

# L97 SERIES

## MULTIPOINT CAP SWITCH

User Manual

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**WHITMAN™**  
CONTROLS

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800-233-4401 | [www.whitmancontrols.com](http://www.whitmancontrols.com)

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## Revision History

Revision	Who	Changes
2020-02-06A	mkeste	Document created
09/20/2023	KPATEL	Revised changes

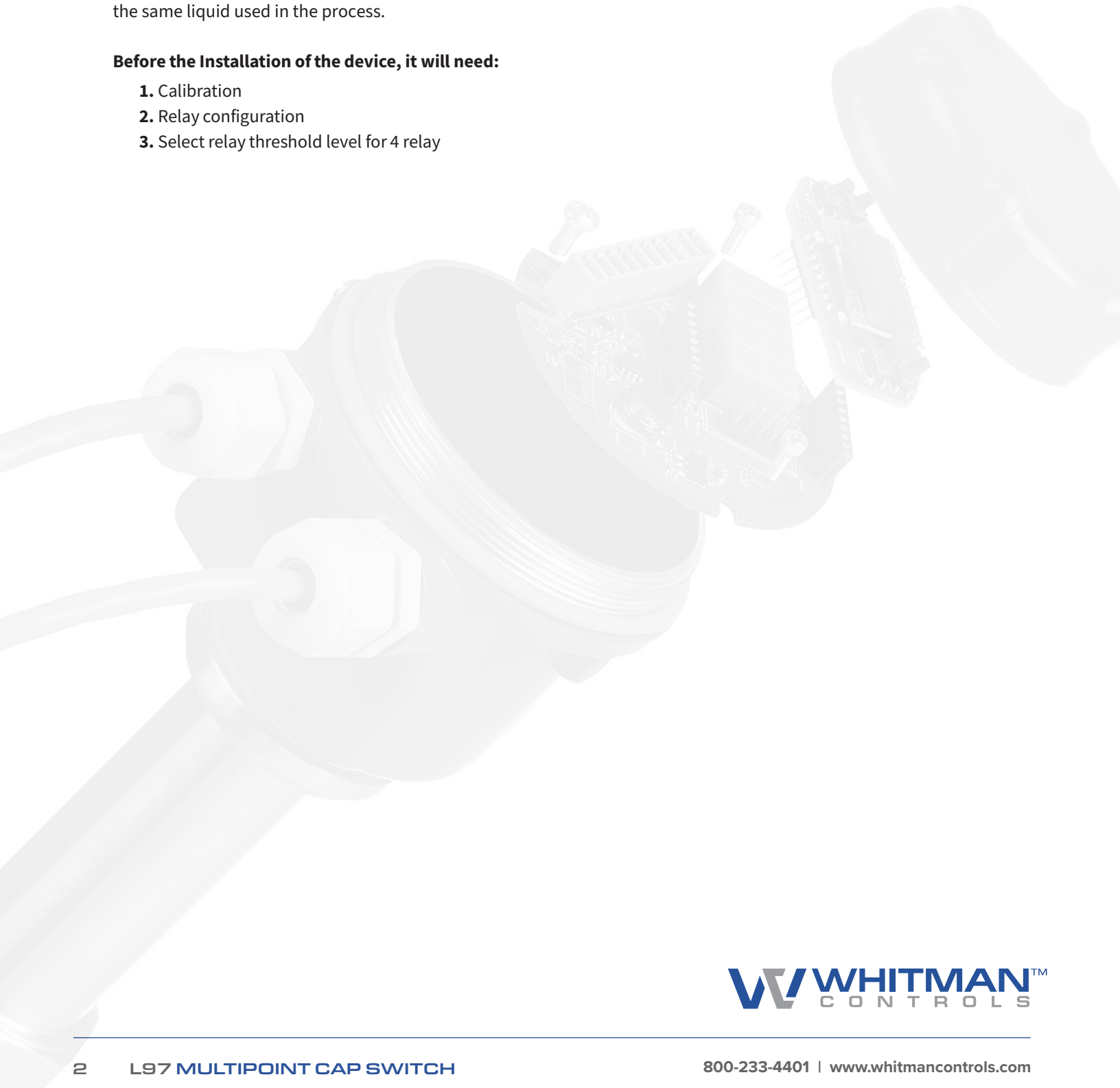


## Getting Started

The Multi-Level cap switch is used to switch industrial equipment with output relays to predefined levels. The switch includes an add-on display module which displays the current level (as a percentage) and the status of the four relay outputs. Relays are user configurable (See Section 4-Configuration) within the equipment's process range. Calibration of the low & high point in the process range will need to be performed during, or prior to, installation in the same liquid used in the process.

### Before the Installation of the device, it will need:

1. Calibration
2. Relay configuration
3. Select relay threshold level for 4 relay



## Technical Specifications

### Power Details

Input Voltage	12V ~24VDC
Power Consumption	MAX 2W

### Measurement details

Measurement range	50pF to 1000000pF
Sensitivity	15pF
Pressure	1 to 21 bar
Overload Protection	No

### Output Details

Relay output	4-True fully configurable latching relay
	Contact rating 2A
	Voltage 125VAC 0.5amp ,30 VDC 2amp
	Configurable to: 0 to 99% of level
	Configurable contact: close or open at threshold

### User Interface

Display	OLED -0.96" 128x64
Calibration and configuration	Supported by using display

## Getting Started

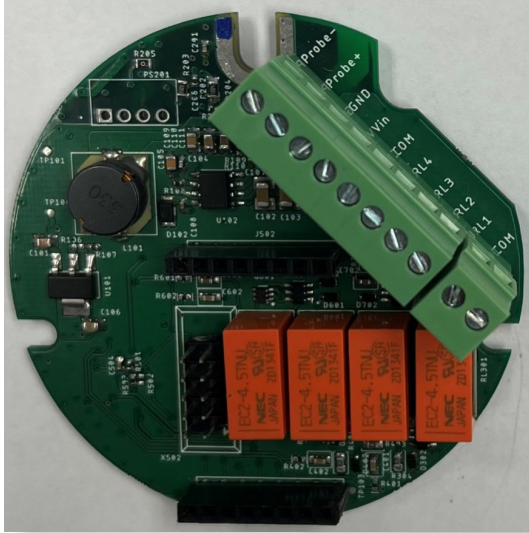
### Environmental

Input Voltage	12V ~24VDC
Power Consumption	MAX 2W

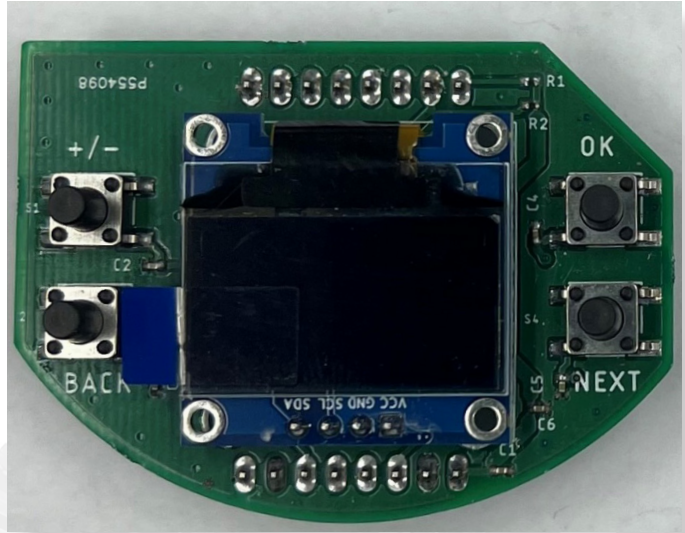


## PCB Assembly

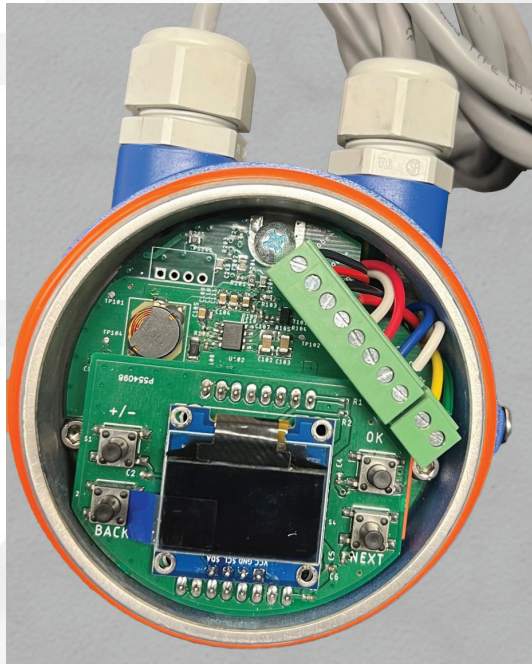
Main PCB



Main PCB



PCB To Enclosure

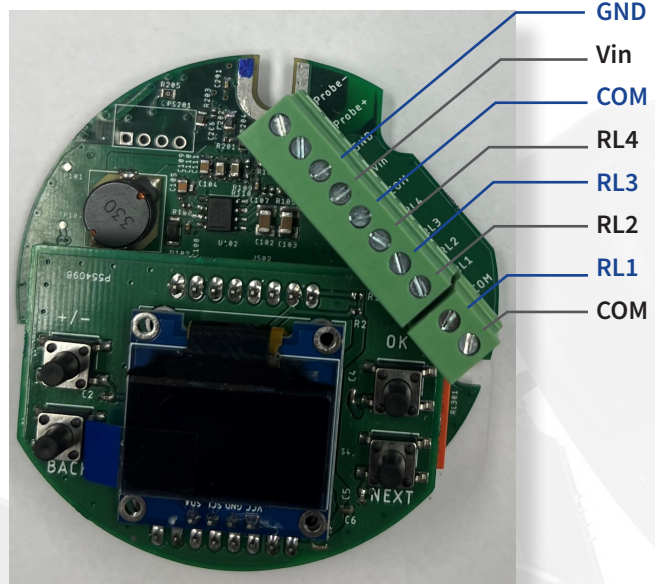


## PCB Assembly

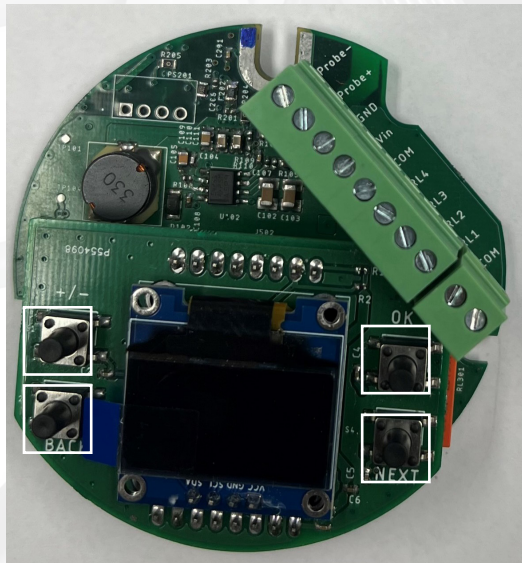
Main PCB



Pinouts



Configuration



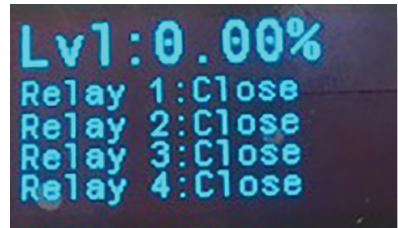
Configuration and calibration can be done

- OK To select the desired Menu
- NEXT To navigate cursor
- PLUS Enter digits 0 to 9
- BLACK Go back to the previous menu



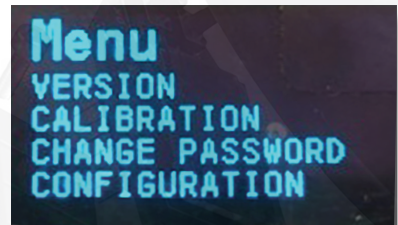
## 1. Current Level

By default, the home screen will display the current level as a percentage. It also shows the current state of each relay. The display will be updated every second.

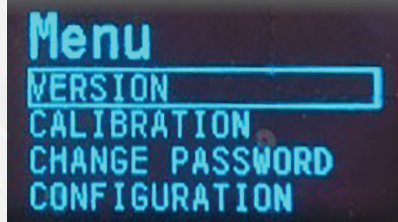


## 2. Version Check

Press any **KEY**. It will display menu screen.



Press **“Next”** key to move cursor to version option.



Press **“OK”** key to see current hw and sw version.



## 3. Calibration

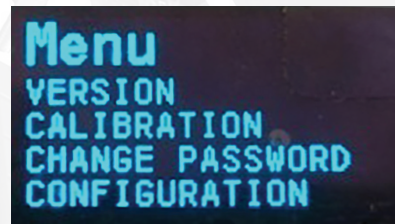
Calibration should be performed during, or prior to, installation of the device and it should be performed on the actual tank and liquid the device will be used to monitor. If the user needs to change the liquid, then the device will need recalibration. Calibration should be performed at two points,

1. **Low level Calibration (The level at which users expect 0%).**
2. **High level Calibration (The level at which users expect 100%).**

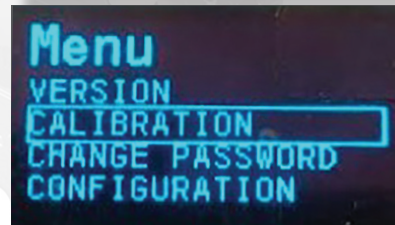
### 3.1 Low Level Calibration

To perform low level calibration: **User needs to empty the tank or submerge the probe in the liquid to an expected “Low Level” while performing these calibration steps.**

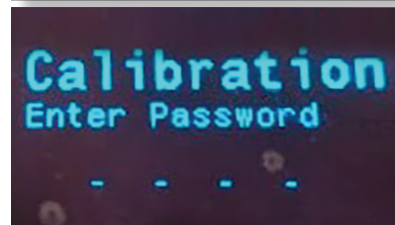
Press any **KEY**. It will display menu screen.



Press **“Next”** key to move selection to Calibration.

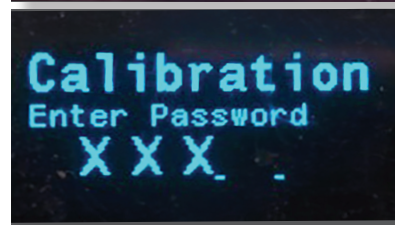


Press the **“OK”** key. It will ask for the password.



Default password is **“0000”**. Using **“PLUS”** and **“OK”** Key enter the password. **“PLUS”** to change digits from 0-9 and **“OK”** to select the digit. Use **“BACK”** to cancel or go back to the previous menu.

If the wrong password is entered then it will show the message “wrong password” use the **“BACK”** key to go back to the previous menu.



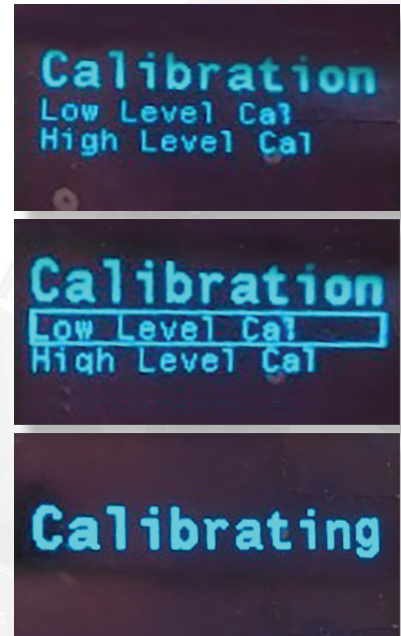
## 3.1 Low Level Calibration

To perform low level calibration: **User need to empty the tank or submerge the probe in the liquid to expected low level entire time of performing calibration steps below.**

After correct password entered it will enter to calibration screen.

Press **“NEXT”** key to select “low level Cal” option.

**Press “OK”** to select calibration. On display it will show the message “calibrating...”. Once it’s done calibrating low level the display will go back to Calibration screen.



## 3.2 High Level Calibration

Perform high level calibration: User will need to fill the tank and **submerge the probe to an expected “High Level” while performing these calibration steps.** The procedure is similar to the low-level calibration but select “high level calibration” this time.

Press any **KEY**. It will display menu screen.

Press **“Next”** key to move cursor to the Calibration option.

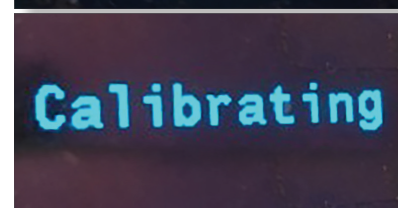
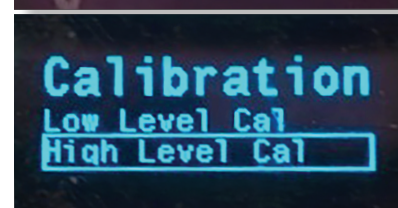
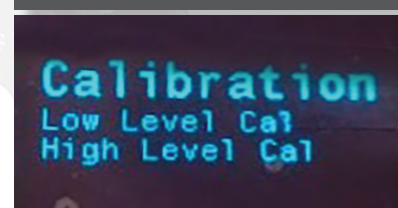
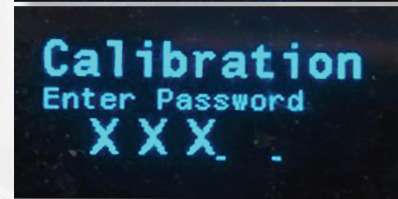
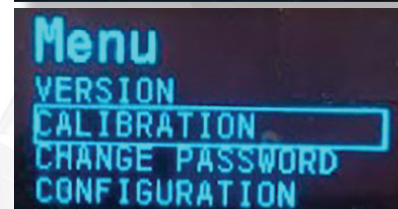
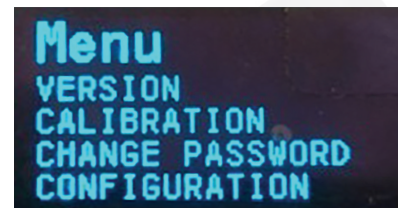
Default password is **“0000”**. Using **“PLUS”** and **“OK”** Key enter the password. **“PLUS”** to change digits from 0-9 and **“OK”** to select the digit. Use **“BACK”** to cancel or go back to the previous menu.

If the wrong password is entered then it will show the message “wrong password”. use the **“BACK”** key to go back to the previous menu.

After correct password entered it will show sub-menu.

Using **“NEXT”**. move the selection to **“High level Cal”** option.

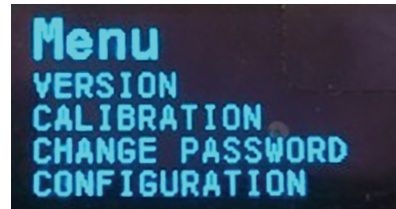
Press **“OK”** to select calibration. Display should show the message “calibrating...”. It will take few second and once done it will go back to Calibration screen.



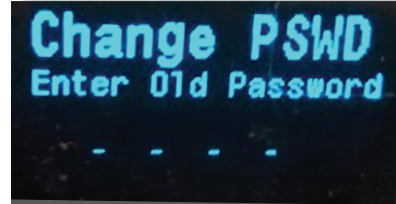
Go back to home screen by pressing **BACK** button or it will automatic go to home screen in few seconds.

## 3 Change Password

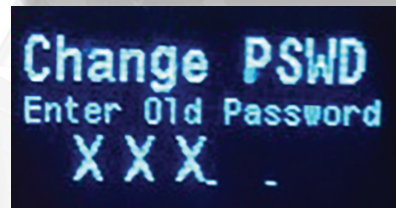
Press any **KEY**. It will display menu screen.



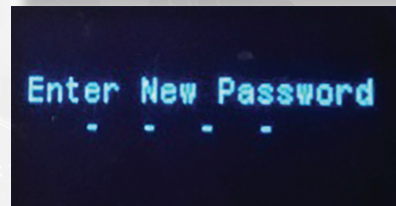
Press the **“OK”** key. It will ask for the old password.



Default password is **“0000”**. Using **“PLUS”** and **“OK”** Key enter the password. **“PLUS”** to change digits from 0-9 and **“OK”** to select the digit. Use **“BACK”** to cancel or go back to the previous menu.



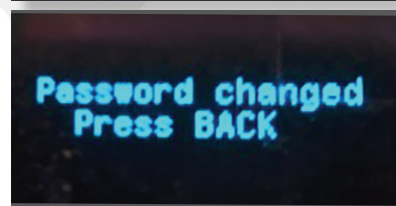
If the wrong password is entered then it will show.



After correct password entered it will ask for new password.

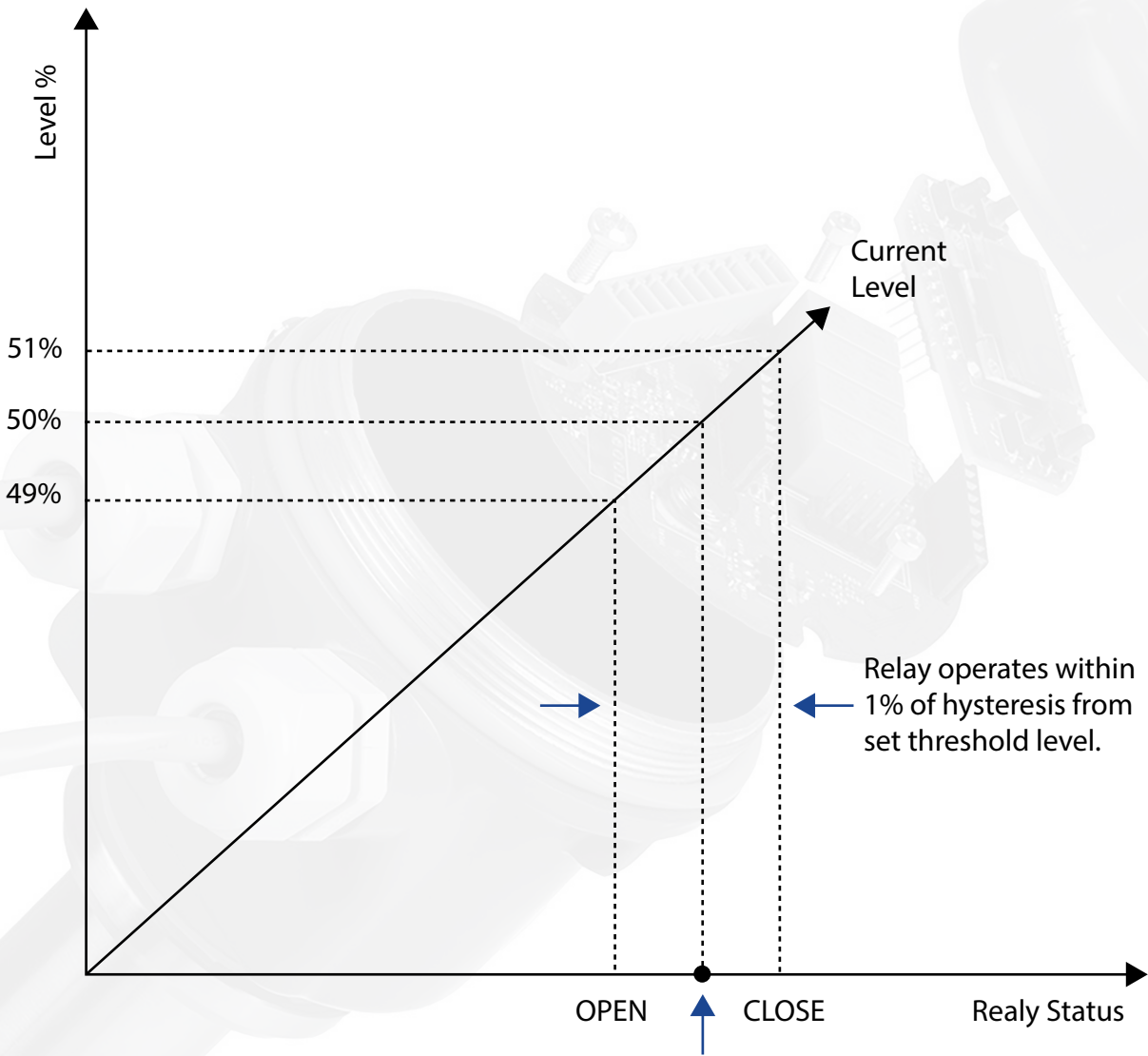
Using **“PLUS”** and **“OK”** Key enter the new password. **“PLUS”** to change digits from 0-9 and **“OK”** to select the digit.

Once new password is entered, **“Password changed”** should display. Use **“BACK”** key to return.



## 4 Configuration

User can configure 4 relay outputs as per the process requirements. Relays can be configured to either open or close at threshold. Threshold level can be entered at any value between 0 to 99%. Relay will operate within 1% built in hysteresis. Please review below image for graphical explanation.



Threshold set at 50% level; Relay set at close at threshold

## 4 Configuration

### Note:

1. Threshold has to be in between 0 to 99%. No decimal values.
2. If threshold is set at 50% of the level and relay is configured to close at threshold. In that condition relay will operate(open) at 51% on increasing level and reset at 49%(close) when level is decreasing.

### Available configurations:

1. Relay threshold
2. Mode (Always close, always open, close at lower threshold, close at upper threshold)
3. View settings

### 4.3.1. Relay Level Threshold Configuration

Press any **KEY**. It will display menu screen.

Press **“Next”** key to move the cursor to the configuration option.

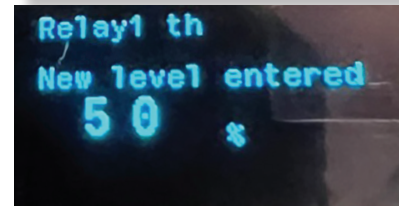
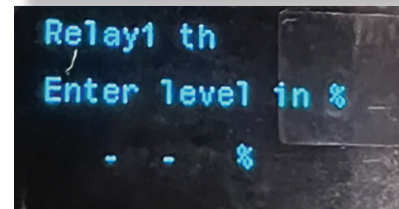
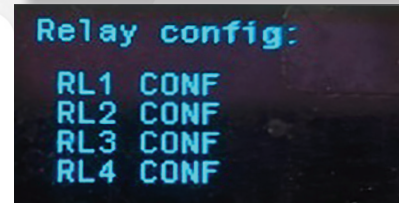
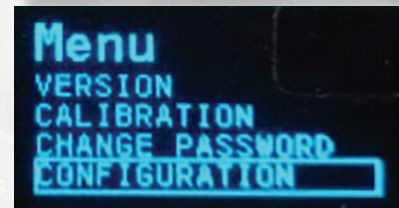
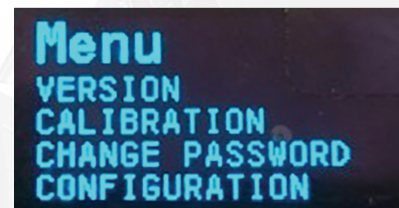
Press the **“OK”** key. It will show list of four relay configuration.

Using the **“NEXT”** and **“OK”** key select the desired relay. Then it will show configuration options.

Press the **“OK”** key to select relay threshold option, Enter threshold level in percentage.

Enter values between 0 to 99% using **“PLUS”** and **“OK”** key. **“PLUS”** to change digits from 0-9 and **“OK”** to select the digit. Once level is entered new level should show on the screen.

Press **BACK** to go back to home screen .



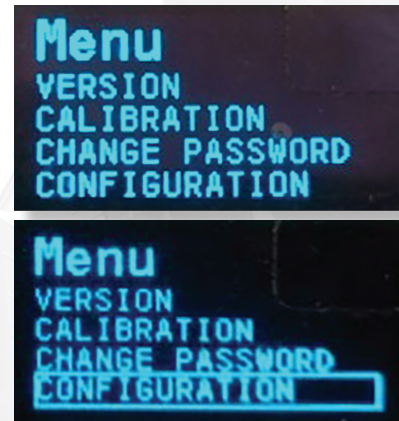
## 4.3.3 Relay Mode Configuration

Relay status at 0% level can be configured with steps below, four selectable modes are available

1. Mode0 - Always Close
2. Mode1 - Always Open
3. Mode2 - Close at threshold
4. Mode3 - Open at threshold

Press any **KEY**. It will display menu screen.

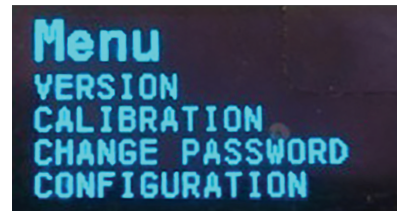
Press "**Next**" key to move the cursor to the configuration option.



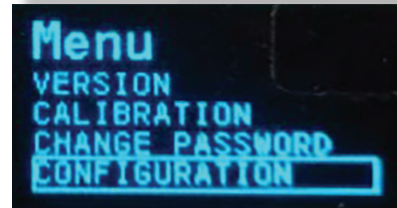


## 4.3.4 View Relay Settings

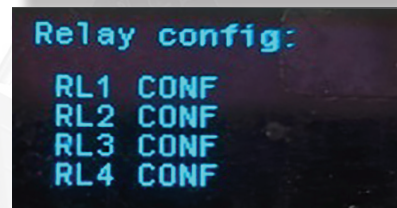
Press any **KEY**. It will display menu screen.



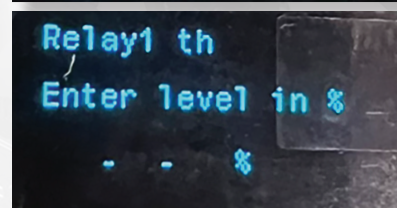
Press **“Next”** key to move the cursor to the configuration option.



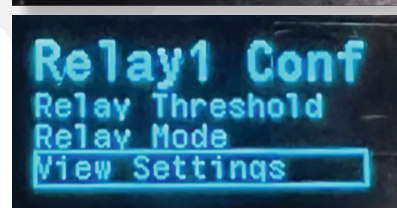
Press the **“OK”** key. It will show list of four relay configuration.



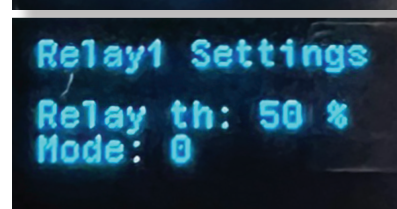
Using the **“NEXT”** and **“OK”** key select the desired relay. Then it will show configuration options.



Using **“NEXT”** key move cursor to the view settings option.



Press the **“OK”** key to view settings. It will show current settings.



### Factory Reset

To factory reset the device press and hold switch **“OK”** and **“NEXT”** key simultaneously for the at least 10 second. **“Factory Reset.”** will be displayed.