

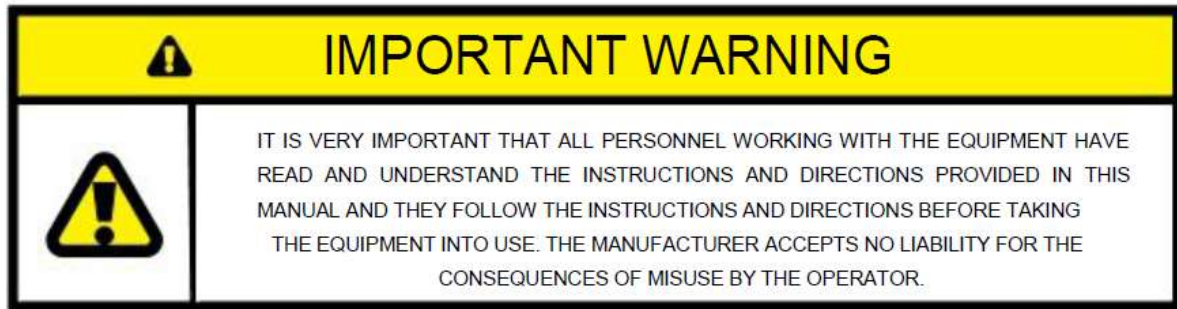
Instruction Manual Magnetic Flow Meter [MFM]



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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, ACCUMAX INSTRUMENTS PVT. LTD. 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 lining and electrode materials as regards abrasion 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 lining and/or electrode 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 electromagnetic flow-meter are:

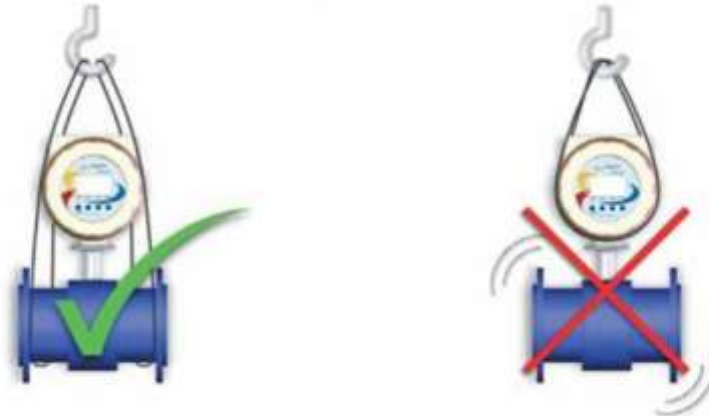
- A. The sensor - is installed in the pipes using flanges or threaded attachments or clamp attachments
- B. The converter - may be installed on the sensor (in compact version), or nearby (in remote version) connected by two cables.

Electromagnetic flow meters have many important advantages over their mechanical counterparts: outstanding long term stability, maximum process reliability, no maintenance - to name just a few. As a result, these meters can deliver precise and reliable measurements for many years.

NOTE	
	<p>Electromagnetic Flowmeters are specially designed to work under few basic conditions:</p> <ol style="list-style-type: none">1. Liquid must be conductive2. Full pipe conditions at any time3. Recommended inlet and outlet distances4. Proper earthing to flowmeter

2. GENERAL PRECAUTIONS

The correct lifting method is shown in the figure on the right, while the one shown in the figure on the left should be avoided; more importantly DO NOT lift the flow-meter by its converter but by holding it on its sides.



3. INSTALLATION OF THE FLOW-METER

3.1 IDENTIFYING DATA PLATE

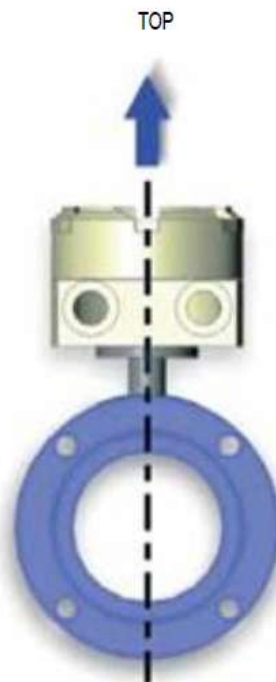
- MODEL:
- PART N° : part number identifying the instrument (Identification number for tracing identity)
- DN: nominal diameter [inches or mm]
- PN nominal pressure [bar]
- Temp.: maximum temperature of the fluid to process
- IP: degree of international protection
- ELECTRODES: material composition of the electrodes
- LINING: internal lining material
- KA: calibration coefficients
- ITEM: other particular guidelines

3.2 INSTALLATION INSTRUCTIONS

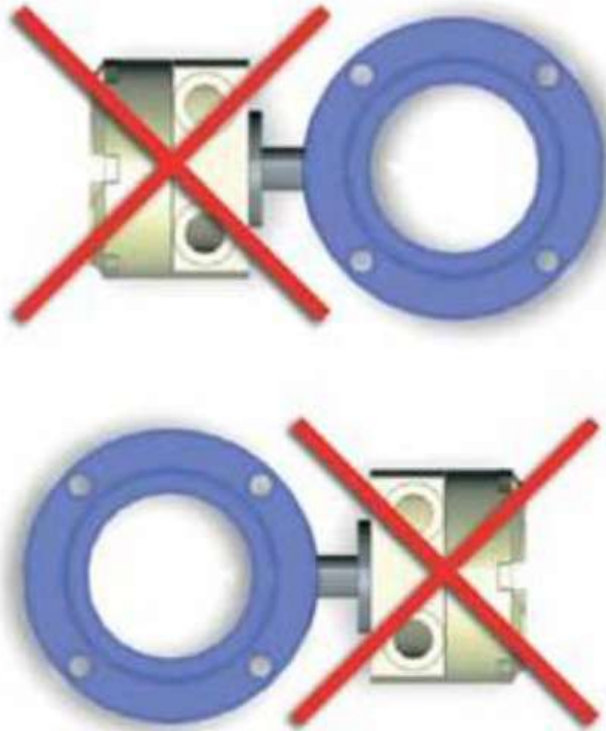


3.2.1 POSITIONING IN RELATION TO THE FLOW

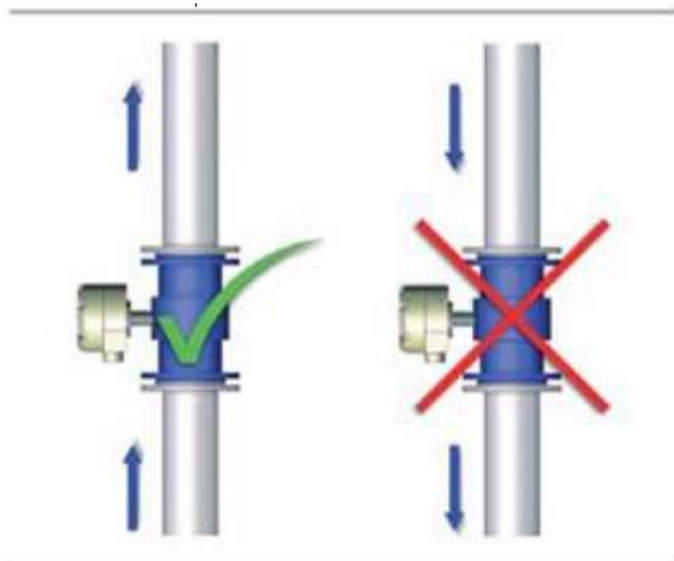
With installations in horizontal pipes, the converter (or the junction box in the separate version) must be placed on the upper part.



Avoid following positions:



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.

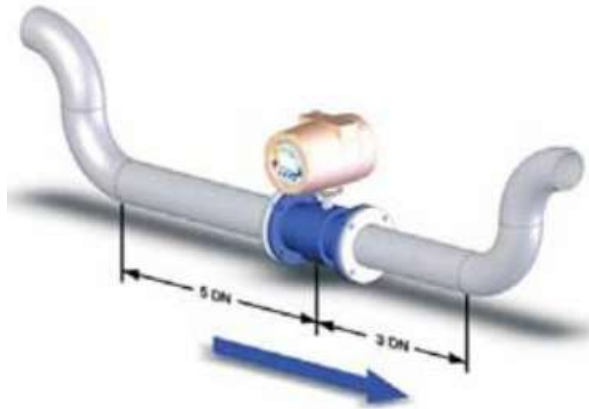


3.2.2 IMPORTANT GUIDELINES FOR CORRECT INSTALLATION

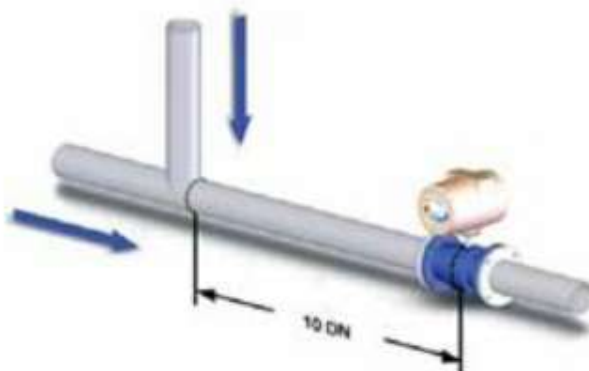
For a correct working condition please follow the important guidelines shown in the following figures. A wrong installation cannot guarantee a good measurement.

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)

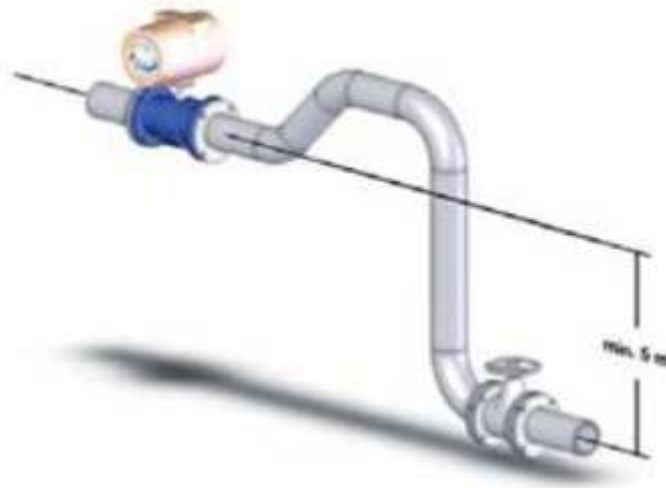
- For partially filled pipes or pipes with downward flow and free outlet, the flow-meter should be located in a U-tube, respecting the upward and downward lengths between the bends.



- 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.



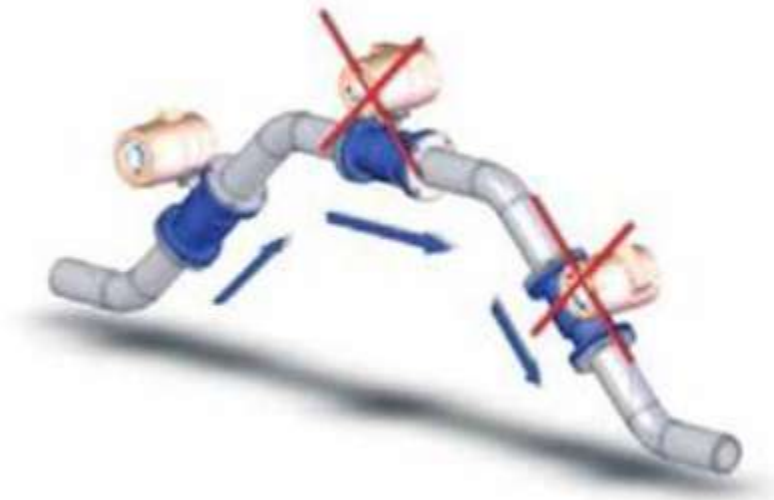
- This installation keep the the sensor full with liquid.



- This installation DOES NOT guarantee a full pipe.



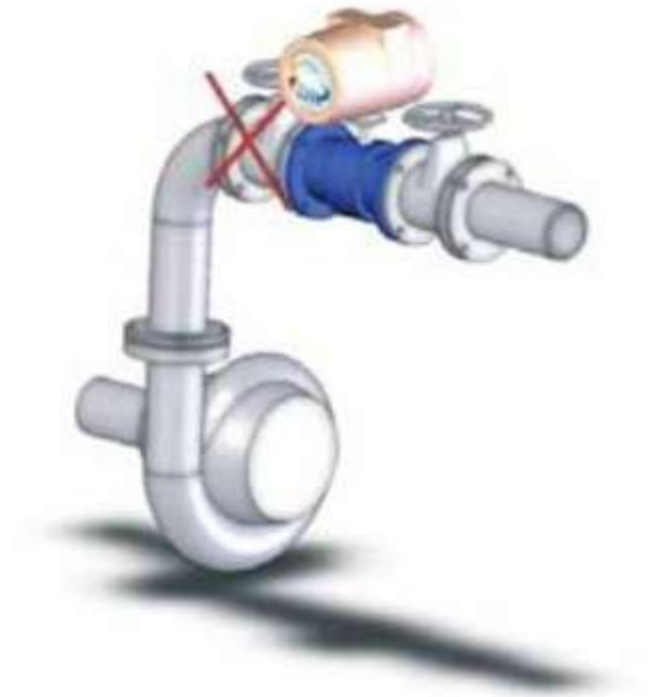
- The position on the left is correct, the other two ARE NOT.



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



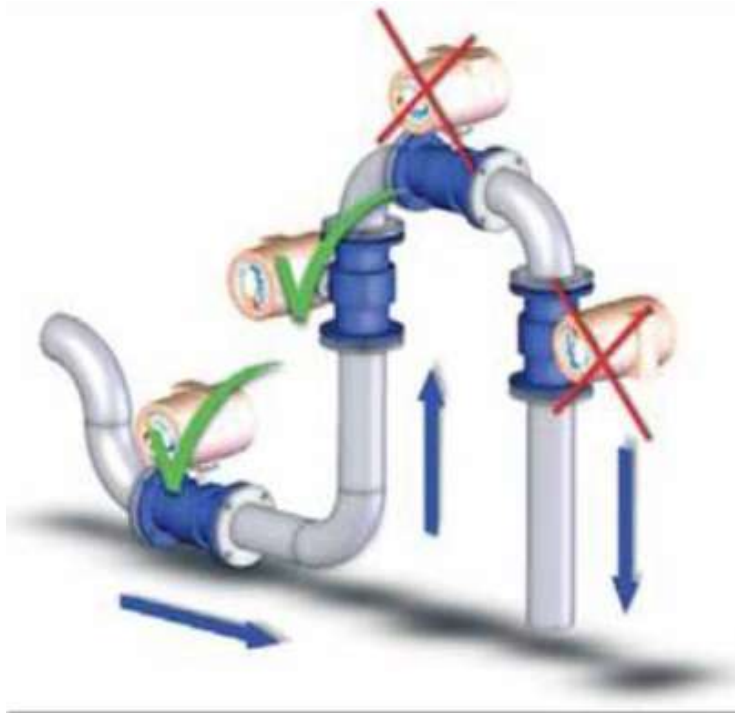
- DO NOT place any gate valve directly connected condition.



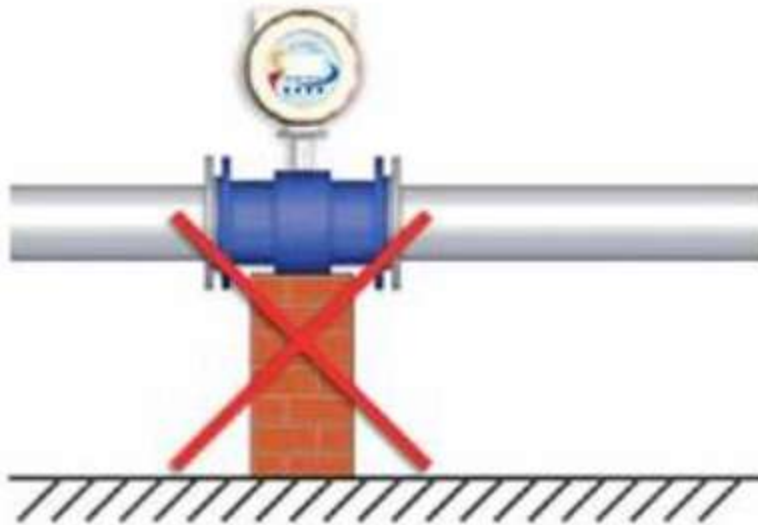
- Always install the sensor downstream the pump and NEVER upstream to avoid vacuum.



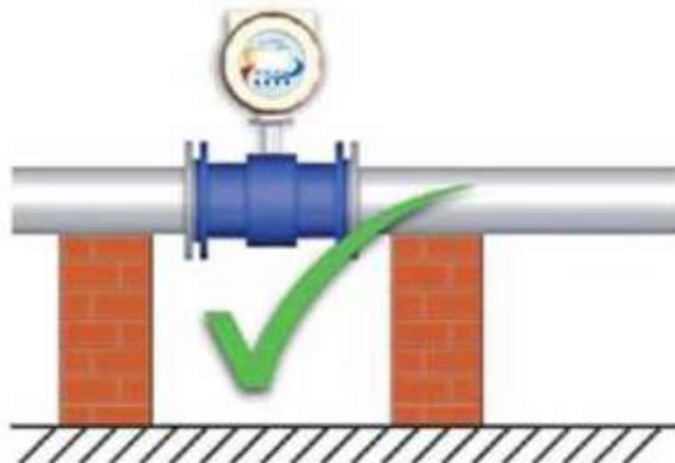
- DO NOT install the sensor in vertical pipes with free outlet or at the highest point in the pipe system



- 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 arise.



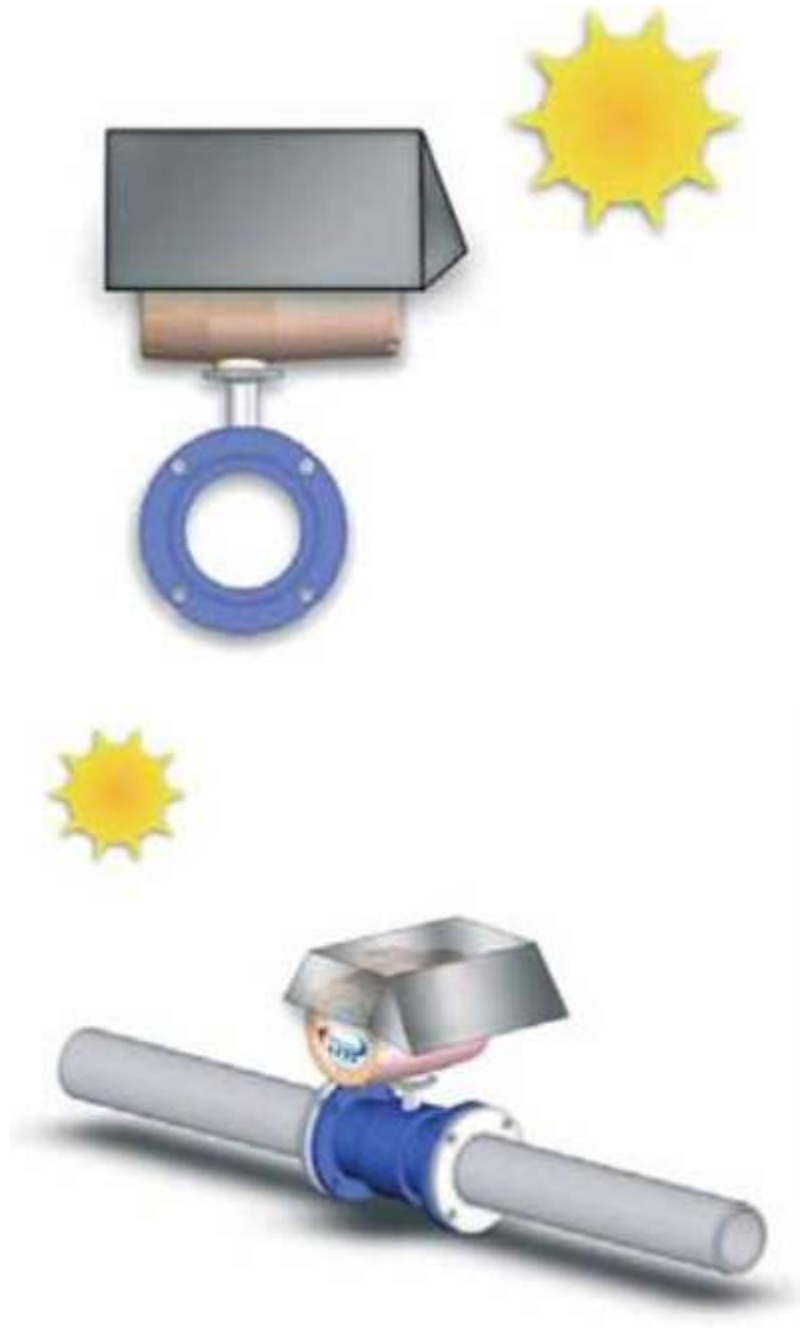
- DO NOT expose the flow-meter to vibrations and/ or movement, which may affect its performance and duration.



- AVOID exposure of the flow-meter to strong or nearby magnetic fields.





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

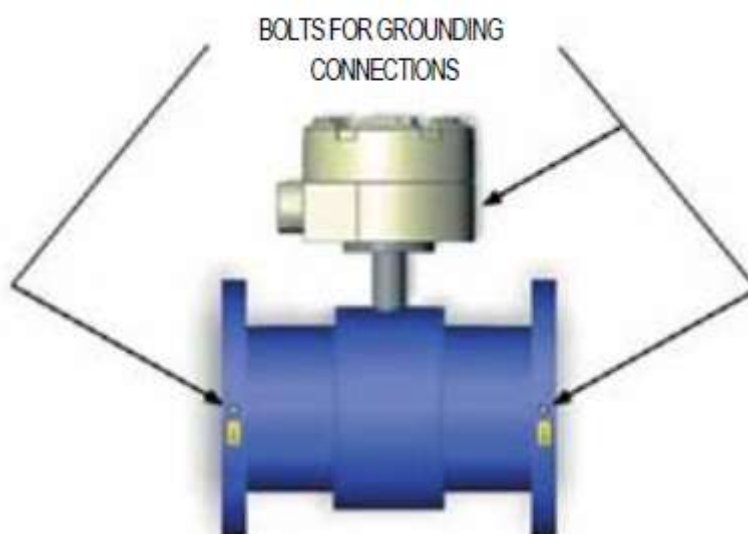


4. POTENTIAL EQUALIZATION

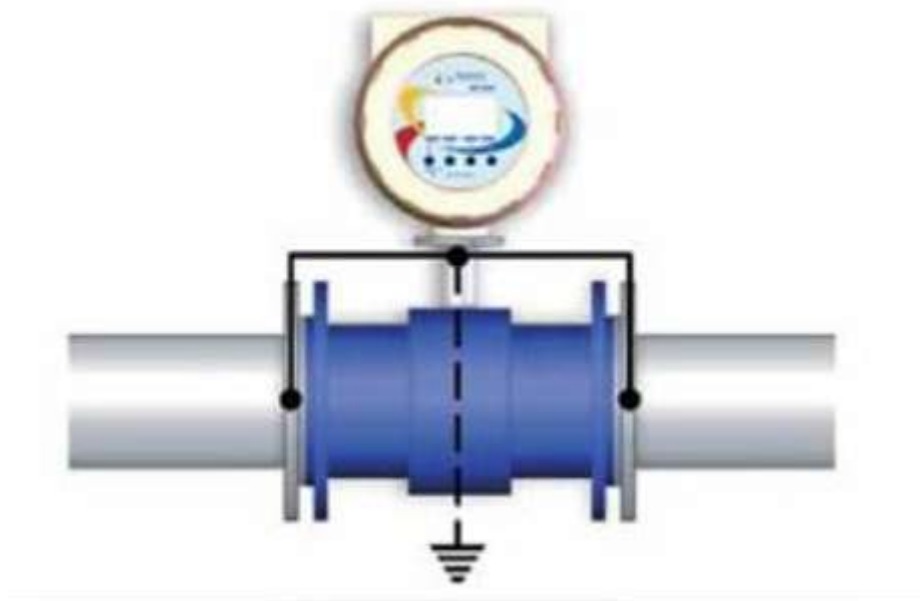
Liquid potential equalization or grounding is accomplished with the built-in grounding electrode (so called 3rd electrode). The 3rd electrode electrically bonds the liquid to the meter to provide a stable and accurate measurement.

IMPORTANT NOTE	
	THE SENSOR MUST ALWAYS BE GROUNDED! Wrong ground connection can lead to a wrong measurement

NOTE	
	The flowmeter is equipped with a grounding electrode (3rd electrode). Grounding rings are not necessary!



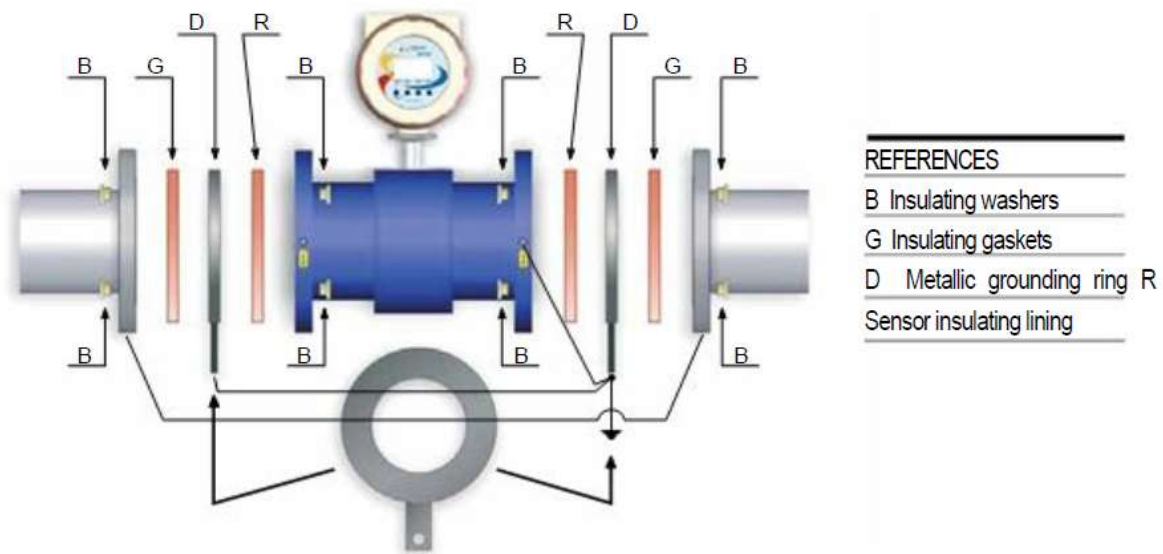
The sensor body must be grounded using grounding/bonding straps and/or rounding rings to protect the flow signal against stray electrical noise and/or lightning. This ensures that the noise is carried through the sensor body and noise-free measuring area within the sensor body



On plastic pipelines and lined metal pipes, OPTIONAL grounding rings can be used at both ends to ensure a good potential equalization. Grounding rings are not included in the delivery.

Special attention for meter installation in cathode protected pipeline.

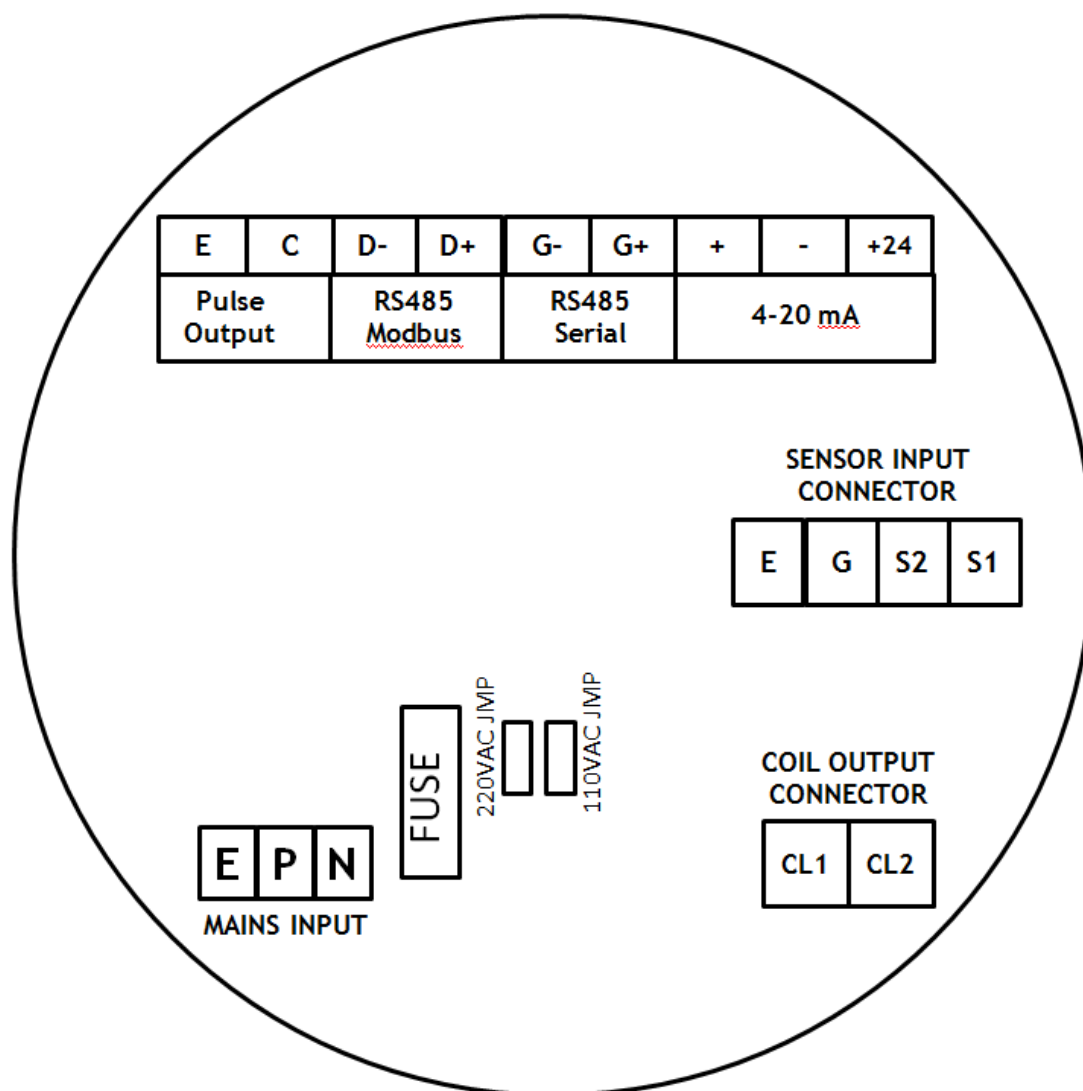
Isolate the meter from the pipeline by mounting isolation Sleeves and Washers on the flange bolts and connect a wire between the pipelines, dimensioned to manage the cathode current and environmental influence. Use grounding rings on both ends.



5. NEGATIVE PRESSURE IN THE PIPE

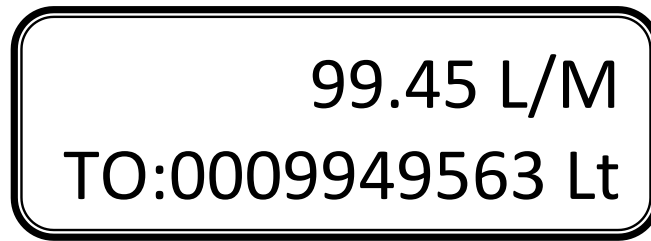
Avoid high vacuum conditions in the pipe, these can damage the lining of the flow-meter and move the electrodes from the correct position.

6. HARDWARE CONNECTIONS



- Connect Sensor wires to sensor input connector.
- Connector Coil wires to coil output connector.
- Proper connect LCD Connector & Keypad Connector.
- Any loose connection will give error in output.
- Connect Mains (220V AC) to P & N in Mains Input Connector.
- Earthing must be connected proper for safety purpose and best output
- 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.

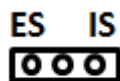
- LCD Display:



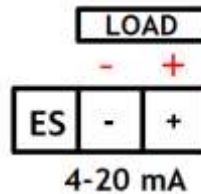
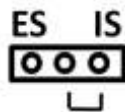
7. HARDWARE Connections

- 4-20 mA Connection :

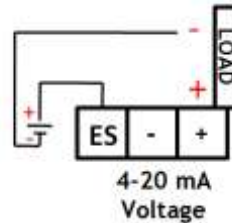
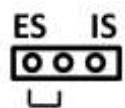
- Hardware have two source option.(Internal & External)



- Default connection is internal Source (IS), which uses supply current from hardware itself.



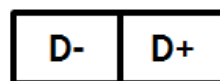
- To change supply from PLC/External source place jumper ES side.



- In case of external source voltage should not above 25V DC.

- RS485 Connection:

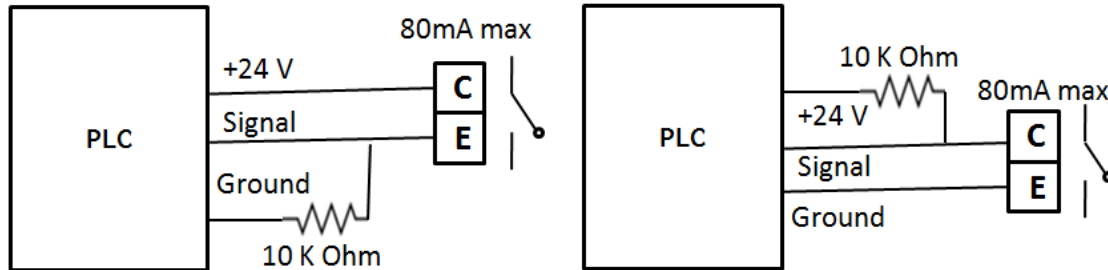
- Connect D+ & D- Wire from Master device to flow-meter.



RS485

- Pulse Output Connection :

Connecting Flow-meter with a PLC Controller As following



Note: Maximum load is 80mA, pulse width is 10mS.

8. SOFTWARE SETTINGS

- Switch1 -- Enter
- Switch2 -- Menu
- Switch3 -- Shift

- Password Settings :
 - Press “Menu” (Switch(M)) for 2 seconds for setting mode
 - Press Switch(M) to enter number and Switch(S) to shift cursor(Set password XXXX)
 - Press Switch(E) to enter

Password Table

Password (XXXX)	Function
1111	Basic configuration
2222	Calibration setting
3333	Modbus setting
5555	Pulse Output Setting
6666	Set Zero Flow

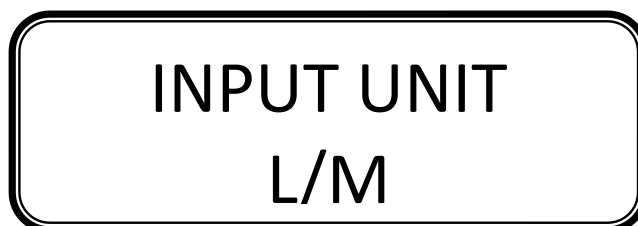
8.1 Basic Configuration

- Press “Menu” (Switch(M)) for 2 seconds for setting mode
- Press Switch(M) to enter number and Switch(S) to shift cursor(Set password 1111)
- Press Switch(E) to enter



▪ Unit Select :

- Press switch(M) to select Unit
- Press Switch(E) to enter



▪ PIPE ID Select:

- Press switch(M) to select PIPE ID
- Press Switch(E) to enter

PIPE SIZE	PIPE ID	Max Flow
½"	15	5 m ³ /H
1 "	25	9 m ³ /H
1 ½ "	40	22 m ³ /H
2"	50	36 m ³ /H
2 ½"	65	60 m ³ /H
3"	80	90 m ³ /H
4"	100	121 m ³ /H
5"	125	200 m ³ /H
6"	150	318 m ³ /H
8"	200	450 m ³ /H
10"	250	600 m ³ /H
12"	300	850 m ³ /H

PIPE ID
0015

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

FLOW AT 20 mA?
009.00

- **Totalizer Setting:**
 - Press Switch(E) to reset Totalizer
 - Press Switch(S) to enter without resetting Totalizer

RESET TOT+
YES NO

RESETTING
+ TOTALISER

ENTRY COMPLETE
YES NO

8.2 Calibration Setting

- Press “Menu” (Switch(M)) for 2 seconds for setting mode
- Press Switch(M) to enter number and Switch(S) to shift cursor(Set password 2222)
- Press Switch(E) to enter

PASSWORD
2222

▪ CALIBRATION FACTOR:

- Press switch(M) to select Cal. Factor
- Press Switch(E) to enter
- Press Switch(S) to shift cursor

CAL. FACTOR
1.000

▪ Count for 4mA:

- Press switch(M) to increase count
- Press switch(S) to decrease crease count
- Press Switch(E) to enter

COUNT FOR 4mA
00100

▪ **Count for 20mA:**

- Press switch(M) to increase count
- Press switch(S) to decrease crease count
- Press Switch(E) to enter

COUNT FOR 20mA
00470

▪ **Cut OFF Span setting:**

- Press Switch(E) to enter

CUT OFF SPAN
0.0 %

▪ **Display Update Setting:**

- Press switch(M) to set display update rate
- Press Switch(E) to enter

DISPLAY UPDATE
RATE 00

- **Complete Setting Mode:**
 - Press Switch(E) to complete setting
 - Press Switch(S) to enter in setting mode again

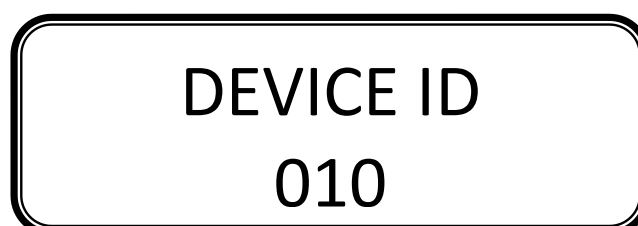


8.3 Modbus Setting

- Baud Rate: 9600
 - Data Size: 8
 - Parity: None
 - Stop bit: 1
- Press “Menu” (Switch(M)) for 2 seconds for setting mode
 - Press Switch(M) to enter number and Switch(S) to shift cursor(Set password 3333)
 - Press Switch(E) to enter



- **DEVICE ID Select:**
 - Press switch(M) to select Device ID
 - Press Switch(E) to enter
 - Press Switch(S) to shift cursor



- **Modbus Format Select:**

- Press switch(M) to select Modbus output format(Float, Long Integer, Decimal, Integer)
- Press Switch(E) to enter

OUTPUT FORMAT
FLOAT

- **Complete Setting Mode:**

- Press Switch(E) to complete setting

ENTRY COMPLETE?
YES NO

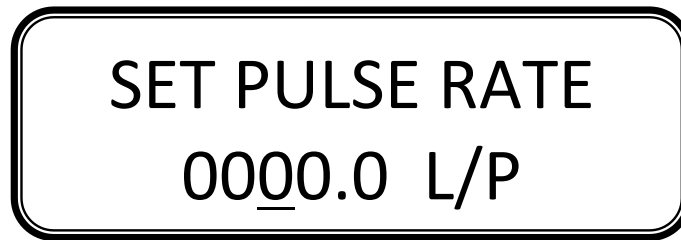
99.45 L/M
TO:0009949563 Lt

8.4 Pulse Output Setting

- Press “Menu” (Switch(M)) for 2 seconds for setting mode
- Press Switch(M) to enter number and Switch(S) to shift cursor(Set password 5555)
- Press Switch(E) to enter

- **Pulse Output Select:**

- Press switch(M) to select litre per Pulse (L/P, m3/P, KI/P)
- Press Switch(E) to enter
- Press Switch(S) to shift cursor



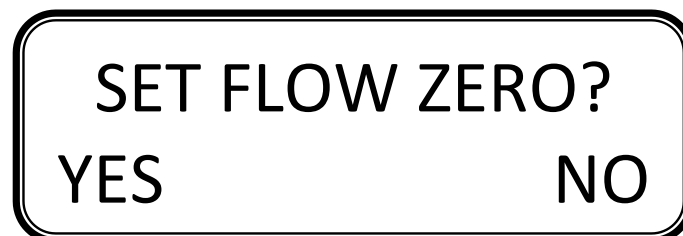
8.5 Set Zero Flow.

Note: Ensure that Water or conductive liquid is fully filled in flow-meter (No air) & Zero flow (No Flow) condition before applying this setting.

- Press “Menu” (Switch(M)) for 2 seconds for setting mode
- Press Switch(M) to enter number and Switch(S) to shift cursor(Set password 6666)
- Press Switch(E) to enter

SET FLOW Zero

- Press switch(E) to Yes
- Press Switch(S) to No



9. TROUBLESHOOTING

- No Power: Check Fuse, Power cord, Mains supply across P&N
- No Flow Indication: Check voltage across CL1 & CL2
 - a. Without coil connected : 22-24 Volt pulsating DC
 - b. With coil connected : 10-12 Volt pulsating DC
 - c. Check Sensor Connection S1, S2 & G
- Wrong Flow: Check Switch position (Default 1-ON, 2,3,4-OFF), Set Calibration Factor
- No RS485 Data: Check D+ & D- connection, Device ID & Output Format

- **No 4-20 mA:** Check I+ & I- connection, count setting for 4ma & 20mA.
- **Minor flow indication at No flow:** Set Cut off Span Proper

For More Information Please Contact ACCUMAX INSTRUMENTS PVT. LTD..

10. 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.

11. CALIBRATION AND VERIFICATION TESTS

The ACCUMAX INSTRUMENTS PVT. LTD. flow meters are supplied from the manufacturing plant calibrated.