

**INSTRUCTION MANUAL
FOR
ULTRASONIC FLOW
METER
MODEL NO. :- ASIONIC 200**

Authorised Dealer



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CONTENT

Safety Warning & General Instructions

Introduction

1. Technical Specifications	01
2. Assembly Overview	02
2.1 Key board key details.....	03
3 Termination Details	03
4. Installation Details	04
4.1 Internal View.....	04
5. Flow chart	06
5.1 General Overview of Operation.....	06
5.2 Set Parameter.....	07
5.3 Set RTC & View Data.....	09
5.4 Set Instrument Information.....	10
5.5 Calibration Mode.....	11
6. Calibration Procedure	13
6.1 Set calibration factor.....	13
6.2 (4-20mA)Ret. Output calibration.....	13
6.3 Flow Calibration	14
7. MODBUS Rs485 Communication Details	16
8. Dos & Don'ts	18
9. Trouble Shooting Procedure	18

SAFETY WARNING & GENERAL INSTRUCTIONS

1. Read user manual carefully and understand instructions & directions provided in this manual.
2. Installation, connections, commissioning and service shall carry out by only qualified and authorized person.
3. To protect instrument from any external hazards, customer should take necessary care while preparing site ready before installation.
4. Ensure proper supply voltage (24V DC) with proper polarity to the instrument, before Powering ON instrument.
5. During calibration, follow the steps mentioned in the manual. Calibration should be done by authorised technical person only.
6. Verify that earthing is proper.
7. The following principles should be considered during installation:
 - If there is a noisy power supply voltage (especially peaks generated, usually by motors), use an external power supply filter between the flow meter and power supply.
 - Protect the flow meter and the internal lining of the sensor pipe from mechanical damage, especially during installation or cleaning.
 - Do not expose the flow meter to intense vibration.

INTRODUCTION

ASIONIC 200 is micro-controller based Ultrasonic flow transmitter specially used for various industrial applications. This flow transmitters accurately measures the flow rate of liquids & slurries in closed pipes. Due to simple, rigid & obstruction less design the flow transmitter is a maintenance free instrument in place of conventional mechanical flow measuring device.

ASIONIC 200 standard configuration is a sensors with transmitter integrated in one unit. It's performance is independent of temperature, pressure, density and viscosity of the medium. The simple design allows easy and quick installation of the meter. ASIONIC 200 is a flanged meter available in sizes from 20NB to 1500NB. A retransmission output of 4-20 mA & RS485 is provided.

Sensor: Four ultrasonic sensors for double beam & Two Ultrasonic sensor single beam mechanism.

Electronics: The conditioning electronics circuitry is housed in a cast aluminum connection box. The termination of this electronics is given in the same housing through cable glands for the required connecting cables.

Applications:

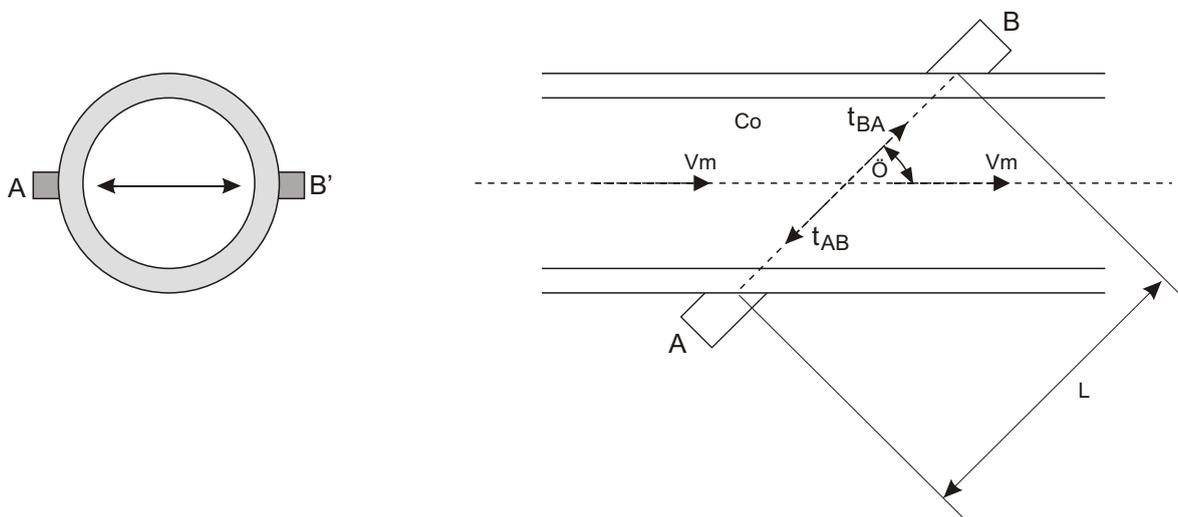
- 1) Applications include measurement of flow on liquids, pastes and slurries (even highly corrosive and abrasive) in chemical and petrochemicals, fertilizers, foodstuffs, paper, mining industries etc.
- 2) Monitoring water flow in cooling circuits in steel plants, power plants etc.
- 3) Measuring flow of clean water, effluent, sludge etc. In pollution and environmental control.
- 4) The isolated 4-20 mA output proportional to flow can be fed to PLCs, DCS or remote mounted indicator.
- 5) The Ultrasonic flow meter is used for measurement of flow of liquids and slurries in a wide range on industries such as chemical, petrochemical, fertilizer, pharmaceutical, foodstuff, mining, dairy, sugar, breweries, paper, steel etc.

Operating principle:

ASIONIC 200 ultrasonic flow meters operate using the transit-time differential method. The Transit-time differential measurement is based on a simple physical fact. Imagine two canoes crossing a river on the same diagonal line, one with the flow and the other against the flow. The canoe moving with the flow needs much less time to reach the opposite bank.

Ultrasonic waves behave exactly the same way, a sound wave traveling in the direction of flow of the product is propagated at a faster rate than one traveling against the flow ($v_{AB} > v_{BA}$). Transit times t_{AB} and t_{BA} are measured continuously. The difference ($t_{BA} - t_{AB}$) in time traveled by the two ultrasonic waves is directly proportional to the mean flow velocity (v_m) of the product.

The volumetric flow rate per unit time is the product of the mean flow velocity (v_m) and the cross-sectional area (A). A liquid product is identified by direct measurement of the transit time of ultrasonic waves. Assuming the same path length (L), the transit time in water is shorter than in crude oil, for example.



1. TECHNICAL SPECIFICATION

Instrument Name	: Ultrasonic Flow Meter
Model No.	: ASIONIC 200
Serial No.	: -----
Line Size	: 50NB
Range	: 0 to 6m ³ /hr
Media	: Liquid
Output	: 4-20mA DC
Display	: 16 X 2 LCD 6 digit for Flow & 8 digit for Totaliser flow
Power Supply	: 24V DC
Power Consumption	: Less than 10VA
Response Time	: 2Sec
Temp. Coefficient	: +/-0.02% of full scale per °C
Accuracy	: +/-1% of MV
Linearity	: +/-1% of MV
Direction of Flow	: Direction of Arrow on Meter
Mounting	: In Line - Horizontal
Cable Entry	: 2 Nos. M20 x1.5 Double Compression Cable Gland
Transmitter Enclosure	: Aluminum Die cast
Termination	: Through Pin Type Lugs
Operating Temperature	: 0 to 55 °C
Process Temperature	: 0 to 85 °C
Operating Pressure	: 0 to 5Kg/cm ²
Relative Humidity	: 10 - 99 % RH ,non condensing at 25°C

2. ASSEMBLY OVERVIEW

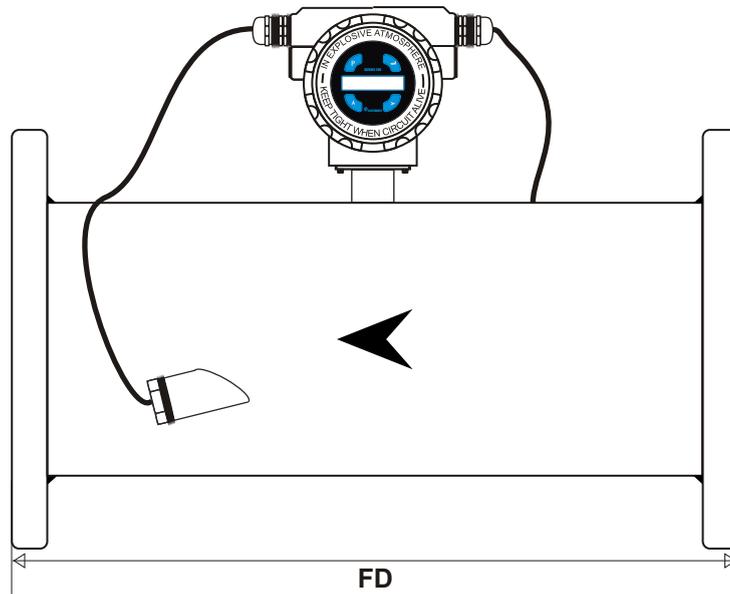


Fig.1 Front View

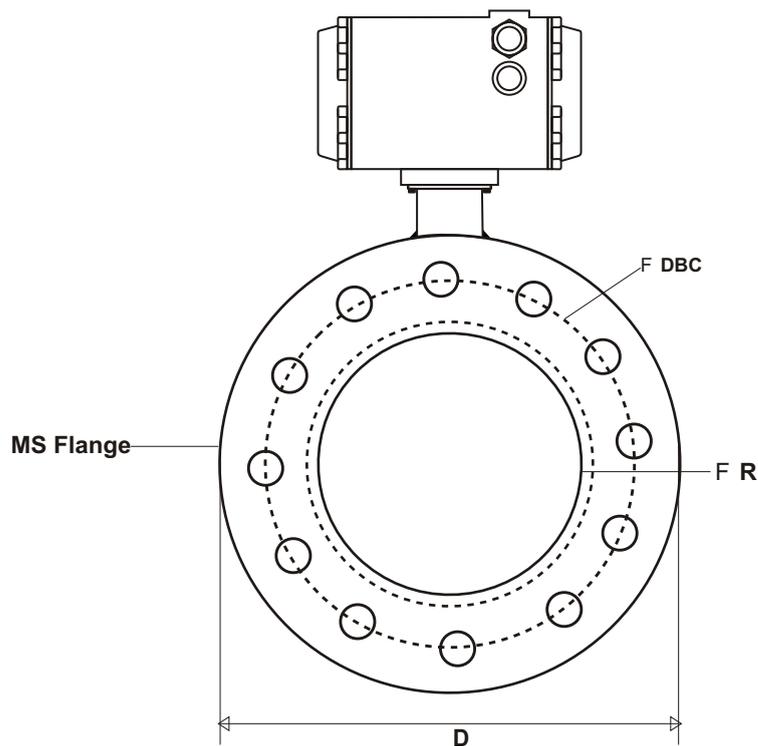


Fig.3. Side View With Flange Details

DIMENSIONAL DETAILS OF FLANGE ASA 150 # RF B 16.5 Table :-

Line Size		Flange Diameter D (mm)	Diameter of Raised Face R (mm)	Diameter of Bolt Hole Circle DBC (mm)	Diameter of Bolt Hole (mm)	No. of Holes	Flange to Flange Distance (FD) (mm)	Thickness of Flange
Inch	NB							
2"	50	152.4	92.1	120.6	19.0	4	300	19.0

Note : All Dimensions are in mm.

2.1 Key Board Key Details

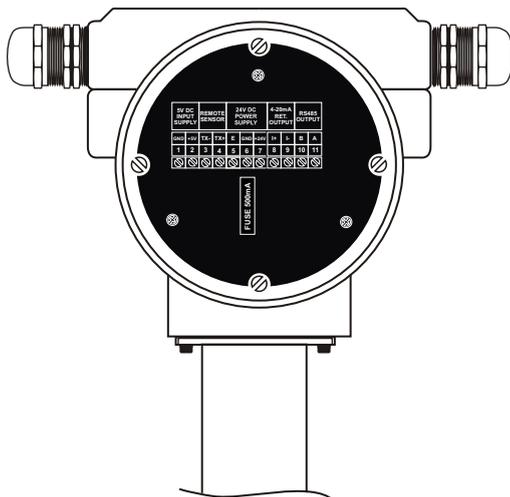
-  **PROG KEY:** - This key is used to toggle between Run mode and Program mode.

-  **INCR KEY:** - This key is used to
 - 1) Increment the numerical value of any digit, from 0 to 9, by one at each time.
 - 2) Go to the next parameter in Program mode.

-  **SHFT KEY:** -
 - 1) This key is used to shift the cursor to the next digit.
 - 2) Go to the previous parameter in Program mode.

-  **ENTR KEY:** - This key is used to validate the function or value of parameter.

3. TERMINATION DETAILS



1	GND	5V DC INPUT SUPPLY	8	I+	4-20 mA DC RET. OUTPUT
2	+5V		9	I-	
3	TX-	REMOTE SENSOR	10	B	RS485 OUTPUT
4	TX+		11	A	
5	E	24V DC POWER SUPPLY	FUSE 500mA		
6	GND				
7	+24V				

Fig 5 . Rear View

4. INSTALLATION DETAILS

4.1 Internal View

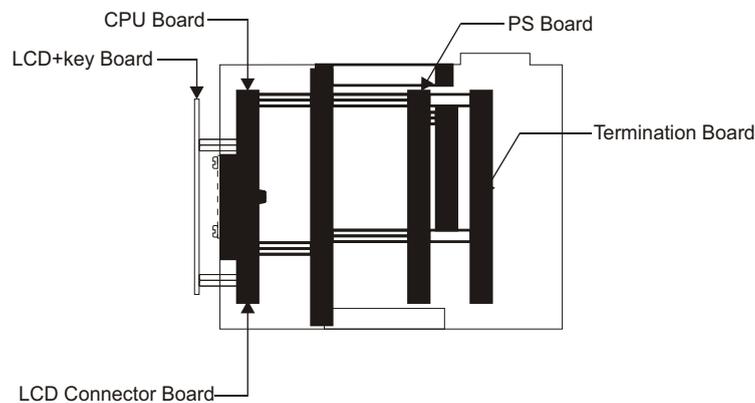
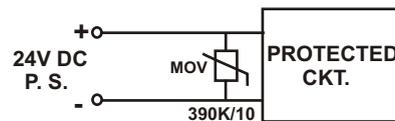


Fig.5 Internal View for Electronic Assembly

Surge Protection :-



Surge protection against transient is provided by putting Mov (390K/10) across the 24V DC supply line.

4.2 How to Install Flow Meter :-

- 1) Flowmeter can be installed in any position either vertical or horizontal.
- 2) **Select a pipe location which will always run full 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) Flowmeter is to 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.

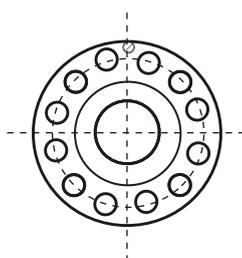


FIG.8a.



Fit gaskets ensuring proper alignment.

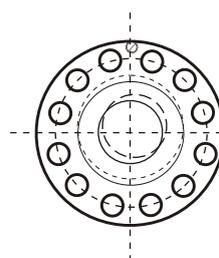


FIG.8b.



Poorly aligned gasket can cause leaks and flow errors.

FIG.6. GASKET ALIGNMENT

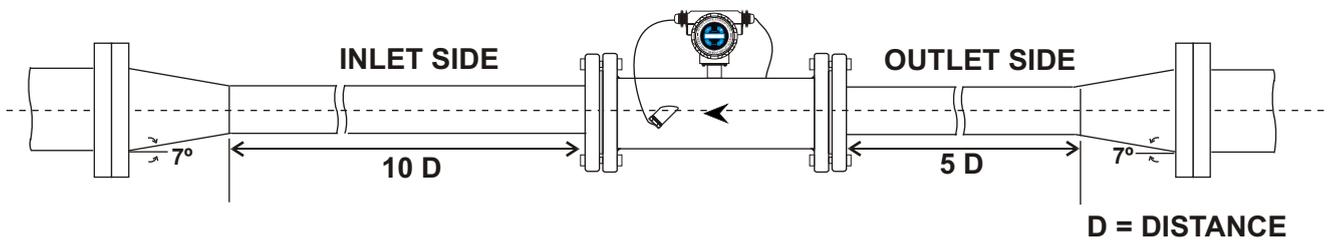
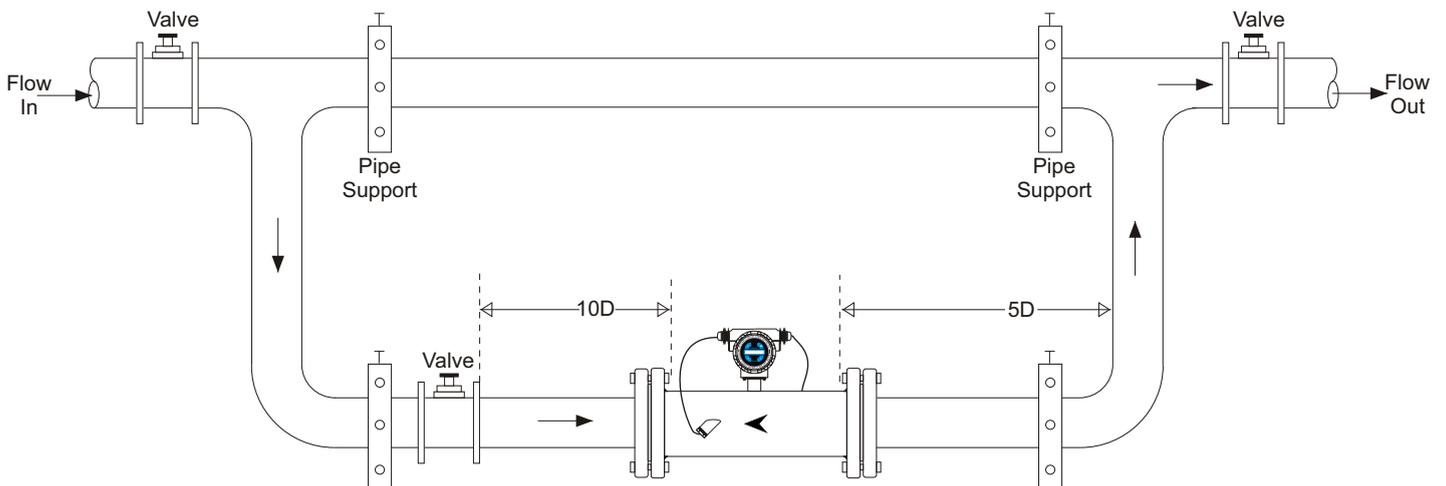


FIG.7. FLOWMETER INSTALLATION WITH REDUCER

- 1) Reducers are to be used for mounting flowmeter only where pipeline is bigger than flowmeter size.
- 2) At inlet side, straight run to be maintained 10 times of flowmeter bore size 'D' and similarly 5 times of 'D' at outlet side.
- 3) Flange size to be selected as per pipeline and flowmeter size.

Note :- 1) Select a pipe location which will always run full of liquid.
 2) Distances of pipe bends and elbows should be atleast 20D from the flowmeter.

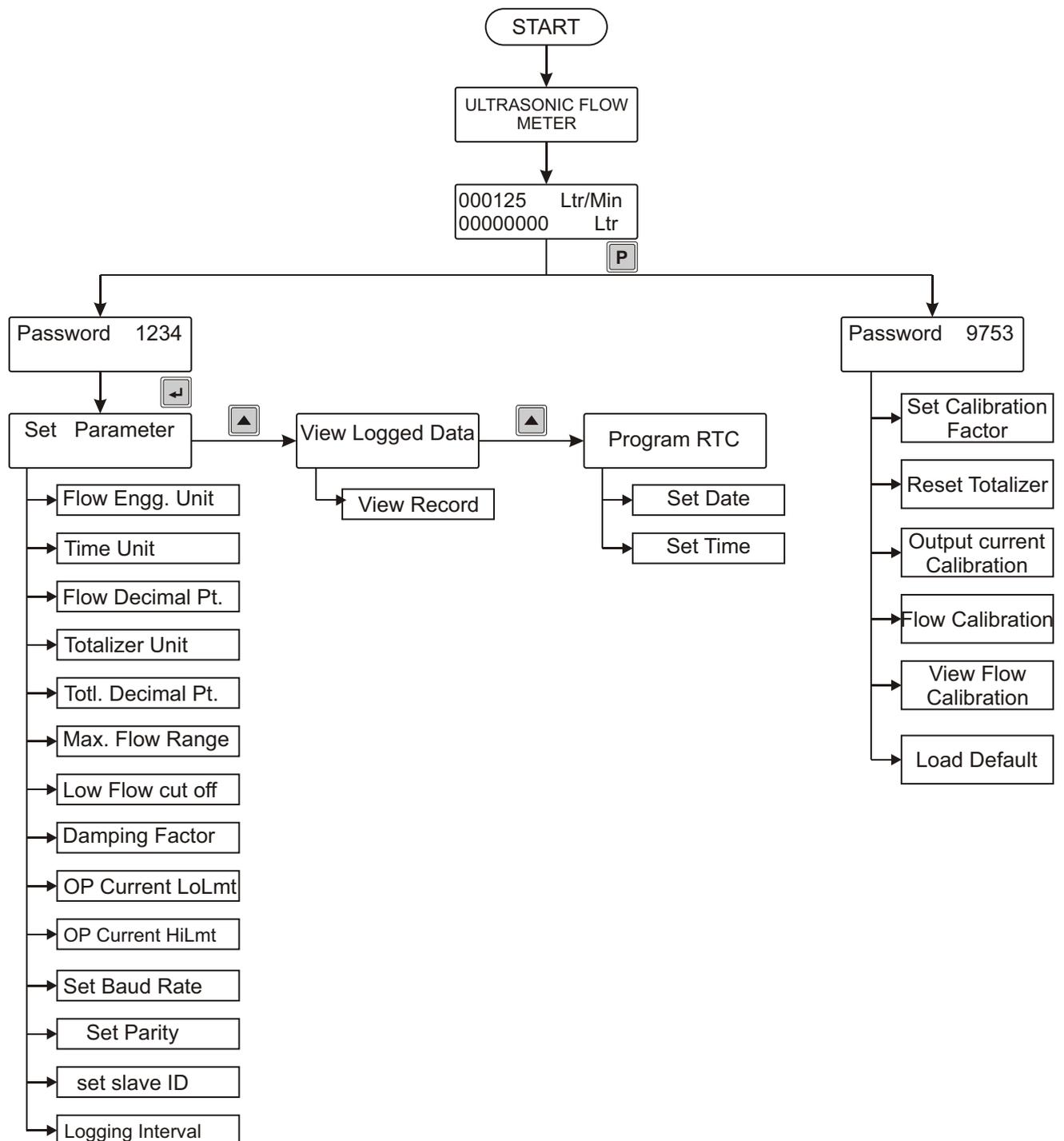
4.2.1 Installation In Horizontal Position:-



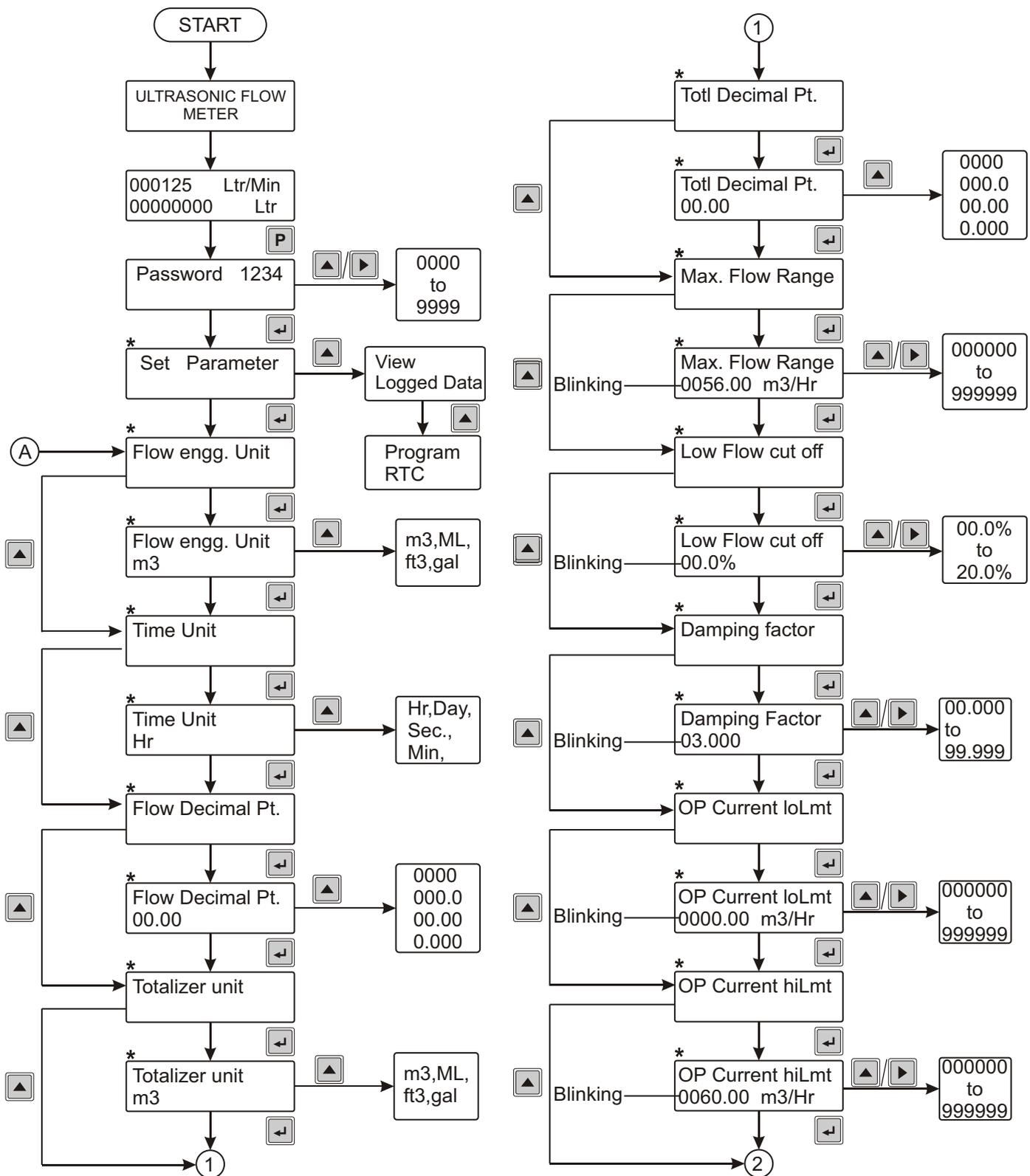
NOTE: Flow meter can be installed in any position either vertical or horizontal. Select a pipe location which will always run full of liquid. Vertical installation with flow from down to top assures full pipe condition.

5. FLOW CHARTS

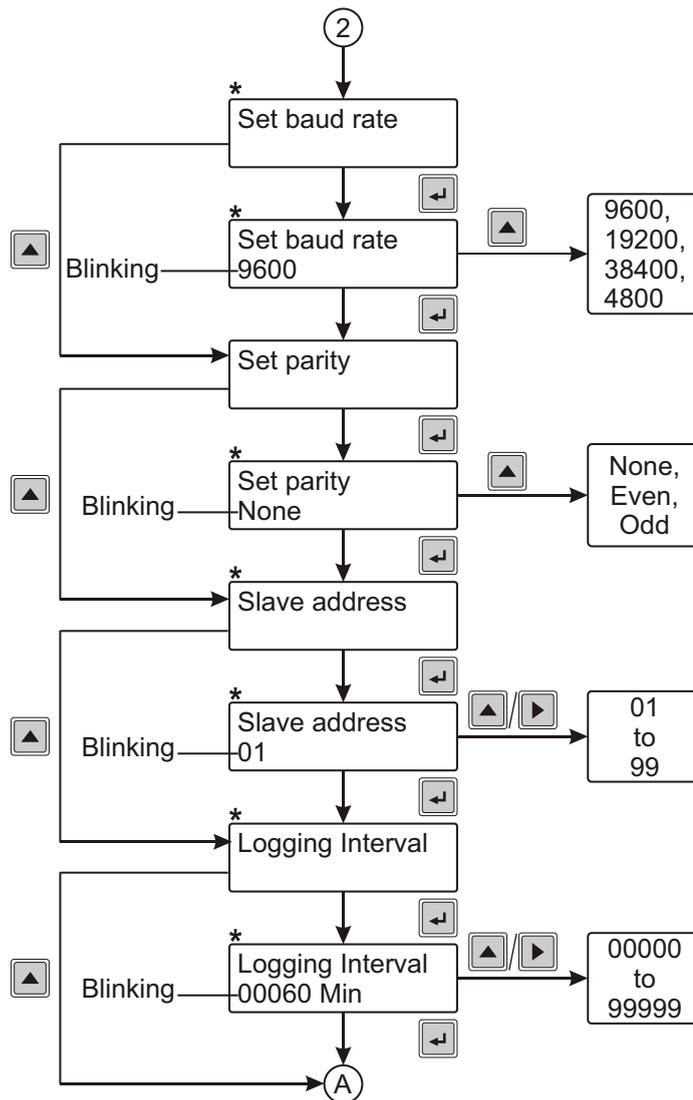
5.1 General Overview of Operations :



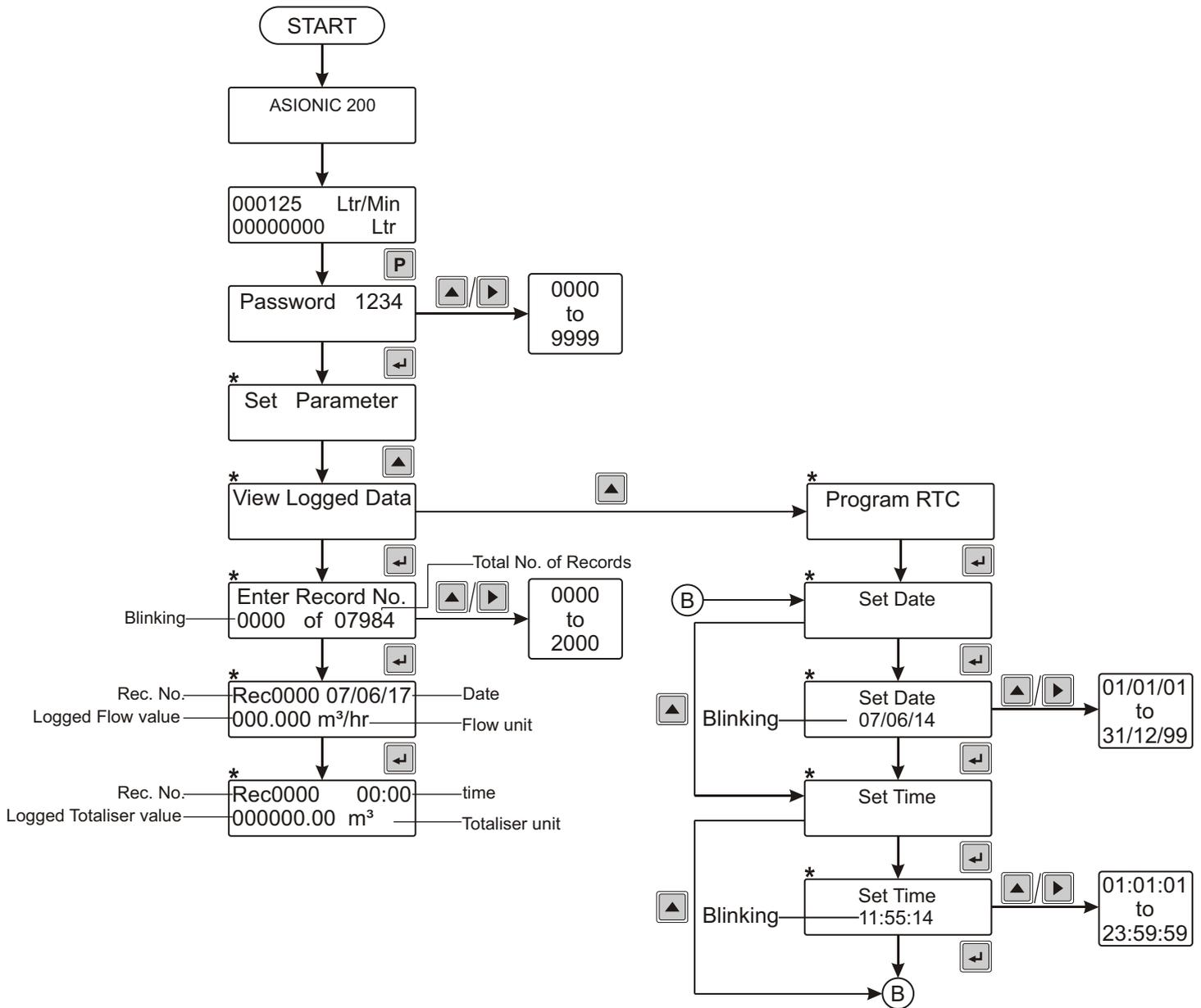
5.2 Set Parameters :



* Press **P** To Exit to higher level menu

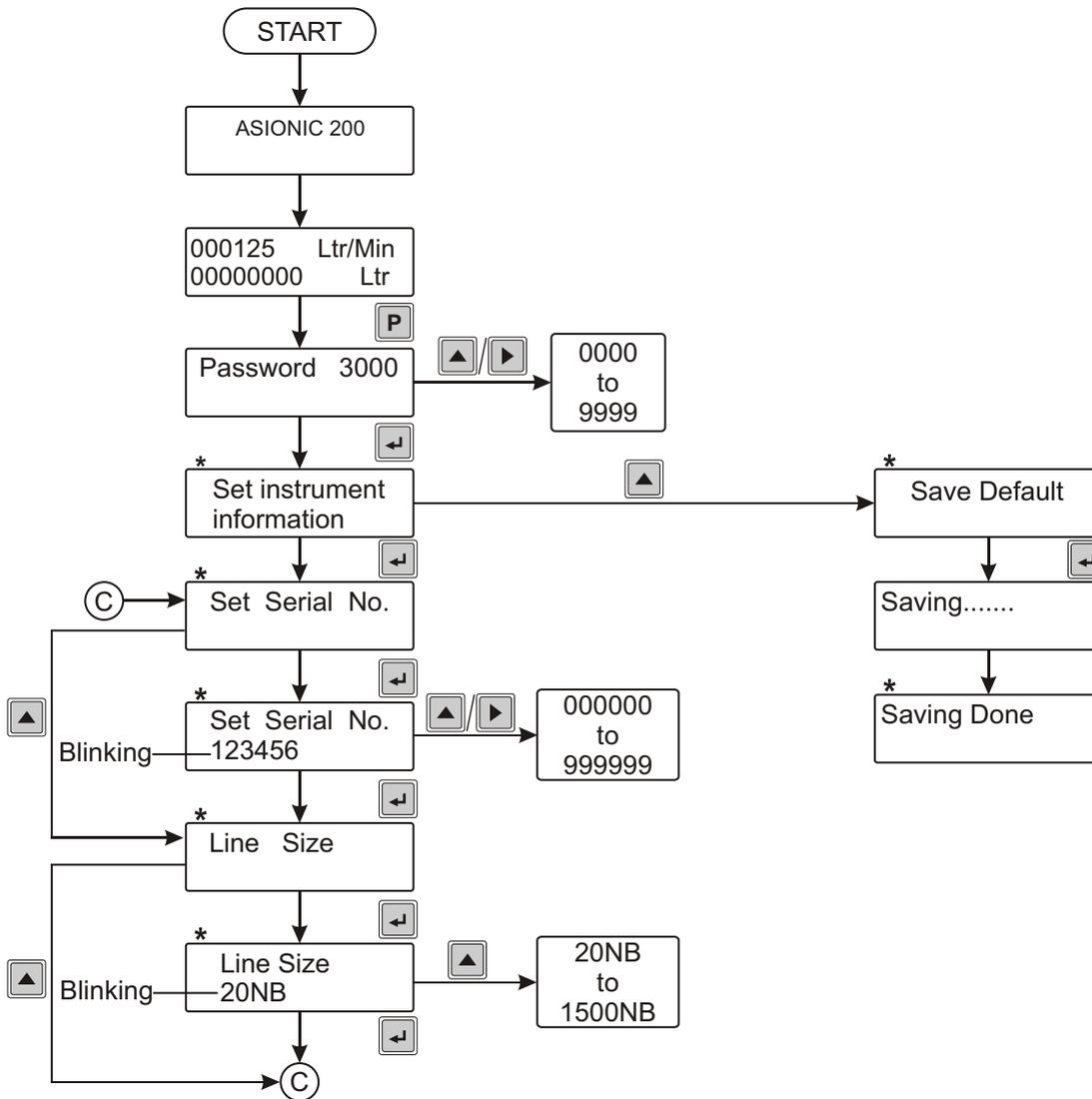


6.3 Set RTC & View Data :



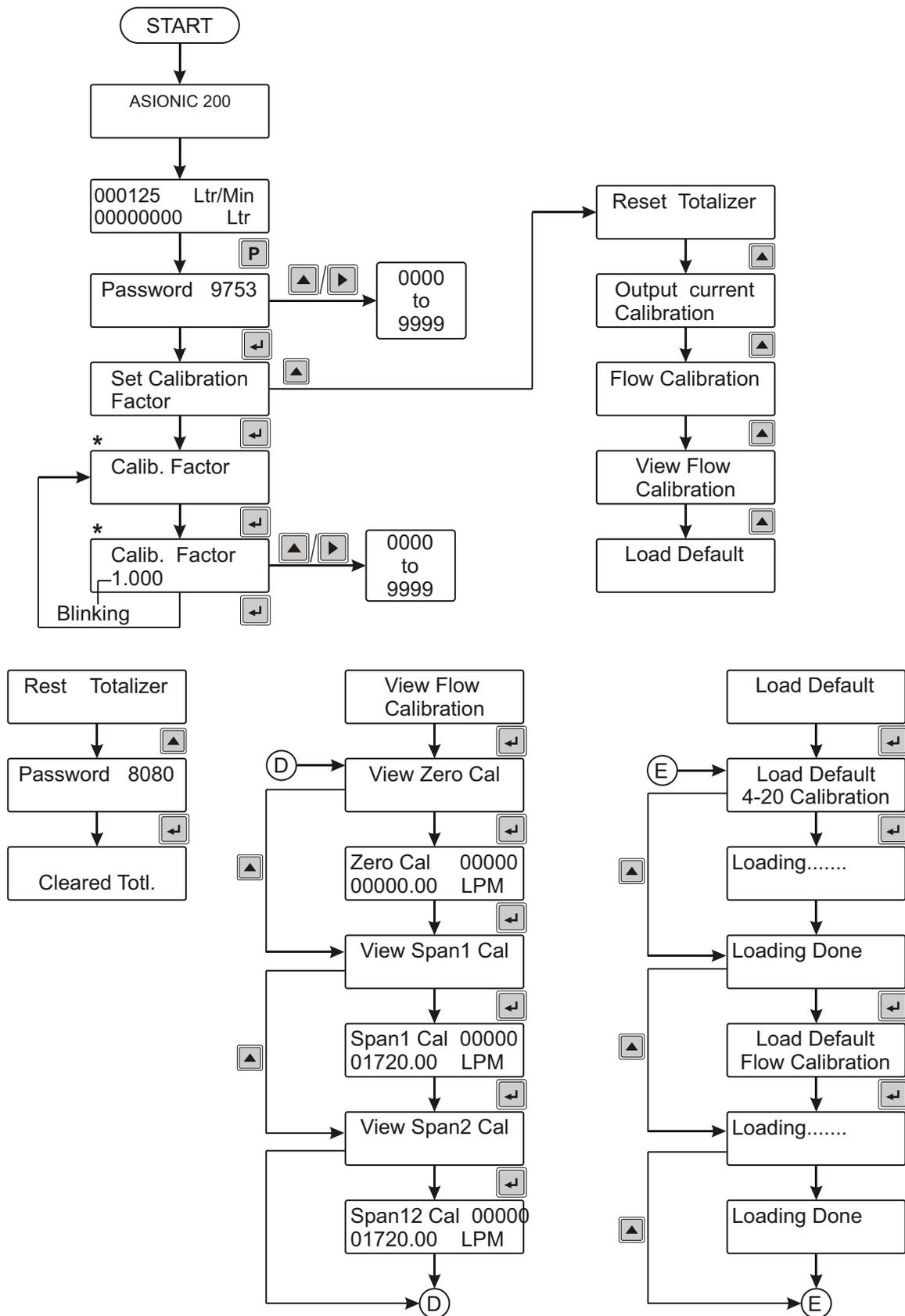
* Press **P** To Exit to higher level menu

5.4 Set Instrument Information :

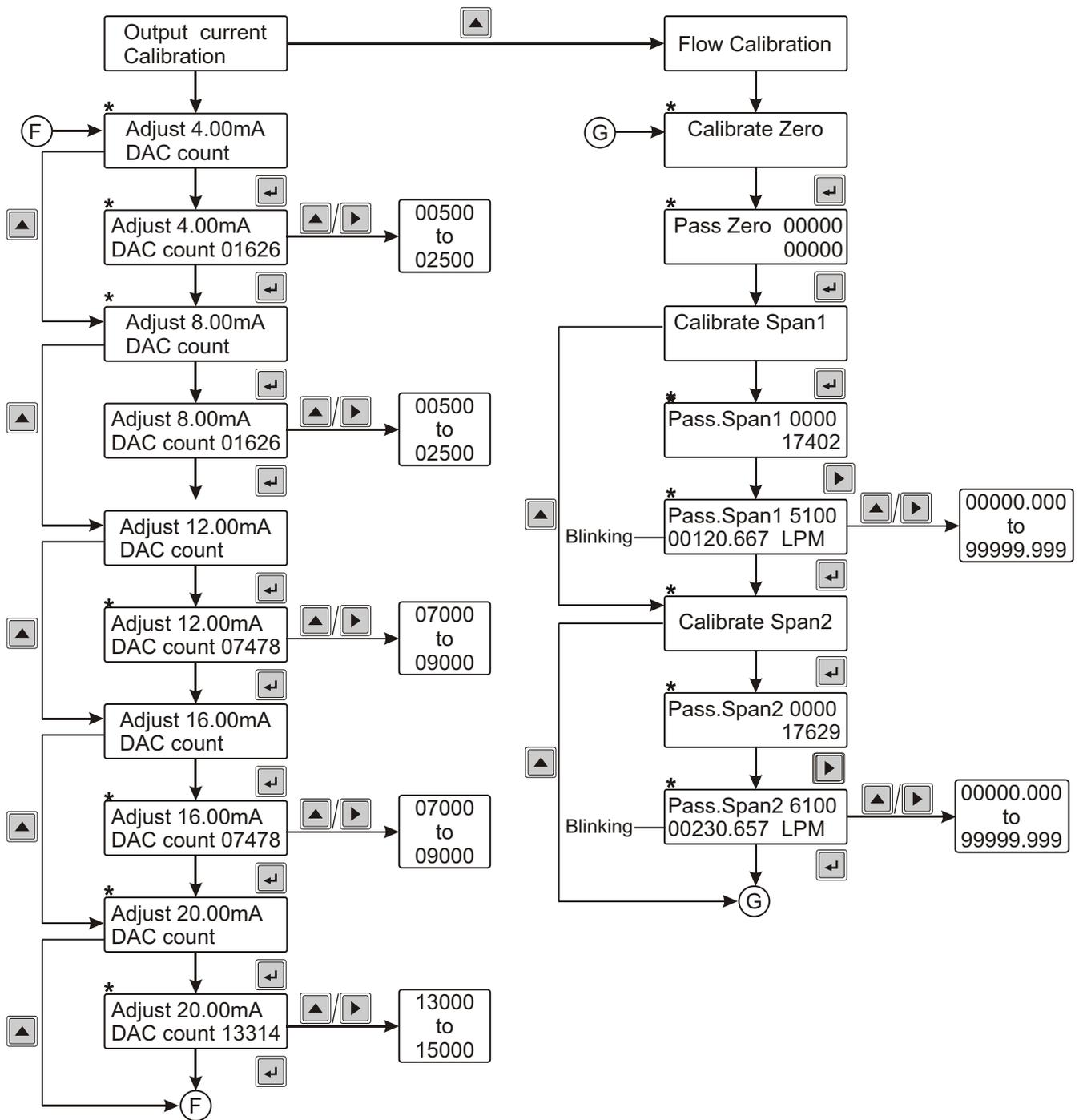


* Press **P** To Exit to higher level menu

5.5 Calibration Mode :



* Press **P** To Exit to higher level menu



* Press **P** To Exit to higher level menu

6. CALIBRATION PROCEDURE

6.1 Set calibration Factor:-

- 1] Do the connections as per the termination details.
- 2] Power ON the instrument, LCD display will show 0004.91 m3/Hr
000000.02 m3 LH
- 3] Go to the program mode by pressing **P** key. Now display will show Enter Password
0000
with left most 0 digit blinking. Enter password as 9753 using **▲** key, to increment value & **▶** key, to shift cursor to immediate next digit on right side.
- 4] When last digit enter Press **◀** key. Now Display will show Set calibration
Factor
- 5] Press **◀** key. Display will show Calib. Factor
Press **◀** key, display will show Calib. Factor
1.000
- 6] Now, adjust the calibration factor with the help of **▲** & **▶** key.
Press **◀** key to save the count.
- 7] Now Press **P** key to come out of calibration mode.

6.2 (4-20mA)RET. OUTPUT CALIBRATION :-

- 1] Do the connections as per the termination details.
- 2] Power ON the instrument, LCD display will show 0004.91 m3/Hr
000000.02 m3 LH
- 3] Go to the program mode by pressing **P** key. Now display will show Enter Password
0000
with left most 0 digit blinking. Enter password as 9753 using **▲** key, to increment value & **▶** key, to shift cursor to immediate next digit on right side.
- 4] When last digit enter Press **◀** key. Now Display will show Set calibration
Factor
Press **▲** key. Display will show Reset Totaliser
- 5] Press **▲** key. Display will show Output current
calibration
- 6] Press **◀** key. Display will show Adjust 4.00mA
DAC count ——— Approximate DAC Count
Press **◀** key, display will show Adjust 4.00mA
DAC count 01626 ——— Approximate DAC Count Blinking
- 7] Now, adjust 4.00mA at output with the help of **▲** & **▶** key.
Press **◀** key to save the count.

8] Similarly, Adjust respective output current as display shows 8.00mA, 12.00mA, 16.00mA & 20.00mA.

9] Now Press **P** key to come out of calibration mode.

10] Now check the current output as per the retransmission set limit i.e. Lo & Hi limit.

6.3 FLOW CALIBRATION :-

1] Do the connections as per the termination details.

2] Power ON the instrument, LCD display will show

0004.91 m3/Hr
000000.02 m3 LH

3] Go to the program mode by pressing **P** key. Now display will show

Enter Password
0000

 with left most 0 digit blinking. Enter password as 9753 using **▲** key, to increment value & **▶** key, to shift cursor to immediate next digit on right side.

4] When last digit enter Press **◀** key. Now Display will show

Set calibration
Factor

Press **▲** key. Display will show

Reset Totaliser

Press **▲** key. Display will show

Output current
calibration

5] Press **▲** key. Display will show

Flow Calibration

Press **◀** key. Display will show

Calibrate Zero

6] Press **◀** key. Display will show

Pass. Zero 000.0	— Last enter value
00001 00003	— Approx ADC counts

Now ensure that pipe is completely filled with the fluid for the zero flow calibration. (Half filled pipe line will lead to incorrect calibration.)

Now press **▲** key. Counts in the first row starts increasing. Now after 10 sec press **▶** key. Counts in the first row will stop increasing.

7] Press **◀** key, to Store Zero Flow Counts.

8] Now, Display will show

Calibrate Span1

. Press **◀** key

Display will show

Pass.Span1 000.0	— Approx ADC counts
17402	

Now pass approximate 20 to 30% of full scale flow through the flow meter, counts will start increasing.

Let the count become stable. Once the count is stable then press **▲** key. Counts in the first row starts increasing, now press **▶** key after certain fixed time (1 min.)

9] Now measure the quantity of liquid passed through the flow meter by weight and measurement or any other equivalent method and calculate the flow rate in LPM from this measure quantity of liquid.

9] Now display will show Set span 1
xxxxx.xxx LPM Press  key display will show Set span 1
xxxxx.xxx LPM — Blinking

Now enter the calculated LPM value in the second row by  &  key. after that press  key.

Display will show Calibrate SPAN 2

Press  key display will show Pass SPAN 2 XXX.X
XXXXX

10] Now pass any flow between 30 to 100% of full scale range (Normally 60%). Counts will start increasing.

Let the count become stable after that press  key. Counts in the first row start increasing

Now press  key. After certain fixed time (Say 1 min) measure that quantity of liquid and from that calculate flow in LPM. Display will show Set SPAN 2 XXX.X
XXXXX.XXX LPM

Now Press  key. Display will show Set SPAN 2 XXX.X
XXXXX.XXX LPM — Blinking

11] Now enter the calculated flow in LPM in the second row by  &  key to save SPAN2 calibration.

Now display will show Calibration ZERO

12] Calibration over. Now press  key to come out of calibration mode.

7. MODBUS (RS 485) COMMUNICATION DETAILS

Supported communication parameters.

- 1) Slave ID = 01 to 99
- 2) Baud Rate = 4800/9600 / 19200 / 38400 bps
- 3) Parity = NONE / EVEN / ODD.

Sr. No.	Function Code	Register Address	Parameters	Details	Data Format
1	0x03	40001	RTC Hours	00-23hrs	Integer
		40002	RTC Minutes	00-59Min	Integer
		40003	Date	01 to 31	Integer
		40004	Mounth	01 to 12	Integer
		40005	Year	00 to 99	Integer
		40006	Flow Engineering Unit	1 : m ³ 2 : ML 3 : GAL 4 : Ft ³ 5 : Ltr	Integer
		40007	Time Unit	1 : Day 2 : Hour 3 : Min 4 : Sec	Integer
		40008	Totaliser Unit	1 : m ³ 2 : ML 3 : GAL 4 : Ft ³ 5 : Ltr	Integer
		40009	Flow Decimal Point	1 : 0000 2 : 000.0 3 : 00.00 4 : 0.000	Integer
		40010	Totaliser Decimal Point	1 : 0000 2 : 000.0 3 : 00.00 4 : 0.000	Integer
		40011-12	Totaliser Value	00000000 to 99999999	Long Integer
		40013-14	Serial Number	00000000 to 99999999	Long Integer
		40015-16	Continues Flow	000000 to 999999	Long Integer

Sr. No.	Function Code	Register Address	Parameters	Details	Data Format
		40017-18	Max Flow Range	000000 to 999999	Long Integer
		40019	Calibration Factor	0.000 to 9.999	Integer
		40020	Low Flow Cut Off	00.0 to 20.0%	Integer
		40021-22	Damping Factor	0000.00 to 9999.99	Long Integer
		40023-24	Output Current Low Limit	0000.00 to 9999.99	Long Integer
		40025-26	Output Current High Limit	0000.00 to 9999.99	Long Integer
		40027	Line Size	20NB to 1500NB	Integer
		40028	Number Of Records	0000 to 3000	Integer
		40028	Data logging	0000 to 9999	Integer
		40256	Record-00	Hours	Integer
		40257	Record-00	Minutes	Integer
		40258	Record-00	Date	Integer
		40259	Record-00	Month	Integer
		40260	Record-00	Year	Integer
		40261	Record-00	Flow Unit	Integer
		40262	Record-00	Time Unit	Integer
		40263	Record-00	Totaliser Unit	Integer
		40264	Record-00	Flow decimal Point	Integer
		40265	Record-00	Totaliser decimal Point	Integer
		40266-69	Record-00	Totaliser Value	Long Integer
		40270-71	Record-00	Flow Value	Long Integer
		40272	Record-00	Reserved	Integer
		40273	Record-00	Reserved	Integer
		↓	↓	↓	↓
		48240	Record-3000	Hours	Integer

8. DOS & DON'TS

General mishandling on site :-

1. Application of power supply 24V DC at incorrect terminals like input .
2. Loose connection on terminations.
3. Incorrect calibration.
4. Sensor damage during insertion.
5. Sensor wires misplaced in terminals of input card.

Precautions to be taken on site :-

1. Read the instruction manual carefully before installing the instrument.
2. Do the connections as per the termination details given in the manual.
3. Terminal connections should be tight.
4. Check for proper supply voltage. It should be between 24V DC.
5. During calibration, follow the steps mentioned in the manual.
6. Verify that earthing is proper.
7. Check for proper communication between indicator and input card.

9. TROUBLE SHOOTING PROCEDURE

SYMPTOMS	CAUSE OF FAILURE	ACTION TO BE TAKEN
No display indication	1. Absence of power supply at terminal block 2. Loose connection on termination.	1. Check power supply connections & rectify the fault. 2. Tight the termination connections.
Incorrect flow indication.	1. Incorrect calibration.	1. Recalibrate the instrument. Refer calibration procedure.
Flow is not registered at all.	1. Reverse flow direction.	1. Check for correct flow measurement direction as indicated by arrow on the flowmeter.
Incorrect retransmission output.	1. Retransmission output calibration disturbed.	1. Recalibrate the instrument for retransmission output. Refer calibration procedure.
IPC comm. error message	1. Comm. error between input card and indicator. 2. Improper supply to input card	1. Check the comm. LEDs & connections. 2. Check for 5V supply to I/P card.

Periodical maintenance :-

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

Authorised Dealer



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