
TM
FMCON
CUSTOM DESIGNED
SENSORS AND
INSTRUMENTS
Sensors &
Measuring
Instruments for
Environment
INDIGENOUS AND
CUSTOM MADE
SENSORS & MEASURING
INSTRUMENTS

EMCON™
CUSTOM DESIGNED SENSORS AND INSTRUMENTS

SENSORS AND INSTRUMENTS
FOR HYDRO-DYNAMIC MODEL STUDIES

Over 30 years EMCON have been designing,manufacturing ,indigenous, custom-made SENSORS & MEASURING INSTRUMENTS in the field of Ocean Sttudies, Meteorology, Agricultural Science,Architecture Studies, Fisheries , Dam Safety...etc..
Today EMCON prides itself in having developed more than 150 different types of sensors and instruments which has been used by over 600 different institutions, research centers ,colleges ,defencesector & various other industries throughout the country.

There have been several studies conducted based on our new sensors and data acquisition systems. Some of them are already implemented in NITC, NITK, NITS, CET, NIOT, IIT's etc.

EMCON™
CUSTOM DESIGNED SENSORS AND INSTRUMENTS

Environmental Measurements and Controls

Over 35 years EMCON have been manufacturing custom-made innovative solutions in the fields of Ocean Technology, Meteorology, Agricultural sciences and Dam safety. EMCON prides itself in having developed more than 150 different types of sensors and related instruments which is been used by over 600 different government and private institutions and indusries throughout the country.

Suspension type water current meter with depth sensor for river gauging

Suspension type water current meter with hand held display unit

Suspension type Current meter for river gauging.

Special feature of EMCON Current meter:

- Direct Reading type (No chart required)
- Underwater probe: With technical features and facility for automatic stabilization under-water, despite the tilt of the suspension cable due to water thrust causing, major Cosine Angle error by the tilting of the suspension cable in higher velocities.

Specification:

Measurement type : All parameters are measured as direct reading and displayed in LCD/ OLED display.

Velocity sensor

Water current	:	Direct reading in M/sec.
Range	:	0 to 5 M/sec., +/- 0.04 M/sec.
Sensing threshold value	:	**Less than 0.04 M/sec.**
Display	:	Single display for display of velocity.
Water current sensing method	:	Savanius rotor for sensing at very low ranges with threshold values.

Depth sensor

Range	:	0 to 20 Meters.
Accuracy	:	+/- 1% of FS.
Operational depth	:	Direct reading in LCD/ OLED display in meters.

Weight of theSensor along with fish weight (dead load) : Less than 7 Kgs. in air.

Power : 9 volt rechargeable battery with Battery charger.
Cable length : 22 metres.
Material : Stainless steel
Carry case : Specially designed box with brackets and handles for easy transportation of the equipment.
Sensor handling rope : Nylon rope 22 meters.

Light weight portable hand-held device to carry along with the sensor which includes the battery inside.

Application : For measurements in rivers, lakes,estuaries & other water bodies.

Designers & Manufactures

EMCON™

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Savanious Rotor Type Current Sensor (Wading Rod)

Wading rod type Current Meter

Hand held display unit

Specification:

Measurement type	:	**Direct reading in M/sec.**
Electronic meter with single read out for current	:	**LCD / OLED display.**
Range of current/velocity	:	**0.02 to 4 M/sec.**
Accuracy	:	**0.03 M/sec.**
Sensing threshold value	:	**Less than 0.04 M/sec.**
Water current sensing method	:	**Savanius rotor for sensing from very low velocities.**
Cable length	:	**2.5 metres.(Longer cable if required can be provide).**
Materials used	:	**Stainless steel, Delrin and ABS plastic.**
Carry case (2nos)	:	**1. Bag for carrying the sensor 2. Bag for carrying the Hand held reader**

Hand Held Reader:

Electronic meter with single read out for Water current/velocity displayed: Displayed in an OLED display.

Power : 9 Volt Lithium battery with battery charger.
Power switch : Piano switch.

Applications: Idea for measurements in creeks, rivers, canals etc.

The sensors pick up the water current without making mechanical or magnetic load and hence have very low threshold values needed for model tanks.

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EMCON-Micro Impeller Type Water Current Meter

For measurement of velocity of water channels, creaks, model tank/ model studies, running water and related water bodies having Bi-direction sensing ability.

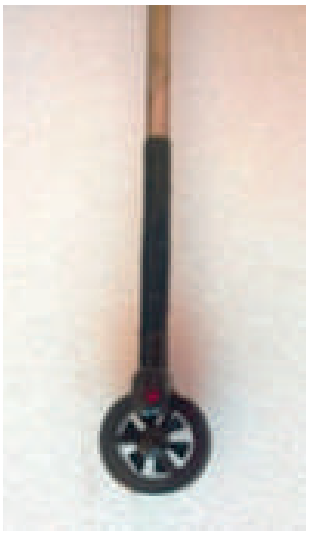

Image of micro impeller type Current Meter

Hand held display unit

Unique Features

- Measurement and display: Direct reading and display as cms. in LCD / OLED.
- Measures the velocity of water current from very low threshold levels
- Principle of measurement: Impeller having non-contact Infra-red pickup type.

Specification

- Range : 0 to 1 m/sec. (+/- 0.01m/sec)
- Measurement type : Direct reading in cms/sec.
- Dimension of the impeller case : 30 mm. daimeter.
- Dimension of sensor : Micro size of 30 mm diameter and 6 mm. thickness.
- Legth of the handle : 1 meter.
- Threshold value : Less than 0.01 m/sec.
- Water current sensing method : Impeller type rotor for sensing from very low ranges.
- Cable length : 1.5 meters (Longer cable length can be provided on demand).
- Material : Plastic impeller and plastic body fixed on a stainless-steel pipe with handle
- Carry case (2 nos) : 1. Bag for carrying the sensor
  2. Bag for the hand-held device

Application : For measurements in creaks, model tank/ model studies, etc.

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Water Level Sensor (Piezo Resistance Based.)

Depth sensor with its cable

Display unit ad sensor

EMCON Water level sensor is designed for Hydrological observation, where reliable sensor with accuracy of measurement and long-term stability is amust. The low power consumption makes it ideal for remote applications. The sensor provides a linear 0-to-5-volt output. The sensor can be used for longer periods in freash or marine waters.

Features

- Hydrostatic pressure-based measurement.
- Light weight and easy to install.
- Made of 316 grade stainless steel or suitable plastic material for use in marine waters also.
- Linear voltage output
- Small size
- Excellent long term stability.

Range of sensor:

- Different range of sensors from 0 to 1 meter to 1000 meters are available.

Selection of sensor ranges:

- The appropriate sensor with its required range may be selected as per the need of the user.

Electrical:

- Power : Minimum 7.5 to 12 V DC.
- Signal Output : 0.5 to 4.5 Volt having 5mA. output current.
- Impedance : Less than 1500 Ohms.
- Output power
- Rating : 5mA.

PHYSICAL:

- Length : 150 mm.
- Diameter : 30 mm.
- Weight : 450 grams.

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EMCON- Remote Sediment Monitor:

The equipment measures the sediment deposits of rivers, reservoirs, estuaries, back waters etc. The system consists of a remote operated under water probe (under waver suspended weighing scale) for sensing the sediment deposits and an electronic meter, where both being connected by long cable.

Sensor of Remote Sediment Monitor

Remote Sediment Monitor with its electronic display unit/Recorder

Description

The system consists of essentially 2 parts, namely an underwater probe and its electronic meter which records the data at preset intervals.

Under water probe:

This probe essentially is an underwater weight scale sensor, which measures the weight of the sediments settled on the pan/weighing balance along with time. It is designed for operation under water up to 50 m depth. The sensor which is made out of non-corrosive materials such as stainless steel, PVC, ABS-plastic etc. make them long term operational under water. The weight of the sediment settling pan is converted to electrical signals and transmitted to an electronic recorder/display unit which records the data.

Data Recording:

The data is recorded in an SD card which can be connected to a computer or Smart phone to see the data in Microsoft Excel. The data is made available with date and time stamp for detailed analysis.

Installation:

The sensor can either be placed on the river bed or water body using special anchoring methods or can be suspended in water from a buoy or float. The electronic meter can be placed on the float/buoy or can be cabled to the shore depending upon the location.

Specifications:

Range	:	0 to 300 grams, 500 grams or 1000grams, as weight in water.
Accuracy	:	+/- 1% of FS.
Sensor	:	Under water type for operation up to 50 m depth and facility for remote indication through long cables as per need of the installation.
Display	:	In digital LCD indicating the weight of the settled materials in grams. with outputs for feeding data to memory module or paper chart recorder.
Power	:	12 V DC using battery. Data storage in SD card.

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Specification for Water Current Meter with Direction for River/Oceans or Estuaries etc :

Water current meter with direction

Handheld display unit

Water current meter in easy carry box

Special feature of our Current meter:

- Direct display of water current and Direction of flow in its engineering units.
- Underwater probe: With technical features and facility for automatic stabilization under water, despite the tilt of the suspension cable caused by higher velocities. Helps to eliminate the major Cosine Angle error caused by the tilting of the suspension cable.
- Small and light dead weight/fish weight: Very easy to handle and light weight allows the equipment to handle very easily along with the carrycase and weight.
- Hydrodynamic design: The unique auto-balancing design allows the sensor to align its position, keeping the sensor aligned to water current very easily. This is a unique design only available with EMCON Current Meters.

Specification:

Portable Hand-held Reader :

Measurement display : All parameters are measured as direct reading and displayed in LCD display.

Light weight portable hand-held device to carry along with the sensor which includes the battery inside. Facility to display both current and its Direction in its respective engineering units.

Water current : Direct reading in M/sec.

Measures the average velocity of a fixed time for better accuracy.

Velocity sensor

Range of current	:	0 to 3 M/sec.
Accuracy	:	+/- 0.02M/sec.
Threshold value	:	< 0.01M/sec.
Display	:	Single display for display of velocity and Direction.
Water current sensing method	:	Savanius rotor for sensing from low ranges also.

Direction sensor

Type of measurement	:	Electromagnetic miniature direction sensor.
Range	:	0 to 360 degree
Accuracy	:	+/- 4 degree.
Weight of the sensor along with fish weight (dead load)	:	Less than 7 Kgs. in air.
Cable length	:	20 metres.
Material	:	Stainless steel for marine use.
Carry case	:	Specially designed box with brackets and handles for easy transportation of the equipment.
Sensor handling rope	:	Nylon rope 25 meter.
Power	:	9 volt rechargeable battery.

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AUTOMATIC TIDE RECORDER

Tide Recorder:

The microprocessor-based Automatic Tide Recorder is directly connected to its tide sensor using a long cable. The data can be collected at fixed time intervals in multiples of minutes. The data is stored in an SD card and can be down loaded to a smart phone or computer by connecting the SD card to it. The stored data can be exported to Microsoft Excel/CSV file for detailed analysis. The data consists of Date and time of recording, Tide data and Battery volt.

SD card as storage memory : 8 GB or 32 GB Ram. Sufficient for years of continuous operation.
Supply voltage : 7.5 to 12 volts (Mostly powered by 12-volt lead acid battery with its charger.
Battery charger : Will be supplied to charge 12-volt 18Ah. Battery.

Automatic tide recorder

Specification:

The complete system consists of two parts namely

1. Tide Recorder/Transmitter.
2. Pressure based Tide sensor.

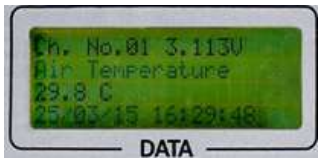
Wireless Transmitter. (Optional)

Automatic tide recorder

Features:

The microprocessor-based Automatic Tide Recorder is directly connected to its tide sensor using a long cable. The data can be collected at fixed time intervals in multiples of minutes. The data is stored in an SD card and

- Stores the Tide data by digitally removing all the water level fluctuations and stores the average water level of a fixed duration.
- Data is stored in SD card along with date and time.
- The system works on DC and is powered by a battery which is charged continuously on mains supply or Solar panel.
- Displays the present Tide values on its front panel display while manually pressing the display button.
- Resolution of data: 12 Bit.



Size of the new Dot Matrix digital display:
Total size of the display: 76 x 25 mm.

Data down loading:

MANUAL DOWN LOADING: Down loading the data directly to a computer or mobile phone using OTG device to connect the SD card or directly to a computer.

Procedure: Go to the site where the ATG is installed. Switch off the system and pull out the SD card from the system. The data from the SD card can be down loaded directly to Microsoft EXCEL/CSV file along with date and time.

Data output: The stored data can be down loaded by removing and connecting the SD card to a computer or mobile phone to download the data in Microsoft Excel/CSV. file along with date and time.

Date: The data consists of Date and time of recording, Tide data and Battery volt.

Tide data measuring technique: The equipment during each recording, measures and takes in account of all the water level fluctuations for a period of time and then records the average fluctuation value making the measurement more accurate and reliable.

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AUTOMATIC TIDE RECORDER

Measures the changes in hydrostatic pressure based on water level fluctuations with facility to compensate the atmospheric pressure using vented tubes.

*Vented cable: For Atmospheric pressure compensation.

Automatic tide recorder

Specification:

TRange	: 0 to 10 meters. (Other ranges on request).
Accuracy	: +/- 0.5% of FS.
*NOTE	: Higher accuracy sensors available on request.
Extra pressure safety	: 2X
Vented cable supplied	: 20 meters.

Wireless Data Transmission - Optional

Online Data Recorder using GSM-GPRS system:

Recorder	: Instant data recording at required intervals.
Storage	: In SD card.
Data downloading	: Directly to CSV file or Microsoft Excel. With date and time of measurement along with data.

*This is a separate cable which goes along with the electrical cable between the sensor and the Tide Gauge. The vented tube allows the sensor to compensate error caused due to changes in atmospheric pressure by allowing the pressure to pass through the tube towards the sensor.

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EMCON Rain Gauge: (Water level type)

EMCON introduces precision type Rain gauge by measuring water level inside the gauge at high precision. This is the only kid available in the market.

Specification:

Principle of measurement: Measuring water level inside the Rain gauge container at *fixed interval of 1 hour.

- Rain gauge material : Copper container.
- Diameter of the container : 12.2 Cms.
- Total height without funnel : 26.4 Cms.
- Sensor type : Capacitance rod to measure the water level in high precision.
- Accuracy of measurement : 2mm.
- Total height of measured water column : 14 cms.

Calculation to overcome the error of measurement due to evaporation:
The output of the sensor gives data in TTL format which contains the following information.

A. Present water level.
B. *Water level output accounting the negative levels variations caused by evaporation.
C. Data is made available every 1 hour.

*The measuring frequency should be minimum 1 hour or more to get the best results and accuracy.
*The data B contains all water level data towards rising levels. If water level goes down due to evaporation or other reasons, that information is accounted and without subtracting the loss in level, the data continuous increasing upward until it reaches the maximum water level of 14 cms. Once the water reaches 14 cms., an indication is sent through data to DRAIN the container. The draining can be done either manually or using our second model which is supplied with a pump.

Data protocol:

Data A : Ldata; for eg: L99.99
Data B : Rdata; for eg: R99.99

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REMOTE SILT METER

For monitoring suspended slit directly from water depths, without water sampling. This helps to conduct measurement/surveys faster and more accurately in larger areas.Ideal for conducting surveys of slitation and sedimentation characteristics of the area.

Photo of Remote Slit Meter and its sensor:

Example: 75 gms of Slit in 1 Kg. water increases the density of from 1.000 gms to 1.075 gms.
The sensor consists of a float which changes its buoyancy as a function of water density.
The buoyancy changes of the float which is proportional to suspenended slit, is converted to electro-inductive pulses and transmitted to the meter, where it is processed to give silt directly as gms.
Per liter. The electro-inductive signels produced in the sensor having low impedancelevels and high immunity to electrical noise are free electrical noise.

Specifications :

Range: 0 to 200 grams/liter.
Accuracy: +/- 1% of FS.= 2 grams.
Measurement time: Instantaneous.
Power: 12 volt x 1.2 Ah. re-chargeable battery.
Display: OLED/LCD display.

Data recording:

Being a portable instrument, we provide internal data storage/internal data logger as mentioned below.

Data-Logger:

Recorded in its internal detachable Pen drive which can be connected to a computerlater and down load the data.The data is recorded with time for the convenience of the user. THe data is made available with time stamp for properpresentation of the data in Microsoft Exel format.

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AUTOMATIC SILT RECORDER AND SEDIMENT SAMPLER

Consists of Silt in suspension sensor, a water pump to supply water from the nearby water body to the sensor container, and an extra-long sieve to collect the silt after silt measurement which will be useful for silt analysis at later stage.

Silt sample is filled inside the sampling tank Just before measurement

Silt sample is filled inside the sampling tank Just before measurement

Measurement process: During each fixed intervals of measurement, the equipment will pump in a fixed quantity of water from the nearby river, lake or other water body to the sensor chamber for making measurement of silt in suspension. Once this measurement is over, the water sample is allowed to pass through a sieve to trap all the silt as sediments. This silt trapped in the sieve can be used for silt analysis, being collected over time scale. The equipment has a display which shows the silt as grams/litre in its LCD display.

Specification:

Type of sensing	: Measurement of density using Archimedes principle.
Sensor	: Non-contact float sensor.
Range	: 0 to 100 grams/litre.
Accuracy	: +/-1 grams/litre.
Temperature compensation	: Done. (Periodically can be adjusted using a trim pot).
Measurement procedure	: Water sampling done using pump and then taken measurement.

Data collection - 2 methods are available:

1. Locally using internal SD card:

The data is collected in a SD card with date and time. The data can be downloaded to a smart phone or a computer by connecting the SD card. The data can be downloaded directly in Microsoft Excel/CSV format which will display the information along with date and time of data collection.
NOTE: No separate software is needed to download the data.

2. Wireless Data Telemetry:

The data that is recorded is transmitted (GSM-GPRS Wireless Data Telemetry System) at preset-fixed intervals to a server and the user can be seen and downloaded by login to a page. The user can see or download the data from any location using internet connection. The data is available with time stamp and can be downloaded to Microsoft Excel/CSV file.

DATA-SERVER FACILITIES PROVIDED:

The server shall maintain the data for 60 days and will automatically erase all previous data. In case there is no internet available on site the same will be stored in the local SD card and will remain there until internet connectivity is available.

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NEAR SHORE AND RIVERBED PROFILING SYSTEM

A simple and cost-effective system to measure the bottom or near shore/river beds profiles where an echo sounder cannot be used for a cost-effective alternative without compromising the data quality. The system records accurate contour of the bottom providing the user a good picture of the bed profile.

THE SYSTEM CAN BE USED FOR SURVEYING NEAR COASTAL LINES (SHORES), WAVE BREAKER AREAS, RIVERS, LAKES AND OTHER WATER BODIES.

Near Shore & River Bed Profiling System

A. Near Shore Profiling System:

Principle of measurement : Hydrostatic pressure based.

Range of measurement : 0 to 10 meters.

Accuracy : 0.5% of FS.

Hydrostatic pressure sensor to measure the depth of the water column with specialized electronics to remove the fast fluctuations caused by waves or other water movements caused by boats etc.

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Portable SALINITY-CONDUCTIVITY-TEMPERATURE METER

For direct measurements from water depths of wells, rivers, reservoirs etc. and suitable for special studies salinity intrusion, water quality etc.

Portable
SALINITY-CONDUCTIVITY-
TEMPERATURE METER

The equipment is portable and can be carried easily from place to place for conducting observations. It can be permanently fixed at a place for continuous monitoring and recording using a wireless telemetry device mentioned above, which receives the signals from the sensor through wired or wireless (Zig-bee) and records the data in date time series. The data is uploaded to a cloud based server, where the customer can access the data from any place using a mobile cellular smart phone or a computer connected to internet.

The measured parameters are :

Water conductivity	: 0 to 10,000 milli sem.
Water Salinity	: 0 to 38 PSU. +/- 1PSU.
Water temperature	: 0 to 40 °C +/- 0.1°C
Silt	: 0 to 200 grams/litre.

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EMCON™
CUSTOM DESIGNED SENSORS AND INSTRUMENTS

Environmental Measurements and Controls

Over 35 years EMCON have been manufacturing custom-made innovative solutions in the fields of Ocean Technology, Meteorology, Agricultural sciences and Dam safety. EMCON prides itself in having developed more than 150 different types of sensors and related instruments which is been used by over 600 different government and private institutions and indusries throughout the country.

WATER QUALITY MONITORING STATION WITH WIRELESS TELEMETRY

Introducing EMCON Electronic Water quality Monitor-Recorder. Designed for continuous monitoring of water quality parameters, directly from water depth of water bodies like ponds, rivers, lakes, oceans etc. The system is a bunch of sensors combined together to record different parameters of water quality and display or record them in time series.

Hand-Held Reader

The system consists of two parts such as Data-Logger, Controller and integrated Sensor unit.

The system consists of an electronic signal processor and its display unit, which displays the current information of quality parameters one by one. The system also has a recorder to record the data in time series in its internal removable SD card.

Display: Dot-matrix – 20-character 4 line display.

Displayed/Recorded parameters:

a. Dissolved Oxygen
b. Conductivity
c. Temperature
d. Salinity not supplied, but can be calculated from Conductivity and Temperature.
e. pH
f. ORP

Storage: In SD card and can be downloaded to CSV or Microsoft Excel directly.

Data downloading device and data format: The SD card can be inserted to an SD card reader to down load the data directly to Microsoft CSV or Excel file.

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WATER QUALITY MONITORING STATION WITH WIRELESS TELEMETRY

Data Telemetry:

The data can be transmitted to a server using its internal GSM-GPRS modem. The data transmitted can be down loaded to a smart phone or computer by logging into page provided. The data can be downloaded to Microsoft Excel having time series data of all parameters.

Data storage/transmission interval:

The data can be transmitted in an hourly basis or as per the need of the observation from a minimum interval of 15 minutes to multiplication of minutes.

Cable connectors	: Specialized connectors with environmental protected (splash proof design).
Power	: Solar Panel for charging the lead acid batteries.
Battery	: 6 or 12 volts battery to support the entire operation.
Recording interval	: hourly basis. (Every 4 hour)

*Additional information which can be provided:

Sensor to sense the vibration of the box where the instrument and solar panel is fixed. (Useful in cases where the instrument is placed in a theft prone/venerable place. Sensor to detect the loss, by observing the displacement of solar panel or opening of the instrument container to prevent theft.

Power	: Internal 6 or 12-volts battery with charger.

Removable memory (SD card recorder).

Recorder	: Instant data recording with variable recording interval selections.
Storage	: In SD card.
Data downloading	: Directly to CSV file or Microsoft Excel. With date and time of measurement along with data.
Carry case	: Permanently installed type.

Integrated sensor unit:

An integrated package of 5 sensors clubbed together to measure the different water quality parameters directly from the depth of waters. This helps the user to make measurements more effectively and on a wider area without water sampling.

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WATER QUALITY MONITORING STATION WITH WIRELESS TELEMETRY

EMCON-Dissolved Oxygen Sensor:

Senso-Lumin-S Optical Do Probe Product S

Pecification

Measurement Principle Optical measurement via luminescence

Measurement Ranges : 0 -20.00 mg/L 0.00-20.00 ppm 0-200%

Accuracy : ± 0.1 mg/L ± 0.1 ppm ± 1%

Response Time : 90% in less than 60 seconds

Measurement Interval : > 5s

Membrane Cap Cross Sensitivity : Organic solvents (acetone, toluene, chloroform, methylene chloride); Chlorine gas No Cross

Sensitivity : pH 1-14, H2 S, CO2 , SO2

Temperature Compensation :10K NTC

Temperature Accuracy : 0.5°C Sample

Temperature : 0-50°C

Max Pressure : 5 bar (72.5 PSI)

pH and ORP sensor:

pH & ORP ELECTRODES FOR ONLINE PROCESS MONITORING

Our EMC-S272CDTC for pH and ORP sensors deliver reliable online monitoring for in-line or submersion installation configuration. Double-junction reference extends sensor lifetime by preventing contamination of the reference with sample components that interact with Silver (Ag). Minimal maintenance required due to the flat glass measurement surface, which also reduces the threat of measurement surface breakage. A versatile sensor for moderate and multi-purpose applications. S272CDTC sensors come with a fully integrated cable assembly, and automatic temperature compensation is available for applications where it is required.

Specification:

pH Measurement Range : 0 - 14 pH (Sodium ion error when 12.3 < pH)

ORP Measurement Range : ± 2000mV

Temperature Range : 0-100°C (32-212°F)

Pressure Maximum : 100 psig.

Cable Length/Connector : 3m (10ft)

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WATER QUALITY MONITORING STATION WITH WIRELESS TELEMETRY

Conductivity and Temperature sensor:

Sensor for continuous observation of Conductivity using 4 electrodes.
The sensor can be used in marine waters continuously with minimum bio fouling.
The sensor can last long with minimum maintenance and works in very low power.

Conductivity sensor:

Type	: Platinum conductivity electrodes
Range	: 0 to 64 milli Seimens for marine use.
	0 to 25000µS/cm. To be selected. for fresh water use:
Accuracy	: ± 0.1 milli Seimens
Resolution	: 0.1 millli seimens

NOTE: Always use low range of 0 to 25000 µS/cm in fresh water application for better accuracy.

Temperature Sensor:

Type	: pT. 1000 type.
Range	: 0 to 80°C.
Accuracy	: 0.2°C

Data storage in server:

Server storage: Will get refreshed every 3 months.
NOTE: The user should save the data from the server every 3 months for the safety of data.

Power:

Battery with solar panel: System can be powered using solar panel and its battery for long term operations.

Cable length:

The entire set of sensors are combined together and comes with a cable length of 3 meters.

Facilities which can be provided free of cost:

1. Sensor to sense the vibration of the box where the instrument and solar panel is fixed. (Useful in cases where the instrument is placed in a theft prone/venerable place.
2. Sensor to detect the loss, by observing the displacement of solar panel or opening of the instrument container to prevent theft.

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ENVIRONMENTAL SENSORS

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Capacitance based Soil Wetness-Moisture Sensor (Model: EMC-SW-M-22)

Soil Wetness Sensor

- EMCON Soil Wetness sensor is designed for continuous observation of moisture as wetness, directly in soil or other engineered soils. The sensor gives accurate wetness/moisture percentage instantaneously. Specially designed to sense the slightest changes in moisture with excellent repeatability. The low power consumption makes it ideal for remote and long-term operations.

Features

- **The sensor can be connected with long cable for, enabling remote and centralized measurements.**
- **The sensor can be easily used for different soils.**
- **Linear voltage output of 0 to 5 Volt.**
- **Small size.**
- **Fully Indigenous make.**
- **Excellent sensor interchangeability.**
- **Excellent long-term stability.**
- **Affordable cost**

Applications

- **Precision farming**
- **Precision irrigation**
- **Soil science**
- **Agro Metrology and Hydro meteorology.**

Soil Moisture:

Type: Capacitive type.
Ranges selectable: 0 to 100%
Accuracy: < 2%
Repeatability: Within 1%
Resolution: 0.1 %
Operating Temperature range: -50 to 95 ^{O}C.
Output: 0 to 5 V, 5 mA. capacity.

ELECTRICAL:

Power: **5 volt up to 12 volt.**

PHYSICAL:

Width: **4 cms.**
Length: **12 cms.**
Weight: **less than 200 grams.**

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Evaporation sensor Capacitance type

Evaporation sensor installed on a pan.

Capacitance type Evaporation sensor

EMCON Evaporation sensor (Capacitance type) is designed for meteorological observation, where reliable sensor with accuracy of measurement and long-term stability is a must. The sensor provides a linear output for changes in water level fluctuations inside the evaporation pan. The sensor can be used for long periods in hostile weather conditions, with bare minimum maintenance.

Features

- Long term stability, repeatability with good accuracy.
- Does not respond to changes in ambient Temperature or Atmospheric pressure fluctuatuion.
- Fully sealed construction, for use in remote hostile and coastal areas.
- Linear output.
- Small size.
- Fully Indigenous make.
- Excellent sensor interchangeability.

Applications

- Meteorology, Agro Metrology, Hydrology etc.

Specifications

- Type : Capacitance type
- Outputs availble:
  Voltage : 0 to 3.3, or 5 volts.
  Range : 0 to 300 mm.
  Accurancy : +/- 1mm.

Electrical:

- Power : 7.5 to 12V DC depending upon the voltage required.

Physical:

- Length : 400mm.
- Sencering rod : 8mm.
- Weight : 400 grams.
- Material : Stainless steel and plastic used for long durability.

Cable:

- Cable : Supplied with 3-meter cable.
- Cable length : 3 meters.

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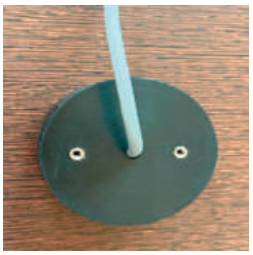
EMCON-Leaf Wetness Sensor

For disease prediction on plants or crops

Size of the sensor

Front view



Back view

Type of sensor: Capacitance type which can be directly exposed to sun light. The sensitive part of the sensor is covered by a thin layar of UV. protected coating, which is ideal for long tern operations. The sensor measures the laf wetness continuously which is a measure of dampness of the environment and this information helps to make sure the environment where plants or crops are grown is free from fungal or bacterial groth. The sensor is mostly used in AWS units for observations and predition of fungal or bacterial infection which occurs in plants/crops.

FEATURES

- Can be easily fixed on a platform or pole using the two sealed nut points which is part of the sensor.
- Sensor can be connected with long cable, enabling remote and centralized measurements.
- Wide operational temperature range.
- Linear voltage output.
- Small size.
- Low power consumption.
- Fully Indigenous make.
- Excellent long-tern stability.

APPLICATIONS

- Meteorology, Agro Meteorology
- Observation and control of “Climate control chambers” and plant growth chambers.

SPECIFICATIONS

- Range : 0 to 100%
- Accuracy : +/-1%
- Output : 0 to 5 or 3.3 selectable.
- Response : instant.
- Protection : UV protected which lasts for years.
- Power : less than 10 mA. at 12 volt supply.
- Input : 5 to 12 volt DC. Depending upon the output voltage selected.

Fixing the sensor

There are two nuts inserted behind the sensor body. This screw points can be utilized for fixing the sensor using suitable clamps or brackets.

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EMCON Barometric Pressure Sensor

EMCON Atmospheric pressure sensor is a digital sensor with high precision that measures the pressure variations in the atmosphere and can be operated in very rugged hostile weather conditions. The small size and very low power consumption makes it ideal for various field level applications. The sensor comes with a digital as well as analog output which can be fed to standard data loggers.

Barometric Pressure sensor

Features

- Excellent accuracy
- Long tern stability
- Temperture Compensated throughout the range
- Analog voltage output availble
- Compact size

Specifications

Differrent Ranges	: 300 to 1100 hPa (17.70-32.50 in Hg) other ranges on request.
Accuracy	: ± 1.5 hPa over the full pressure range.
Resolution	: 0.1 hPa.
Operating Compensation Range	: - 40 to 85 °C.
TemperatureCompensation Range	: - 40 to 85 °C.
Time constant	: Less than 10 sec. to reach 90% final output with step function pressure input.
Long tern stability	: ± 1.0 hPa over 12 months.
Accuracy	: ± 0.12 hPa average across the total range.

Electrical

Excitation Power	: 7.5 to 12 VDC. (Depending on the output voltage required)
Power	: 10 mA at 12 VDC.
Signal Output	: 0 to 5 V or 3.3 V DC.

PHYSICAL

Enclosure dimensions	: 140 mm X 20 mm (Tubular design).

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EMCON Solar Radiation sensor:

EMCON Pyranometer sensor is designed for metrological observation, where reliable sensor with accuracy of measurement and long-term stability is a must. The low power consumption makes it ideal for remote applications. The sensor provides a linear 0 to 3.3 or 0 to 5 volt output. The sensor can be used for long periods in hostile weather conditions, without maintenance or re-calibration. Special filters are provided to keep the sensor free from dust and water splash.

Solar Radiation sensor

Features

- **Photovoltaic sensor used for solar energy and light monitoring.**
- **Sensor can be connected to long cable without any loss in signal. (Ideal for remote monitoring.)**
- **Linear voltage output.**
- **Small size.**
- **Excellent Sensor Interchangeability.**
- **Excellent long term stability.**
- **Affordable cost.**

Applications

- **Metrology, Agro Metrology**
- **Agricultural Investigation**
- **Agricultural Evapotranspiration estimation.**
- **Observation and control of "Climate control chambers"**
- **Architectural/Civil/Structural studies**
- **Air Pollution Dispersion Calculation**
- **Educational Purpose**

Specification

The sensor is a photo diode which covers the required spectral range. silicon-cell pyranometer, calibrated to measure radiation, with an amplified output.

Type	**: Semiconductor type.**
Range	**: 0 to 1500 W/m² or 0 to 1800 W/m²**
Accuracy	**: +/- 3% of FS.**
Resolution	**: 1W/m2.**
Field of view	**: 90°**
Response time	**: 20 milli second.**
Operating Temperature range	**: -50 to 80°C.**
Output	**: 0 to 5 V and 5 mA. capacity.**

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Wind Direction sensor

EMCON - Wind Direction sensor is designed for metrological observation, where reliable sensor with accuracy of measurement and long-term stability is a must. The sensor provides a linear voltage output for changes in Wind direction. The sensor can be used for long periods in hostile weather conditions, without maintenance.

Wind Direction sensor

Features

- **Unique magnet coupled contact free sensor design for long-term trouble-free operation.**
- **Design free from wear and tear due to contact less signal pick up.**
- **Sensor with zero dead zone for better reliable data.**
- **Wide operational temperature range.**
- **Water splash and dust contamination resistant construction.**
- **Linear output.**
- **Small size.**
- **Excellent Sensor interchangeability.**
- **Excellent long term stability.**
- **Affordable cost**

Applications

- **Meteorology, Agro Meteorology**
- **Architectural studies**
- **Civil/Structural studies**
- **Observation and control of "Climate control chambers".**

Specifications :

Type : **Wind wane with magnet coupled sensor having contact free coupling.**
Range : **0 to 360^{O} +/- 2^{O}**
Out put : **0 to 5 Volt or 0 to 1 volt**
Operating Temperature range: -50 to 90^{O}C.

ELECTRICAL:
Power : **12 V DC**
Signal Output : **0 to 5 Volt or 0 to 1 volt, with 5 mA capacity.**

PHYSICAL:
Length of fin : **108 mm.**
Total height : **246 mm.**
Weight : **300 grams.**
Material : Aluminum and Stainless steel material used for durability.

Fixing clamp:

The bottom of the sensor consists of two threaded holes to mount the sensor to any bracket.

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Wind Speed sensor

EMCON - Wind Velocity sensor is designed for metrological observation, where reliable sensor with accuracy of measurement and long-term stability is a must. The low power consumption makes it ideal for remote applications. The sensor can be used for long periods in hostile weather conditions.

Wind Direction sensor

Features

- **The sensor can be connected with long cable for remote and centralized measurements.**
- **Wide operational temperature range.**
- **Water splash and dust contamination resistant construction.**
- **Linear output.**
- **Small size.**
- **Excellent Sensor Interchangeability.**
- **Excellent long-term stability.**
- **Affordable cost**

Features

- **Meteorology, Agro Meteorology**
- **Architectural studies**
- **Civil/Structural studies**
- **Observation and control of "Climate control chambers".**

Specifications :

Type : Three cup Anemometer with Infra red pickup.
Ranges : 0 to 60 m/sec. +/- 0.3 m/sec.
0 to 216 Kmph. +/- 1.08 Kmph.
Threshold value : Less than 0.45 m/sec.
Operating Temperature range : -50 to 90^{O}C.
Output : Both Analog and Digital available.

Electrical
Power : 12 V DC
Signal Output : TTL Digital output.

Physical:
Height : 234 mm.
Weight : 300 grams.
Material : Aluminum and ABS plastic material used for better durability.

Fixing clamp:

The bottom of the sensor consists of two threaded holes to mount the sensor to any bracket.

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EMCON Soil Temperature Sensor

EMCON soil temperature sensor is designed for continuous observation, where reliable sensor with accuracy of measurement and long term stability is a must. The low power consumption makes it ideal for remote applications. The sensor provides a linear voltage across the range.

FEATURES:

- The sensor can be connected with long cable for enabling remote and centralized measurements.
- Wide operational temperature range.
- Dust/water contamination resistant construction.
- Linear voltage output.
- Small size.
- Excellent sensor interchangeability.
- Excellent long term stability.
- Affordable cost

APPLICATIONS:

- Soil science
- Meteorology, Hydro Meteorology, Horticultural studies etc…
- Architectural/Civil/Structural studies

SPECIFICATIONS:

Type	:	Pt.1000 type.
Ranges selectable	:	0°C to 80°C , -20 to 100°C etc. Other customized ranges on request. (Other ranges on request)
Accuracy	:	± 0.2°C.
Repeatability	:	± 0.1°C.
Resolution	:	0.1°C
Operating Temperature range	:	-50 to 150°C.
Output	:	0 to 5 and 3.3 volts.

ELECTRICAL:

Power	:	minimum 7.5 to 12 V DC.
Signal Output	:	0 to 3.3 or 5 Volt, with 5 mA. capacity.

PHYSICAL:

Diameter	:	4 mm.
Length	:	30 mm.
Weight	:	15 grams.

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COMBINED - TEMPERATURE / RELATIVE HUMIDITY SENSOR

EMCON - Leaf temperature sensor is designed for scientific observations, where reliable sensor with accuracy of measurement and long term stability are must. The low power consumption makes it ideal for remote applications. The sensor provides a linear 0 to 5 Volt or 0 to 1 volt as per the need of the customer. The sensor can be used for long periods in hostile weather conditions, without maintenance.

Sensor with multiple plates

New model without weather shades

FEATURES

- Long cable can be connected , enabling remote measurements and centralized measurements ,without any loss in signal.
- Wide operational temperature range.
- Dust contamination resistant construction.
- Linear voltage output.
- Small size.
- Fully Indigenous make.
- Excellent Sensor Interchangeability.
- Excellent long term stability.
- Affordable cost.

APPLICATIONS

- Architectural studies
- Meteorology, Agro Metrology, Micro meteorology
- Civil/ Structural studies
- Observation and control of “Climate control chambers”

SPECIFICATIONS

- Air Temperature:
- Type: Pt.1000 type

  * Number of plates for weather shielding: 2 nos.

SELECTABLE RANGES

- 0 to 60 °C. +/-0.2 °C
- -20 ° to 60 °C +/-0.2 °C
- -20 ° to 80 °C +/-0.2 ° C

Operating Temperature range: -50 to 90 °C.

Output: 0 to 5 V and 5 mA capacity.

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RELATIVE HUMIDITY

- Type: Capacitance based.
- Range: 0 to 100%
- Accuracy: +/- 3%
- Repeatabilitty: 2%
- Operating Temperature range: -509 to 70 °C.

Range:	0%	0 volt
	100%	5 volt

ELECTRICAL

- Excitation power : 5 to 12 V DC depanding on the output requirement.
- Signal Output : 0 to 3.3 or Volt with 5 mA. capacity.

PHYSICAL SENSOR

- Length : 2cms.
- Diameter of sensing part : 4.5 cms.
- Weigth : 85 grms.

WEATHER SHIELD

- Heigth : 6cms.
- Daimeter : 144 mm.
- Weigth : 200 grms.

ACCESSORIES

- Weatheer protective shad: For protecting the sensor from rain and dust and sunligth, as well as maintainiing easy movement of air.

  Design: Total 3 plates.
  Material: ABS plastic or high grade Nylon

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Roof or Surface temperature sensor:
(screwing type sensor)

screwing type sensor

APPLICATIONS

- Measurement of the temperature on outdoor walls
- Surfaces of objects which are exposed to sun light or other environments etc

SELECTABLE RANGES

- Response time : 3 sec. time, screwing type.
- Range : 0 to 80.0° C selectable. (Other ranges on request)
- Accuracy : +/-0.1°C
- Resolution : 0.01°C

Designers & Manufactures
EMCON™
K.P Vallon Road, Kadavanthara, Cochin-682020,
Off: +91 484 2317939, 2317971 Mob: +91 9447797793, 9895125678,
email: info@emconindia.com, sales@emconindia.com
Website: www.emconindia.com , GSTIN: 32AAAFE6710F1Z2

EMCON
CUSTOM DESIGNED SENSORS AND INSTRUMENTS

Environmental Measurements and Controls

Over 35 years EMCON have been manufacturing custom-made innovative solutions in the fields of Ocean Technology, Meteorology, Agricultural sciences and Dam safety. EMCON prides itself in having developed more than 150 different types of sensors and related instruments which is been used by over 600 different government and private institutions and indusries throughout the country.

COMBINED SOIL WETNESS - SOIL TEMPERATURE SENSOR

EMCON soil wetness sensor is designed for continuous observation of mosture as wetness, directly in soil or other engineered soil. The sensor gives accurate wetness / moisture percentage instantaneouly. Specially designed to sense the slightest changes in moisture with excelent repeatability. The low power consumption makes it ideal for remote and long-term operations.

Soil Wetness + Soil Temperature sensor: (Capacitance type)

SOIL WETNESS:

Type	: Capacitive type.
Range	: 0 to 100%
Accuracy	: < 2%
Repeatability	: Within 1%
Resolution	: 0.1 %
Operating Temperature range	: -50 to 95 ^{o}C.
Output	: 0 to 2.8 Volt, 5 mA. capacity.

SOIL TEMPERATURE:

Type	: Pt.1000
Range	: 0°C to 80°C .
Accuracy	: 5°C .
Operating Temperature range: -50 to 95 ^{o}C.	
Output	: 0 to 5 volts, 5 mA. capacity.

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Environmental Measurements and Controls

COMBINED SOIL WETNESS - SOIL TEMPERATURE SENSOR

FEATURES:

- The sensor can be connected with long cable for, enabling remote and centralized measurements.
- The sensor can be easily used for different soils.
- Linear voltage output of 0 to 5 Volt.
- Small size.
- Fully Indigenous make.
- Excellent sensor interchangeability.
- Excellent long term stability.
- Affordable cost

APPLICATIONS:

- Precision farming
- Precision irrigation
- Soil science
- Agro Metrology and Hydro meteorology.

ELECTRICAL:

Power	: 7 to 12 volt.
Cable Length	: 2 mtrs.

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