FIPL

DO METER

DO 650

(OPERATING MANUAL)

TECHNICAL SPECIFICATIONS:

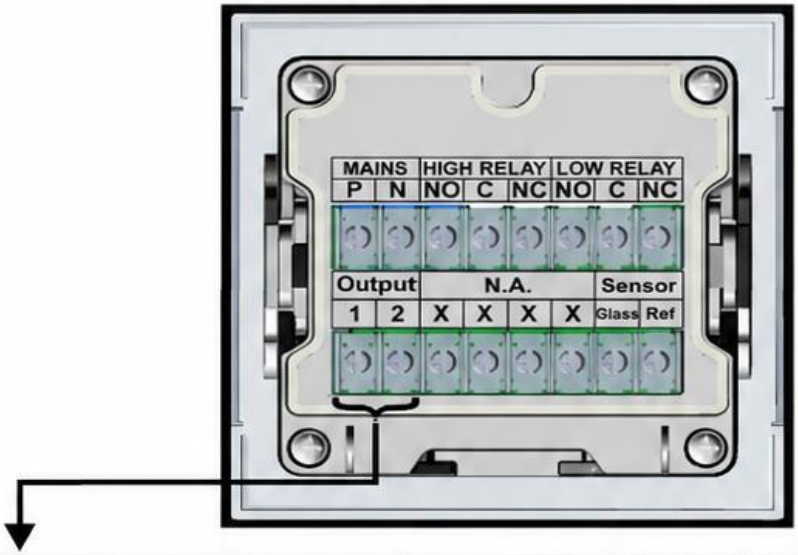
1. Physical dimensions Panel cut out	105 X 105 X 120 mm 90 mm X 90 mm
2. Enclosure	ABS Weather proof/IP 65
3. Mounting	Field/Panel
4. Parameter sampling rate	< 2 seconds
5. Resolution	0.1
6. Accuracy	± 2% of FSD
7. Power supply	230V A.C.
8. Alarms	Separate LED indication for High & Low DO value
8. Alarms/Control 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 RS-485 } (Optional)
12. Range	00 to 10 ppm

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 DO Meter. This is dipped into the line/tank of which DO is to be measured, it senses the DO and sends a signal to the meter.
2. **METER** : This is the unit that processes the information received from the sensor and displays actual DO in the line. This unit also controls the DO by transmitting signals to dosing pumps, hooters, valves etc through inbuilt relays.

WIRING CONNECTIONS:



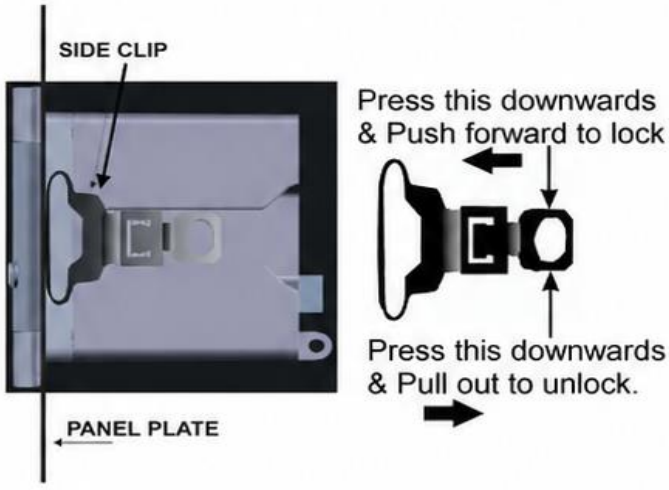
Description	Terminal details	1	2
With relay output only	Not appl.	X	X
4-20 mA current O/P with relays	Current O/P	+	-

INSTALLATION GUIDELINES :

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

MOUNTING POSSIBILITIES

PANEL MOUNT APPLICATION



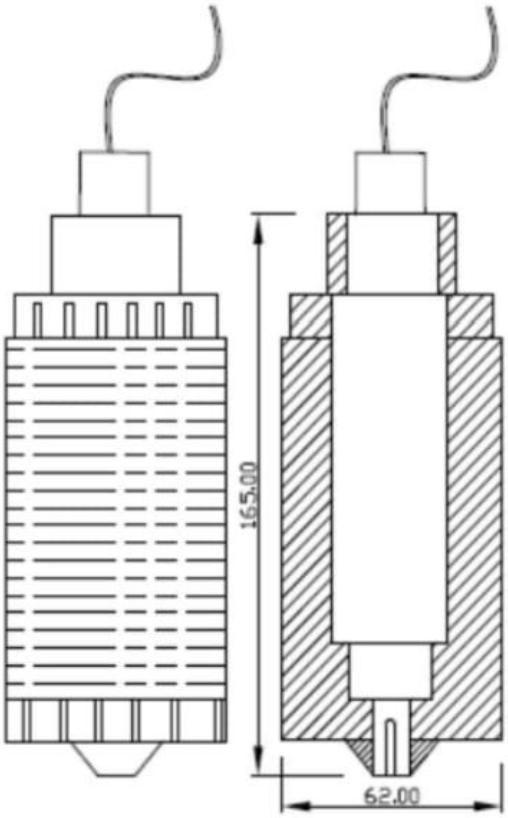
SENSOR MOUNT APPLICATION

INSTALLATION GUIDELINES :

The sensor is designed to suit tank mount application. However it can not be submerged in the tank for more than one feet. As long as possible the DO sensor should be close to the water surface and should not be exposed to suspended solids directly. The sensor holder design is suitable for such application.

Please ensure the protective cap is removed before installation.

SENSOR HOLDER DRAWING



METER OPERATION:

In regular operation, the DO Meter displays the actual DO in the Line. Pressing the view key display will scroll through all the settings in the DO 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 DO value
Use ACK. & VIEW key to set high DO value	
MENU	HYS1 (Hysteresis* 1)
MENU	Previously set Hysteresis value
MENU	St Lo (Set Low)
MENU	Previously set low DO value
Use ACK. & VIEW key to set Low DO value	
MENU	HYS2 (Hysteresis* 2)
MENU	Previously set Hysteresis value
MENU	TEmP(Temperature)
MENU	Previously set temp. value
Use ack. & view key to set temp value	
MENU	END

Hysteresis (hys1):

The %age value for which the relay will not reset after getting energised. For eg. If the high DO value is set at 18 and the hysteresis is kept at 10% then the high relay will get energised the moment DO exceeds 18 (after the set control delay) and will remain energized until the DO value falls to 16.2 And similar is the case with hyst2 i.e. for low DO.Eg. If low set point is 4 with 10% hysteresis, the relay gets reset only when the DO goes over 4.4. (Normally, both hysteresis values are kept at 10%).

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

ON SITE CALIBRATION OF METER:

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

Before starting the calibration procedure ensure availability of standard solutions.

KEY TO BE PRESSED	DISPLAY
VIEW & ACK	PASS then 0000
ENTER THE PASSWORD 0123 USING VIEW & ACK. KEY	
MENU	Calb
MENU*	SInG(in case of Single point calibration)
ACK	Dual(in case of Two point calibration)
MENU	Pnt 1
Dip the sensor in (0) mV solution and calibrate 0 ppm. (Dissolve **20 gm SMBS (Sodium Meta Bi Sulphite) in 300 mL DM** water by continuous stirring it. Leave the solution at STP(standard temperature and pressure) conditions for 15 min. Then dip sensor in the solution. The sensor should not detect more than 2-3 mV in the solution else there something wrong with the solution.)	
ACK	SETC
Using VIEW & ACK. key set value to 000.0	
MENU	END
MENU	Actual reading
MENU	Pnt 2 (second point of calibration)
Dip the Sensor in fresh water (8 ppm) *(Remove sensor from sensor body, clean it in RO or DM water make sensor dry and keep it in fresh water for 10mins. Make sure sensor is at ambient temp (25°C) with no sunlight falling on the sensor and surrounding is well ventilated.)	
MENU	Acrd(Actual reading)
ACK	SETC
Using VIEW & ACK. key set value to 008	
After calibration check sensor by dipping in RO water the reading should be above 7ppm.	

*In case of single point calibration,Dip sensor in standard DO solution & follow below guideline.

MENU	SInG
MENU	ConS
MENU	Previously set value.
Use VIEW & ACK.key to set the constant to match the readings.	
MENU	End
MENU	Actual reading

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.
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 DO 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.

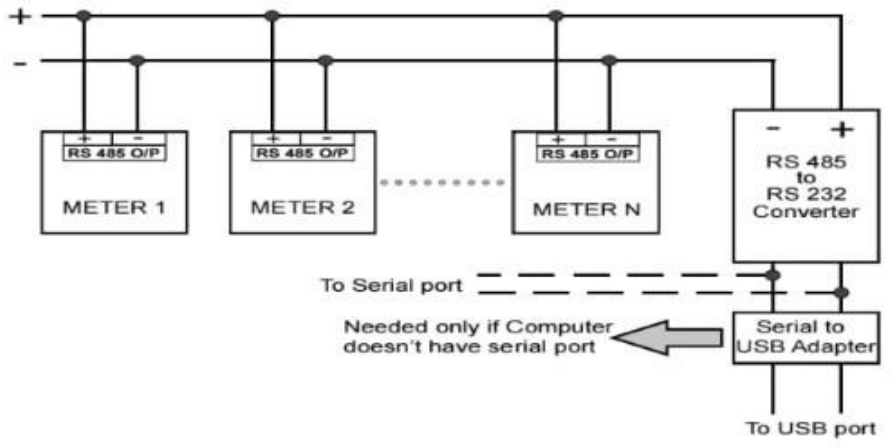
KEY TO BE PRESSED	DISPLAY
VIEW & ACK.Simultaneously	PASS
ENTER PASSWORD 0234 USING ACK. & VIEW KEY	
MENU	Cdly (control delay)*
What is this ? This is the delay for which processor will ignore increase/decrease in DO value & will energies relay after this much time (in seconds).	
MENU	0010
Use ACK. &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

IN CASE OF RS-485 OUTPUT:

In case of pH meter with RS-485 output,if number of instruments are connected through same wire (as shown below) 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 Simultaneously	PASS then 0000
ENTER THE PASSWORD 0345 USING VIEW & ACK. KEY	
MENU	bd.rt (Baud Rate)
MENU	4800
Use ACK. Key to make it 9600 (if required).	
MENU	Addr(Address)
MENU	Previously set meter address
Use VIEW & ACK.key to change the address.	
MENU	Prty
MENU	none
Use ACK.key to change the Parity as EvEn/odd	
MENU	End
MENU	Actual value

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



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 DO at which transmitter would give 4 mA current) & SPAN (value of DO at which transmitter would give 20 mA current) are:

Reading(PPM)	Current Output(mA)
000.0	4mA
010.0	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

TROUBLESHOOTING:

TROUBLE	PROBABLE CAUSE	ACTION
DURING COMMISSIONING		
Fluctuating readings	Sensor not dipped in the line properly	Loop the outlet tubing such that the sensor always remains flooded with water
	Wrong wiring	Connect the wires as per drawing
	Sensor not sensing	Disconnect the sensor, by removing the wires then by shorting the input terminals, check the reading, the reading is around 0000, then change the sensor.
DURING CALIBRATION		
Meter shows sensor error	Difference between actual reading of span and zero is less than 40%	Recalibrate the meter
DURING NORMAL SERVICE		
Display Shows Erroneous reading	Sensor not dipped in the line properly	Loop the outlet tubing such that the sensor always remain flooded with water.
Meter shows sensor error	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 remove electrode sleeve or cap before using a new electrode.	Do not touch the bottom part of DO electrode with your hands, especially the bulb.
Ensure that the constant flow around sensor. Sensor cable/lugs should not be extended.	Do not scratch or damage the DO electrode bulb. This may totally break electrode or result in erroneous readings.
The sensor should be mounted **vertically** in the Tank. Dip sensor 2ft. inside tank but not more than that.	Do not use reference electrode with fast flowing reference junction in small samples where flow of reference solution could contaminate the sample.
Do turn DO meter OFF before disconnecting electrode.	Do not mount the sensor in any housing other than the supplied one
Do rinse the DO electrode throughly with d-ionized water before measuring a new sample.	Do not put the sensor in pressurized line above 5 kg/cm2.Ensure the Sensor tip is always kept inside water of Tank.
Sensor need regular cleaning.	Do not mount sensor in horizontal plane.
	Do not extend sensor cable.