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RTM- SmartINFI

Greenvironment
Innovation and Marketing India (P) Ltd

Product: **RTM SmartINFI – Sewage Treatment Plant (STP) Monitoring**

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The document gives brief description of RTM SmartINFI, real time monitoring system description along with its solutions architecture with details of hardware and software.

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System Documentation – SmartINFI, Real Time Monitoring System

1. Introduction

Sewage treatment plants are dynamic systems that require adjustments to be made on the fly for smooth running, and for this access to real-time data is absolutely essential. However, at present, operational decision-making at most plants remains largely reliant on after-the-fact information. Moreover, the pressure to keep running costs low forces many customers to rely on unskilled operators for plant management, resulting in unreliable and sub-optimal performance. We have developed SmartINFI Real-Time Monitoring (RTM) system to address these problems.

RTM SmartINFI system comprises of real-time data collection, analysis and control tools. Using Internet based technologies (IoT) and a full array of smart sensors, we collect data pertaining to quality, flow, energy & other environmental indicators from our customers' water utilities/treatment plants. Using analytics, the system identifies potential issues and alerts operators in real-time to prevent unnecessary shutdowns. It also analyses performance trends to proactively identify issues well before they can develop, further improving both reliability and performance of the plants. The system also facilitates transfer of knowledge from experts at a remote-control center to local operators in real-time.

2. Solution Architecture

The architecture of the system is explained in figure 1.

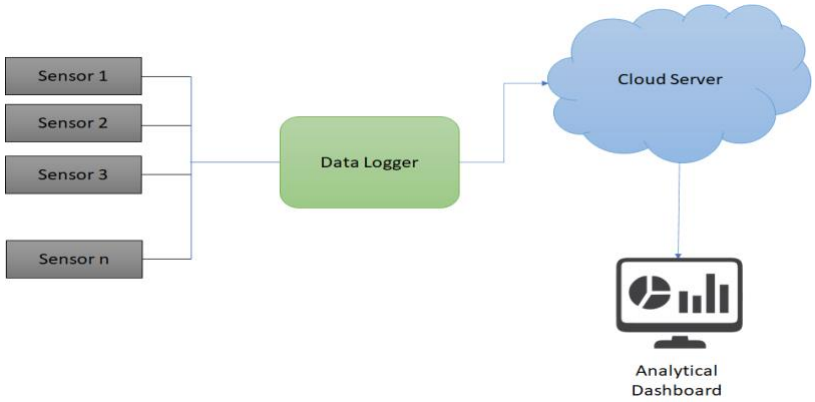


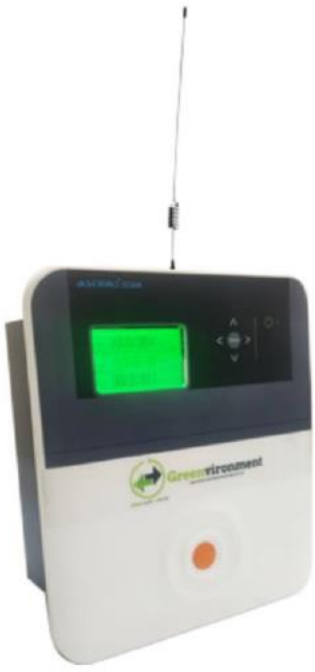
Figure 1: Solution Architecture of SmartINFI, Real Time Monitoring System

The hardware of SmartINFI comprises of data loggers and sensors. We employ indigenously built hardware with maximum locally available content, in order to make the replacement/ repair very easy and quick, in turn to prevent/ minimize the shut down time period. The hardware has been developed with the following features:

- Geo location support
- Robust Body/ Weather resistant
- Web Based Dashboard accessible in all platforms
- Mobile and Web-interface for provisioning the device & also for monitoring each device periodically
- Supports calibration of multiple sensors with flexible output format
- Optional battery as well as AC power operated with moderate power consumption

A. Technical Specification – Hardware & Software

a. RTM SmartINFI Panel



- **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, TDS, RC, Turbidity, Nitrate, Flow and Pressure along with relay status
- **RS 485** for online monitoring/ data logging.

b. Data Logger

- **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

c. Details of Sensor

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) Total Dissolved Solids

- 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: 0 to 1999

iii) Turbidity

- Sensor Type: Infra-Red LED
- Accuracy: ± 10% FSD
- Robust and waterproof
- Measuring range: 0 - 100 NTU
- Maximum Pressure: 5 Bar
- Operating Temperature: 5 to 50° C

iv) Nitrate (Additional)

- Sensor Type: Ion Selective Electrode
- Resistance at 25°C : <2.5 meg Ohm
- Accuracy: ± 10% FSD
- Concentration range: 0.4 to 62,200 ppm
- Operating Temperature: 5 to 50° C
- Operating pH range: 2 to 11
- End point time: Typically, 10 to 30 sec

vi) Residual Chlorine (Additional)

- Sensor Type: Ion selective Electrode
- Input Supply: 8 to 24V D.C
- Accuracy: ± 2% FSD
- Calibration: Using Trim pots
- Output: Isolated 4 - 20 mA
- Measuring range: 0 to 40 ppm

Note:

SmartINFI sensors in the system measures pH with an ion selective glass electrodes, TDS with a toroidal sensor, and infrared (IR) based optical sensor for Turbidity & TSS measurement. BOD & COD parameters are measured with a regression equation with ± 10% accuracy. The sensors are factory calibrated and reference samples is provided for field level calibration.