

## Data Sheet



# DIGITAL SEEPAGE MONITORING SYSTEM

**MODEL ESM-12S**

## OVERVIEW

The model ESM-12S digital seepage monitoring system is designed for precision measurement and monitoring of seepage in dams or water flow in open channels. Quantity of water seeping through, around or under a dam is of great importance in analyzing structural behaviour of a dam. The seepage or the flow rate data provided by the weir and seepage monitoring system give important information for analyzing the long term stability of the dam.

## FEATURES

- Highly sensitive and stable reading
- Accurate and simple to read
- Suitable for remote reading of seepage
- Atmospheric pressure change does not affect reading
- Easy to install & maintain

## APPLICATION

- Monitoring of water level in weirs, open channels
- Monitoring of seepage in dams, structures in landslide areas.



## DESCRIPTION

### Model ESM-12S Seepage monitoring system

Model ESM-12S Seepage monitoring system typically consists of:

- Model ESM-12S/1 digital seepage monitoring sensor
- Model ESDL-30 datalogger
- Model ESM-10 Weir (ordered separately)
- Standard accessories
  - Slotted PVC pipe
  - Moisture trap with desiccant unit
  - Terminal box
  - Mounting plate, clamps and fasteners

Our smart digital seepage monitoring system is very easy to install and configure. The high precision pressure sensor allows long term reliable monitoring, with least maintenance cost.

### Model ESM-12S/1 Digital seepage monitoring sensor

Model ESM-12S/1 is a digital high precision low range level sensor with vented signal cable. The sensor has inbuilt temperature sensor. It is installed enclosed in a perforated PVC pipe. The air vent tube of the vented cable is connected to the desiccant unit with moisture trap. The 3 core signal cable is connected to the datalogger either directly, or through terminal box depending on the site conditions.

### Model ESDL-30 Datalogger

Model ESM-12S/1 seepage/water level sensor is connected to Encardio-rite model ESDL-30 datalogger for remote online monitoring. ESDL-30 datalogger is a compact datalogger that can be mounted easily near the sensor or in a control room in close vicinity. The datalogger's configuration software is user friendly, which makes the commissioning of digital seepage monitoring system quite easy and fast.

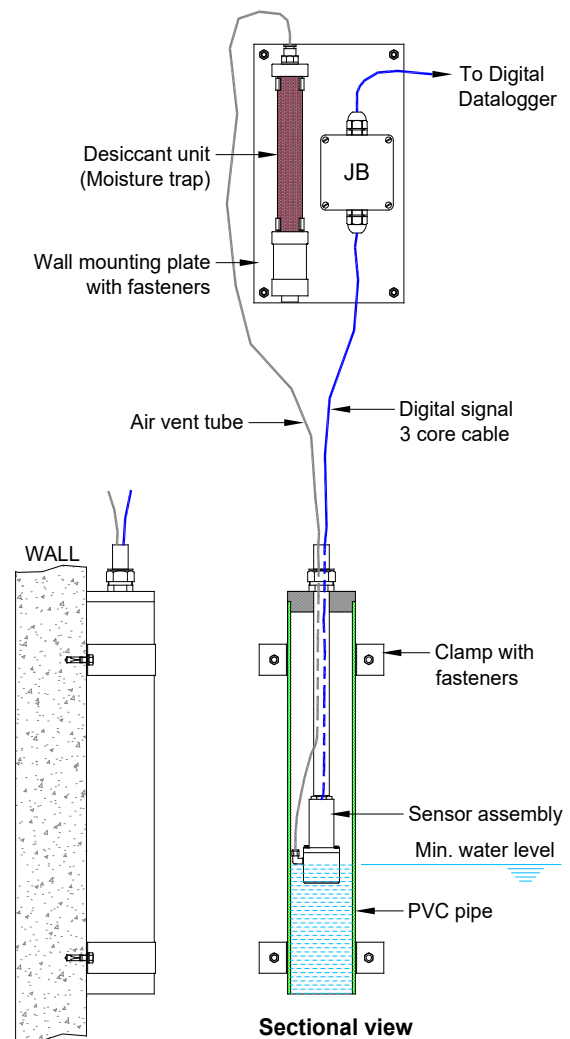
At locations covered by a mobile network, the data from the ESDL-30 datalogger can be transmitted remotely to a central/cloud server.



Model ESDL-30 datalogger for digital sensors

### Model ESM-10 Weir or V-Notch

The seepage monitoring system can be supplied with a stainless steel V-notch or rectangular weir, if ordered separately.



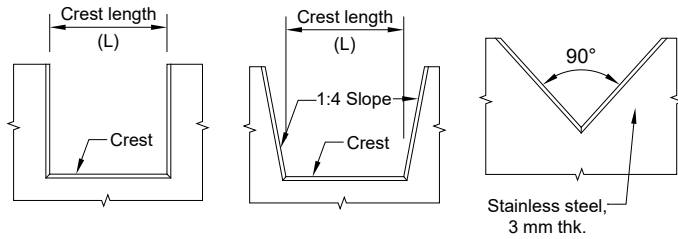
Typical installation of model ESM-12S/1 digital seepage monitoring sensor



To compensate the barometric variation automatically, the sensor is vented to the atmosphere with a vented signal cable.

The vent tube is terminated in a desiccant unit of moisture trap, while the signal cable is terminated in the terminal box/ datalogger mounted adjacent to moisture trap.

To avoid water level variations caused by waves, turbulence or vibration, the head is normally measured in a stilling well- constructed upstream of the weir in the collection channel.



### Model ESM-10 Weir - Rectangular and V-Notch type

The weir comprising of stainless steel plate, is provided in a suitable size and angle, to suit expected flow rate. The most used size is rectangular or 90° V-notch type.

Other sizes of weir can also be provided, depending on site requirements. In case of a low flow rate, a V-notch weir with an angle of less than 90° may be used. The weirs are normally manufactured as per Indian Standard IS: 9117-1979

Sizes available: 22.5°, 45°, 90° and rectangle

Range available: 10 to 70 litres/second

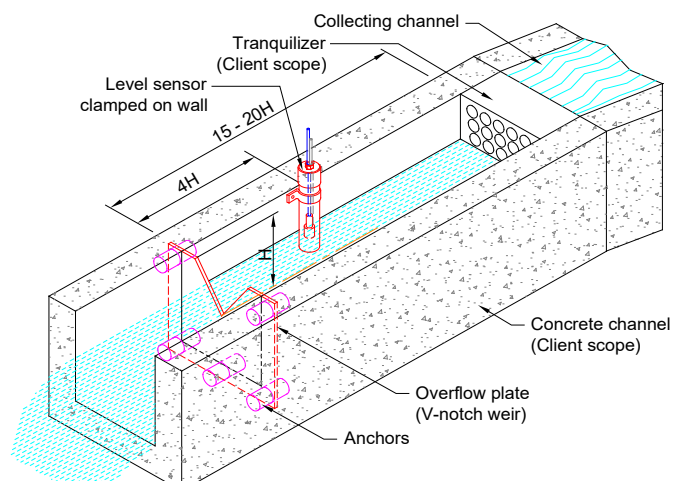
### OPERATION

In dams, for measuring seepage, the drain water is taken through collection channel(s) for discharge into the downstream of dam. The collection channel/channels are terminated in a collection chamber where the discharge is accurately measured with a weir ('V' notch or rectangular weir) and a water level/seepage measurement device.

In order to measure discharge over the weir accurately, the head over the weir is measured with the water level sensor. The water level sensor is installed inside the slotted PVC pipe fixed at the required location. The sensor position is kept submerged in water, lower than the vertex of weir. Any change in water level results in change in water head, which is measured by the pressure sensor.

### ONLINE DATABASE MANAGEMENT

Encardio-rite offers public cloud based web monitoring service to its customers through Drishti for retrieving data from the 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.



Typical installation scheme for ESM-12S seepage monitoring system in open channel with weir



## SPECIFICATION

<b>Range</b>	1000 mm
<b>Sensor accuracy*</b>	± 0.2 mm
<b>Sensor resolution</b>	0.025 % fs
<b>Stability</b>	± 0.05 % fs per year
<b>Output</b>	Digital (SDI-12 serial interface)
<b>Over rage capacity</b>	200%
<b>Temperature limit</b>	-20 to 70°C

\* As tested under lab conditions

\*All specifications are subject to change without prior notice

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