ENCARDIO RITE
METASENSING FOR MEGA STRUCTURES

# AUTOMATIC WATER LEVEL MONITORING SYSTEM

## DATASHEET

**MODEL EWLR-101BX/BH**


## OVERVIEW

The Encardio Rite Model EWLR-101 Automatic Water Level Recording System is a versatile and reliable solution for monitoring water levels, addressing the critical need for sustainable management of diminishing water resources. It is suitable for a wide range of applications, from low-maintenance, standalone monitoring of individual boreholes to comprehensive, statewide networks managing hundreds of boreholes remotely.

A key feature of the EWLR-101 system is its two-way communication capability, which significantly reduces field costs by enabling remote access for system updates and maintenance. The system can monitor groundwater levels using existing or newly drilled boreholes, where a casing pipe and a geotextile-covered filter prevent clogging and ensure stability. The water level in the borehole reflects the local water table elevation, referenced to mean sea level.

In addition to groundwater monitoring, the EWLR-101 is equally effective for tracking water levels in rivers, lakes, and reservoirs, where sensors are deployed in gauge wells to provide accurate and reliable data.

# FEATURES

- **Near neal-time data:** Provides near real-time data with telemetry options.
- **Two-way communication:** Allows remote access for configuration and management, reducing the need for field visits.
- **Easy installation and use:** User-friendly configuration application ensures simple setup and operation.
- **Large data storage:** Ample memory capacity for long-term data logging.
- **Long battery life:** Features easy-to-replace batteries with extended life.
- **Weather resistant housing:** Durable construction to withstand harsh environmental conditions.
- **Barometric pressure sensor:** In-built sensor in datalogger for barometric correction, ensuring accurate readings.
- **Rain gauge connectivity:** Option to connect a rain gauge for simultaneous monitoring of rainfall and water levels.
- **High precision:** Monitors water levels with high accuracy and stability.
- **Multiple communication options:** Supports GSM/GPRS, USB, and Bluetooth for flexible data retrieval and transmission.
- **Comprehensive software:** Windows-based application for easy setup, data retrieval, and monitoring.
- **Event-based transmission:** Data collection can be triggered by specific events or by remote interrogation.
- **Remote alarms:** Up to three programmable alarms for water levels and low battery, with notifications via SMS to up to 10 recipients.

# SYSTEM COMPONENTS

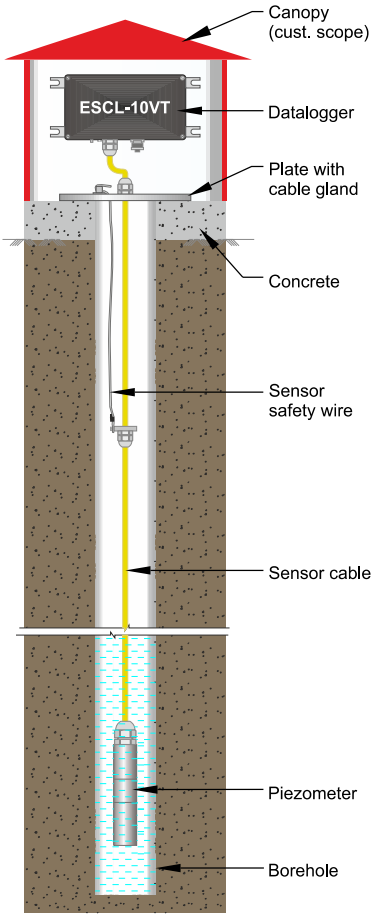
EWLR-101 Automatic Water Level Monitoring System consists of three primary components:

- Absolute pressure sensor with interconnecting cable
- Automatic data logging system
- Data retrieval and transmission mechanism

## Absolute pressure sensor

The system utilizes a high-accuracy fluid pressure sensor to monitor the water level or water table. The sensor is installed below the minimum expected water level and features an integrated thermistor for measuring water temperature. It connects to a datalogger for automated data collection, which is then transmitted to a remote or cloud server.

The Encardio Rite models EPP-30V, EPP-40V and EPP-60V offer a comprehensive range of sensors suitable for any water level monitoring application. Each sensor is hermetically sealed via electron beam welding, maintaining an internal vacuum of approximately 1/1000 Torr to enhance accuracy and durability.



Constructed from stainless steel, the sensors resist rust and corrosion, even in water containing various dissolved impurities. For saline or high-impurity environments, specialized sensors with additional protective features are available.

The two pair screened cable has Kevlar strength member (for good longitudinal stability of cable) and is polyurethane sheathed, corrosion/ moisture free with good flexibility. It can be extended up to 200 m without degrading accuracy, stability & data communication. Screen can be connected to logger ground terminal to minimize electrical interference.

## Barometric pressure correction

The system incorporates an inbuilt barometric pressure sensor, enabling automatic correction of water level data for atmospheric pressure variations. This eliminates apparent water level fluctuations caused by changes in barometric pressure, ensuring highly accurate measurements.

## Specific gravity correction

Water density affects pressure sensor readings, particularly in regions with saline water or high dissolved solids. The system allows users to input the specific gravity of the water into the datalogger, ensuring accurate water level corrections tailored to site conditions.

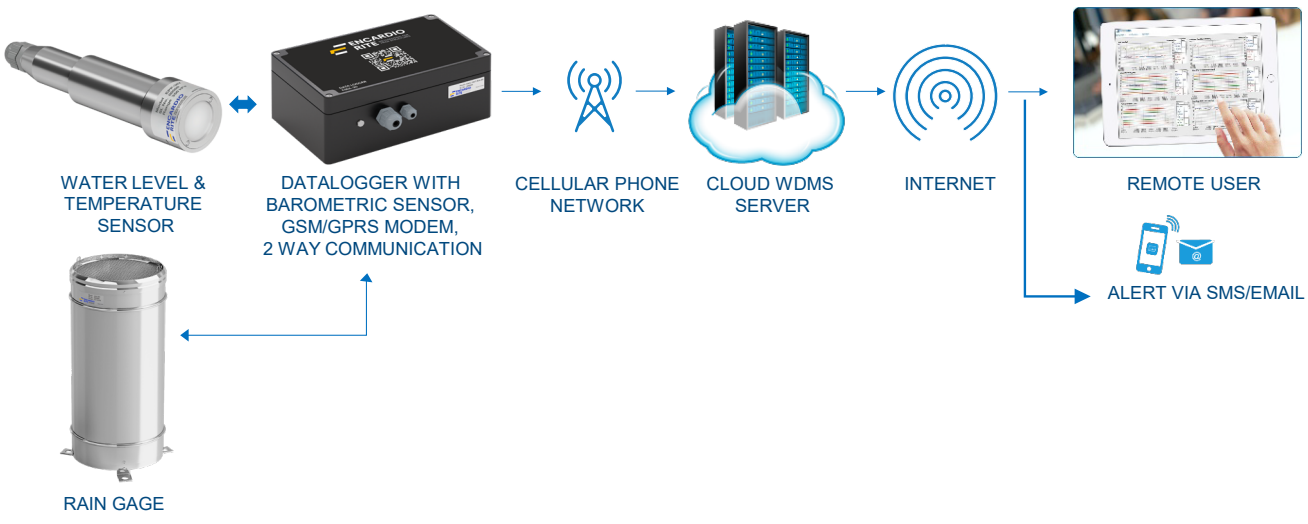
## Datalogger

The **Model ESCL-10VT Datalogger i**s a designed for automatic data collection of groundwater level. It records output from the absolute pressure sensor, barometric pressure sensor, and thermistor. It calculates water pressure, corrected for barometric pressure and specific water density, converting it into a water column equivalent. The data, along with the date, time, and battery voltage, is stored in the datalogger's non-volatile memory for easy retrieval.

**Automated data collection and transmission:** The ESCL-10VT reduces field costs by automating data collection and transmission, providing near real-time access to critical data and early alarms. Its telemetry capability eliminates the need for on-site visits, making it ideal for remote and unattended installations.

**Two-way communication:** Remote configuration, status updates, maintenance, diagnostics, and preventive actions can be performed seamlessly from the office, further lowering operational costs.

**Flexible measurement scheduling:** The datalogger supports customizable measurement intervals, ranging from 5 seconds to 168 hours in linear mode. While higher frequency measurements offer detailed insights, they can affect battery life, making optimal scheduling important.



**User-friendly software:** Equipped with a Windows-based application, the datalogger allows users to:

- Configure sensor calibration coefficients, recording intervals, borehole codes, and sensor serial numbers.
- Synchronize the real-time clock with IST
- Monitor diagnostic parameters, including battery voltage and GPRS signal strength
- Start/stop scans, manage data files, perform corrections, and export data for analysis.

**Rugged and durable design:** Engineered for reliability in diverse applications, the ESCL-10VT features:

- Wide operating temperature range
- Dependable standalone operation.
- Low power consumption with multiple power supply options.
- Durable construction suitable for harsh environments.

The ESCL-10VT is a versatile and robust datalogger, ideal for a variety of applications requiring accurate data collection, remote access, and seamless integration with modern telecommunication systems. Its advanced features make it a dependable solution for both simple and complex monitoring needs.

## Rainfall monitoring

The ESCL-10VT Datalogger offers the capability to attach an ERG-200/ERG-201 Rain Gauge for simultaneous rainfall monitoring alongside water level/table data. This integration allows users to correlate changes in the water table with rainfall data, providing a more comprehensive understanding of environmental conditions and supporting more accurate water management.

## Data retrieval and transmission

### Telemetry via GSM/GPRS modem

The datalogger is equipped with an in-built GSM/GPRS modem and either an integrated or separately mounted antenna. In areas with GSM/GPRS coverage, the datalogger can transmit data remotely to a cloud server. Users will need to provide a data SIM card for operation. The system also features the option to disable interrogation to conserve power at remote sites.

### Data retrieval using laptop

Data logged in the field can be easily downloaded directly to a laptop. Users can transfer the data to a central PC or server via USB pen drive or the internet, enabling efficient data management and analysis.

### Data retrieval using mobile phone

The datalogger can communicate with an Android mobile phone using the supplied configuration/application software, connected via a detachable Bluetooth dongle. Data can then be transferred to a server or central PC using USB cable, Bluetooth, or internet connection, offering flexible and mobile data retrieval options.

These retrieval methods ensure that users have multiple options to access and manage data remotely, enhancing operational flexibility and efficiency.

## Data presentation, archiving, and global access through Encardio Rite public cloud service

Encardio Rite offers public cloud based web monitoring service to its customers for retrieving data from ESCL-10VT 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 tables and graphs related to any site or sites can be accessed by authorized personnel who can login to their site using the supplied login ID and access password from anywhere in the world over the internet. Users can have two types of access – any user with lower level access can only view or access the data whereas a higher level user has the authority to set or modify some of the settings.

No special software is needed for accessing the user sites as the information can be viewed using most standard and popular web browsers 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. This service offers flexible, reliable, and global access to vital monitoring data, ensuring users can effectively manage and analyze their data remotely.

# SPECIFICATIONS

| MODEL EPP-30V, EPP-40V PRESSURE SENSOR: | |
|---|---|
| Range - EPP-30V (≥ 20 mWC) | 0.2, 0.35, 0.5, 0.7, 1.0, 1.5, 2.0, 35 MPa (20, 35, 50, 100, 150, 200, 350 mWC) |
| Range - EPP-40V (≥35 mWC) | 0.35, 0.5, 0.7, 1.0, 2.0 MPa (35, 50, 70, 100, 200 mWC) or specify |
| Sensor type | Absolute pressure sensor (non-vented hydrostatic), with individual barometric pressure correction (through datalogger) |
| Accuracy | ± 0.2 % fs standard<br>± 0.1 % fs optional |
| Resolution | 1 mm |
| Reproducibility | 0.05 % fs |
| Long term stability | ± 0.1 % fs (without any field calibration requirement, except barometric compensation) |
| Over range limit (overload pressure) | 200% fs (2 times fs, without effect on calibration) |
| Temp. range | -20°C to 70°C |
| Humidity | Upto 100% |
| Burst pressure | ≥ 3 times fs |
| Thermistor | YSI 44005 or equivalent (3 kOhms at 25°C) |
| Temp. measurement accuracy | ± 0.5°C standard<br>± 0.2°C optional |
| Output | Compatible with model ESCL-10VT datalogger |
| Material | Stainless steel or corrosion resistant alternative |
| Protection | IP 68 with impact resistance Sensor is hermetically sealed by electron beam welding with a vacuum of around 0.001 Torr inside it. |
| Overvoltage protection | Provided for lightening, over-voltage, surge protection |
| Dimension (Ø x L) | 42 mm x 185 mm (EPP-30V)<br>19 mm x 155 mm (EPP-40V) |
| Cable | Two pair screened cable with Kevlar strength member polyurethane sheathed. |

# SPECIFICATIONS

| MODEL ESCL-10VT DATALOGGER | |
|---|---|
| Input | Vibrating wire sensor, freq. range 400-5000 Hz; Thermistor 3 kOhm; raingage |
| Resolution | 18 bits (better than 1 mm for 70 m WC sensor) |
| Temperature measurement | -40 to +100°C with 0.1°C resolution |
| Scan interval | 5 seconds to 168 hours |
| Memory capacity | Flash memory 2 million data points, cyclic memory storage capacity 4GB, 2.5 years (with 15 minute logging interval) |
| Data output format | CSV text file. Can be easily imported in many third party applications like Microsoft® Excel |
| Real Time Clock (built-in clock) | Resolution: 1 second (displayed time); Accuracy: ± 2 seconds/year (when auto-sync network time enabled; time synchronization with IST) |
| Measurement Resolution | 24-bit with ±1 bit LSB accuracy<br>Water Level: 0.1 mm<br>Temperature : 0.1°C<br>Barometric pressure: 0.1 hPa |
| Barometric sensor | Has the provision to apply barometric pressure correction automatically |
| Communication port | RS-232 (standard) 115 kbps |
| Telemetry | Two way communication between datalogger and FTP server<br>4G: Quad-Band LTE: (1800, 850, 900, 700 MHz), Tri-Band UMTS: (WCDMA/FDD 2100, 850, 900 MHz), suitable for all 4G bands used in India |
| Operating temp. | -30 to 70°C |
| Power supply | 2 x D size 3.6 V/19 Ah Lithium cells;<br>2 x D size 1.5 V Alkaline high power cells;<br>12 V SMF battery chargeable from solar panels or AC mains |
| Housing | Corrosion resistant weather proof enclosure, with water tight connectors |
| Protection | IP 67 with impact resistance |
| Overvoltage protection | Provided for lightening, over-voltage, surge protection |
| Dimensions | 120 (W) x 220 (L) x 91 (H) (mm) |
| Humidity | Upto 100 % |

**All specifications are subject to change without prior notice*



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**Encardio-Rite Electronics Pvt. Ltd.** A-7, Industrial Estate, Talkatora Road, Lucknow, UP-226011, India | info@encardio.com | T: +91 522 2661039-320