply	Universal Mains 90 to 265 V AC, 50/60Hz and 24 V DC (@ 3 Watt)
Sensor to Evaluation Unit Cable	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.
Zero% Range	30pf to 250pf
100% Range	10pf to 4500pf (Difference from Zero%) Current 4 to 20mA. RL max = 700 Ohm using internal isolated supply. RL max = 1K Ohm for external loop supply of 24 V DC.
Outputs	3 Potential free relays with one set of potential free change over contact per Relay.
Indication	• Continuous: -50% to 150% digitally on 1"2 Seven Segment Display • Switching: 5 mm Red LEDs for Alarm Indication
Switching Hysteresis	1% in Single Point Switching, 1 to 98% selectable in Pump Control.
Fail Safe Select (Set Point Select)	Field Selectable through Interactive Relay Configuration Menu.
Dimensions	Refer to enclosed drawings.
Weight	2.3 Kg Approx.

Table 1: Evaluation Unit

5.2 Electronic Insert

For specifications of electronic insert, please refer to Table 2.

PARAMETER	VALUE
Accuracy	$\pm 0.5\%$ of Full Scale*
Beam Angle	10°
Ambient Temperature Compensation	Automatic
Measuring Range	0.45 m - 10 m in liquids
Enclosure	IP-65, Cast Aluminium
Sensor	PVDF material
Operating Pressure	0.9 bar - 2 bar
Mounting	2" BSP/NPT Threaded, Flange mounting as per user specification
Dimensions	Refer to figures 1 and 2
Weight	1500 gm approx
Display	Integral LCD, 8 Digits
Supply	$90 - 265$ V AC / $18 - 55$ V DC (on same terminal)
Operating Temperature	• 0° to $+80^{\circ}$ (Sensor) • 0° to $+60^{\circ}$ (Electronics)
Power Consumption	135 mA @ 18 V DC
Certificates	CE
Analog	4-20 mA (Galvanically isolated/ not isolated) 22 mA Error Indication
Digital	RS-485 (Custom ASCII)
Switching	One Potential free Relay (Single point / pump control logic) Contact rating 6A , 230 V AC, 50 Hz for non-inductive load
Sensor Indication	• Red: Pulse Transmit • Green: Eco Received • (Bi-color LED)
Switching Indication	• Red: Alarm • Green: Normal • (Bi-color LED)
Digital Indication	Data (+) and Data (-) (Two Green LED)
Fail-Safe	• Min (Fail safe low) • Max (Fail safe high)
Delay Setting	Covered and Uncovered (0-99 sec.)

Table 2: Electronic Insert

6 Displays

6.1 Primary Displays

The primary displays are:
- [init] : Instrument Power On
- [SnSdt] : Communication initiated with SAPSONIC (sensor)
- [ErSnS] : Trouble with sensor communication
- [hxxxx] : Head Level in mm (xxxx mm)
- [Pxxx.x] : Head Level in Percentage (xxx.x%)
- [Fxxxx] : Flow in user units for Q=K*L n

Flow in cusec (xxx.x) for following Selected Weirs:

[1] Cipoletti Weir

[2] Fully Contracted Rectangular Weir

[3] Standard Suppressed Rectangular Weir

[4] 90 Degree Notch Triangular

- [dxxx.x] : Flow (Discharge) in Percentage (xxx.x%)
- [L Hi] : Level is more than 2000mm or 150%
- [L Lo] : Level is less than -400mm or -50%
- [F Hi] : Flow is higher than 9999 Flow Rate Units (or 999.9 cusecs)
- [F Lo] : Flow Rate percentage is Less than -50%

6.2 Display Selection

To select a display mode from <level mm> <level%> <Flow> <Flow%> Press UP key any when ROF is displaying the measurement. The displayed mode will change. When the desired display mode appears, Press Enter Key to select it. Pressing UP key again will change the display mode but selected (Entered) display mode will appear after power on.

7 Installation & Calibration Guidelines

7.1 ROF Relays

ROF is having three relays:
- [rEL 1]
- [rEL 2]
- [rEL 3]

All three relays are independently programmable for Level or Flow. In both operations (Level or Flow) all three relays have the following:
- Alarm Status : Means presence of Alarm.
- Pump Control : Two point (hysteresis) Switching of a relay
  Requires High and Low set-points to be entered.
- Single Point : Single Point Switching of a relay.
- Covered Status : Level or Flow Rate is Higher then the High Set Point.
- Uncovered Status : Level or Flow Rate is Lower then the Low Set Point.
- Fail Safe Selection : Alarm Selection for Covered or Uncovered Status.
- Covered Delay Setting: Delay from Covered to Alarm or No Alarm Status.
- Uncovered Delay Setting: Delay from Uncovered to Alarm or No Alarm Status.
- Both Covered and Uncovered Delays are set in Seconds.
- High Set Point : High Level (mm) set point, High Flow Rate set point.
- Low Set Point : Low Level (mm) set point, Low Flow Rate set point
  For Single Point switching single Alarm Set Point is used.

7.2 ROF 4-20 mA Loop

ROF is having One Galvanically Isolated, PLC friendly, 4-20 mA loop. 4-20 mA can be set to follow either Level or Flow Rate percentage. Setting 4-20 mA loop for Level or Flow Rate will Cause the respective percentage display to be visible in display mode selection. Percentage can be forward or reverse. Dynamic range of percentage display is +150.0% to -50.0% 4-20 mA loop operates from zero% to 100% only. For details, refer to Figure **??**.

7.3 ROF Flow Rate Calculations

ROF provides built-in support for Cipoletti, Rectangular and Triangular Weirs. Conventional Q=K*L^n is also provided.

[1] K factor can have a value from 0.01 to 99.99.

[2] n factor can have a value from 0.01 to 5.00.

[3] n Factor is not limited to 0.5, 1.5, or 2.5 value selections.

[4] L is the head level measured in mm.

[5] Q is the Flow Rate in user units based on K and n values.

7.3.1 Built-in Weirs and Equations

[1] **Cipoletti Weir**
Data Requirement : Length of Weir is required to be entered
Flow Rate : Q=3.367*W*$L^{1.5}$ cusecs.
Head level L is in feet.
Weir Length W is in feet.

[2] **Standard Suppressed Rectangular Weir**
Data Requirement : Length of Weir is required to be entered.
Flow Rate : Q=3.33*W*$L^{1.5}$ cusecs.
Head level L is in feet.
Weir Length is in feet.

[3] **Standard Contracted Rectangular Weir**
Data Requirement : Length of Weir is required to be entered.
Flow Rate : Q=3.33*(W-0.2L)*$L^{1.5}$ cusecs.
Head level L is in feet.
Weir Length W is in feet.

[4] **90 degree Triangular Notch Weir**
Data Requirement : No Data Required.
Flow Rate : Q=2.49*$L^{2.48}$ cusecs.
Head level L is in feet.

ROF takes all data in mm, conversion factor used is : 1mm = 0.0032808399 feet.
1 cusec is 1 cubic feet per second = 101.940648 cubic meters per hour.

7.4 ROF Calibration

ROF may be required to be calibrated at site where installation makes factory supplied calibration unacceptable. ROF is calibrated or to be calibrated only for Head Level. Calibration is carried out directly in mm. ROF installation thus requires:

[1] ROF Calibration for Head Level where necessary.

[2] Setting of relay parameters for Level or Flow Rate Alarm.

[3] 4-20 mA loop setting for 4-20 mA hardware current loop and percentage display.

[4] Weir Selection, required weir length entry or K and n factor entry.

7.5 Calibration Procedure

To calibrate ROF probe first have a calibration tank available.
Two points are required for calibration:

- Low Calibration Point can have values from 0 mm to 400 mm.
- High Calibration Point can have values from 401 mm to 2000 mm.

When ROF is displaying the measurements,

- Press CALIB Key for 6 to 8 seconds.
- [CALb] will appear on display.
- Press ENTER Key.
- [Lxxxx] will appear. [Lxxxx] indicates a previously set Low Calib Point.
- Press ENTER Key, xxxx will start to blink.
- Press UP or DOWN Key to reach the Low Calibration Point.
- Press ENTER Key when required Low mm is reached.The blinking will stop.
- **Low Calibration Point is thus entered.**

Now raise the water level to the required high level.
It is advisable to maintain more than 400mm difference between the Low and High Calibration Points.

- Press UP Key.
- [Hxxxx] will appear.Hxxxx indicates a previously set High Calib Point.
- Press ENTER Key, xxxx will start to blink.
- Press UP or DOWN Key to reach the High Calibration Point.
- Press ENTER Key when required High mm is reached.The blinking will stop.
- **High Calibration Point is thus entered.**

Now It is required to save and exit from the Calibration Menu.

- Press UP Key.
- [APPLY] will appear.Apply asks for accepting the calibration.
- Press ENTER Key, One of the Following Message will appear.
  - [ErdFL] : Calibrated Level Difference or Capacitance change thereof is lower.A re-calibration is necessary.
  - [ErCAL] : Error in Calibration.Re-calibration is necessary.
  - [donE] : Done, Calibration is Successful.
- If [donE] appears, Press UP Key once.
  - [APPLY] will appear again.
- Press UP Key again.
  - [quit] will appear.
- Press Enter Key here, ROF will return to measurement display mode.
- **ROF is thus calibrated to understand the head level in mm.**

7.6 Relay Setting

To set the three relays first have a plan about how to use the relays.
Each relay can give alarm for either Head Level or Flow Rate.
Head Level and Flow Rate can be used in combination among three relays.
Suppose the following setting is required:

- Relay 1 will give Alarm when Flow Rate is Higher than 54.0cusec (units).
- Relay 2 will give Alarm when Head level is Higher than 700mm.
- Relay 3 will give Alarm when Head level has raised to 600mm and will continue to give alarm until head falls to 300mm.

Relay 1 requires:

- Switch Type : Flow Rate Alarm Single Point Switching.
- Fail Safe : To be selected High, (Higher Flow Rate $-\rangle$ Alarm).
- Cover Delay : Set as per turbulence at measuring head may be zero.

- Uncover Delay : Set as per turbulence at measuring head may be zero.
- Set Point : Set at 54.0 as required by the example.

Relay 2 requires:

- Switch Type : Level Alarm Single Point Switching.
- Fail Safe : To be selected High, (Higher Flow Rate $-\rangle$ Alarm).
- Cover Delay : Set as per turbulence at measuring head may be zero.
- Uncover Delay : Set as per turbulence at measuring head may be zero.
- Set Point : Set at 700 as required by the example.

Relay 3 requires:

- Switch Type : Level Alarm Pump Control Switching.
- Fail Safe : To be selected High, (Higher Flow Rate $-\rangle$ Alarm)
- Cover Delay : Set as per turbulence at measuring head may be zero.
- Uncover Delay : Set as per turbulence at measuring head may be zero.
- Set Point : Set at 600 as required by the example.
- Set Point : Set at 300 as required by the example.

7.7 4-20 mA Loop Setting

Since relay, 4-20 mA loop and Weir have same container menu, it is advisable to set 4-20 mA and Weir Data along the way.
Suppose 4-20 mA is required to be coupled to Flow Rate. Selecting 4-20 mA loop for Flow Rate will make Flow Percentage available for display in display selection modes and will debar level percentage from the display mode list.
Suppose zero percent Flow Rate is when Flow Rate is zero.
Suppose 100 percent flow rate is when Flow Rate is 64.0cusecs units.
4-20 mA settings requires:

- Loop Setting : To be selected Flow, Loop is coupled to flow rate.
- Loop Zero : Set at 0.0 as required by the example.
- Loop Full : Set at 64.0 cusecs as required by the example.

7.8 Weir Setting

Supposed that in the example application, weir type is Cipoletti and weir length is 2351 mm as measured on the weir itself.
Weir setting requires:

- Weir Type : select Cipoletti type.
- Weir Length : set at 2351 as required by example.

7.9 Relay and Weir Setting Procedure

When ROF is displaying the measurements,

- Press PROG Key for 6 to 8 seconds.
- [ProG] will appear on display.
- Press ENTER Key
- [rEL 1] will appear.rEL 1 indicates that relay 1 will be configured.
- Press UP key
- [St xx] will appear.These xx may have following values:
  - L1 : Level Type Relay in Single Point Switching.
  - LP : Level Type Relay in Pump Control Switching
  - F1 : Flow Rate Relay in Single Point Switching
  - FP : Flow Rate Relay in Pump Control Switching.
- Press ENTER Key, xx will start blinking.
- Press UP or DOWN Key select appropriate Switching Type for Relay 1 which will be F1 : Flow Rate Single Point in this example.
- Press ENTER Key, blinking will stop to indicate that switching type is selected.
- Press UP Key.
- [FS x] will appear.This x can have following values:
  - H for Fail Safe High or Maximum Fail Safe.
  - L for Fail Safe Low or Minimum Fail Safe.
- Press ENTER Key, x will start blinking.
- Press UP or DOWN Key select appropriate Fail Safe Type for Relay 1 which will be H : Fail Safe High in this example.
- Press ENTER Key, blinking will stop to indicate that Fail Safe High is selected.
- Press UP key.
- [C xx] will appear.Here, xx can have a value from 0 to 90.
- Indicating previously set Covered Delay.
- Press ENTER Key, xx will start blinking.
- Press UP or DOWN Key reach to required Covered Delay for Relay 1 which will be 1 second in this example.
- Press ENTER Key, blinking will stop to indicate that Covered Delay of 1 second is selected for relay 1.
- Press UP key.
- [U xx] will appear.Here, xx can have a value from 0 to 90.
- Indicating previously set Uncovered Delay.
- Press ENTER Key, xx will start blinking.
- Press UP or DOWN Key reach to required Uncovered Delay for Relay 1 which will be 1 second in this example.
- Press ENTER Key, blinking will stop to indicate that Uncovered Delay of 1 second is selected for relay 1.
- Press UP key.
- [Axxx.x] will appear.Here, xxx.x indicates the previously selected Set point for Single Point Switching.
  - **Note that decimal point xxx.x format ap-**

pears only for built in weir types and where direct cusecs reading is reqd.
  - **For K and n entry type weir, decimal point will not be there.**

- Press ENTER Key, xxxx will start blinking.
- Press UP or DOWN Key reach to required Switching Set Point for Relay 1 which will be 54cusec (units) in this example.
- Press ENTER Key, blinking will stop to indicate that Switching Point is selected at 54cusec (units) for relay 1.
- Press UP Key.
- [rEL 1] will appear again.This is a role back, pressing UP Key again allows to see the parameter settings for selected relay.
- Relay 1 in this case.
- Now the selected Relay will be changed to Relay 2.
- Press ENTER Key.
- [rEL 1] will start blinking.Blinking indicates that relay number can now be changed.
  - [rEL 2] $-\rangle$ Relay 2 can be selected for editing/viewing parameters
  - [rEL 3] $-\rangle$ Relay 3 can be selected for editing/viewing parameters
  - [4-20L] $-\rangle$ 4-20 mA loop can be selected for loop parameters
  - [Weir] $-\rangle$ Weir Type, Weir Length or K, n parameters
  - [APPLY] $-\rangle$ For Saving the parameters and exit.
  - [quit] $-\rangle$ For Exit without saving the changes.
  - Pressing DOWN key will roll through in reverse order.

- Back to operation, Pressing UP Key once, [rEL 2] will appear. And it is still blinking.
- Press ENTER Key.
- [rEL 2] will stop blinking, indicates relay 2 parameters can now be viewed and edited.
- Use UP/DOWN and ENTER Keys as it was done for relay 1 to select the following:
  - [St L1] Switch Type : Level Alarm Single Point Switching.
  - [FS H] Fail Safe : High (Alarm when Level is High).
  - [C 1] Cover Delay : 1 sec (Delay from Level High to Alarm).
  - [U 1] Uncover Delay: 1 sec (Level Low to No Alarm Delay).
  - [A 700] Alarm Set Point : 700 mm.

- Eventually roll back will happen after setting the Alarm Set Point.
- [rEL 2] will appear.
- Press UP Key.
- [rEL 3] will start blinking.
- Press UP Key again to select Relay 3.
- [rEL 3] will stop blinking, indicates relay 3 parameters can now be viewed and edited.
- Use UP/DOWN and ENTER Keys as it was done for relay 1 to select the following:
  - [St LP] Switch Type : Level Alarm Pump Control Switching.
  - [FS H] Fail Safe : High (Alarm when Level is High).
  - [C 1] Cover Delay : 1 sec (Delay from Level High to Alarm).
  - [U 1] Uncover Delay : 1 sec (Level Low to No Alarm Delay).
  - [H 600] High Set Point : 600 mm Alarm Starts here.
  - [L 300] Low Set Point : 300 mm Alarm Ends here.

- Roll back will happen after setting the Low Set Point.
- [rEL 3] will appear.
- Press ENTER Key.
- [rEL 3] starts blinking.
- Press UP Key.
- [4-20L] will appear and it is blinking.Here 4-20Loop parameters can be edited. This menu will hold the following:
  - 4-20 mA Hardware is coupled to Level or Flow Rate % data.
  - Percentage data of Level or Flow Rate % value.
  - 4 mA or 0% Level mm or Flow Rate units entry.
  - 20 mA or 100% Level mm or Flow Rate units entry.

- Press ENTER Key.
- [4-20L] stops blinking.Indicating that 4-20 mA loop parameters can now be viewed and edited.
- Press UP Key.
- [LP x] appears.Here x can have a value of L (Level) or F (Flow Rate) Like relay Failsafe Parameter, it can edited by using:
  - Press ENTER $\langle$blink$\rangle$ Press UP/DOWN $\langle$L/F edit$\rangle$
  - Press ENTER $\langle$blink stops$\rangle$ $\langle$L/F selected$\rangle$
  - Select F (Flow Rate) for present example.

- Press UP Key.
- [Zxxx.x] appears.Z requires little creative reading for seven segment. This is entry point to set 0% or 4mA value.
- Decimal point will not appear for user units(K n Entry)
- As done for relay set point entries, enter 0.0 for this

ex.
- Press UP Key.
- [Fxxx.x] appears.This is entry point to set 100% or 20mA value.
- Decimal point will not appear for user units(K n Entry).
- As done for relay set point entries, enter 64 for this ex.
- Press UP key and roll back will occur.
- [4-20L] appears again.
- Press ENTER, [4-20L] starts blinking.
- Press UP Key.
- [Weir] appears and it is blinking.(W appears like underlined U).
- Press ENTER Key, blinking Stops and thus appropriate weir type can be selected:
  - Pressing UP key will scroll through following:
  - [Weir]−⟩[W Khn]−⟩[Kxx.xx]−⟩[n x.xx]−⟩[Weir] : K,n Entry Wier
  - or [Weir]−⟩[WCiPo]−⟩[Lxxx]−⟩[Weir] : Cipoletti Weir
  - or [Weir]−⟩[WCont]−⟩[Lxxx]−⟩[Weir] : Rect. Contracted Weir
  - or [Weir]−⟩[WSuPP]−⟩[Lxxx]−⟩[Weir] : Rect. Suppressed Weir
  - or [Weir]−⟩[W90dn]−⟩[Weir]: Triangular 90deg Notch Weir.

  It depends on which weir was selected last time
  - [W Khn] : weir with manually provided K and n Entry
  - [WCiPo] : Cipoletti Weir
  - [WCont] : Rectangular Contracted Weir
  - [WSuPP] : Rectangular Suppressed Weir
  - [W90dn] : Triangular Notch Weir

- To select a weir other than which appears on the display, first reach to the [Wxxxx] weir type display, using UP key.
- Suppose it is showing suppressed rectangular weir and it is needed to select a Cipoletti weir for present example; [WsuPP] : presently selected weir is suppressed rectangular type.
- Press ENTER Key.
- [WsuPP] will start blinking, indicating that weir type can now be changed.
- Press UP Key until [WciPo] is reached, [WciPo] is blinking.
- Press ENTER Key.
- [WciPo] stop blinking, indicating Cipoletti weir is selected.
- Now it's needed to supply the length of crest of weir.
- Press UP Key.
- [Lxxx] Previously entered crest length in mm will appear.
- Change it to 2351 mm for present example using:
  - Press ENTER ⟨blink⟩ Press UP/DOWN ⟨Lxxxx edit⟩
  - Press ENTER ⟨blink stops⟩ ⟨new Lxxxx selected⟩

- Press UP Key.
- [Weir] will appear again.
- By now all the required parameters for present example have been entered.
- Now it is needed to save (APLLY) the parameters and start the measurement mode of the ROF instrument.
- Press ENTER Key.
- [Weir] will start blinking.
- Press UP Key.
- [APPLY] will appear and it is blinking.
- To Apply the changes and get back to normal measurement mode.
- Press ENTER Key.
- [donE] will appear.
- **Press Enter Key now and normal measurement mode of ROF will get activated and running with the parameters set above.**

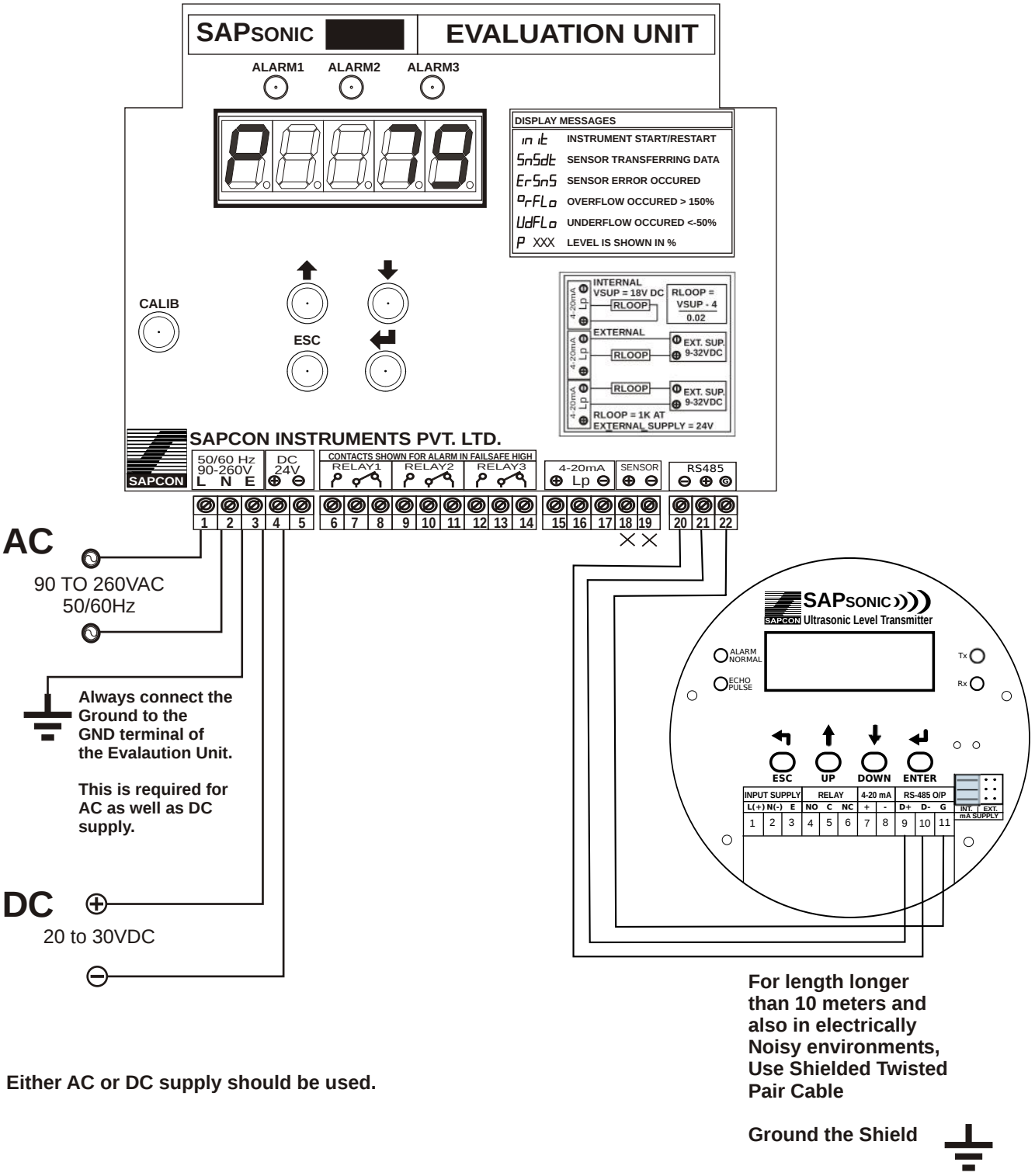
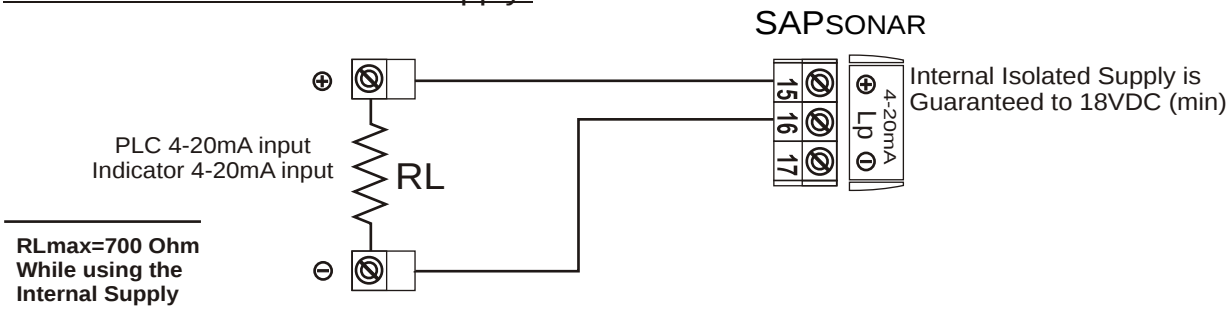
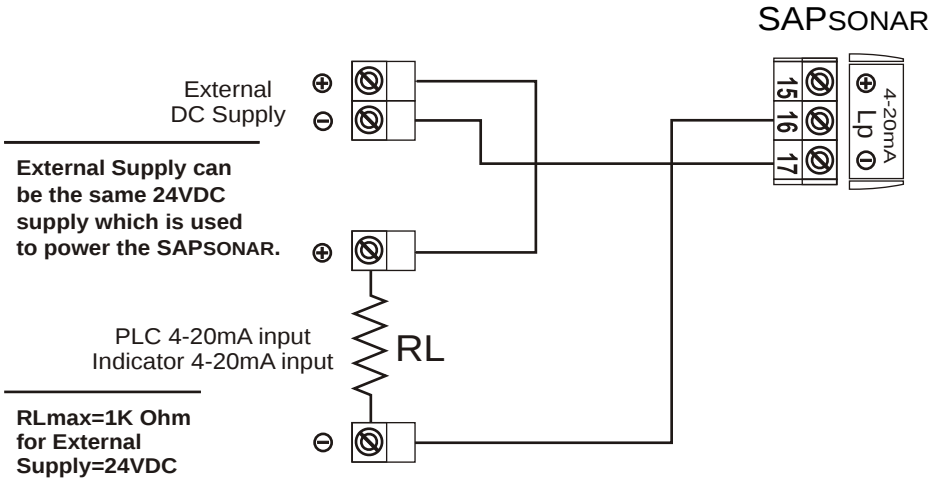


Figure 3: SAPSONAR Connection Diagram - Sensor and Power Supply

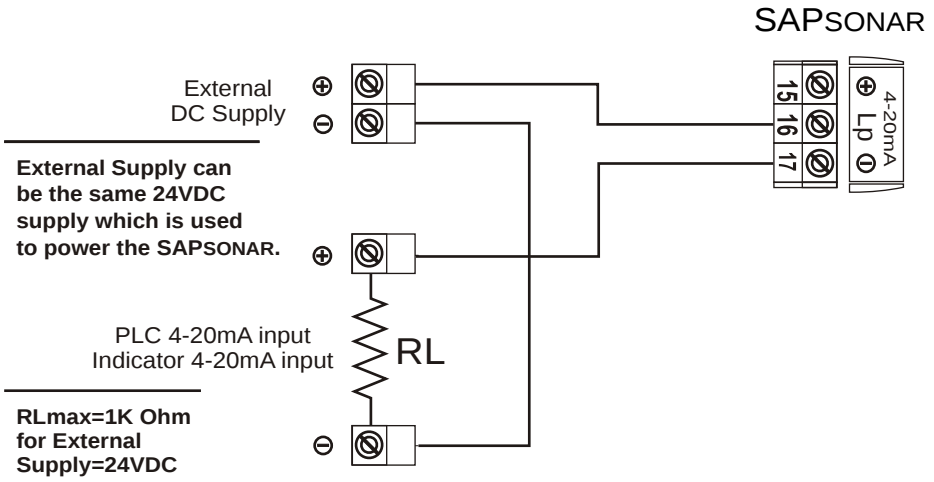
Internal Isolated DC Power Supply:



External DC Power Supply (RL to Lp):



External DC Power Supply (RL to Negative):



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

Figure 4: SAPSONAR Connection Diagram - 4-20mA Combinations

SAPSONAR is capable is displaying Flow Rate, Head Level, % reading of either flow rate of head level as well as Total Flow Quantity using Totalizer Function.
Following are various information being displayed by SAPSONAR during operation:

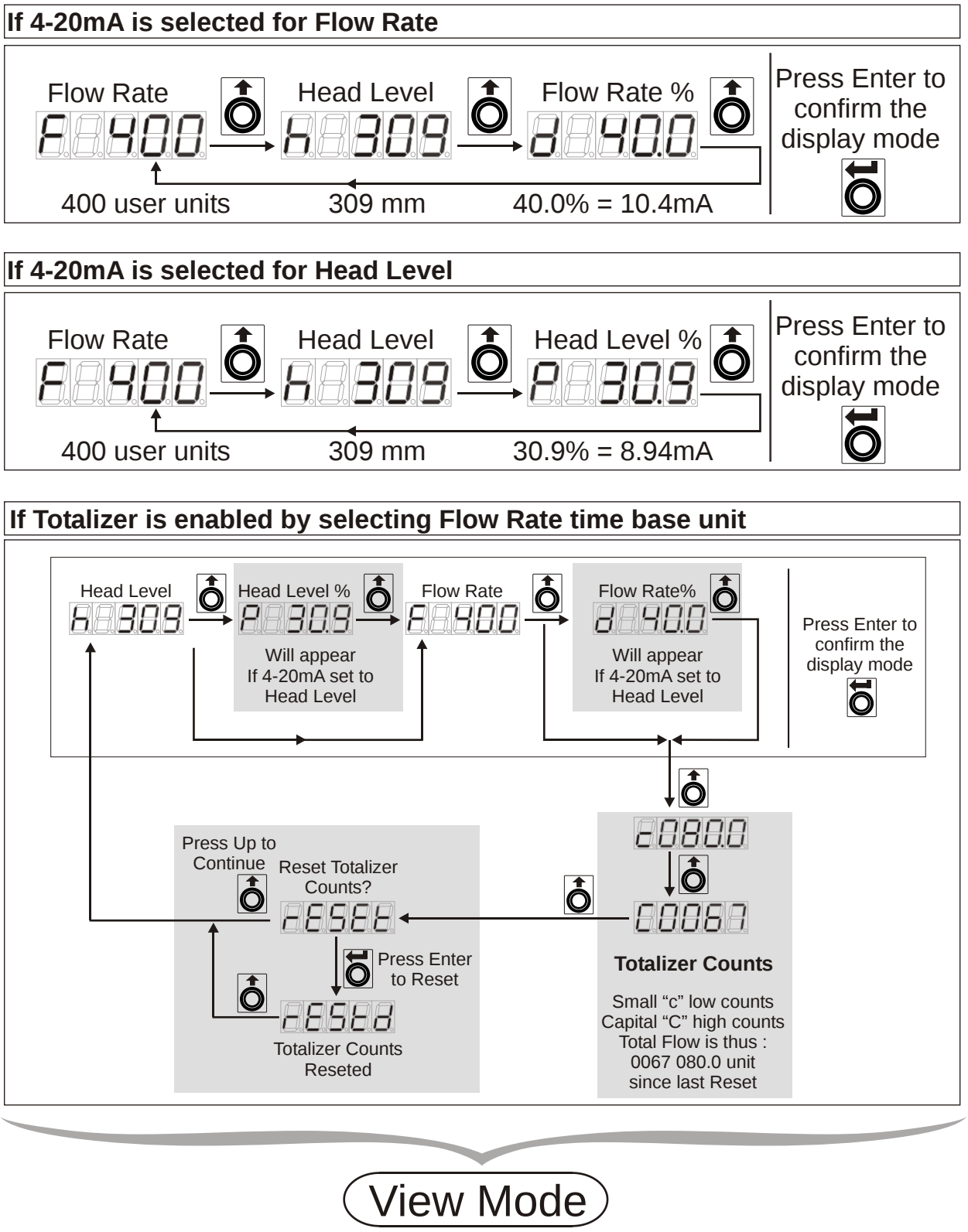


Figure 5: SAPSONAR Quick Reference - View Mode

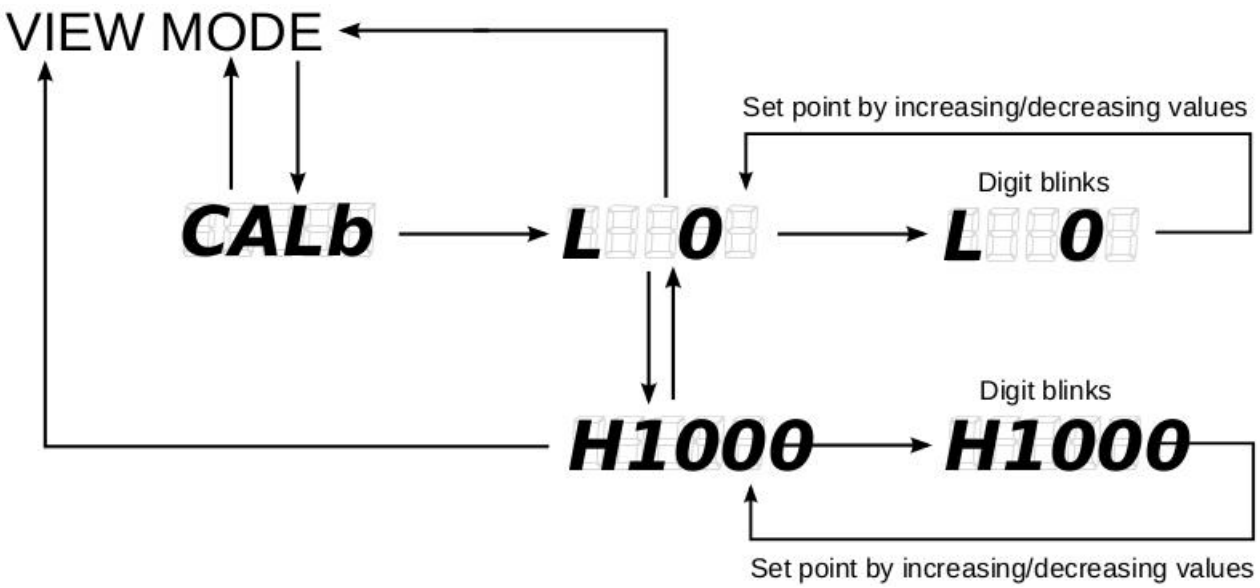


Figure 6: SAPSONAR Quick Reference - Calibration

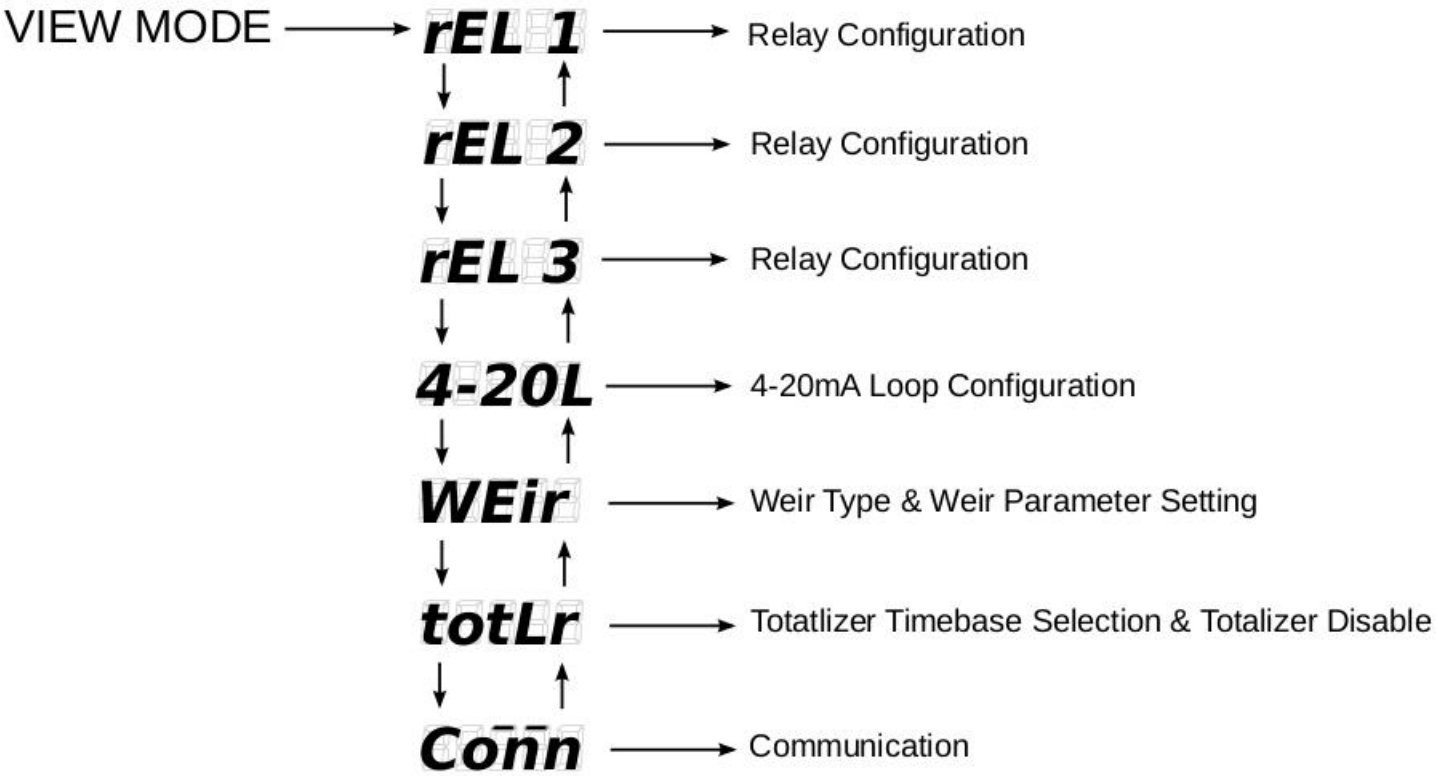


Figure 7: SAPSONAR Quick Reference - Operational Configuration

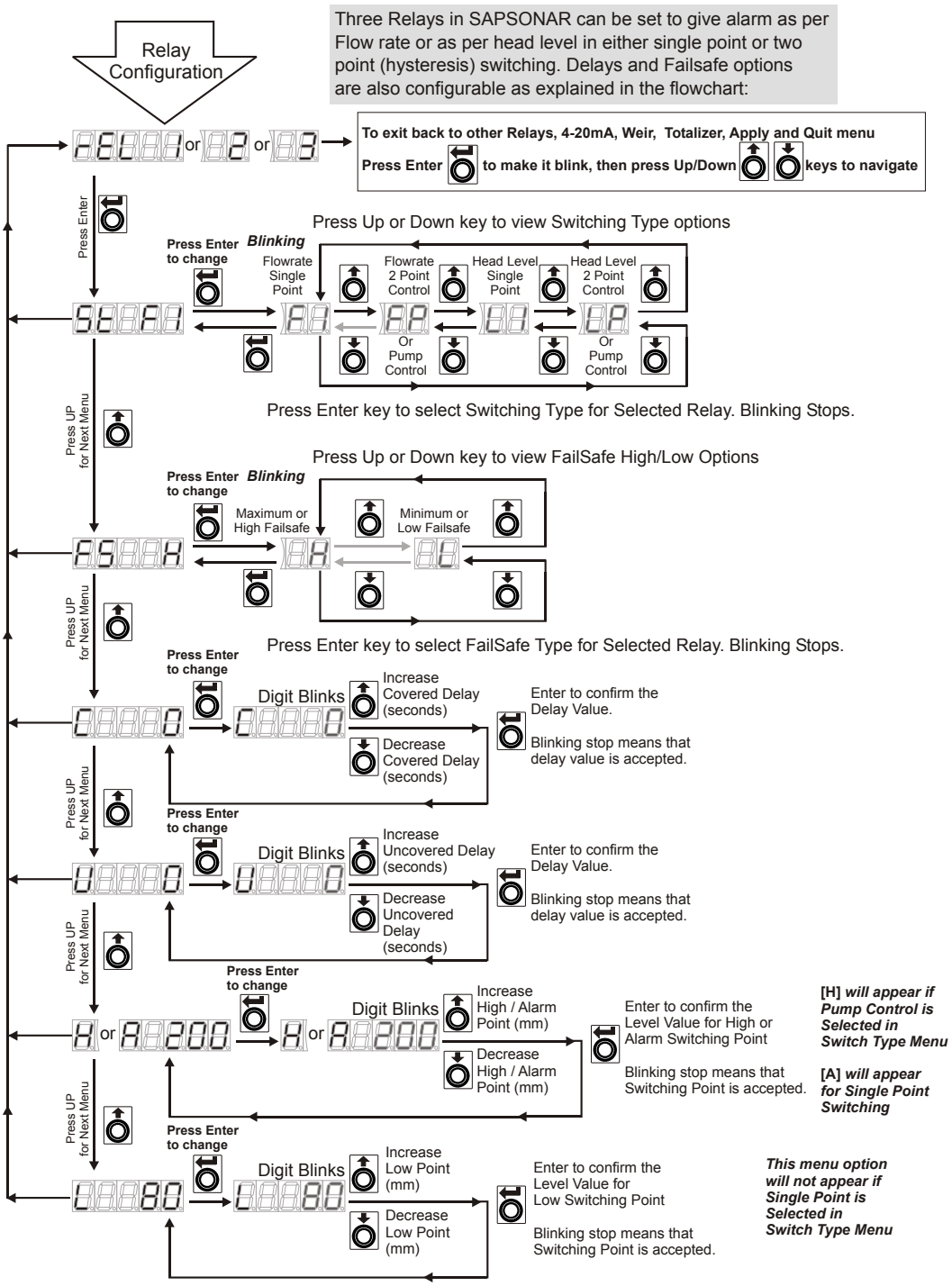


Figure 8: SAPSONAR Quick Reference - Relay Programming Configuration

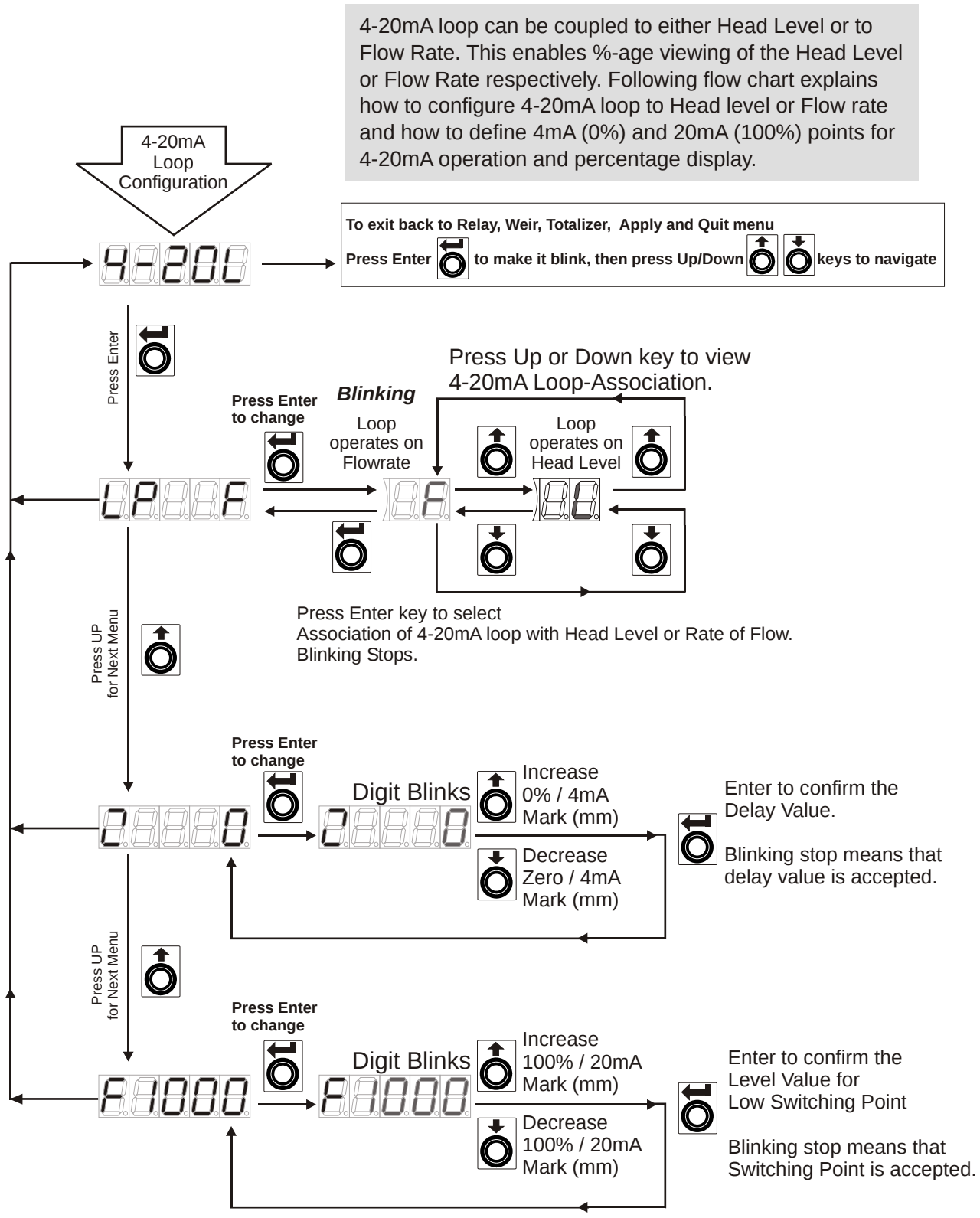


Figure 9: SAPSONAR Quick Reference - 4-20mA Loop Programming Configuration

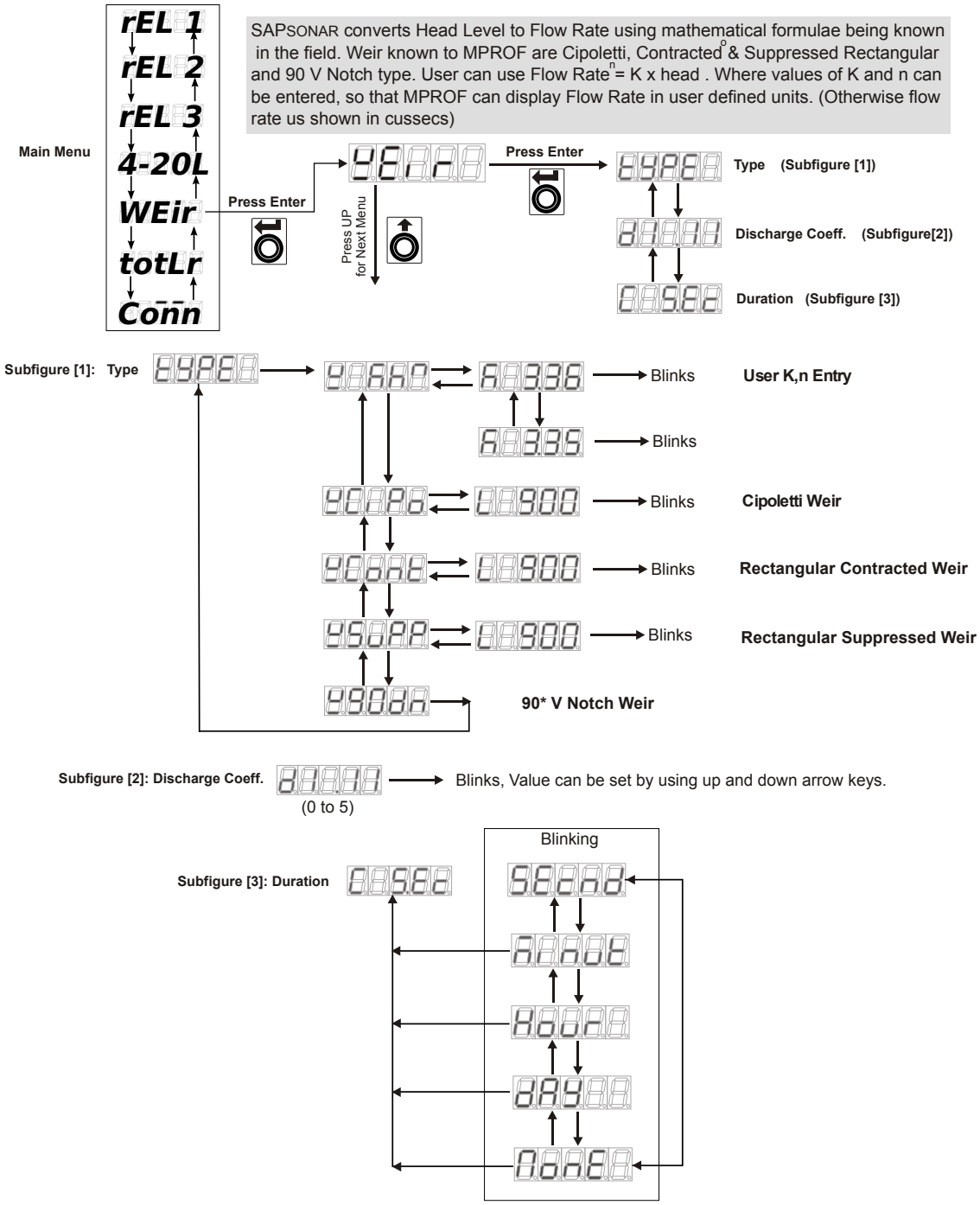


Figure 10: SAPSONAR Quick Reference - Weir Selection

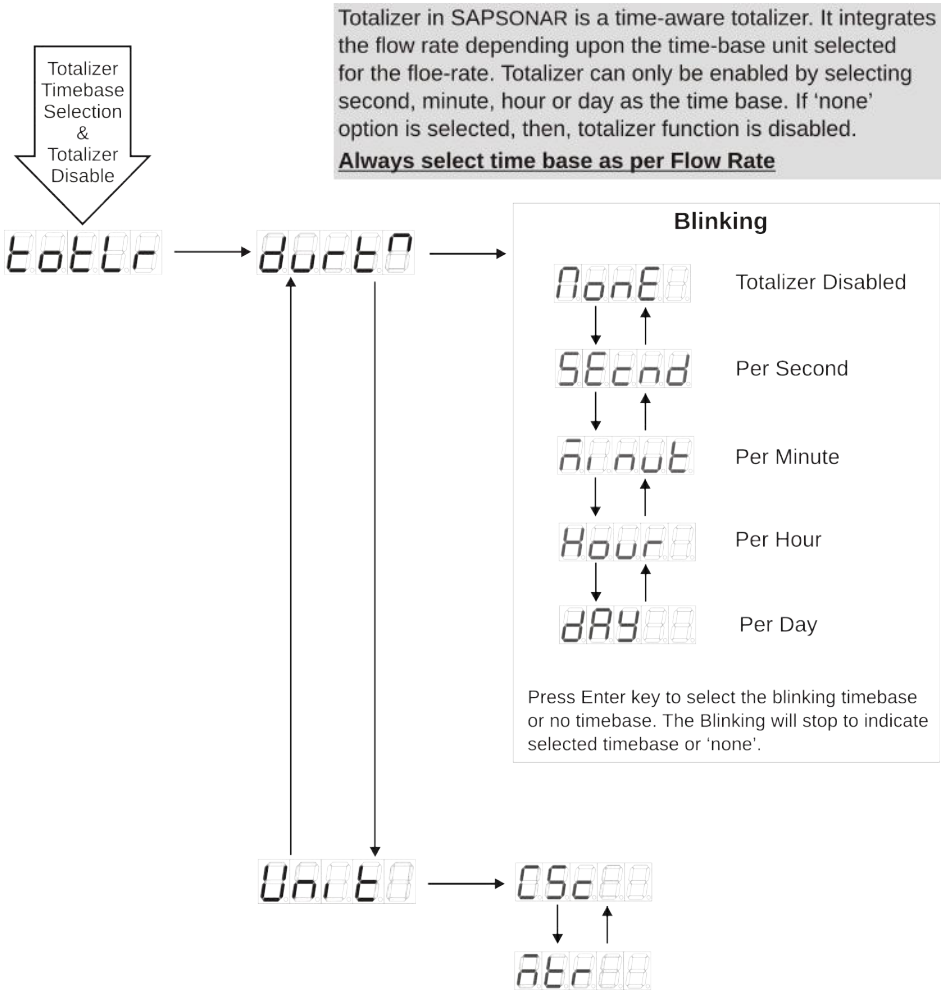


Figure 11: SAPSONAR Quick Reference - Totalizer Configuration

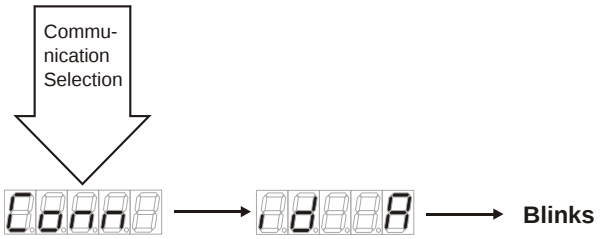


Figure 12: SAPSONAR Quick Reference - Communication Settings

8 Customer Support

Thank you for going through the instructions given in this manual. To further ease the process of installation and use, we have developed special demo videos which are hosted on YouTube.

Sapcon's YouTube channel, SAPCON INSTRUMENTS, lists all these videos: https://goo.gl/dnxfcz

Should you require further information regarding installation, use or working of the instrument, please don't hesitate to contact us. Kindly provide the following information at the time of contacting:

- Instrument Model and Serial Number
- Purchase Order Number and Date of Purchase
- Description of the query
- Your contact details

In an attempt to serve you better, we are open seven days a week (9:30am to 7:30pm). We are available at:

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