SYSTEM USER MANUAL -

RTM AstroSCAN - Online Monitoring System for

Sewage Treatment Plants

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- PUSH BUTTON FRONT KEYS for easy set up
- INDIVIDUAL HIGH & LOW SET POINT RELAY for alarm or signal to PLC or can be used for proportional acid/alkali dosing
- PROGRAMMABLE CONTROL DELAY
- IN-BUILT DIAGNOSTICS for wrong calibration or sensor error
- IN-BUILT ALARM ANNUNCIATOR It's a facility to acknowledge high/low fault condition and reset relays by pressing the acknowledge key DUAL LINE BACKLIT LCD which displays pH, TSS,
- BOD,COD, & Flow , RS 485 for online monitoring/ data logging.
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- MULTIPLE SENSORS WITH RS485 OUTPUT can be connected to the data logger if provided with Modbus map
- 16 ANALOG OUTPUT SENSORS can be connected
- CREATES GSM/GPRS NETWORK to share safely with cloud
- VERY LESS POWER CONSUMPTION
- Device can be able TO STORE DATA FOR 30 DAYS, in case of connectivity issues to gateway or cloud

i. pH

- Sensor Type: Inline Electrode
- Input Supply: 8 to 24V D.C
- Accuracy: ± 2% FSD
- Calibration: Using Trim pots
- Output: Isolated 4 - 20 mA
- Measuring range: pH 0 to 14

ii. TSS, BOD & COD

- Sensor Type: Infra Red LED
- Accuracy: ± 10% FSD
- Ref: CPCB revised Guidelines, July 2018 Measuring range:
- Biological Oxygen Demand (BOD eq) – 0 to 100
- ppm
- Chemical Oxygen Demand (COD eq) - 0 to 150 ppm
- Total Suspended Solids (TSS eq)- 0 to 100 ppm

iii. Electro Magnetic Flow Sensor

- Sensor Type: Full Bore Electro-Magnetic
- Input Supply: 230 A.C ± 15%
- Accuracy: ± 2% FSD
- Calibration: using front panel keypad
- Output: 4 - 20 mA Current or RS 485
- Measuring range: 2 -35 m3/hr

i. pH

A pH sensor is one of the most essential tools that's typically used for water measurements. This type of sensor is able to measure the amount of alkalinity and acidity in water and other solutions.

The most common method of measuring pH is to use an electrochemical pH sensor. Glass pH electrodes are being utilized for the measurement of pH values using liquid internal reference systems, which had been introduced on principle nearly hundred years ago and are still existing.

ii. TSS, BOD & COD

S.No.	Monitoring Parameters	Measurement Technique	Description	Accuracy	Application
1.	Total Suspended Solids (TSS)	1. Nephelometry Method 2. Turbidity range – 0 to 100 NTU 3. Ref: CPCB revised Guidelines, July 2018	The sensor measures suspended particulates by employing a light beam (source beam) and a light detector set to one side of the source beam. Sensor emits at its end an infrared light capable of detecting particles that are suspended in water measuring the light transmittance and the dispersion rate to measure the amount of TSS (Total Suspended Solids) present in water.	±10	Technique suitable / applicable for STP's treated water with Turbidity between 0- 50 NTU only
2.	Biochemical Oxygen Demand (BOD)	1. Regression Equation 2. Co-related with Turbidity & TSS 3. CPHEEO Manual, 2013, Part B, Chapter 4	The principle of the regression equation is related to the BOD caused by colloidal and suspended organics as relatable to the BOD. BOD is co-related to suspended solids using Turbidity and TSS values. This technique is similar	±10	Technique suitable/applicable for STP's treated water with Turbidity between 0-50 NTU only

S.No.	Monitoring Parameters	Measurement Technique	Description	Accuracy	Application
			to Palintest tube method for instantaneous assessment of BOD using nephelometry and theory mentioned in the 2013 CPHEEO Manual for operation and Maintenance of Sewage Treatment Facilities. The technique is developed only for sewage and not for industrial effluent. The results are within 90% accuracy.		
3.	Chemical Oxygen Demand (COD)	1. Regression Equation 2. Co-related with Turbidity & TSS	The regression equation is developed for STP treated water based on co-relating Turbidity and TSS across samples from sensor & lab values to establish the corelation to derive COD. The technique is developed only for sewage and not for industrial effluent. The results are within 90% accuracy.	±10	Technique suitable/applicable for STP's treated water with Turbidity between 0-50 NTU only

INSTALLATION GUIDELINES:

- Plug & Play system can be placed at any place with power connection & cellular network connectivity.
- The system can be installed at any place as IP66 protestation has been provided.
- All the sensors can be easily connected to the Smart INFI using PCB connector.
- Kindly check the antenna connection as loosely connected antenna will impact the data communication.

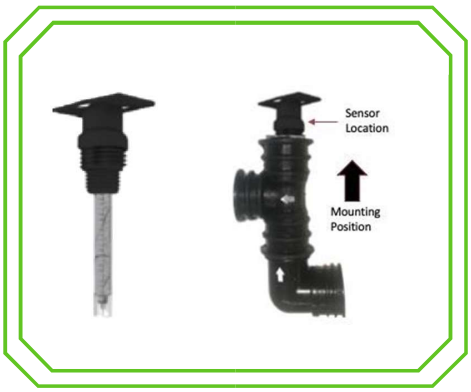
6. INSTALLATION - SENSORS CASING

INSTALLATION GUIDELINES:

- Sensor Pipe casing comes with an opening of each sensor.
- From the left pH, TDS & Turbidity can be added
- Arrow marks has been provided in the casing to ensure flow direction. The piping must be looped
- in such that the sensors fittings remain filled with Water always.

7. INSTALLATION - SENSORS

i) pH



- pH sensor comes with 20NB installation fittings with a female threading.
- Mounting of the sensor should be Vertical in the line.
- The sensor shall be connected in the sampling line only as the sensor body is meant for the pressurized line up to 5kg/cm2.

ii) TSS/BOD/COD

- IR LED sensor comes with 25NB installation threaded T -fittings. Mounting of the sensor should be Vertical in the line.
- The sensor shall be connected in the sampling line only as the sensor body is meant for the pressurized line up to 5kg/cm2.
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ii) Electro magnetic Flow Sensor

It is very Important that all the personnel working with the equipment have read and understood the instructions given in the manual and follow the instructions and directions as given below:

- The Flow through the sensor should be in the same direction as the arrow indicated on the sensor

8.

CALIBRATION OF SENSORS

i) pH

- Before starting the calibration procedure ensure availability of fresh buffer solution of 4 and 7 pH
- Press Left & right arrow button simultaneously, and enter password: 210 Select: calib pH zero? And
- it will show ACT Value of the sample water. Dip the sensor in 4 Ph solution, wait till reading
- stabilizes & then display will start showing reading (e.g.04.05) with first digit blinking. Set this value to 4.00 using up/down button & press select to confirm calibration.

ii) TSS/BOD/COD

- Before starting the calibration procedure ensure availability of known NTU solutions
- Press Left & right arrow button simultaneously, and enter password:456 Select: calib Tbd zero? And
- it will show ACT Value of the sample water. Dip the sensor in known calibration solution (O NTU),
- once the value is constant, select the up button to confirm the calibration.

ii) Electro Magnetic Flow Sensor

CHANGING FLOW CONSTANT

Note: The instrument has been calibrated at the factory under standard conditions, incase of a need of field calibration

KEY TO BE PRESSED	DISPLAY
Scroll & select ch simultaneously	Password: 000
Enter the password **123** using scroll & select ch keys	
Sensor Interface	FLOW CONST
	previously set value
Increase or Decrease the OCNST v using scroll & select ch keys	ılue to match with the actual flow
	EXIT

HOW TO RESET THE ENGINEERING UNIT:

By using this function, we able to Select Engineering Unit

KEY TO BE PRESSED	DISPLAY
Scroll & select ch simultaneously	Password: 000
Enter the password **234** using scroll & select ch keys	
	Engg Unit Change
Menu	LPH / m3 / hr

HOW TO DO ZERO SETTING:

By using this function, we can set Zero of the meter. Ensure that the pipe is full of water and there is no flow before doing zero setting

KEY TO BE PRESSED	DISPLAY
Scroll & select ch simultaneously	Password: 000
Enter the password **234** using scroll & select ch keys	
	Engg Unit Change
Menu	LPH / m3 / hr

9. POWER SUPPLY & CONNECTIVITY

The power supply is adapted to work in the entire world. The Primary Power supply is 230 V single phase. You could also power the system by battery or solar panel from 75 Watt Panel, 20 AH

CONNECTIVITY	
Cellular	Available Technologies - 2G, 4G
SIM Card	Single SIM Slot
Cellular Connection	IoT SIM Airtel & Vodafone (India)
Data Transmission	Periodic, as per client requirement
Antenna	External Antenna

10. DATA & SOFTWARE

Data Hosting	Cloud
Cyber-Security	TLS 1.2 Protocol
Software Integration	REST API
IoT Software Platform	Web-based from desktop, tab & mobile
Greenvironment Mobile App	iOS, Android
Data Export Options	PDF, CSV
Device Memory	In-built SD Card
Data Communication	Two-way Authentication
Alert Notification	SMS, Email, Voice
System Health Check	Included

11. MAINTANANCE & CLEANING

1.Ensure all the quality Parameters within the acceptable limit.

2.If any of the parameters are abnormal/ beyond acceptable limits, as a basic troubleshooting:

Step 1 - Ensure that the pump is pumping the water to sensor sampling pipe line, if not check the pump is taking load. load the pump incase of no load.

Step 2 - Check the water in the pipe casing to ensure the sensor is in contact with water, if not check if the valve is open slightly to get the water from the treated water pipeline.

Step 3 - Check if sludge accumulated on the sensor tip and clean the same.