

# FLOW METER FT-650 (Full bore type)



## TECHNICAL SPECIFICATIONS

### INDICATOR

1. Physical dimensions	105 X 105 X 120 mm 92 mm X 92mm (panel cut out)
2. Enclosure	ABS Weather proof IP 65
3. Mounting	Field/Panel
4. Supply power	230V A.C./115V A.C./24V D.C.
5. Display range	0-9999999.9 m <sup>3</sup> /0-9999999 liters
6. Flow rate sampling	3 seconds
7. Resolution	0.01/0.1 depending on range
8. Accuracy	± 2% of FSD
9. Alarms/Control relays	1 no. 5 A @ 230 VAC
10. Display	16 X 2 Alphanumeric LCD
11. Calibration/Set point	Using front panel keypad.
12. Input	From sensor
13. Output	Relay output for batch quantity 4-20mA Current } Optional RS-485 }

### Sensor

1.Type	Full bore turbine	
2.Fluid	Water	
3.S.G of medium	1	
4.Max operating pressure	5.0 Kg/cm <sup>2</sup>	
5.Max operating Temp	60° C	
6.Bearing	<b>Ceramic with SS ball</b>	
7.Size	1"	2"
8.End connection	BSPM	BSPM
9.Face to face distance(mm)	205	260
10.Range ( LPH)	250-8000	1000-30000
11.Impeller	Polypropylene	

12.Body Material	Glass filled nylon
13.Cable	3 mtr 3 core Teflon

**\* Suitable only for water of normal pH.For any other applications contact nearest dealer**

**\*\* Each sensor is calibrated with specific meter. Hence use the sensor & meter as a single set.**

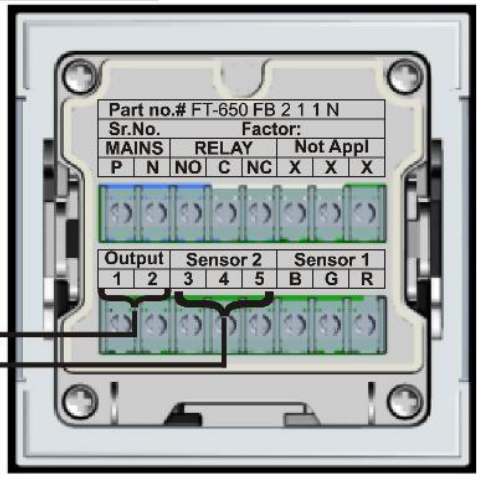
**GETTING AQUAINTED WITH THE METER:**

This meter is user friendly & easy to understand. Its operation will be clear when we go through all the parts of the meter.

**1. SENSOR:** It is the main part of flow meter. It consists of a turbine having magnets on its periphery. As the turbine rotates pulses are generated and sensed. These pulses are proportional to the flow through pipe.

**2. METER:** This is the unit that processes the information received from sensor and displays actual flow in the line. this unit also controls the flow by transmitting signals to dosing pumps, hooters, valves etc through inbuilt relays.

**WIRING CONNECTIONS:**



Part no.	Description	Terminal details	3	4	5
FT-650 FB 2 1 1 N	With one sensor only	Not appl.	X	X	X
FT-650 FB 2 2 1 1 N	With two sensors	SENSOR 2	B	G	R

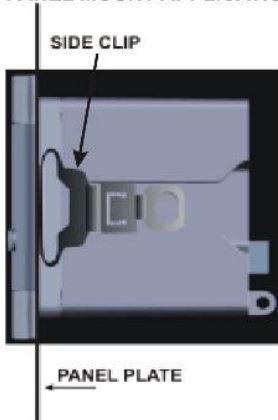
Part no.	Description	Terminal details	1	2
FT-650 FB 2 1 1 N	With relay output only	Not appl.	X	X
FT-650 FB 2 1 1 C	4-20 mA current O/P with relays	Current O/P	+	-
FT-650 FB 2 1 1 R	RS-485 O/P with relays	RS 485 O/P(Tx)	+	-



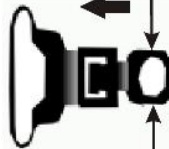
## INSTALLATION GUIDELINES:

**1)METER:** Meter has been designed to suit panel as well as field mounting as shown below.

### PANEL MOUNT APPLICATION



Press this downwards  
& Push forward to lock



Press this downwards  
& Pull out to unlock.

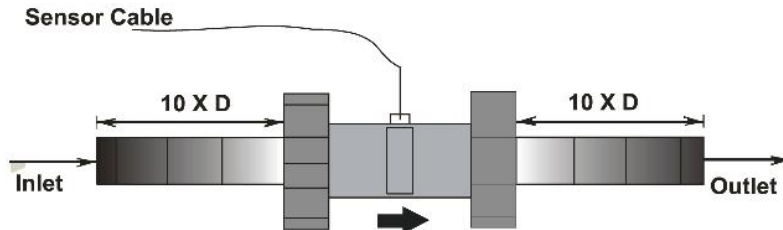


### FIELD MOUNT APPLICATION



## MOUNTING POSSIBILITIES

### 2)SENSOR:



- 1) While installing the sensor in line follow the arrow direction on the sensor body.
- 2) Sensor will be ideally located in horizontal line with minimum straight run as mentioned above.
- 3) Ensure upstream & downstream of 10 inches & 20 inches on either side for 1" & 2" line size respectively.
- 4) It is recommended not to loosen or tighten NUTS of the sensor while fitting on line (use extra union connectors on both ends).

### **ON SITE CALIBRATION OF METER:**

Each flow meter normally comes duly calibrated along with the corresponding sensor (for a given line size). In case re-calibration is required at site, the previously programmed channel constant can be increase/decreased in proportion to the difference in the reading between the actual flow and the displayed reading. Follow the instructions given below.

<b>KEY TO BE PRESSED</b>	<b>DISPLAY</b>
Scroll & select ch simultaneously	PASSWORD :000
Enter the password <b>123</b> using scroll & select ch keys	
	CH1 CONSTANT
	ml/PULSE: _ _ _ previously set value
Required value can be set by scroll & select ch key	
	EXIT

**In case of a dual sensor meter, CH2 CONSTANT can be**

<b>KEY TO BE PRESSED</b>	<b>DISPLAY</b>
Scroll & select ch simultaneously	PASSWORD :000
Enter the password <b>123</b> using scroll & select ch keys	
	CH1 CONSTANT
	ml/PULSE: _ _ _ previously set value
Required value can be set by scroll & select ch key	
	CH2 CONSTANT
	ml/PULSE: _ _ _ previously set value
Required value can be set by scroll & select ch key	
	EXIT

### **PROGRAMMING FLOW MONITOR:**

Aster Flow Monitor is user friendly and can be operated in following different modes as:

- Batcher Mode/Totaliser Mode
- Flow Comparator Mode
- Rate switch mode
- Pulsar mode
- Flow rate indicator

[To change the settings i.e. (operating the meter in a mode other than Totaliser) contact nearest dealer.]

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### **BATCHER MODE:**

In this mode the relay is programmed to operate after a fixed quantity of water passes through the sensor. When the power to the unit is switched ON, it displays

<b>ASTER</b>	
And then	FR1: 00000.0 Lit /hr
Press scroll key to toggle between	Total O/P T1 : 00000.0 Lit & Batch Qty B1 : 00000.0 Lit

The unit will count down the batch volume till value becomes zero after which relay will get energized. Relay could Operate in the following modes in case of a batcher.

- (1) **Auto reset:** In this mode relay will give a 2 sec pulse and will get reset and meter will start counting down the next batch.
- (2) **Manual Reset:** Once programmed quantity of water has passed through the sensor, relay will get energized with "BATCH OVER" indication on the display. Relay can be reset by pressing **ACK**. key
- (3) **Two Relay Operation:** When 80% of the water batch quantity passes through sensor, the first relay gets energized. This relay can be reset by pressing the **ACK**. key and second relay will get energized with "BATCH OVER" indication on display after programmed quantity of water passes. Relay can be reset by pressing **ACK**. key

### **HOW TO SET THE RELAY OPERATION MODE:**

<b>KEY TO BE PRESSED</b>	<b>DISPLAY</b>
Scroll & select simultaneously	PASSWORD :000
Enter the password <b>234</b> using scroll & select keys	
Menu	ENGG UNITS
MENU	CH1 ENGG UNITS
Menu	m <sup>3</sup>
m <sup>3</sup> can be changed to Liters by select ch key.	
Menu	QUIT
Menu	RELAY OPERATION
Menu	CH1 RELAY OPRN
Menu	MANUAL RESET
MANUAL RESET can be changed to AUTO RESET by select ch key.	

Menu	QUIT
Menu	EXIT

### **HOW TO DO BATCHER SETTINGS:**

<b>KEY TO BE PRESSED</b>	<b>DISPLAY</b>
Menu	View settings
The display scrolls through all the settings of meter and finally comes to --	CHANGE SETTINGS
Menu	CH1 SETTINGS
Menu	CH1 BATCH QTY (and then previously set value)
Set required batch quantity by using scroll & select ch key	
Menu	QUIT

### **HOW TO RESET THE TOTALISER READING:**

By using this function we can reset various values such as Totaliser reading, batch quantity, batch counter etc.

<b>KEY TO BE PRESSED</b>	<b>DISPLAY</b>
Scroll & select ch simultaneously	PASSWORD :000
Enter the password 456 using Scroll & Select ch keys.	
Menu	CLR CH1 TOT? NO
To reset the total press Select ch key	CLR CH1 TOT? YES
Menu	CLR CH1 BATCH? NO
To reset the total press Select ch key	CLR CH1 BATCH? YES
Menu	CLR CH1 CNTR? NO
To reset the total press Select ch key	CLR CH1 CNTR? YES
Menu	Exit

### **FLOW COMPARATOR MODE :**

This mode is ideal for Reverse Osmosis systems. Here the meter is supplied with 2 sensors (one for permeate line and the other for reject or feed line). The meter displays both the flow rates and also calculates the % RECOVERY. One could set the relay at a particular recovery % and relay would get energized whenever the system recovery crosses the set point.

Recovery can be calculated by the formula:

$$\% \text{ Recovery} = \frac{\text{Permeate flow Rate (PR)} \times 100}{\text{Permeate flow rate(PR)} + \text{Reject flow rate (RR)}}$$

The relay will get energized, if actual recovery exceeds the set value.

**NOTE:** Second sensor is normally supplied for reject flow sensing. This can however be assigned as the inlet sensor. To change the factory settings, contact nearest dealer or supplier.

**HOW TO SET THE FLOW COMPARATOR:**

KEY TO BE PRESSED	DISPLAY
Menu	View settings
Menu	The display scrolls through all the settings of meter and comes to Change Settings?
Menu	CH1 SETTINGS
Menu	RECOVERY: _ _ _ _ previously set value
Set required recovery quantity by using scroll & select ch key	
Menu	HYSTERESIS: _ _ _ _ previously set value
Set required Hysteresis using scroll & select ch key	
Menu	QUIT
Menu	Display scrolling
Menu	Auto
Auto can be changed to manual by select ch key & vice versa	
Menu	EXIT

**IN CASE OF 4-20mA OUTPUT:**

In case of transmitter, meter takes the sensor input & gives 4-20mA output current. Factory settings for ZERO (value of flow at which transmitter would give 4 mA current) & SPAN (value of flow at which transmitter would give 20 mA current) are:

Reading	Current Output(mA)
00.00	4mA
	20mA



To change the SPAN settings follow below guideline:

Scroll & select ch simultaneously	PASSWORD :000
Enter the password <b>678</b> using scroll & select ch keys	
Menu	SPN
Menu	000.00 m3/hr. previously set value
Required value can be set by scroll & select ch key	

Instrument also works as 4\_20 mA current simulator.It gives 4 mA & 20 mA current for calibration of other instruments.Follow the below guideline:

KEY TO BE PRESSED	DISPLAY
VIEW & ACK	PASS
ENTER THE PASSWORD 0420 USING VIEW & ACK. KEY	
MENU	4 mA
Instrument will give 4 mA current	
MENU	20 mA
Instrument will give 20 mA current	
MENU	End
MENU	Actual reading

### IN CASE OF RS-485 OUTPUT:

In case of Flow meter with RS-485 output,if number of instruments are connected through same wire then each instrument should have it's specific address(called as meter address).To set the meter address follow the below guideline.

KEY TO BE PRESSED	DISPLAY
VIEW & ACK	PASS
ENTER THE PASSWORD 0345 USING VIEW & ACK. KEY	
MENU	Addr Previously set meter address
Use VIEW & ACK.key to change the address.	
MENU	Actual value

## TROUBLESHOOTING:

TROUBLE	PROBABLE CAUSE	ACTION
Display remains zero even if flow is there.	Flow less than the minimum sensing value required	<ul style="list-style-type: none"> <li>➔ Check if any downstream valve is closed. Open the valve, remove the sensor from the fitting and check the change in reading by physically rotating the turbine. If meter shows reading check whether there is actual flow.</li> <li>➔ Change the fitting if normal flow is less than the minimum sensing velocity.</li> </ul>
	Turbine not moving freely.	<ul style="list-style-type: none"> <li>➔ Check the direction Arrow.If it is wrong correct the orientation.</li> <li>➔ Remove the sensor.Clean Turbine &amp; ensure free movement of turbine wheel Refer opening instructions (Page 12)</li> </ul>
Meter shows error in reading	Wrong wiring	<ul style="list-style-type: none"> <li>➔ Connect the wires as per wiring diagram.</li> <li>➔ Recalibrate the meter</li> <li>➔ In case of multiple instruments ensure that the serial number of sensor &amp; meter is same.</li> </ul>
	Adequate straight run is not provided at upstream, downstream of sensor.	<ul style="list-style-type: none"> <li>➔ Provide straight run as per guidelines.</li> <li>➔ Provide a bend between the valve and the sensor.</li> </ul>
	Scale factor disturbed	<ul style="list-style-type: none"> <li>➔ Check factor. Correct factor as mentioned on sensor.</li> </ul>
No display	High voltage	<ul style="list-style-type: none"> <li>➔ Check input supply &amp; make proper connections</li> <li>➔ Check MOV/FUSE; if it is burnt then replace it with new one</li> </ul>
Frequent Fuse failure	MOV short	<ul style="list-style-type: none"> <li>➔ Replace MOV* as well as FUSE**</li> </ul>

\*MOV – 14mm Dia. and 320V AC

\*\* FUSE - 630mA

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## Parts List

Nut



Pipe



O-ring  
Bush



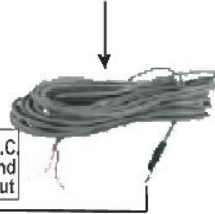
Turbine  
Ball



Sensor body



Sensor Cable



Red - +5V D.C  
Black- Ground  
Green - Output

### Opening Instructions:

1) While opening the sensor for cleaning always ensure that the arrow is pointing downwards before removing the turbine to avoid falling of the ball.

\*In case sensor is being connected directly to a PLC/Pulse counter it is recommended to put a pull up resistance of **1kohm** across O/P(Green) and Supply(Red) wires.

### Quick Reference :

Sr.No.	Password	Feature	Page no.
1	123	Calibration	6
2	234	Relay Operation	7
3	456	Reset readings	8
4	----	Batcher settings	8
5	420	Current output	10
6	678	Span settings	10
7	345	Meter address (In case of RS 485 O/P only)	10

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