

TURBIDITY METER

TB 650

(OPERATING MANUAL)



TECHNICAL SPECIFICATIONS:

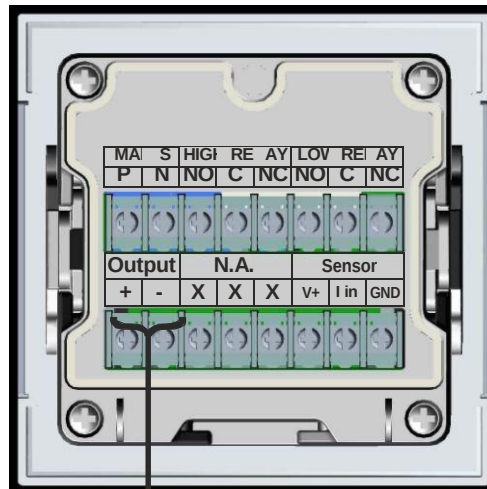
METER	
1. Physical dimensions Panel cut out	105 X 105 X 120 mm 92 mm X 92mm
2. Enclosure	ABS Weather proof/IP 65
3. Mounting	Field/Panel
4. Parameter sampling rate	< 2 seconds
5. Resolution	1
6. Accuracy	± 2% of FSD
7. Power supply	230V A.C./110V A.C./24V D.C.
8. Alarms	Separate LED indication for High & Low TURBIDITY value
8. Alarms/Control relays	Individual high & low relay (programmable through entire range with settable control delay & hysteresis)
9. Display	4 Digit 7 SEGMENT LED
10. Calibration/Set point	Using front panel keypad.
11. Output	4-20 mA D.C.Current } (Optional) RS-485
12. Range	0-1000 NTU
SENSOR	
1. Overall dimension	117 mm(L) X 30 mm(W)
2.Type	Flow through
3.Sensor O/P	Milli Volt
4.Electrode	IR BASED
5.Process connection	25NB SS BSPM
6.Integral cable	3 core
7.Application	Water
8.Temperature	0-60°C
9.Max. Pressure/Flow	5 kg/cm2/ 50lph

GETTING ACQUAINTED 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 the TURBIDITY Meter. It has IR BASED : One Transmitter and one Receiver electrode enclosed in PPE body. This is dipped into the line of which TURBIDITY is to be measured, it senses the TURBIDITY and sends a signal to the meter.
2. **METER** : This is the unit that processes the information received from the sensor and displays Actual TURBIDITY in the line. This unit also controls the TURBIDITY by transmitting signals to pumps, hooters, valves etc through inbuilt relays.

WIRING CONNECTIONS:

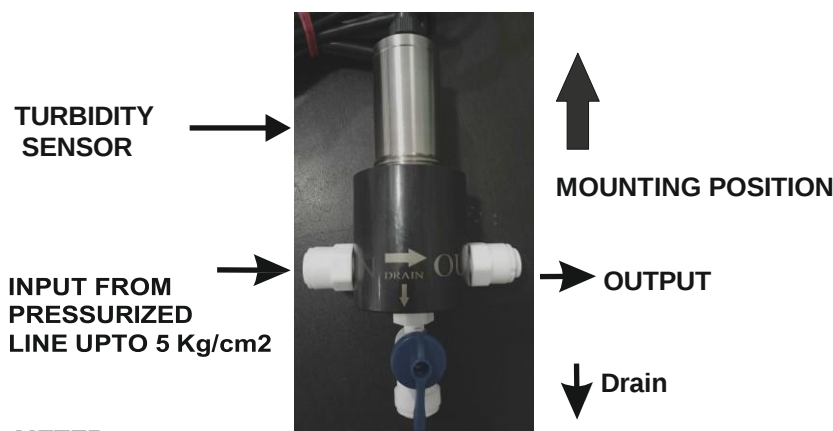


Description	Terminal details	1	2
With relay output only	Not appl.	X	X
4-20 mA current O/P with relays	Current O/P	+	-
RS-485 O/P with relays	RS 485 O/P(Tx)	+	-

INSTALLATION GUIDELINES:

SENSOR:

1. The TURBIDITY sensor is normally supplied with **25 NB** male threading.
Maximum flow in line should not more than **50LPH**.
2. The sensor should be mounted **vertically** in the line.
3. The sensor shall be connected in the **sampling line** and line is of material PVC/UPVC only no metal.
4. The sensor body is delicate meant for the pressurized line up below **5 kg/cm²**.
5. The fitting should be connected to the **sampling point**.
6. Sensor cable/lugs should not be extended.
7. Sensor need regular cleaning.

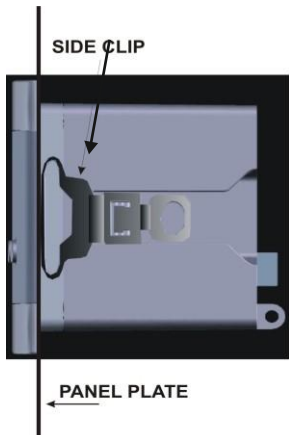


METER:

The meter is designed to suit field, panel as well as sensor mounting as shown below.

MOUNTING POSSIBILITIES

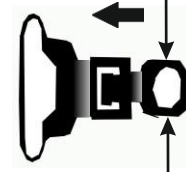
PANEL MOUNT APPLICATION



SENSOR MOUNT APPLICATION



Press this downwards
& Push forward to lock



Press this downwards
& Pull out to unlock.



METER OPERATION:

In regular operation, the TURBIDITY Meter displays the actual TURBIDITY in the Line. Pressing the view key display will scroll through all the settings in the TURBIDITY meter.

PROGRAMMING THE SET POINT:

For programming the set point go as per following table

KEY TO BE PRESSED	DISPLAY
MENU	St Hi (Set High)
MENU	Previously set high TURBIDITY value
Use ACK. & VIEW key to set high TURBIDITY value	
MENU	HYS1 (Hysteresis* 1)
MENU	Previously set Hysteresis value
MENU	St Lo (Set Low)
MENU	Previously set low TURBIDITY value
Use ACK. & VIEW key to set Low TURBIDITY value	
MENU	HYS2 (Hysteresis* 2)
MENU	Previously set Hysteresis value
MENU	END

Hysteresis (hys1):

The %age value for which the relay will not reset after getting energised. For eg. If the high TURBIDITY value is set at 180 and the hysteresis is kept at 10% then the high relay will get energised the moment TURBIDITY exceeds 180 (after the set control delay) and will remain energized until the TURBIDITY value falls to 162. And similar is the case with hyst2 i.e. for low TURBIDITY. Eg. If low set point is 80 with 10% hysteresis, the relay gets reset only when the TURBIDITY goes over 88. (Normally, both hysteresis values are kept at 10%).

Low set point should be lower than the high set point else meter will

ON SITE CALIBRATION OF METER:

The TURBIDITY Meter supplied comes duly calibrated by experienced professionals from our factory. In case the need arises for onsite calibration please follow the below procedure:

Before starting the calibration procedure ensure availability of standard millivolt(mV) solutions.

KEY TO BE PRESSED	DISPLAY
VIEW & ACK	PASS then 0000
ENTER THE PASSWORD 0123 USING VIEW & ACK. KEY	
MENU	CpTS
MENU	MAKE IT 3
ACK	2 (in case of Two point calibration)
MENU	Zero
Dip the sensor in RO WATER ,wait till reading stabilizes	
ACK	ZSet
Dip the sensor in 100 NTU Standard solution ,wait till reading stabilizes	
MENU	Cpt 1 (second point of calibration)
MENU	Actual reading
ACK	First Digit will start to blink.
Use VIEW & ACK. key set value to100	
Dip the sensor in 1000 NTU Standard solution ,wait till reading stabilizes	
MENU	Cpt 2 (third point of calibration)
MENU	Actual reading
ACK	First Digit will start to blink.
Use VIEW & ACK. key set value to1000	
MENU	END

Note : Incase the actual reading for zero and span differ by 40% then the meter will show Sensor error and start showing readings as per previous calibration.

OPERATION MODES

The meter can be operated in three modes (based on relay operation):

1. **CONTROL MODE:** In this mode, the relay gets energized and will be time proportionately energized between the set value and the hysteresis.e.g.If the high value is kept at 180 with 10% hysteresis , between the TURBIDITY values of 180 & 198 high relay would operate in an ON/OFF cycle(total cycle time 10 seconds).

The ON time increases as the TURBIDITY value approaches 198 beyond which relay remains energized. The same operation will be for Low TURBIDITY value.

2. **ALARM MODE:** In this there are two options:
 - i) Ack (Acknowledge) : In this mode, the relay will get energized and reset once Ack. key is pressed.
 - ii) nAck (No Acknowledge) : In this mode relay will be energized as long as pH value is across the set point. One can't reset the relay with Ack. Key
3. **AUTO RESET MODE:** In this mode, the relay gets automatically reset after 2 seconds.

KEY TO BE PRESSED	DISPLAY
VIEW & ACK.Simultaneously	PASS
ENTER PASSWORD 0234 USING ACK. & VIEW KEY	
MENU	Cdly (control delay)*
What is this ? This is the delay for which processor will ignore increase/decrease in TURBIDITY value & will energise relay after this much time (in seconds).	
MENU	0010
Use ACK. & VIEW key to change this time	
MENU	rlop
Use ack. key to make it AUtr(Auto reset) or CntL(Control) or CLng(Cleaning)	
MENU	Ack
Use ACK. key to make it nAck	
MENU	END
MENU	Actual reading

IN CASE OF 4-20mA OUTPUT:

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

Reading(mV)	Current Output(mA)
0000	4mA
1000	20mA

To change the Zero & Span settings follow the guideline below:

KEY TO BE PRESSED	DISPLAY
VIEW & ACK	PASS
ENTER THE PASSWORD 0678 USING VIEW & ACK. KEY	
MENU	Type
MENU	Norm
MENU	Zero
MENU	Previously set ZERO value
Use VIEW & ACK.key to change the value	
MENU	SPAN
MENU	Previously set SPAN value
Use VIEW & ACK.key to change the value	
MENU	END

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

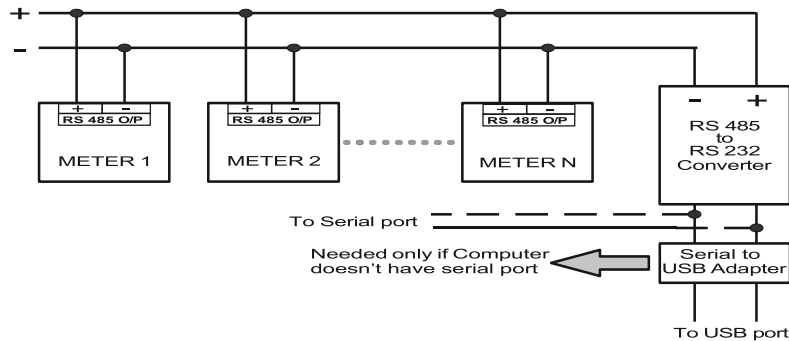
KEY TO BE PRESSED	DISPLAY
VIEW & ACK	PASS
ENTER THE PASSWORD 0420 USING VIEW & ACK. KEY	
MENU	4 mA
Instrument will give 4 mA current	
MENU	20 mA
Instrument will give 20 mA current	
MENU	End
MENU	Actual reading

IN CASE OF RS-485 OUTPUT:

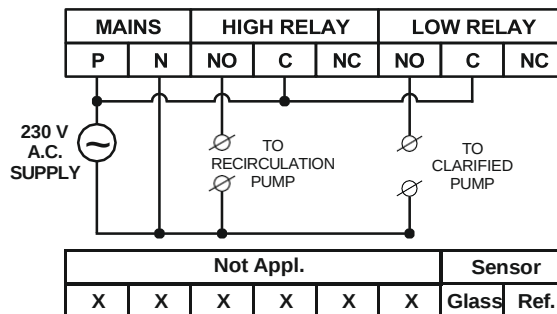
In case of Turbidity meter with RS-485 output, if number of instruments are connected through same wire then each instrument should have its specific address (called as meter address). To set the meter address follow the below guideline.

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	Prt
MENU	none
Use ACK. key to change parity EvEn/Odd.	
MENU	Actual value

Connection diagram for number of meters (with Rs485 O/P) to Computer:



TYPICAL WIRING DIAGRAM OF A PUMP THROUGH RELAY :



TROUBLESHOOTING:

TROUBLE	PROBABLE CAUSE	ACTION
<u>DURING COMMISSIONING</u>		
Fluctuating readings	Sensor not dipped in the line properly	Loop the outlet tubing such that the tee always remains flooded with water
	Wrong wiring	Connect the wires as per drawing
Display Shows Erroneous reading	Sensor not dipped in the line properly	Loop the outlet tubing such that the tee always remains flooded with water
Meter shows 2000	Sensor output may be more or less than the min. or max. values	Recalibrate the meter. If problem persists change the sensor
No display	High voltage	Check MOV/FUSE, if it is burnt then replace it with new one
Frequent Fuse failure	MOV short	Replace MOV* as well as FUSE**

*MOV 14mm Dia. and 320V AC

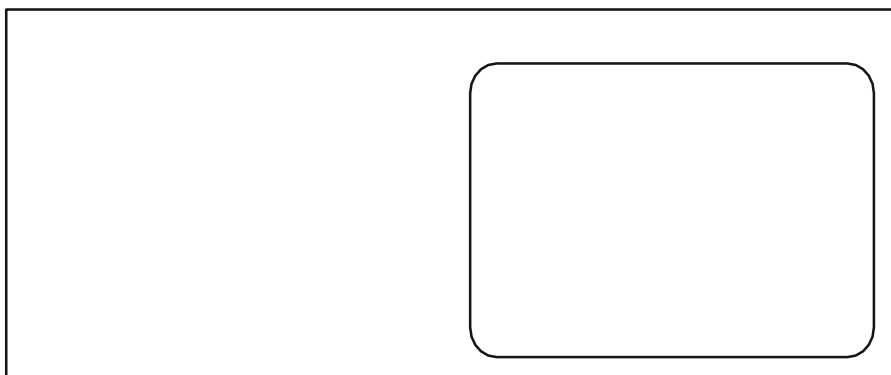
** FUSE -- 630mA

Follow the guideline below for better results.:

DOS	DON'TS
Do turn TURBIDITY meter OFF before disconnecting electrode.	Do not touch the bottom part of TURBIDITY electrode with your hands, especially the bulb or reference junction.
Do rinse the TURBIDITY electrode thoroughly with deionized water before measuring a new sample.	Do not scratch or damage the TURBIDITY electrode bulb. This may totally break electrode or result in erroneous readings
Do standardize your TURBIDITY sensor frequently for the most accurate results.	Do not use reference junction with fast flowing reference junction in small samples where flow of reference solution could contaminate the sample.
Do mount TURBIDITY sensor in a sampling line vertically.	Do not mount the sensor in any housing other than the supplied one
	Do not put the sensor in pressurized line above 5kg/cm ² . Ensure the output is always kept open to atmosphere.
	Do not extend the sensor cable.

Follow the guideline below for better results.:

DOS	DON'TS
Do turn TURBIDITY meter OFF before disconnecting electrode.	Do not touch the bottom part of TURBIDITY electrode with your hands, especially the bulb or reference junction.
Do rinse the TURBIDITY electrode thoroughly with deionized water before measuring a new sample.	Do not scratch or damage the TURBIDITY electrode bulb. This may totally break electrode or result in erroneous readings
Do standardize your TURBIDITY sensor frequently for the most accurate results.	Do not use reference junction with fast flowing reference junction in small samples where flow of reference solution could contaminate the sample.
Do mount TURBIDITY sensor in a sampling line vertically.	Do not mount the sensor in any housing other than the supplied one
	Do not put the sensor in pressurized line above 5kg/cm ² . Ensure the output is always kept open to atmosphere.
	Do not extend the sensor cable.



Available with Your Trusted Partner for Water Treatment Solutions:

