



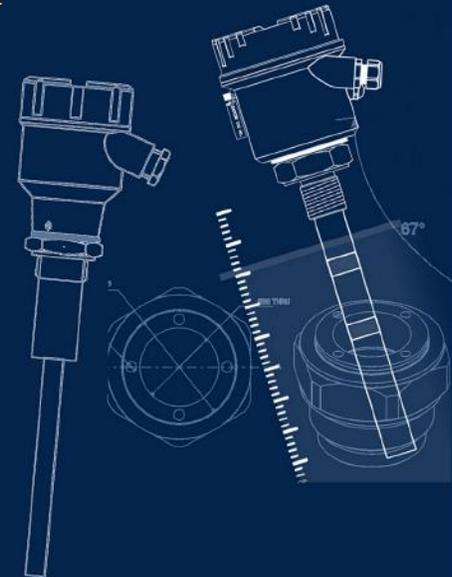
Grown...to meet challenges

INSTRUCTION MANUAL

STELLAR

Pressure Based Level Transmitter

Version 2.0



SAPCON INSTRUMENTS PVT. LTD.

30+ Years in Process Control Instrumentation

An ISO 22000 company

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2 Evaluation Unit 5

Revision History

Revision	Date	Author(s)	Description
1.0	28 Jan 2014	RND	First Version Editing
1.1	15 Jun 2014	MRK	Applications Revision
1.2	20 Jul 2015	RND	Features Revision
1.3	28 Dec 2015	RND	Specs Revision
1.4	21 Jul 2016	RND	Specs Revision
2.0	08 Jan 2017	BRND	Revised Format
2.1	17 Sep 2017	BRND	Branding Revisions

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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's STELLAR instruments are RISC Processor based Flame Proof Differential Pressure Sensor for Continuous Level Indicators with built-in Three Point Switching. The instrument is suitable for measuring the level of conductive or non-conductive liquids. Apart from level indication, the built-in two 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: Stellar

2 Operating Principle

In an application, the Pressure sensor is measure pressure of the liquid. The amount of pressure by the liquid measure by the sensor. STELLAR build measures the Change of Pressure to measure the change of level of the material. Since this is a relative measurement, a proper Calibration is thus always necessary.

3 System Description

4 Features

- Latest RISC Core Micro-controller Technology.
- Measured Level is Displayed Continuously in terms of Level, Volume or mass according to strap chart and density entry.
- Multipurpose 8 digit Seven Segment LED Display for best resolution and better viewing from distance.
- Two wire Analog Communication from Sensor to Evaluation unit. Supporting as much as 1 KM distance between Sensor and Evaluation Unit with shielded two core cables.
- Two Independent Potential Free relays providing flexibility of selecting two independent switch points.
- Galvanically Isolated True Two Wire 4-20 mA Proportional to 0% and 100% level, Volume or Mass (according to user selection) 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.

- The loop resistance can be 1K Ohm for External DC Supply of 24 Volts.

5 Applications

6 Technical Specifications

6.1 Evaluation Unit

For Evaluation Unit, please refer Table 2

PARAMETER	VALUE
Housing	Cast Aluminum, Weather Proof, Stoving Enamel Painted.Suitable for Back Panel / Wall Mounting
Operating Ambient Temperature	-20°C to 60°C
Power Supply	Universal Mains 90 to 265 VAC, 50/60Hz (@ 2.4 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
Outputs	2 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
Indication	<ul style="list-style-type: none"> • Continuous: Level, Volume or Mass digitally on Seven Segment Display • Switching: 5 mm Red LEDs for Alarm Indication
Fail Safe Select	Field Selectable through Interactive Relay Configuration Menu
Dimensions	Refer Enclosed Drawings

Table 2: Evaluation Unit

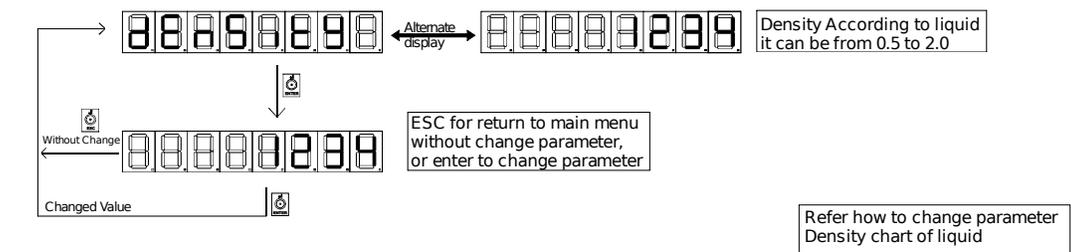
7 Electrical Specifications

8 Mechanical Specifications

9 Installation Guidelines

10 Electrical Connections

DENSITY



NUMBER of STRAPS CHART

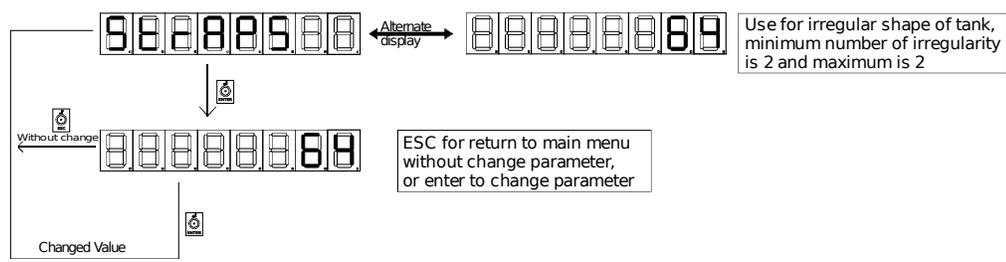
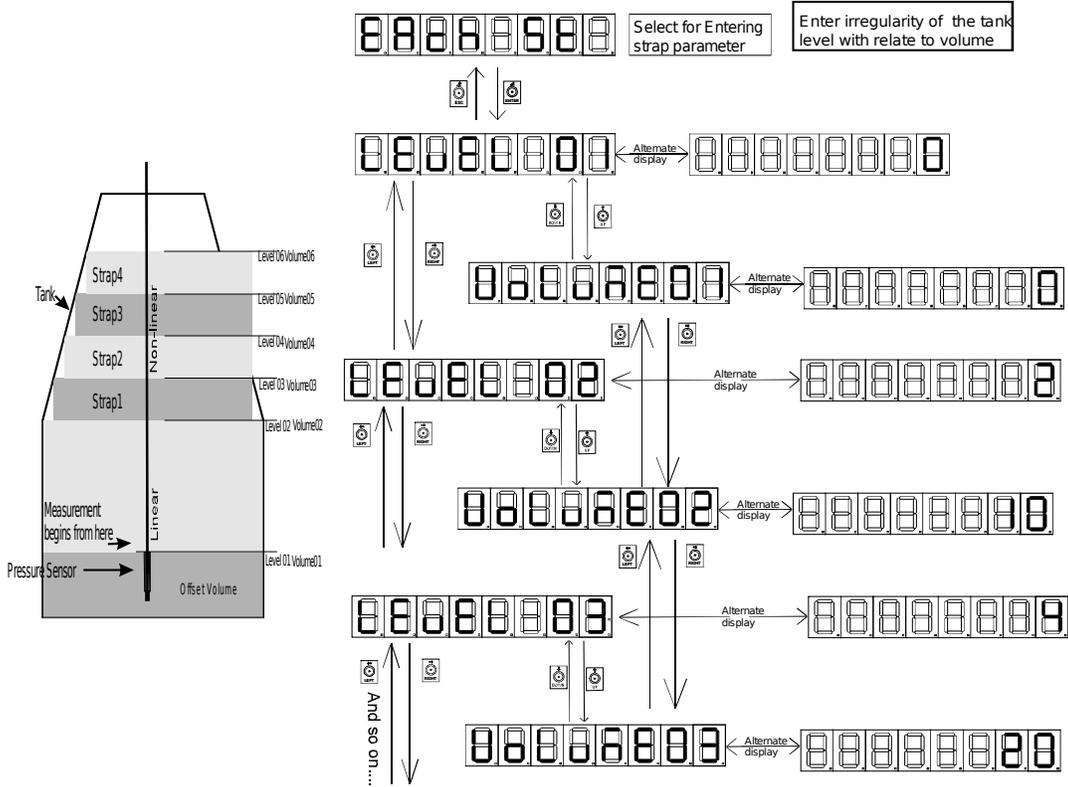


Figure 2: Change Density and Number of Strap Chart

EACH STRAP



*Strap chart must be fill with correct level and volume relationship.(Level in mm and volume in Lt.)

How to fill each strap chart :-

when enter to fill each strap chart its alternate display last entered value.

First its display Level 01 with alternate display of last entered value.
Enter to change those value.

Press UP key to relate that level with the volume.
Its displayed Volume 01 with alternate display of last entered value, Enter to change parameter.

After enter the value, through left or right key select level and through UP down key select related volume.

The higher level and volume must be grater than lower.

User take help "how to change parameter" page no. Xx and strap chart provided by tank manufacturer.

Figure 3: Enter Paramter In Each Strap

Calibration LOW level:-

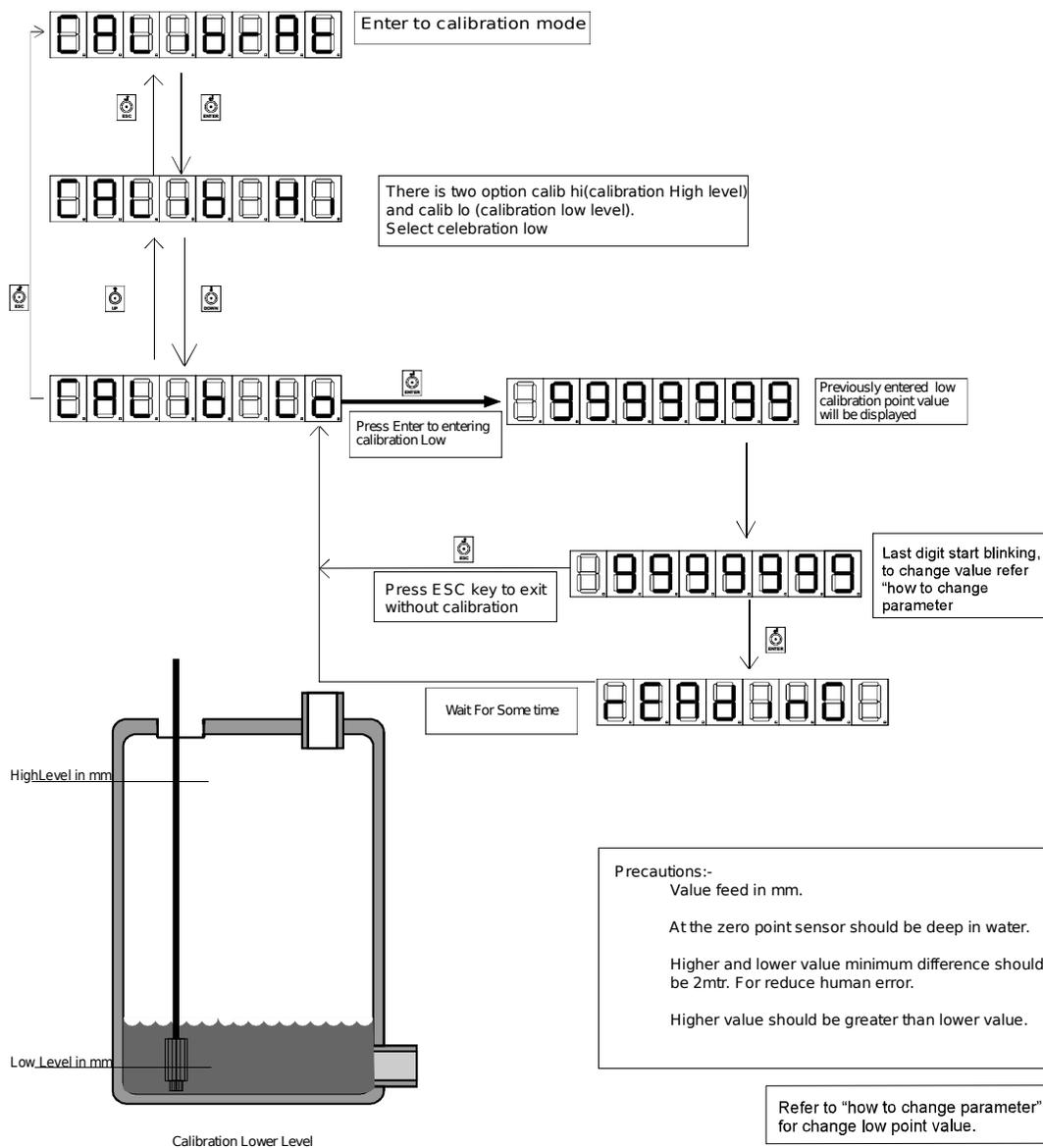


Figure 4: Calibration Low Level

Calibration HIGH Level:-

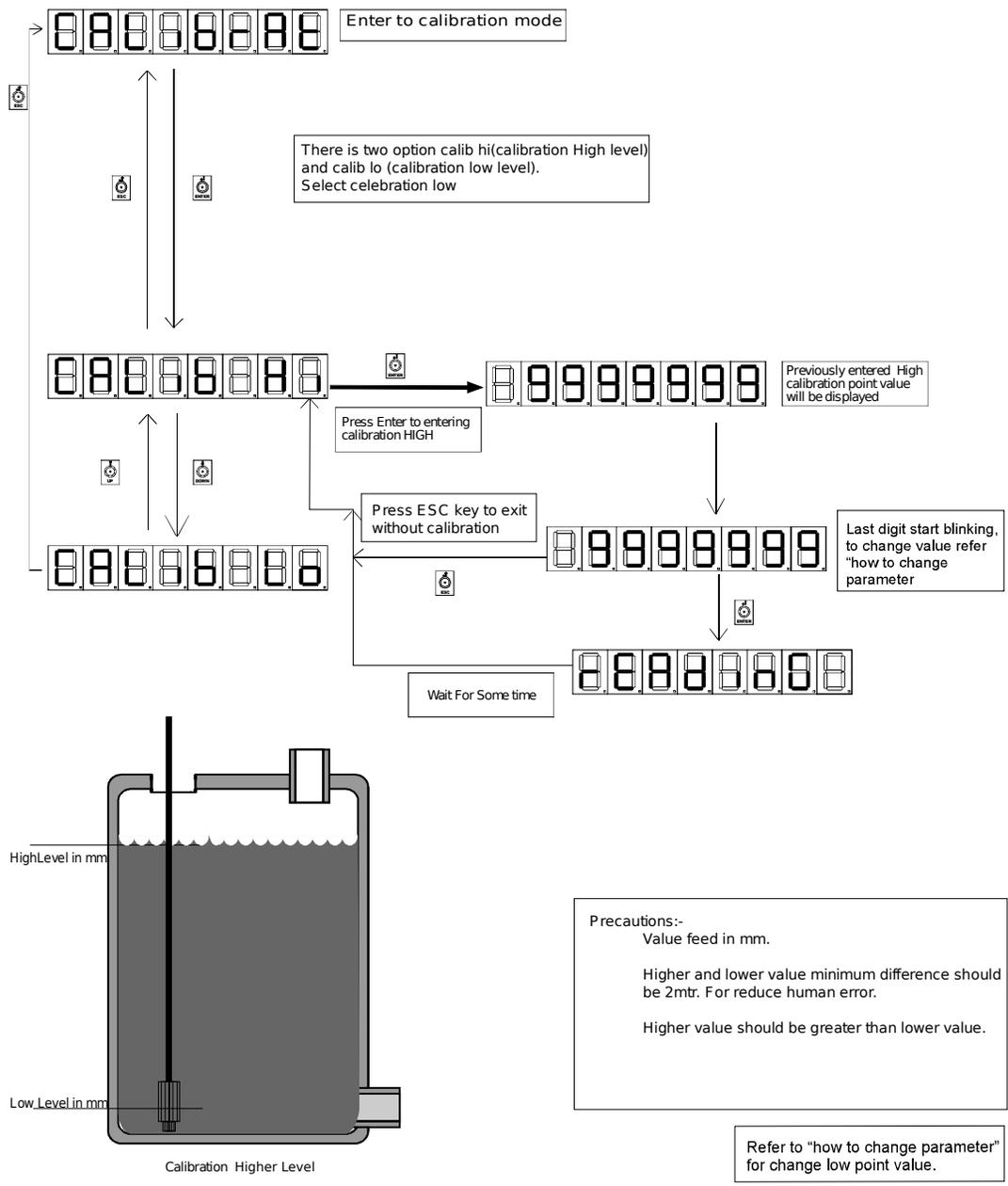


Figure 5: Calibration High Level

About STELLAR Relays:



There are Three Potential free Relays in MPILC.

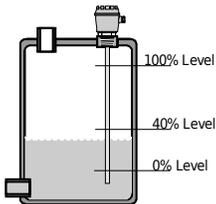
- Relay 1
- Relay 2

Single Point Switching

Set Point =40%

Fail Safe High
No Alarm

Fail Safe Low
Alarm



Each Relay is having Two Operating Modes:

- Single Point Switching
- Pump Control Switching

Relays Can be set to give Alarm in following Conditions:

Single Point Switching

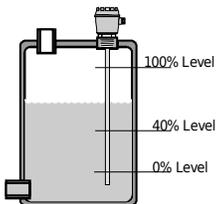
Fail Safe High or Maximum Fail Safe
Alarm Starts when Level \geq Set Point Level
Alarm Stops when Level $<$ Set Point Level

Fail Safe Low or Minimum Fail Safe
Alarm Starts when Level $<$ Set Point Level
Alarm Stops when Level \geq Set Point Level

Set Point =40%

Fail Safe High
Alarm

Fail Safe Low
No Alarm



Relays have following configurable delay timers:

Covered Delay (0 to 90 Seconds)
Time Delay to recognize Alarm Level Condition.

Uncovered Delay (0 to 90 Seconds)
Time Delay to recognize No Alarm Level Condition.

<p><u>During Alarm</u> Relay is at NC (Normally Connected) Relay LED Glows (Red)</p>	
<p><u>During No Alarm</u> Relay is at NO (Normally Open) Relay LED Turns Off</p>	

Figure 6: Relay

RELAY CONFIGURATION

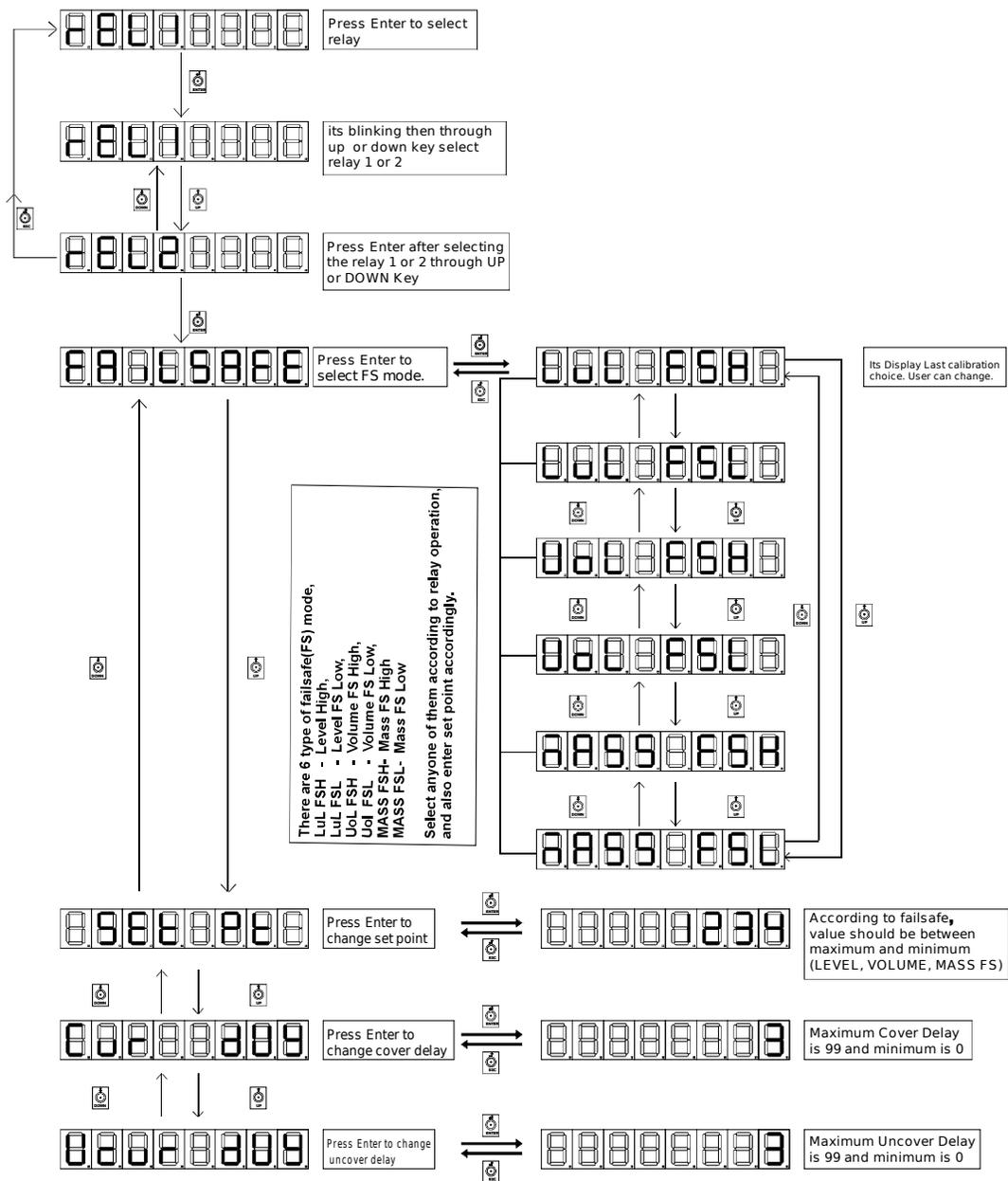
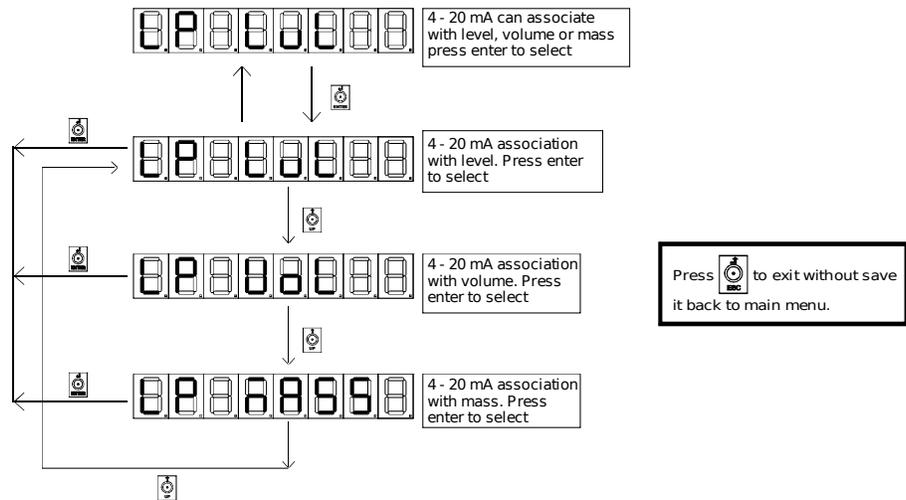
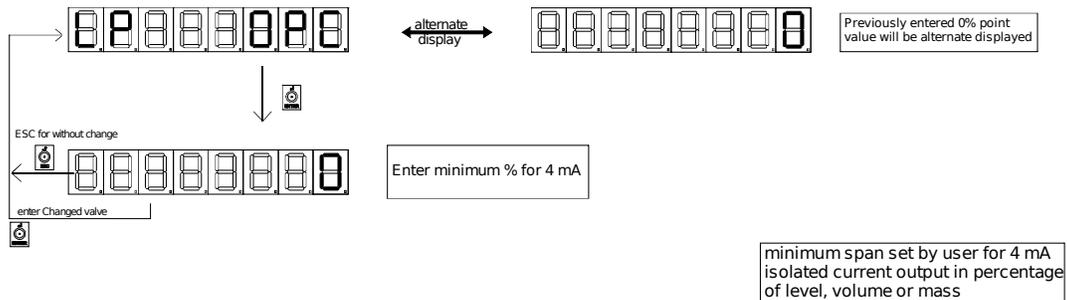


Figure 7: Relay Configuration

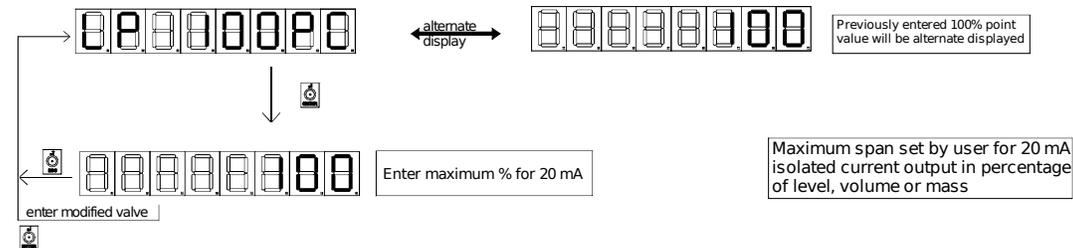
LOOP SELECTION



LOOP 0%



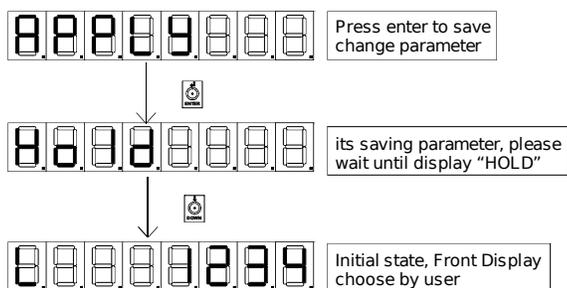
LOOP 100%



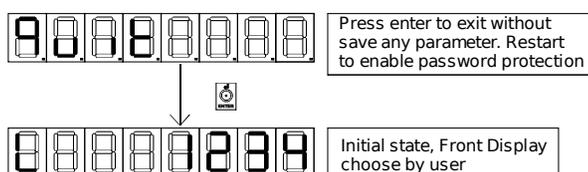
Minimum(LP 0PC) and Maximum (LP 100PC) for 4 mA and 20mA
 Minimum span differences is between maximum and minimum 20% to 100%
 For connection refer connection diagram of 4-20 mA

Figure 8: Loop Selection

APPLY



QUIT



Apply is must if user change any parameter in the instrument.

If any power failure / interruption during calibration/changing parameter, data will remaining same it doesn't change user should change again these parameter and apply.

Figure 9: Apply and Quit

11 Serial Commands

Only one command at a time. Commands show between single quote. ("")

'<':- For start command line.

'>': - For end command line.

Command describes below:-

'D':-This command is use for set density (limit 0001 to 2000)

Example: - "<D 1234>"

'd':- This command is use to get density

Example: - "<d >"

'S':- This command is use for set maximum straps (limit 2 to 64)

Example: - "<S 03 >"

's':- This command is use to get maximum straps

Example: - "<s >"

'L':- This command is use for set strap number: Level

Example: - "<L 02 123>"

'l':- This command is use to get strap number: Level

Example: - "<l 02>"

'V':- This command is use for set strap number: Volume

Example: - "<V 02 123>"

'v':-This command is use to get strap number: Volume

Example: - "<v 02 >"

'R':- This command is use for set relay associate: Relay 0 to 1 has Association 0 to 5

- 00 Level failsafe high
- 01 Level failsafe low
- 02 Volume failsafe high
- 03 Volume failsafe low
- 04 Mass failsafe high
- 05 Mass failsafe low

Example: - "<R 1 04>"

'r':- This command is use to get relay assoc: Relay 0

to 1 has Association 0 to 5 described above

Example: - "<r 1>"

'H':- This command is use for set relay set point: with specified association (value according to fail-safe and should be between higher and lower value)

Example: - "<H 0 1234>"

'h':- This command is use to get relay set point: with specified association

Example: - "<1>"

'C':- This command is use for set relay cover delay: cover delay

Example: - "<C 1 03>"

'c':- This command is use to get relay cover delay: cover delay

Example: - "<c 0>"

'U':- This command is use for set relay uncover delay: in seconds

Example: - "<U 1 03>"

'u':- This command is use to get relay uncover delay: in seconds

Example: - "<u 1>"

'W':-This command is use for loop association: loop has associations with level, volume, mass: 0 to 2.

Example: - "<W 01>"

'w':- This command is use to get 4-20mA assoc: loop has associations with level volume mass: 0 to 2

Example: - "<w >"

'Z':- This command is use for set 4-20mA zero: loop has associations with level volume mass: 0 to 2

Example: - "<Z 20>"

'z':- This command is use to get 4-20mA zero: loop has associations with level volume mass: 0 to 2

Example: - "<z>"

'F':- This command is use for set 4-20mA 100%: loop has associations with level volume mass: 0 to 2

Example: - "<F 100>"

'f':- This command is use to get 4-20mA 100%: loop has associations with level volume mass: 0 to 2

Example: - "<f>"

'n':- This command is use to get level in mm

Example: - "<n>"

'o':- This command is use to get volume

Example: - "<o>"

'm':- This command is use to get weight

Example: - "<m>"

'*':- This command is use for apply changes parameter

Example: - "<*>"

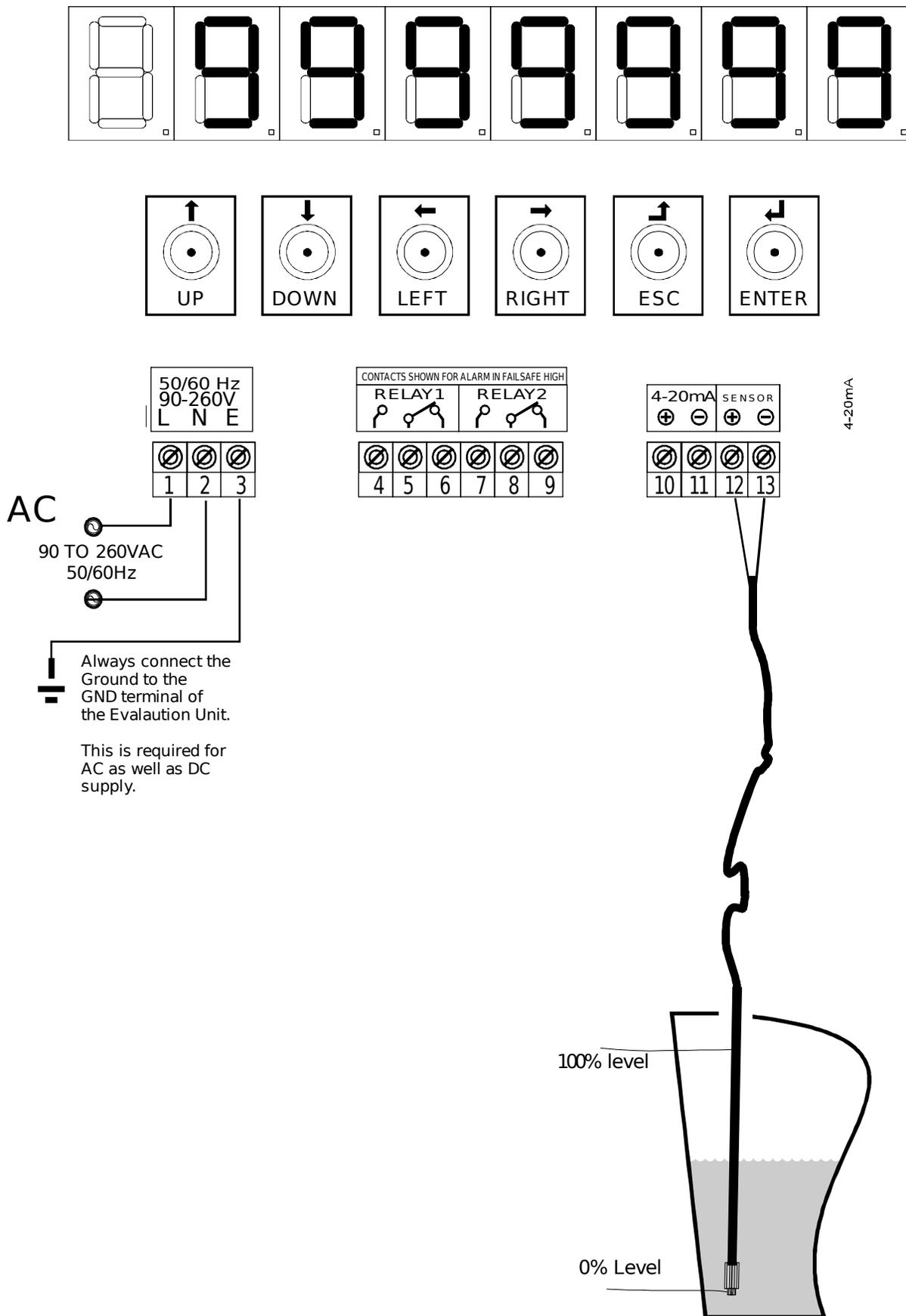
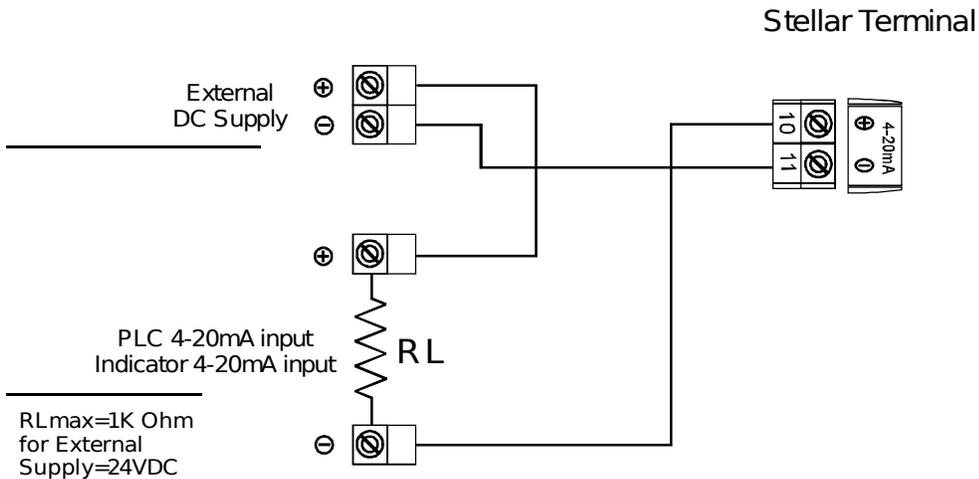
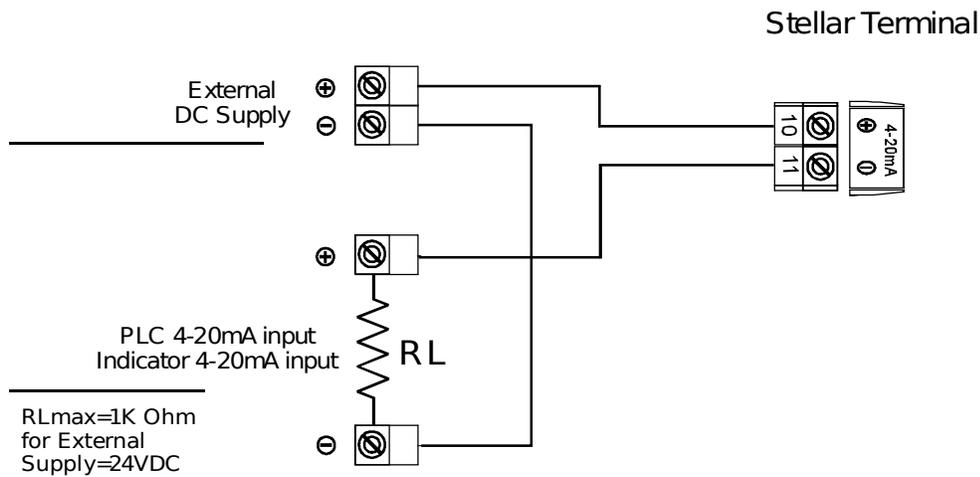


Figure 10: Connection Diagram : Sensor and Power Supply

External DC Power Supply (RL to Lp):



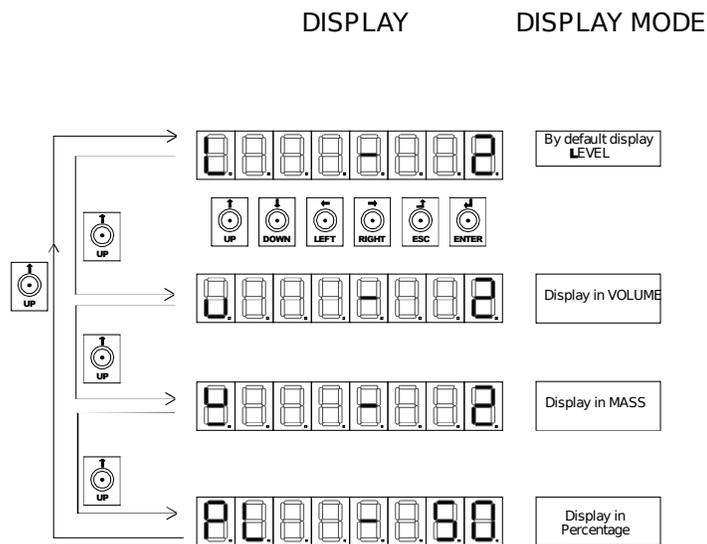
External DC Power Supply (RL to Negative):



$$\text{Loop Resistance} = (\text{Loop Supply Voltage} - 4) \div 0.02 \text{ (Ohm)}$$

Figure 11: Connection Diagram : 4-20mA Combinations

FRONT DISPLAY



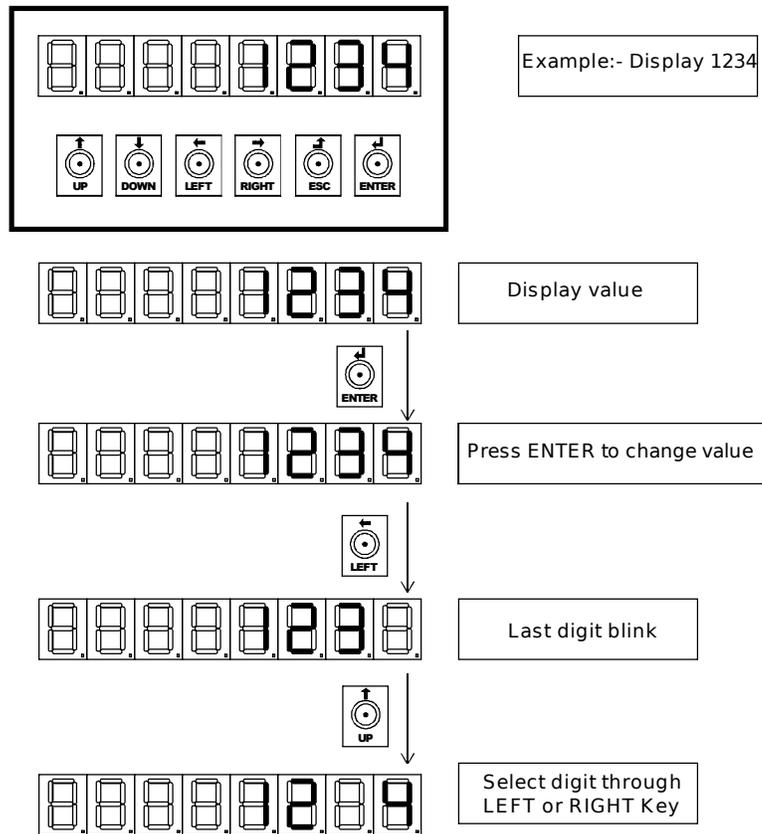
To change display mode press UP Key,
For save change display mode press DOWN Key.

ERROR MESSAGES:-

Reasons for Error	Error Messages
Pressure sensor not connected	0.0.0.0.0.0.0.
Level is lower then lowest strap value	0.0.0.0.0.0.0.
Level is higher then Highest strap value	0.0.0.0.0.0.0.

Figure 12: Front Display

Change Parameter:-



1. Please select parameter which parameter want to change through ENTER Key.
2. After entering the change mode lowest digit is blinking.
3. Digit can be select through LEFT or RIGHT Key, and digit can be change through UP or DOWN Key (from 0-9).
4. Press ENTER to change and exit from the mode.
5. Press ESC to exit from the mode without change.

****Apply is must for the save change value.**

Figure 13: Change Parameter

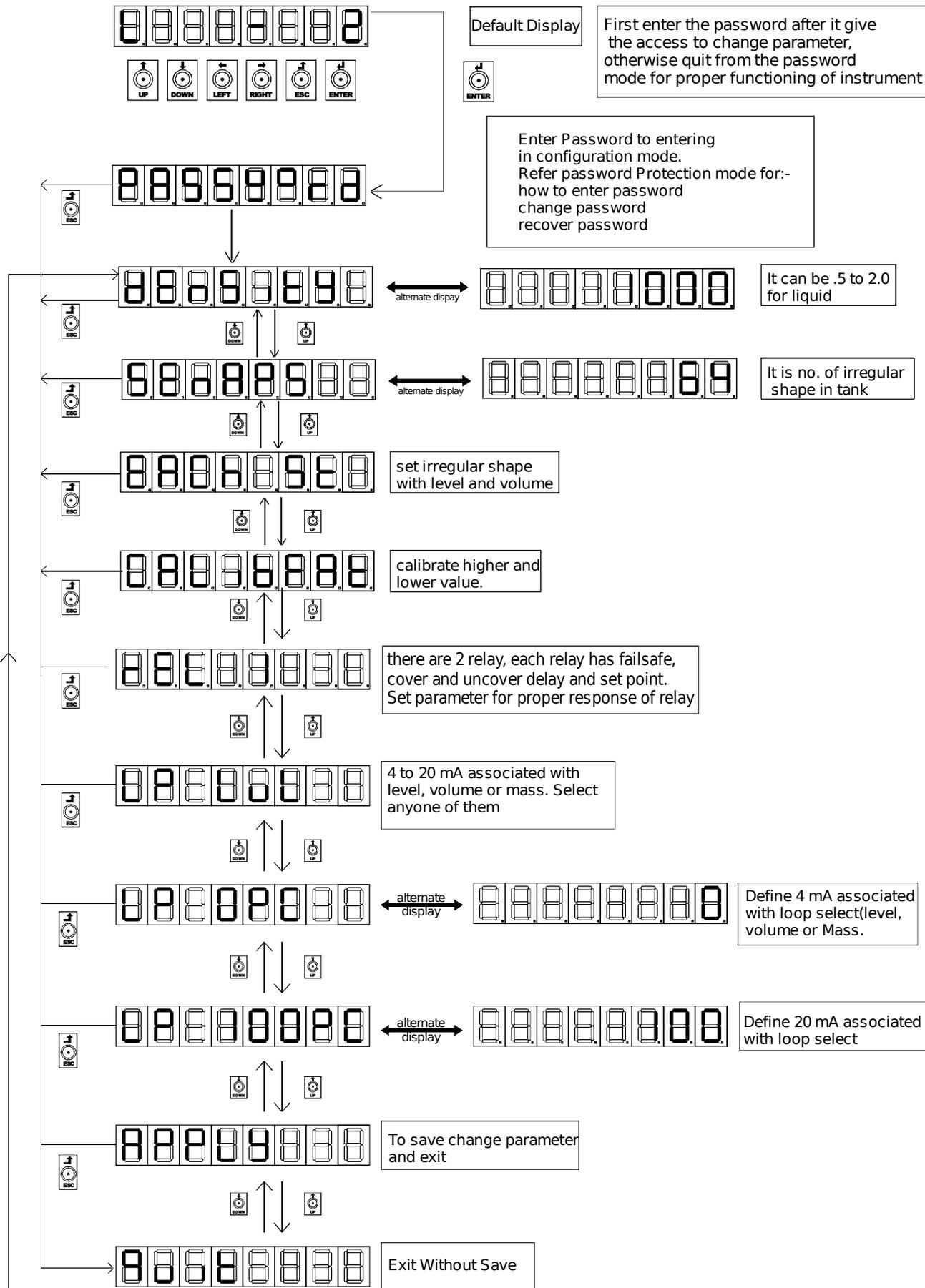


Figure 14: For Selecting Programming Mode

Password Protection

Enter the password for change parameter

There are three submenu in this password mode:-
 1. User Privilege
 2. Company privilege
 3. Change password

User privilege and change password have user accessible but company privilege is only for manufacturer company.

User Privilege :- This mode user enter password if password is correct instruments give access to change parameter. If password wrong than again try to enter correct password. Otherwise quit from password menu.

Company privilege:- its for company use only. If user forget password please contact to SAPCON Help services. It reset password.

Change password:- user can change current password. First Enter correct password after then it display "new password" then enter new password for next access.

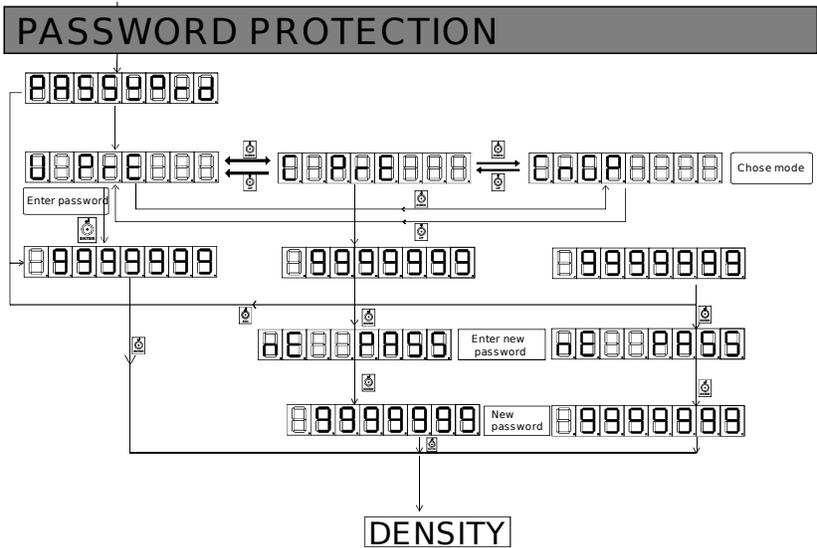


Figure 15: Password Protection

12 Settings

13 Maintenance

14 Support & Training

15 Order Code

16 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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