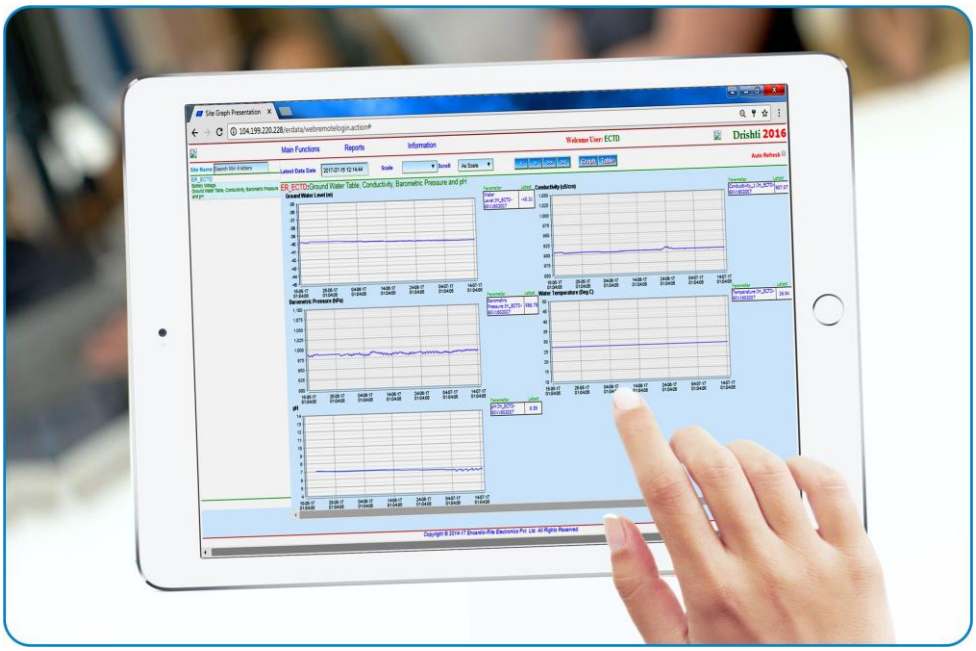
NOVARENT
LOCATION ET VENTE DE MATÉRIEL DE MESURE

INTEGRATED WATER TABLE, CONDUCTIVITY, pH, FLOW & RAINFALL MONITORING



INTRODUCTION

For proper monitoring of ground water resources, online web based monitoring of following parameters have become necessary:

- Water table/water temperature
- Electrical conductivity
- pH
- Water flow – rate and totalized
- Rainfall

FEATURES

- Robust and suitable for use in harsh environments.
- Allows collection of data continuously from several types of sensors.
- External logger with remote transmission option to deliver data to desktop.

APPLICATION

- Aquifer recharge and recovery.
- Discharge monitoring
- Groundwater contamination monitoring
- Saltwater intrusion, de-salination and wastewater.

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At some locations, it may be necessary to monitor other parameters also like soil moisture content, evaporation, atmospheric pressure and ambient temperature etc. Encardio-rite provides a comprehensive online web based monitoring solution to cover all the above parameters and many more through different models of SDI-12 interface dataloggers.

DATALOGGER

Encardio-rite offers following two types of SDI-12 interface dataloggers:

Model ESDL-30VB: This has an integral EDS-12 interface card for directly connecting the model EPP-30V/EPP40V/EPP-60V pressure sensor to it.

Model ESDL-30CTDB: This is specially designed to take input from the model ECTD-30V/ECTD-60V conductivity, water level and temperature sensor.

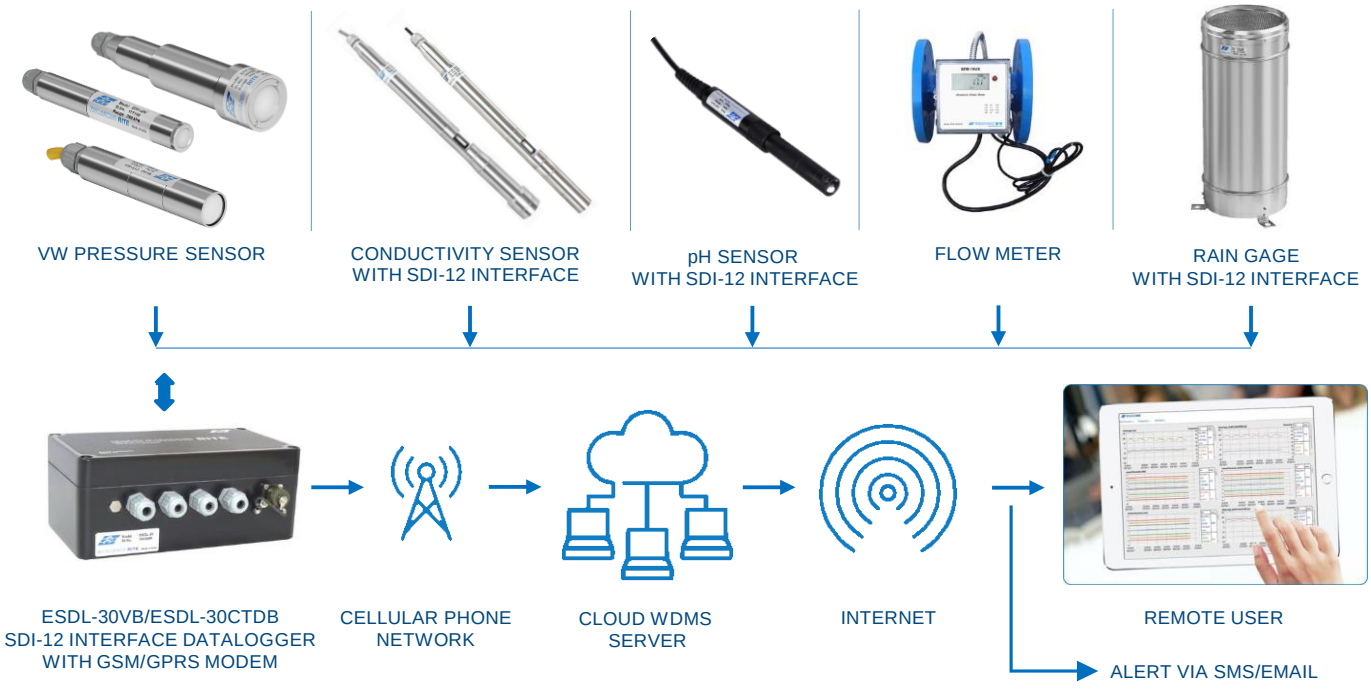
In addition to this any sensor with a SDI-12 signal interface can be connected to the datalogger e.g. based on vibrating wire, resistance strain gage, 4-20 mA output, electro-level, MEMS or ultrasonic technology.

The datalogger is of durable construction and very suitable for unattended application to provide accurate and reliable data. It features wide operating temperature range, low power consumption, compatibility with many telecommunication options and flexibility to support a variety of measurement and control applications.

The datalogger is factory configured to connect up to 5 sensors. At extra cost, it can be configured to take up more sensors. The datalogger has 3 input channels and each channel can be configured to connect up to 61 SDI-12 sensors. It can be programmed to take measurements from once every 5 seconds to once every 168 hours in linear mode. The number of measurements taken per day should however be kept to a minimum as higher frequency of measurement drains the battery at a faster rate.

The measured data is stored, together with the current date, time and battery voltage, as a data record in the internal non-volatile memory (2 million data points) of the datalogger.

The datalogger has an in-built barometric pressure sensor that measures atmospheric pressure. The datalogger measures the output from absolute and barometric pressure sensors as well as temperature in ºC and calculates the pressure in terms of water column after correcting for the measured atmospheric pressure and water density.



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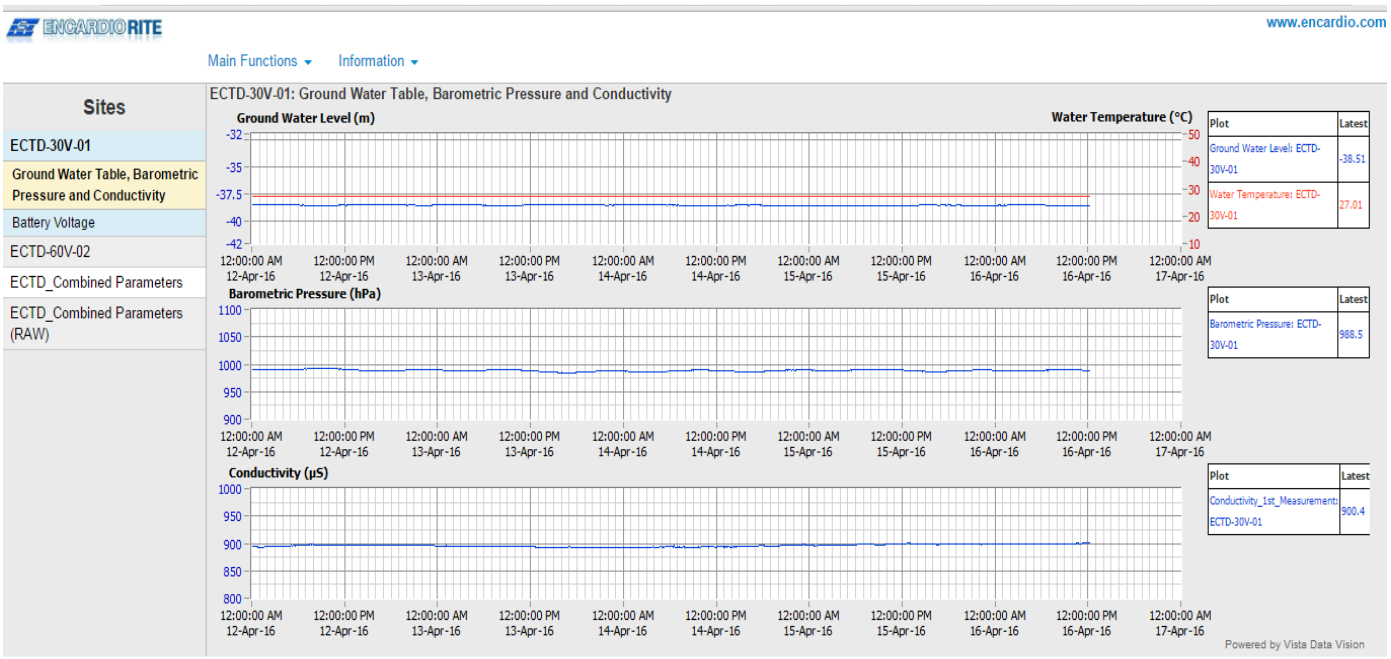

ONLINE DISPLAY

The advantage of the SDI-12 digital interface is that only a single 3 core cable is required to interconnect all the sensors (up to 62 numbers) and the datalogger in a serial bus.

SPECIFICATION

Input	Sensors with SDI-12 version 1.3 interface
No. of sensors	Factory configured for 5 sensors. Optional: Up to 60 sensors on request; up to 183 sensors in consultation with factory
Scan/upload interval	5 seconds to 168 hours
Memory capacity	Flash Memory (64-Mbit); 2 Million data points
Data output format	CSV text file. Can be easily imported in many third party applications like Microsoft® Excel
Communication port	RS-232 (Standard) 115 kbps
Temp. measurement	-20 to +70°C with 0.1°C resolution
Barometric pressure	950 – 1050 hPa; Accuracy ± 2 hPa
Power supply	Lithium cells or Alkaline high power cells or 12V SMF battery chargeable from AC mains or solar panel options available
Housing	Corrosion resistant weather proof enclosure 220 x 140 x 90 mm
Antenna (in telemetry option)	Built-in or separately mounted antenna

Refer to data sheet 1501-15 for further details.

DATA RETRIEVAL AND TRANSMISSION

Following options are available:

- Telemetry through GSM/ GPRS modem
- Readout/data retrieval using laptop/mobile phone

Telemetry through GSM/ GPRS modem

In a location covered by any GSM/GPRS service provider, the data from the automatic datalogger can be transmitted remotely to a PC at a central location. The user will need to arrange a data SIM card for each datalogger.

Readout/data retrieval using laptop PC

The logged data from datalogger in field can be directly downloaded to a laptop/PC. Data can be transferred to central PC/server through Internet/pen drive.

DATA PRESENTATION, ARCHIVING AND WORLD WIDE ACCESS THROUGH ENCARDIO-RITE PUBLIC CLOUD SERVICE

Encardio-rite offers public cloud based web monitoring service to its customers for retrieving data from ESDL-30VB dataloggers, archiving the retrieved data in a SQL database, processing the data and presenting the processed data in tabular and most suitable graphical forms for easy interpretation of logged data. The data can be accessed by authorized personnel by using a unique login ID and password from anywhere in the world over the internet using any popular web browser like Microsoft Internet Explorer, Mozilla Firefox, Google Chrome etc. Encardio-rite cloud services work on a rental model. User has to pay a small setup fee for first time and then a monthly rental has to be paid for accessing the data over the cloud as long as required.

SENSORS

Absolute water level sensor with temperature

Model EPV-30V, EPP-40V and EPP-60V absolute pressure sensors cover the entire range required for any water level monitoring. The sensor is hermetically sealed by electron beam welded with a vacuum of around 1/1000 Torr inside it. The outer body of the sensor is of stainless steel construction with resistance to rusting or corrosion against several kinds of dissolved impurities found in water under field conditions. For saline/brackish water application model EPP-40V and EPP-60V pressure sensors are available in a titanium body.

The pressure sensor is installed at a depth below minimum expected water level. A thermistor is incorporated in the sensor for measurement of water temperature. Output of pressure sensor is proportional to the head of water (piezometric head) above pressure sensor. The absolute pressure sensor with an integral water proof four conductor signal cable is supplied with an individual barometric pressure sensor (fitted inside the datalogger) which allows the water level to be corrected for barometric pressure variation. No desiccant or vented tube cable is therefore required. This results in an almost maintenance free system as no desiccant is to be periodically replaced to avoid moisture ingress in the vent tube and consequent blockage of the vent tube.

SPECIFICATION

Range EPP-60V	10, 20, 35, 50 m WC
Range EPP-40V	35, 50, 70, 100, 200 m WC
Range EPP-30V	20, 35, 50, 70, 100, 200 m WC
Accuracy	± 0.1 % fs standard; ± 0.05 % fs optional
Repeatability	± 0.05 % full scale
Temp. range	- 20°C to 70°C
Temperature accuracy	± 0.5°C standard. (Higher accuracy option available)
Protection	Electron beam welded
Dimension (Ø x L) AISI 304	30 mm x 160 mm (EPP-60V) 19 mm x 155 mm (EPP-40V) 42 mm x 185 mm (EPP-30V)
Dimension (Ø x L) Titanium	30 mm x 160 mm (EPP-60V)
Cable	Two pair screened cable with Kevlar strength member

Refer to data sheet 1216-16 for further details.

Conductivity sensor with water level and temperature

Encardio-rite model ECTD-30V and ECTD-60V CTD sensors are available for monitoring electrical conductivity, water level and temperature in the ground. With a range of 5 to 120,000 µS/cm, the ECTD sensor has the ability to make accurate electrical conductivity measurements in a broad range of applications. The sensor utilizes a pressure transducer to obtain accurate water level measurements. The range of sensor depends on the application.

Model ECTD-30V CTD probe comes with the model EPP-30V absolute pressure sensor and ECTD-60V CTD probe is with the EPP-60V absolute pressure sensor. ECTD sensor is a robust, marine grade sensor. It connects by cable to ESDL-30CTDB datalogger. Much of the complex circuitry is in the data logger, lowering the cost of individual sensors without impacting their accuracy or resolution. This makes the system cost effective.

SPECIFICATION

Pressure sensor	ECTD-60V - 10, 20, 35, 50 m WC ECTD-30V - 20, 35, 50, 100 m WC
Accuracy	0.1 % fs standard;0.05 % fs optional
Temp. sensor	Thermistor 30 k Ohm; 0 – 80°C
Conductivity sensor	4 Electrode bulls-eye cell; 120 mS range; cell constant 0.42 ± 0.05
Conductivity sensor range	5 – 120,000 µS/cm
Accuracy	± 0.5 % of reading + 1 µS/cm (for 5 – 80,000 µS/cm)[1] ± 1 % of reading (for 80,000 – 120,000 µS/cm)[2]
Resolution	0.1 µS/cm [1] ; 1.0 µS/cm[2]
Protection	IP-68 (IS-60529:2001)
Operating temp.	0°C to 60°C
Output	SDI-12 version 1.3
Dimension (Ø x L) AISI 304	30 mm x 390 mm (ECTD-60V) 42 mm x 420 mm (ECTD-30V)
Dimension (Ø x L) Titanium	30 mm x 420 mm (ECTD-60V)

Refer to data sheet 1603-16 for further details.

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pH/ORP sensor

Encardio-rite model EPH-30V pH sensor has been designed to perform under hard conditions from pure mountains water with conductivity as low as 20 µS/cm, lakes and rivers with 100-2000 µS/cm, seawater with 50 mS/cm and to wastewater with conductivity higher than 200 mS/cm.

This sensor has been designed for handheld and in situ applications which have been the most difficult situations for a pH/ORP sensor in term of sensor resistance, quick time response, minimal flow dependence and low power consumption.

The "smart" pH sensor stores calibration and history data within the sensor. This allows a "plug and play" system without re-calibration.

SPECIFICATION

Measure principle	Combined electrode (pH/ref) : special glass, Ag/AgCI ref. Gelled electrolyte (KCI)
Measuring range	0 to14 pH units
Accuracy	± 0.1 pH
Repeatability	98%
Temperature sensor	CTN
Operating temp.	0 to 50°C
Protection	IP68 - cable included
Output	SDI-12 version 1.3

Ultrasonic water meter

Encardio-rite offers the most advanced water flow measurement by using state-of-the-art ultrasonic technology. The flow sensor does not have any moving parts that can wear or tear thus providing a robust and accurate meter with almost no maintenance required. EFM-10US water meter is specially designed for applications where conventional water meters fail due to harsh environment, solids in water, performance degradation, magnetic vandalisation or incapability in leakage detection.

EFM-10US has an integral LCD totalizer. The nine digit LCD can display the integrated flow, daily flow, monthly flow, reverse flow and more. The water flow meter has a Modbus to SDI-12 interface box to make it compatible with model ESDL-30VB datalogger.

SPECIFICATION

Range (pipe size/flow rate)	25/8; 32/12.5; 50/30; 65/50; 80/80 mm/m^3 per hour
Permissible Flow Temperature	- 0ºC to 60ºC for long term and up to 85°C for short term
Protection	IP 68
Power supply	Battery, 3.6 V, Lithium; with replacement interval ~ 10 years
Electromagnet class	E2

RAINFALL GAGE

Model ERG-200/201 rain gage with a proven tipping bucket mechanism provides a cost effective and reliable method for measuring and recording rainfall. It is easy to use, durable and precision automated to provide long term, trouble free operation with a minimum of maintenance. It is corrosion resistant having a stainless steel outer housing. It is designed for many years of trouble free operation.

Inside each rain gage is a balanced tipping bucket mechanism with a magnet and switch assembly. Collection of rain is through a 200 mm diameter catchment through a debris filtering screen.

A funnel inside the rain gage feeds collected rain water into one of the two buckets. As soon as the preset amount of water has been collected in the bucket, it tips the other way, automatically emptying the water and positioning the other bucket for collecting rainfall. The measured water exits through drain tubes provided at the base of the rain gage. The tipping bucket mechanism activates a sealed

magnet sensitive switch that produces a brief contact closure for every 0.2/0.5 mm of rainfall. Two adjustable screws provide calibration of buckets by changing position of the bucket stop point.

High vertical sidewalls of the model ERG-200/201 prevent splash-out of rain from the catchment thus resulting in better accuracy. Each rain gage is individually calibrated for optimum accuracy. Three adjustable legs allow the rain gage to be fastened permanently onto a platform or deck using standard fasteners.

A SDI-12 interface box is mounted inside the rain gage to make it compatible with the ESDL-30VB datalogger.

SPECIFICATION

Sensor Type	Tipping bucket
Output	Potential free contact, one momentary switch closure per tip
Tip sensor	Sealed magnetic proximity switch
Resolution	0.2 mm/tip for model ERG-200 0.5 mm/tip for model ERG-201
Accuracy	± 2 % at around 30 mm/hour ± 5 % at around 120 mm/hour
Operating temp.	Up to 50°C
Humidity	0 – 100 %
Catchment area	200 mm diameter
Construction	Corrosion resistant stainless steel outer housing

Refer to data sheet 1327-13 for further details.