UNI TECH

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Decide with Confidence

Installation & Instruction Manual of U-MAG Flow

Uni-Tech Valves & Pneumatics

INDEX

INSTRUCTION :

U-MAG micro-controller based full bore type electromagnetic flow transmitter specially used for various industrial application. This flow transmitter accurately measures the flow rate of conductivity liquids and slurries in closed pipes. Due to simple, Rigid & and obstruction less Design the flow transmitter is a maintenance free instrument in Place of conventional mechanical flow measuring device. The use pulsed DC excitation technology offers highest ability & better measuring accuracy in the form of electrical signal 4-20 mA DC linearly proportional to volumetric flow.

U-MAG Standard configuration is a sensor with transmitter integrated in one unites. It's performance in independent of temperature, pressure, density and viscosity of the medium. The simple design allow and quick installation of the meter with unskilled

U-MAG is Flanged meter available in size from DN 10 to 300.The rugged flow sensor is conducted form completely welded construction.

In The Instrument the sensor and the sensor and the electrical form one mechanical entity . A Retransmission output of 4-20 mA is provided.

Sensor : The Sensor consist of metering pipe ; electrodes and coils. it' is accommodated in welded and fully encapsulated steel enclosure, filled with expanded Polurthange, prevent it from getting exposed to moisture and Environment conditions.

Electronics : The Conditioning electronics box. The termination of this electronics is given in the Same housing through cable glands for the required connecting cables.

Thus the Inducted voltage is proportional to the mean flow velocity, when the field strength is constant. Inside the electromagnetic flow meter, the fluid passes through a magnetic field applied Perpendicular to direction of flow. An electric voltage is Induced by the movement of the fluid (which much have a minimum electrical conductivity). This is proportional to the mean flow velocity and thus to the volume of flow. The Induce voltage signal is picked up by to the electrodes, which are in conducting contact with the fluid and transmitted to a signal convertors for a standardize output signal.

This method of measurement offers the following advantage :

1) No. pressure loss trough pipe constriction or protruding parts.
2) Since the magnetic field the passes through the entire flow area, the signal represents a mean value or the pipe across section; therefore, only relatively short straight Inlet pipe x DN from the electrode axis are requirement upstream of the primary head.
3) Only the tube liner and the electrodes are in contact with the fluid
4) Already the original signal produced is an electrical voltage, which is an exact linear function of mean flow velocity.
5) Measurement ins independent of the flow profile and the properties of the fluid.

MEASURING PRINCIPLE :

The Measuringment is based on Faraday's law of Electromagnetic Induction according to which, when a conductor is moved in a magnetic field a voltage is induced In the conductor. The Voltage induced, in the case of an electromagnetic flow meter is :

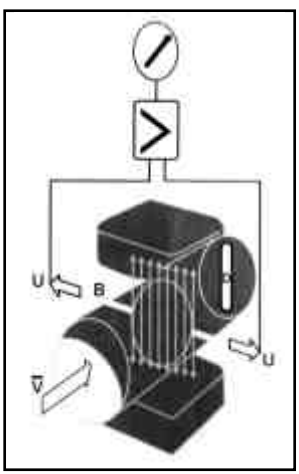
U=K.B.V.D

K=INSTRUMENT CONSTANT

B=STRENGTH OF MAGNETIC FIELD

V=AVERAGE VELOCITY

D=PIPE DIAMETER.



RELATIVE HUMIDITY	:	5-95/RH Non Condensing
MOUNTING	:	In –Line, Horizontal, Vertical
DIRECTION OF THE FLOW	:	Direction Of Arrow On Meter
UPSTREAM STRIGHT LENTH	:	10 *DN (meter size(/)
CABLE ENTRY	:	2 no. ¾ '' ET Double
	:	Compression Cable Gland
MATERIAL BODY	:	MS / SS 304 / SS 316
ELECTRODE	:	SS 316L, Hastalloys C, Platinum
FLANGE	:	MS / SS 304 / SS 316
LINEAR	:	PTFE (TEFLON)
ENCLOUSER MATERIAL(HOUSING)	:	Flameproof, IP65 / IP66
	:	IIA,IIB,CMRI Certified

Electromagnetic Flow Meter

INSTRUMENT DETAILS : SPECIFICATIONS

Line Size Flange Connection	ASA 150 RF 16.5 Table
Calibration Range Process Fluid	Water
Accuracy Output	4 - 20mA, RS 485 (Optional)
Display	16X2alphanumeric LCD Display
Power Supply	24 VDC 1 AMP
Minimum Conductivity	5u Siemens / CM
Operating Temp.	0 to 150 C
Operating Pressure	0 - 10kg / cm2 max

A : 2 ASSEMBLY DETAILS

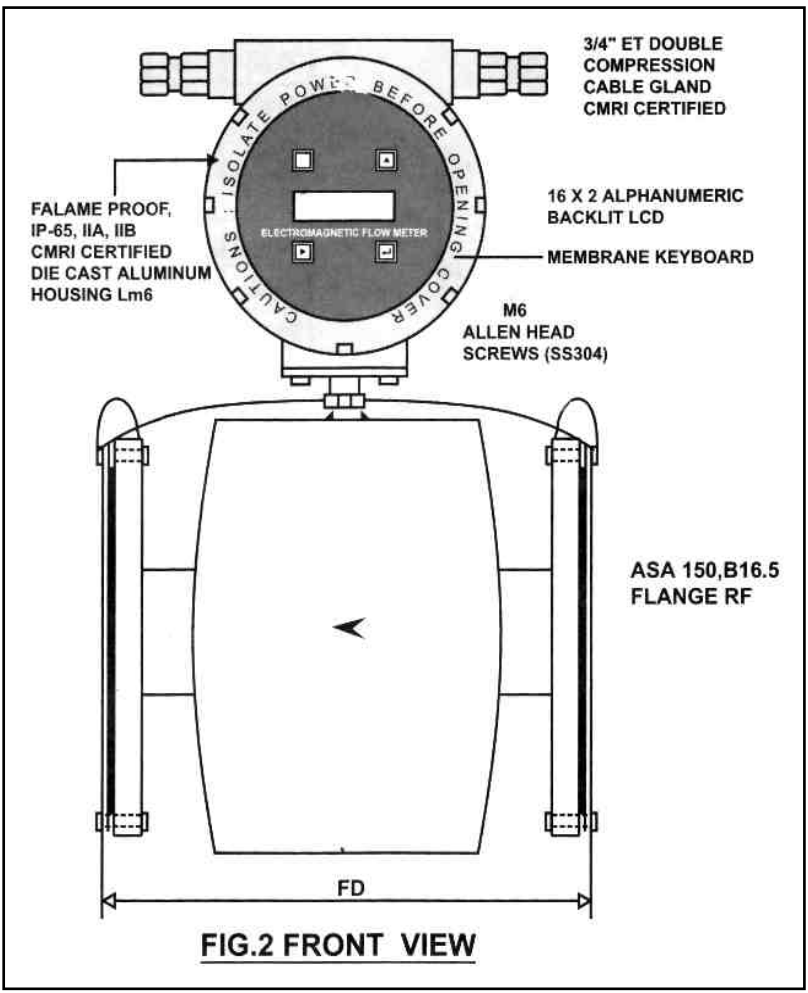
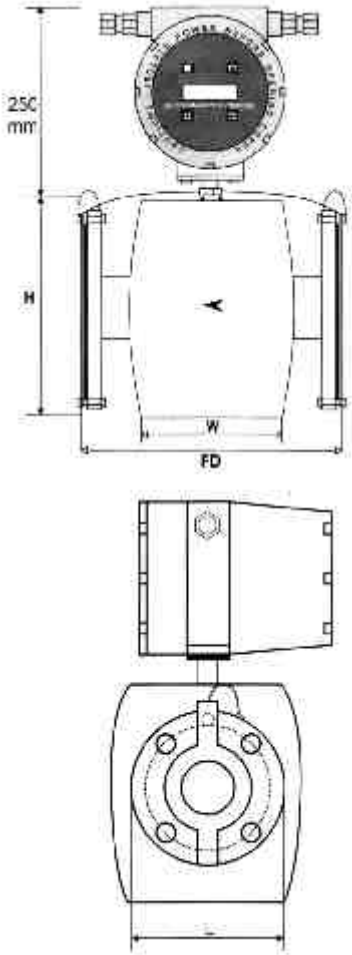


FIG.2 FRONT VIEW

DIMENSIONAL DETAILS



Meter Size	L (mm)	W (mm)	H (mm)	FD (mm)
15 NB	150	100	180	200
20 NB	150	100	180	200
25 NB	150	100	180	200
32 NB	180	100	210	200
40 NB	180	100	210	200
50 NB	180	100	210	200
65 NB	185	100	220	200
80 NB	207	100	240	200
100 NB	250	150	274	250
125 NB	280	175	300	250
150 NB	320	175	330	300
200 NB	380	175	390	350
250 NB	420	244	440	450
300 NB	520	250	520	500
350 NB	520	250	520	550
400 NB	520	250	520	600
450 NB	627	623	632	698
500 NB	679	623	686	768
600 NB	770	818	772	918

Electromagnetic Flow Meter

KEY DETAILS

Menu Program Key Run Mode & Program Mode	It is used to toggle between
Increment Key Value in Program Mode	It is used to increment the digit Batch mode in run mode
Shift Key To next digit in program mode & mode is selected	It is used to shift key the cursor Stop batch I run mode batch
enter Key or Value & to reset totaliser	it is used to validate the function During run mode.

SURGE PROTECTION :

SECTION 'B' INSTALLATION

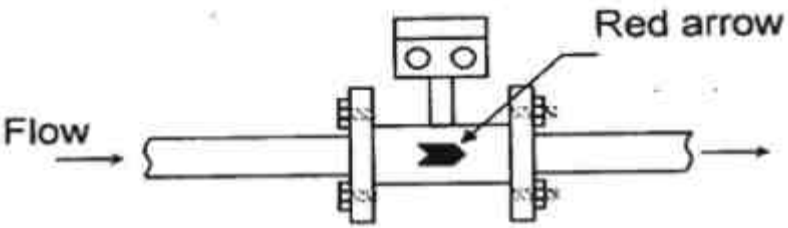
B : HOW TO INSTALL U-MAG

1) Flow meter can be installed in any position either vertical or Horizontal
2) Select a Pipe Location which will always fun of Liquid.

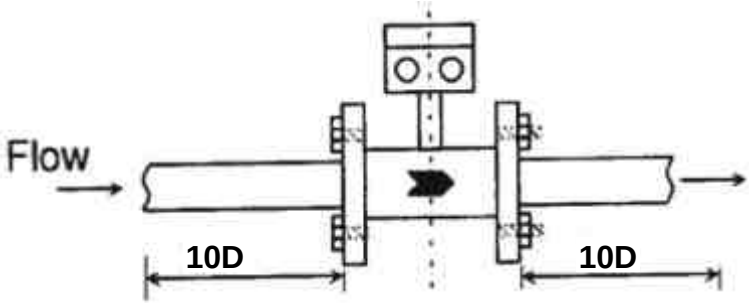
   Vertical Installation with flow from down to top assures full pipe condition.
3) For Horizontal installation, the electrode axis should always be in horizontal plane.
4) Flow meter is no be installed in such a way that flow is always in the Direction pointed by red arrow on the instrument.
5) Suitable gasketing can prevent leakages from near the flanges.

The Primary Flow Tube can be installed at any point in the pipe run either horizontal or vertical provided the following conditions are met;

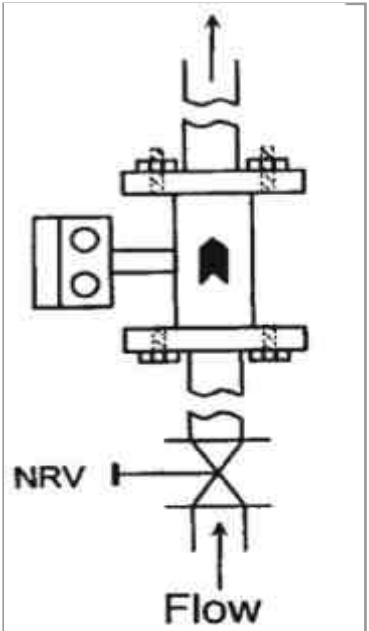
1. The direction of flow though the pipe is same as indicated on the Primary flow tube by a red arrow.



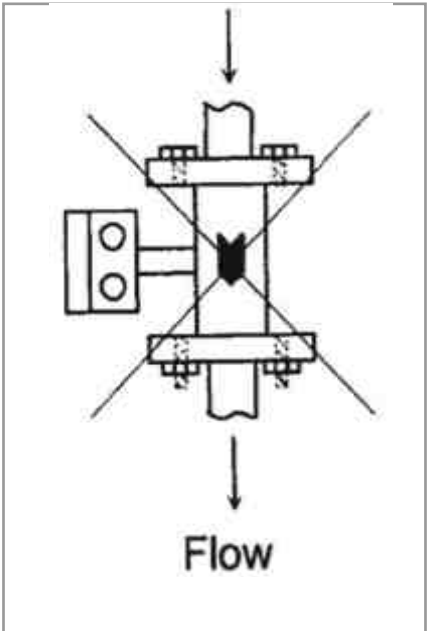
2. Straight lengths of maximum 10D on upstream and minimum10D on Down -stream as shown. If disturbances like cork screwing or vortex flow condition is increased or flow straightness should be used be arranged at a distance of at least 10D downstream of primary flow



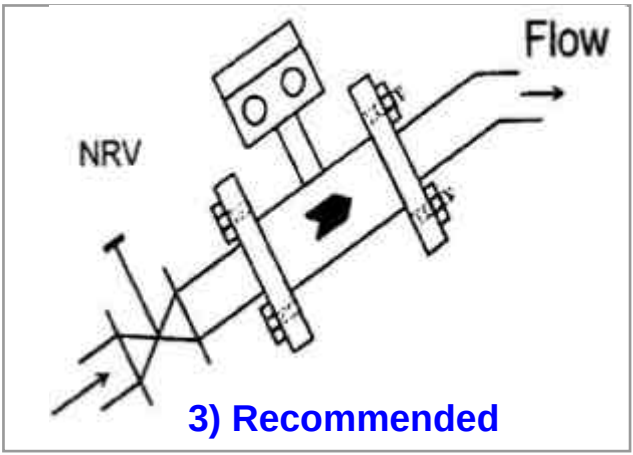
3. Ensure that primary flow tube remains completely filled by the fluid under measurement even under no flow condition. This ensures trouble free and reliable operation of the flow meter. Select a location on the pipe, which will always run full of liquid. For vertical installations the direction of flow against Gravity ensure full pipe. Some of the recommended installation are as under -



1) Recommended



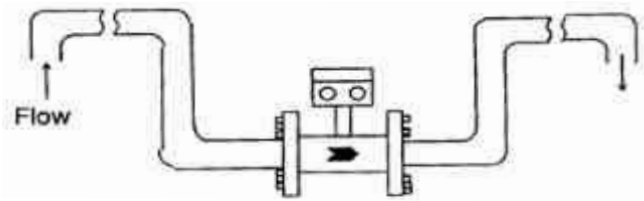
2) Not Recommended



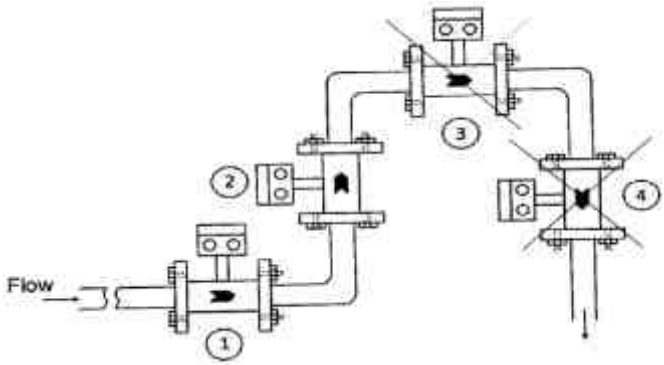
3) Recommended

4. Open Feed or Open Discharge

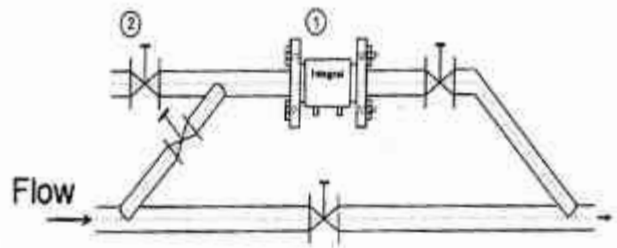
   Provide sluice underpass if full pipe cannot be assured. This ensures full pipe under No Flow Condition.



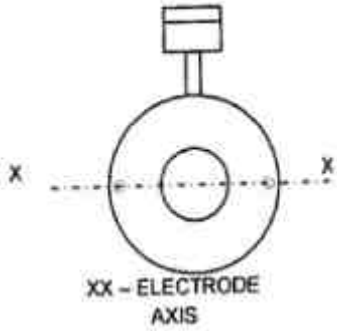
5. Location 1 and 2 are recommended location, Location 3 is the highest point in pipe run. This location in not recommended since air bubbles collect in the metering tube which.



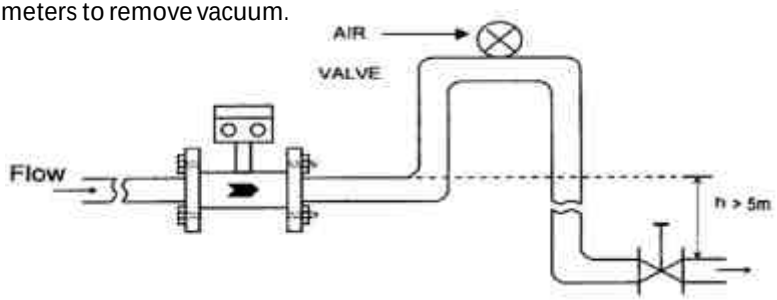
6. I case of heavily contaminated Fluids, the primary flow tube should be installed with a bypass pipeline and isolation valves so that it can be removed for cleaning without interrupting operation.
   1. Primary Flow tube,
   2. Isolation valve and pipeline for draining and cleaning



7. For Horizontal Installations the measuring electrode axis should always lie in horizontal plane to prevent contamination on electrodes and avoid loss of contact of electrodes with fluid because of gas bubbles, if present.



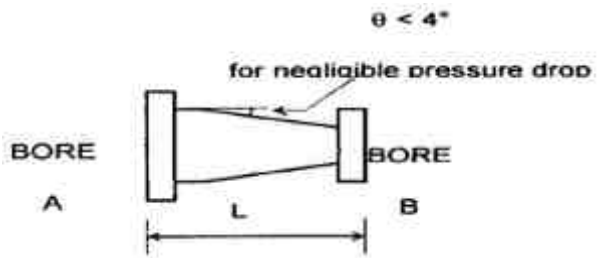
1.Fit Air Valves as shown if the down pipe is at a height greater than 5 meters to remove vacuum.



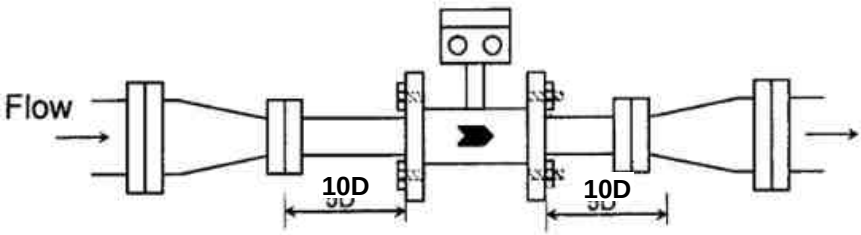
a. Strong Electromagnetic Field should not be located In the immediate vicinity of the flow tube since these could affect the filed generated by the coils in flow tube and hence disturb the reading stability and accurancy. Ensure that no magnetic material other the pipe and connecting flanges should come in contact with the flow tube.

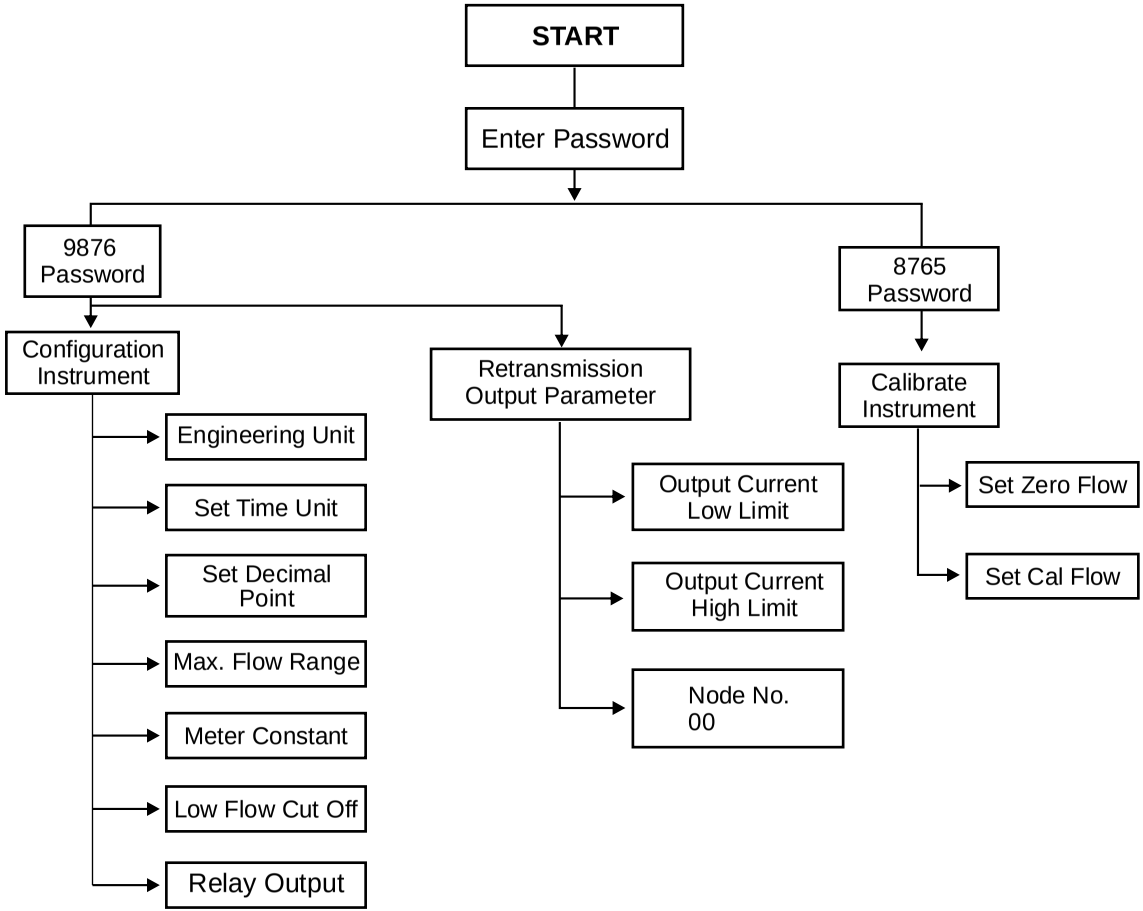
b. Ensure that the minimum conductivity of the fluid under measurement is greater than 5 µseimens / cm are marinated. Ensure that the fluid under measurement does not contain magnetic particles in it otherwise it will lead to measurement errors.

c. Reducer : Reducers should be flanged and generally shall reduce by one size nominal bore otherwise the pressure loss will be high. The table given below is a general guideline Dimensions for reducers



Nominal Bore A (in mm)	Nominal Bore B (in mm)	Length L (in mm)
40	25	150
50	40	200
65	50	200
80	65	200
100	80	205
125	100	300
200	150	300




START
Enter Password
9876 Password
8765 Password
Configuration Instrument
Retransmission Output Parameter
Calibrate Instrument
Engineering Unit
Set Time Unit
Set Decimal Point
Max. Flow Range
Meter Constant
Low Flow Cut Off
Relay Output
Output Current Low Limit
Output Current High Limit
Node No. 00
Set Zero Flow
Set Cal Flow

C : 3 INSTRUMENT CONFIGURATION METHOD

The instrument will have to be configured as per user setting for time unit, decimal point, Range instrument factor, output current etc.

Power On the instrument it will be in RUN mode, Display will show.

Press [MENU] key. Display will show [Enter Password 0000]

Enter the pass word 9876 using [▲] & [▶] key. Display will show [Configure Instrument.]

Press [↵] key. Display will show [Set Engg. Unit Ltrs.]

Press [↵] key. Display will show to blink. The [▲] key is used to change Engg. Unit.

Press [↵] key to enter the unit value.

Press [↵] key. display will show [Set Time Unit Hr]

Press [↵] key. Display will start to blink. The [▲] key is used to change time unit.

Press [↵] key. to enter the unit value.

Now, display will show Set Decimal Point.

Press  key. Display will start to blink. The  key is used to change decimal point..

Press  key to enter the decimal point..

Display will show Max. Flow Range
6.000 M^3/Hr

Press  key. The numeric digit will start to blink. enter the desired value one by one.

using  &  key. The  key is used to increment the numeral value from 0 to 9.

Press  key used to shift the cursor to the next digit. Press  key to enter the value.

Display will show Meter Constant

Press  key. The display will start to blink. but which is constant. The instrument factor is factory calibrated. Please do not disturb it. Press  key.

Display will show Low flow Cut Off - 00%

Press  key. The display will start to blink. Enter the desired value using  &  key. it is the integer value below which the display & the Ret. Output shows the lower limit value. Press  key to enter value.

Set Decimal Point 000.00	The display indicates the decimal point position. "0.0000", "00.000", 00000.
Max. Flow Range 6.000 M^3/Hr	The display indicates the range to be selected by the user.
Instrument Factor 1.0000	The display indicates the instrument Factor, which is a constant. The instrument Factor is factory calibrated. Please do not disturb it.
Low Flow cut Off 00%	The display indicates the low flow cutoff. It is the integer value below which the display and the retransmission output shows the lower limit value.

9. Now, display will show [Damping Factor 05]

   Press [↵] key. Display will start to blink. enter the desired value using [▲] & [▼] key.

   It is No. of ADC count of which average is taken for stabilize the display. Press [↵] key.

   Now, display will show [Configure Instrument] press [▲] key.

10. Display will show [Retransmission O/P Parameter]

    Press [↵] key. Display will show [O/P current Lo Limit 000.00 M^3/Hr]

    Press [↵] key. The numeric digit will start to blink. enter the desired value one by one using [▲] & [▼] key. Press [↵] key to enter the value.

11. Now display will show [O/P Current Hi Limit 350.00 M^3/Hr]

    Press [↵] key. The numeric digit will start to blink. enter the desired value one by one using [▲] & [▼] key. Press [↵] key to enter the value.

12. Press Twice [MENU] key. go to run mode.

SECTION D : CALIBRATION PROCEDURE

A. FLOW CALIBRATION :

Do the connections as per the termination details.

Power ON the instrument, LCD display will show [000.0 M^3/Hr
0000000.1 ML]

Go to the program mode by pressing [MENU] key. Now display will show [Enter
Password 0000]

with left most 0 digit blinking. Enter password as 9876 using [▲] key, to increment value & [▲] key, to shift cursor to immediate next digit on right side.

When last digit enter press [↵] key, Now display will show [Calibrate Instrument]

Press [↵] key. Display will show [Set Zero Flow 33421] → Approx ADC Count

Press [↵] key. Display will show [Set Zero Flow 33421] → Approx ADC Count blinking

Now Ensure that the flow in the pipeline is zero & pipe is completely filled with fluid.
(Half filled pipeline will lead to incorrect calibration)

Press [↵] key, to store zero flow counts.

Now display will show [Calibrate Instrument] press [↵] key.

SECTION D : CALIBRATION PROCEDURE

Display will show [Set Zero Flow 33421] Press [▲] key.

Now display will show [Set cal Flow / 33421 str 200.0] → LAST SET FLOW

Press [↵] key. Display will show [Set cal Flow / 33421 str 200.0] → LAST SET FLOW

Now, pass the known flow near about 25% of full scale value. Now count will start increasing let the count get stabilize. Once count is stable press [↵] key.

display will show [Set cal Flow / 60000 200.0] → LAST SET FLOW

Approx ADC Count — Blinking

Now Enter that known flow rate by using [▲] & [▶] key in right most 4 digit.

Than press [↵] key, to store cal flow (span) counts.

Press [MENU] key to come back to run mode.

C : 4 ONLINE DIAGNOSTIC FEATURES

1. FLOW OVER RANGE :

   'Flow Over Range' message is displayed whenever current flow rate exceeds 110% of calibrated Range. For e.g. if Range is 0 -350.0 m3/hr, then flow meter will show reading up to 385.0 m2/hr i.g. 110% if flow exceeds 385.0 m2/hr display will show 'flow Over Range' message. Ret. Output will also be 21.60 mA (max.) at 385.0 m3/hr.

2. AVERAGE FLOW RATE :

   This feature is used to calculate average value of flow rate over a given period of time. Ir is extremely useful whenever current flow rate is fluctuating and we are required to know what is the average flow rate over a given period of time.

2] Retransmission Parameters : The instrument can be configured for retransmission output. The power limit and the higher limit can be set as per desire by the user.

The user can also select a different range within the range selected for retransmission purposes only.

e.g. The range selected for the U-MAG is 0 to 100 LPH. The use can selected 1 to 50 LPH for retransmission output signal. When the flow is 1 LPH the retransmission output will show 4.00 mA and for 50 LPH it will show 20.00 mA.

O/P Current Low Limit 000.00M^3/Hr	The display indicated Low limit value of retransmission output. The user can select any value within the range specified by.
O/P Current Low Limit 350.00M^3/Hr	The display indicated low limit value of retransmission output. The user can select any value within the range specified by.

NOTES

NOTES

TROUBLESHOOTHING PROCEDURE OR FAULT ANALYSIS

SYMPTOM	CAUSE OF FAILUR	ACTION TO BE TAKEN
No Display Indication	1. Absence of power at terminal block 2. Loose connection on termination	1. Check power supply connections & rectify the fault 2. Tight the termination connections.
Incorrect display indication.	1. Incorrect calibration	1. Recalibrate the instrument refer calibration procedure.
Flow is not registered at a all	1. Reverse flow direction.	1. Check for correct flow measurement direction as indicated by arrow on the flow meter.
Incorrect retransmission output	1. Retransmission output calibration disturbed.	1. Recalibration the instrument for retransmission output refers calibration procedure.

Periodical Maintenance

The flow meter does not require any special maintenance. Dependent on the medical being measured it is recommended that approx. once year, remove the sensor from the pipe a clean the liner. Method of cleaning consists of removing mechanical dirt and non conductivity coating (like oil film) from the liner. A very dirty liner causes inaccuracy of the measurement. Check mechanical state of the liner.

*FOR ANY TECHNICAL QUERIES PLEASE CONTACT ON CELL PHONE NO.: +91 96246 00031
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UNI TECH

FLOW METER

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DEALS IN :
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