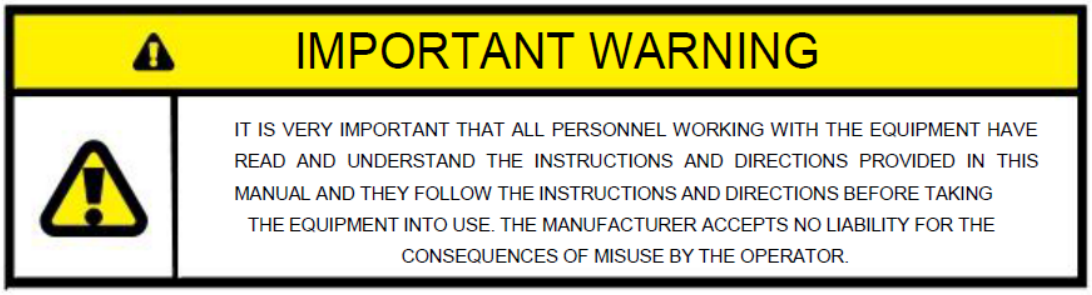
TURBINE FLOW METER

Turbine Flow Meter Manual



The operator shall bear responsibility for the suitability of the device for the specific purpose:

1. Improper installation and operation of the devices (systems) will cause warranty to be void
2. The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited direct, indirect, incidental, punitive and consequential damages.

Installation, connection, commissioning and service must be carried out by personnel who are qualified and authorized to do so.

Installation personnel must ensure that the measuring system is correctly connected in accordance with the connection diagram.

For applications involving high working pressures or media that can be dangerous to people, surroundings, equipment or other in the event of pipe fracture, recommends taking precautions such as special placement, shielding or installation of a safety guard or safety valve prior to installation of the sensor.

This device contains electrical components with an electrical current therefore installation, services and maintenance must be carried out by expert and qualified personnel, aware of all necessary precautions. Before opening any internal parts, please shut off the power supply.

The flow-meter is composed of metal and plastic parts, all of which must be in compliance with local norms and requirements concerning their trash disposal.

Manufacturer’s design and safety statement

- Responsibility for the choice of body's materials as regards abrasion, melting and corrosion resistance lies with the purchaser; the effect of any change in process medium during the operating of the meter should be taken into account. Incorrect selection of Flow-meter could lead to a failure of the meter.
- Stresses and loading caused by earthquakes, traffic, high winds and fire damage are not taken into account during meter design.
- Do not install the meter such that it acts as a focus for pipeline stresses. External loading is not taken into account during meter design.
- During operation do not exceed the pressure and/or temperature ratings indicated on the data label or in this Operating Manual.

1. PRELIMINARY NOTES

The main parts composing the flow-meter are:

A. The sensor - is installed in the pipes using flanges or threaded attachments or clamp attachments
B. The Indicator/Controller - may be installed on the sensor (in compact version), or nearby (in remote version) connected by cables.

It is mandatory to clean sensor over periodically to ensure best performance.

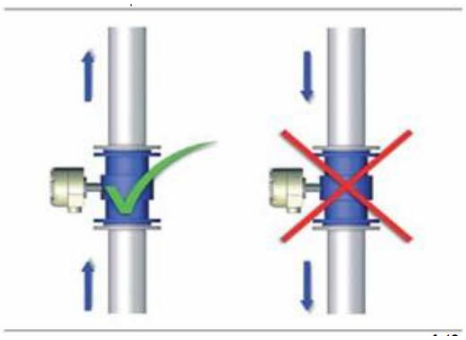
2. GENERAL PRECAUTIONS

Prevent solid particles to enter in to the sensor. It may damage propeller of flow meter. To overcome the problem fixes Steiner before the sensor/Flow-tube.

3. INSTALLATION OF THE FLOW-METER

3.1 IMPORTANT GUIDELINES FOR CORRECT INSTALLATION

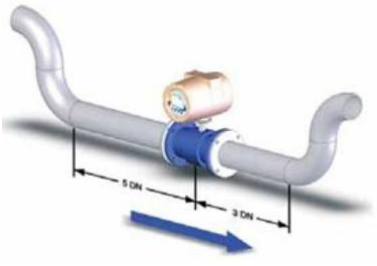
Recommended installation is in vertical/inclined pipe with upward flow direction, to minimize the wear and L max
Deposits in the sensor. Avoid installation in vertical pipes with free outlet.



For a correct working condition please follow the important guidelines shown in the following figures. A wrong installation cannot guarantee a good measurement.

To achieve most accurate flow measurement, it is essential to have minimum straight lengths of the inlet and outlet pipes as shown (DN: sensor nominal diameter)

- For partially filled pipes or pipes with downward flow and free outlet, the flow-meter should be located in a U-tube, respecting the upward and downward lengths between the bends.



- In case of a “T” connection between two different

pipes, please respect 10DN distance upstream the flow-meter.

- Keep 5 meters between the axis of the flow-meter and the axis of the gate valve located downstream.

- This installation keeps the sensor full with liquid.

- This installation DOES NOT guarantee a full pipe.

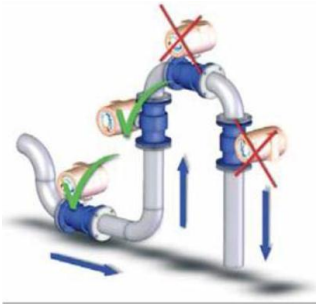
- The position on the left is correct, the other two ARE NOT.

- DO NOT place the sensor close to any variation in the route of the flow.

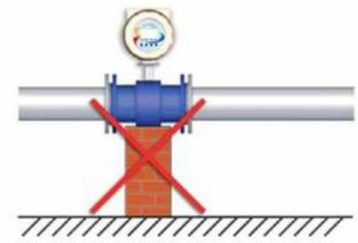
- DO NOT place any gate valve directly connected condition.

- Always install the sensor downstream the pump and NEVER upstream to avoid vacuum.

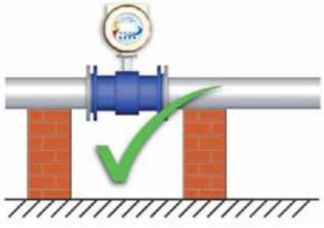
- DO NOT install the sensor in vertical pipes with free outlet or at the highest point in the pipe system



- DO NOT USE the sensor as a support to the pipe.

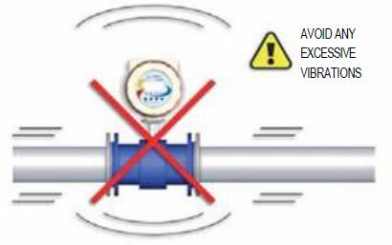


- Pipe should give the support to the flow-meter



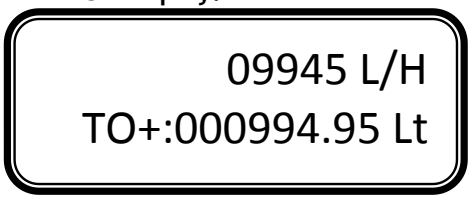
- Install suitable anti-vibration protection if any vibration arises.

- DO NOT expose the flow-meter to vibrations and/ or movement, which may affect its performance and duration.



- Protect the flow-meter if exposed to direct sun radiations.

- **LCD Display:**



4. SOFTWARE SETTINGS

- Switch1 – Menu/Enter/↲
- Switch2 -- Increment/Start/↑
- Switch3 -- Shift/Stop/→
- Switch4 -- Cancel/X

Password Select Table

Password (XXXX)	Function
1111	Basic configuration
2222	Calibration setting
3333	Modbus setting
9876	Resetting configuration

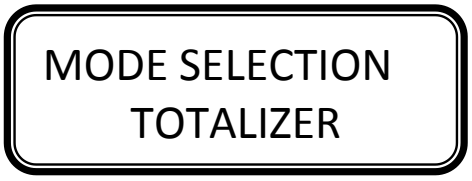
Mode Select Table

Mode	Function
Totalizer	To Monitor current flow and Totalized
Batcher	To make batch of liquid
Flow comparator	To monitor two flow sensor (Inlet Vs. Outlet) and Alarm on reducing rate of recovery
Rate Switch	To monitor current flow and Alarm on crossing preset threshold level.
Pulsar	To operate specific task on completion of prefix volume. E.g. Dosing application.
Dual Totalizer	It's a 2nd totalizer. It can be used regardless of totalizer 1 settings.

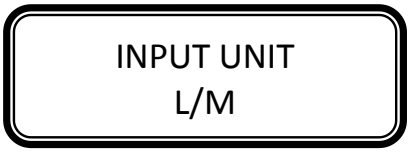
4.1 Totalizer Mode

- Press ↲for 2 seconds for setting mode
- Press ↑ to enter number and →to shift cursor (Set password 1111)
- Press ↲to Enter

- **Mode Select:**
  - Press ↑ to change Mode
  - Press ↲to select.



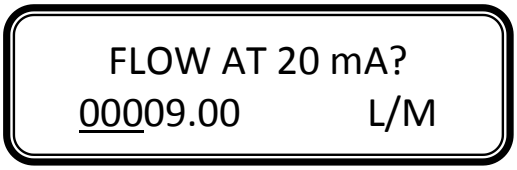
- **Select input Unit:**
  - Press ↑ to select Unit
  - Press ↲to select



List of units for selection

✓ L/S	✓ L/M	✓ L/H
✓ M^3/S	✓ M^3/M	✓ M^3/H
✓ KL/S	✓ KL/M	✓ KL/H
✓ KG/S	✓ KG/M	✓ KG/H
✓ Ml/S	✓ Ml/M	✓ Ml/H

- **FLOW AT 20 mA:**
  - Press switch(M) to enter Flow
  - Press Switch(E) to enter



- **Totalizer Setting:**
  - Press ↲to reset Totalizer.
  - Press **X** to enter without resetting Totalizer.

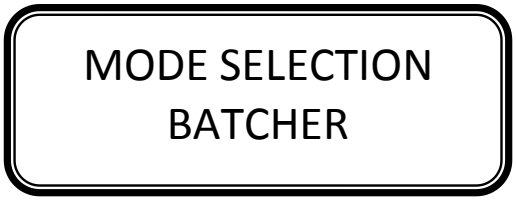
- **Save changed Setting:**
  - Press ↲to accept changes done.
  - Press **X** to discard changes.

4.2 Batcher Mode

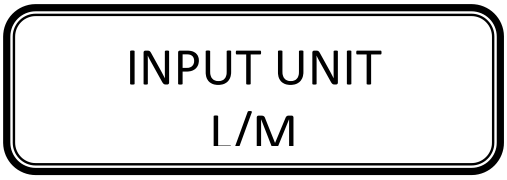
- Press ↲for 2 seconds for setting mode

- Press ↑ to change number and →to shift cursor (Set password 1111)
- Press ↲to Enter

- **Mode Select:**
  - Press ↑ to change Mode
  - Press ↲to select.



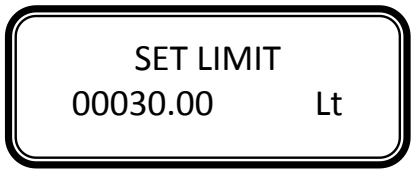
- **Select input Unit:**
  - Press ↑ to select Unit
  - Press ↲to select.



List of units for selection

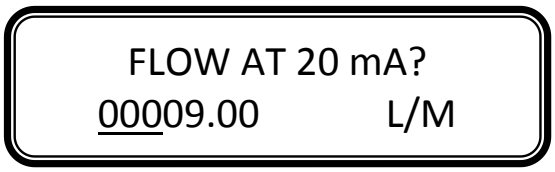
✓ L/S	✓ L/M	✓ L/H
✓ M^3/S	✓ M^3/M	✓ M^3/H
✓ KL/S	✓ KL/M	✓ KL/H
✓ KG/S	✓ KG/M	✓ KG/H
✓ Ml/S	✓ Ml/M	✓ Ml/H

- **Set Limit:**
  - Press ↑ to change number and → **to** shift cursor.
  - Press ↲to Enter.



- **Batch Order:**
  - Press ↲to select increment order.
  - Press **X**to select decrement order.

- **FLOW AT 20mA:**
  - Press switch(M) to enter Flow
  - Press Switch(E) to enter



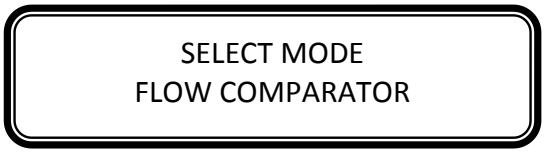
- **Totalizer Setting:**
  - Press ↲to reset Totalizer.
  - Press **X** to enter without resetting Totalizer.

- **Save changed Setting:**
  - Press ↲to accept changes done.
  - Press **X** to discard changes.

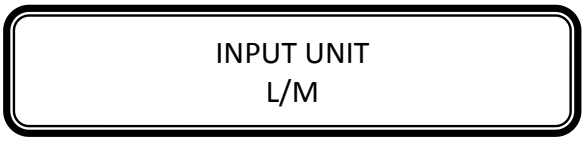
4.3 Flow comparator Mode

- Press ↲for 2 seconds for setting mode
- Press ↑ to change number and →to shift cursor (Set password 1111)
- Press ↲to Enter

- **Mode Select:**
  - Press ↑ to change Mode
  - Press ↲to select.



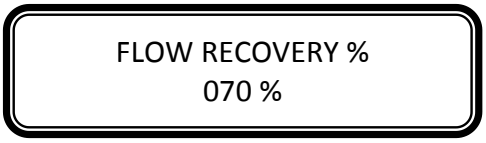
- **Select input Unit:**
  - Press ↑ to select Unit
  - Press ↲to select.



List of units for selection

✓ L/S	✓ L/M	✓ L/H
✓ M^3/S	✓ M^3/M	✓ M^3/H
✓ KL/S	✓ KL/M	✓ KL/H
✓ KG/S	✓ KG/M	✓ KG/H
✓ Ml/S	✓ Ml/M	✓ Ml/H

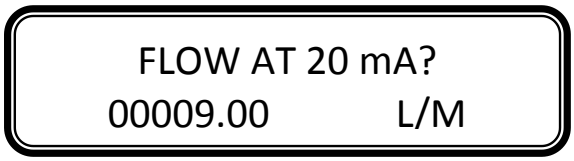
- **Flow Recovery Percentage:**
  - Press ↑ to change number and → **to** shift cursor.
  - Press ↵to Enter.



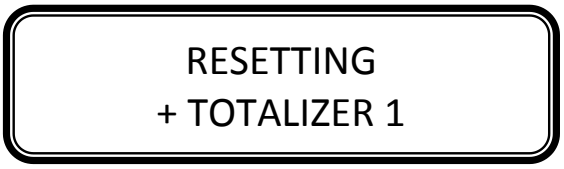
- **Output Fall timer (Seconds):**
  - Press ↑ to change number and → **to** shift cursor.
  - Press ↵to Enter.

- **Relay Energizer:**
  - Press ↑ to change option.
    - Higher then set: Relay On when recovery rate is high then present.
    - Lower then set: Relay On when recovery rate is lower than present.
  - Press ↵to Enter.

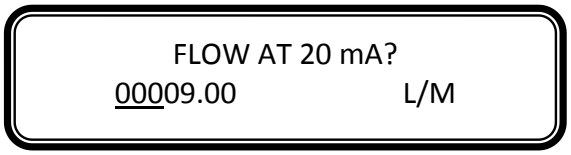
- **FLOW AT 20mA:**
  - Press switch(M) to enter Flow
  - Press Switch(E) to enter



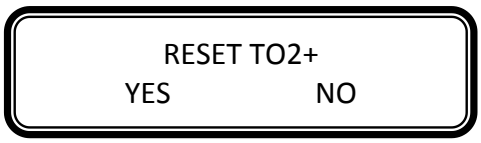
- **Totalizer 1 Setting:**
    - Press ↲to reset Totalizer 1.
    - Press **X** to enter without resetting Totalizer.



- **FLOW AT 20mA:**
    - Press switch(M) to enter Flow
    - Press Switch(E) to enter



- **Totalizer 2 Setting:**
    - Press ↲to reset Totalizer 2.
    - Press **X** to enter without resetting Totalizer.

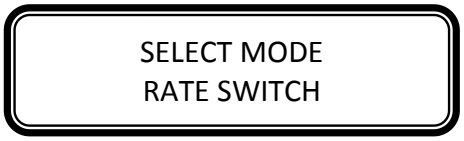


- **Save changed Setting:**
    - Press ↲to accept changes done.
    - Press **X** to discard changes.

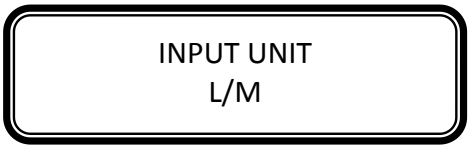
4.4 Rate Switch Mode

- Press ↲for 2 seconds for setting mode
- Press ↑ to change number and →to shift cursor (Set password 1111)
- Press ↲to Enter

- **Mode Select:**
  - Press ↑ to change Mode
  - Press ↲to select.



- **Select input Unit:**
  - Press ↑ to select Unit
  - Press ↲to select.

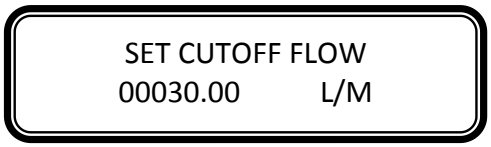


List of units for selection

✓ L/S	✓ L/M	✓ L/H
✓ M^3/S	✓ M^3/M	✓ M^3/H
✓ KL/S	✓ KL/M	✓ KL/H
✓ KG/S	✓ KG/M	✓ KG/H
✓ Ml/S	✓ Ml/M	✓ Ml/H

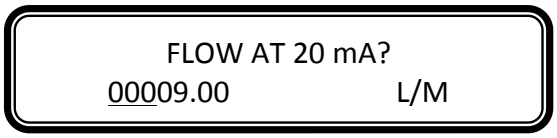
- **Set Cut off flow:**

- Press ↑ to change number and → **to** shift cursor.
- Press ↲to Enter.



- **Relay Energizer:**
  - Press ↑ to change option.
    - Higher then set: Relay On when flow rate is high than present.
    - Lower then set: Relay On when flow rate is lower than present.
  - Press ↲to Enter.

- **FLOW AT 20mA:**
  - Press switch(M) to enter Flow
  - Press Switch(E) to enter



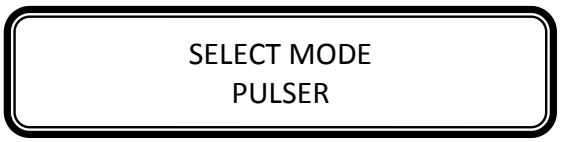
- **Totalizer Setting:**
  - Press ↲to reset Totalizer.
  - Press **X** to enter without resetting Totalizer.

- **Save changed Setting:**
  - Press ↲to accept changes done.
  - Press **X** to discard changes.

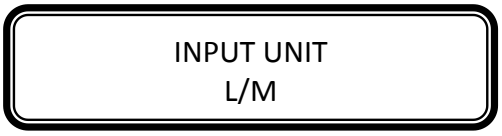
4.5 Pulsar Mode

- Press ↲for 2 seconds for setting mode
- Press ↑ to change number and →to shift cursor (Set password 1111)
- Press ↲to Enter

- **Mode Select:**
  - Press ↑ to change Mode
  - Press ↲to select.



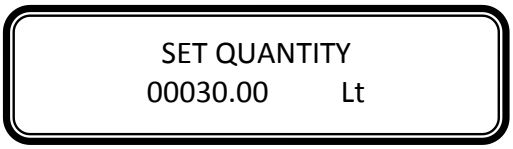
- **Select input Unit:**
  - Press ↑ to select Unit
  - Press ↲to select.



List of units for selection

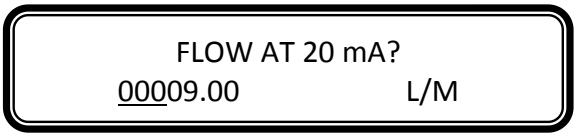
✓ L/S	✓ L/M	✓ L/H
✓ M^3/S	✓ M^3/M	✓ M^3/H
✓ KL/S	✓ KL/M	✓ KL/H
✓ KG/S	✓ KG/M	✓ KG/H
✓ Ml/S	✓ Ml/M	✓ Ml/H

- **Set Quantity:**
  - Press ↑ to change number and →to shift cursor.
  - Press ↲to Enter.



- **Relay On Time:**
  - Press ↑ to change number and → **to** shift cursor.
  - Press ↲to Enter.

- **FLOW AT 20mA:**
  - Press switch(M) to enter Flow
  - Press Switch(E) to enter



- **Totalizer Setting:**
  - Press ↲to reset Totalizer.
  - Press **X** to enter without resetting Totalizer.

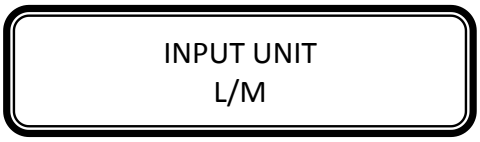
- **Save changed Setting:**
  - Press ↲to accept changes done.
  - Press **X** to discard changes.

4.6 Dual Totalizer Mode

- Press ↲for 2 seconds for setting mode
- Press ↑ to enter number and →to shift cursor (Set password 1111)
- Press ↲to Enter

- **Mode Select:**
  - Press ↑ to change Mode
  - Press ↲to select.

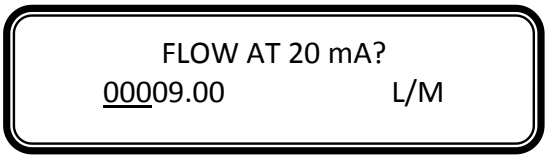
- **Select input Unit:**
  - Press ↑ to select Unit
  - Press ↲to select.



List of units for selection

✓ L/S	✓ L/M	✓ L/H
✓ M^3/S	✓ M^3/M	✓ M^3/H
✓ KL/S	✓ KL/M	✓ KL/H
✓ KG/S	✓ KG/M	✓ KG/H
✓ Ml/S	✓ Ml/M	✓ Ml/H

- **FLOW AT 20 mA:**
  - Press switch(M) to enter Flow
  - Press Switch(E) to enter



- **Totalizer Setting:**
  - Press ↲to reset Totalizer.
  - Press **X** to enter without resetting Totalizer.

(NOTE: This is main totalizer)

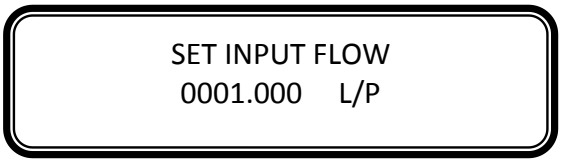
- **Save changed Setting:**
  - Press ↲to accept changes done.
  - Press **X** to discard changes.

- **To Reset 2nd totalizer:**
  - You can reset To2 by pressing and hold menu key about 200 ms.

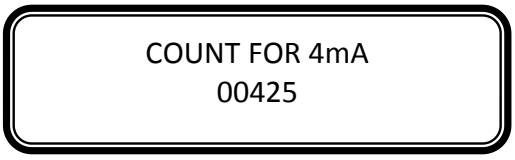
4.7 Calibration Setting

- Press ↲for 2 seconds for setting mode
- Press ↑ to change number and →to shift cursor (Set password 2222)
- Press ↲to Enter

- **Set Input Flow:**
  To Enter Litre per Pulse
    - Press ↑to change number and →to shift cursor.
    - Press ↲to Enter.

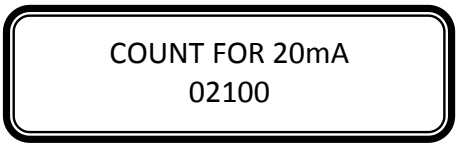


- **Count for 4mA:**
    - Press switch(M) to increase count
    - Press switch(S) to decrease crease count
    - Press Switch(E) to enter



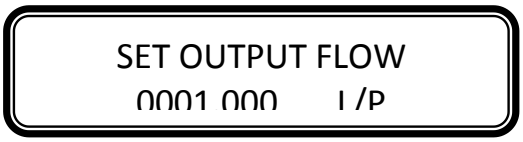
At this instance check 4 mA at output port of hardware. And increase/decrease accordingly

- **Count for 20mA:**
    - Press switch(M) to increase count
    - Press switch(S) to decrease crease count
    - Press Switch(E) to enter



At this instance check 20mA at output port of hardware. And increase/decrease accordingly

- **Set Output Flow: (Only in Flow comparator mode)**
    - Press ↑to change number and →to shift cursor.
    - Press ↲to Enter.

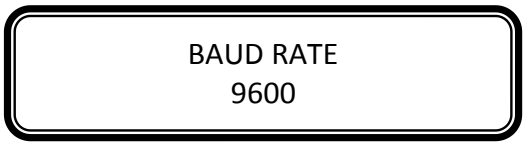


- **Save changed Setting:**
  - Press ↲to accept changes done.
  - Press **X** to discard changes.

4.8 Modbus Setting

- Press ↲for 2 seconds for setting mode
- Press ↑ to change number and →to shift cursor (Set password 3333)
- Press ↲to Enter

- **BAUD RATE Select:**
  - Press ↑ to select BAUD RATE
  - Press ↲to Enter



Available option (2400, 4800, 9600, 19200, 38400)

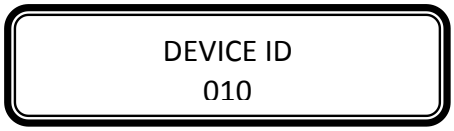
- **PARITY Select:**
  - Press ↑ to select PARITY
  - Press ↲to Enter

Available option (NONE, ODD, EVEN)

- **STOP BIT Select:**
  - Press ↑ to select STOP BIT
  - Press ↲to Enter

Available option (ONE, TWO)

- **DEVICE ID Select:**
  - Press ↑to change number and →to shift cursor.
  - Press ↲to Enter



- **Modbus Format Select:**
  - Press ↑ to select MODBUS OUTPUT FORMAT
  - Press ↲to Enter

Available option (Float, Long Integer, Decimal, Integer)

- **Complete Setting Mode:**
  - Press ↲ to complete setting

1. HARDWARE CONNECTIONS

L N E	Sw1	SW2	D -	D +	I +	GND	12V	S1	S2
230V AC			RS485 MODBUS		4 -20MA OUTPUT Sensor GND		12 VDC SENSOR (+)		PULSE INPUT

NO	COM	NC	NO	COM	NC
RELAY -1			RELAY -2		

2.HARDWARE CONNECTIONS

- **Version 1.0.0**

Connect Sensor wires to Controller.

- Sensor (Red Wire) -> Controller terminal 3
- Sensor (Black Wire) -> Controller terminal 4
- Sensor (Green Wire) -> Controller terminal 5

- Connector power supply.
  - Phase -> Controller terminal 10
  - Neutral -> Controller terminal 11
  - Earthling -> Controller terminal 12

- Any loose connection will give error in output.
- Connect Mains (220V AC) to P & N in Mains Input Connector.
- While providing MAINS LCD will display text.
- Do not alter any variable resistor pot. However, company's technical person may change to re-calibrate the unit.
- Transmission mode: Standard RTU
- Slave response time out: 2000 ms
- Delay between polls: 250 ms
- Default Device ID: 10
- Default Data: Float: Most significant register first
- Starting Address: 0001 (40001)
- Length: 6
- Register: Holding Register

Address Map:
40001: Flow (Unit will be Ltr/Hour)
40003: Totalizer1 (Unit will be Ltr)
40005: Totalizer2 (Unit will be Ltr)
Totalizer = (65535 x Totalizer2) + Totalizer1

2. TROUBLESHOOTING

- **No Power: Check Power cord, Mains supply across P&N**
- **No Flow Indication:**
  a. **Check voltage across Terminal 3& 4, The voltage should be 12 – 16 V DC.**
  b. **Check sensor connection (Red, Black & Green)**
  c. **Check Input flow in calibration setting (Password 2222) & value should not be zero.**
- **No RS485 Data:**
  a. **Check D+ & D- connection, Device ID & Output Format**
  b. **In Ml unit, data will be shown in Ml**
- **No 4-20 mA: Check I+ & I- connection, count setting for 4ma & 20mA.**
  a.
- **Wrong Flow:**
  a. **Enter correct Input flow in calibration setting**
  b. **Clean Sensor and fix it back as it was previous.**
- **No RS485 Data:**
  a. **Check D+ & D- connection,**
  b. **Check Device ID & Output Format**

3. STANDARD TESTS

Each finished product is thoroughly checked to establish the product completeness and compliance with the manufacturer's quality assurance standards. Subsequently the product functions are tested according to specifications of the approved test directions and subject to at least 24-hour burn-in operation cycle.