

electrical conductivity sensor model 1500



Features

- low maintenance, non-contact measurement
- non-metallic wetted parts
- outputs EC and temperature
- optional temperature corrected output
- easy to install

Applications

- River/ stream water quality
- Irrigation runoff water quality
- Salinity studies
- Seawater salinity studies
- Waste water quality monitoring
- Aquaculture

The ES&S 1500 Electrical Conductivity sensor is designed for measuring electrical conductivity of liquids at remote locations. It is specifically suited for low power water quality applications where access and site visits are limited. Unlike conventional electrode based cells, the encapsulated toroid design requires very little

maintenance, ensuring many years of accurate data collection without recalibration and without deterioration of metals.

With all wetted parts made from non metallic materials, the sensor can be employed to measure in difficult and often corrosive liquids such as seawater and sewerage. An integrated temperature sensor, used for temperature compensation, is configured to provide a separate temperature output. Both outputs are industry standard 4-20mA and are readily interfaced to your data system or the popular ES&S 3500 data logger.



Technical Specifications

Range EC	2000, 5000, 10000, 20000, 40000, 75000 $\mu\text{S}/\text{cm}$. Other ranges are available.	Type	Magnetically coupled toroid pair
Temperature	0 to 50°C output 0 to 30°C compensation	Output Options	2 x analogue 4-20mA current loop (3 wire current loop, 600ohms max)
Accuracy	EC+/-2% of full scale over compensated range Temperature +/-0.2°C	Power Supply	9-30 volts unregulated 50mA plus loop current
Zero & Full Scale Setting	+/-0.05% of full scale setting	Surge Protection Materials	Secondary surge protection. Can absorb 0.6J of energy wetted: Delrin, epoxy plastics
Response Time	1 second to full accuracy		

Operating Principle

The measurement of the ability of water to carry an electrical current is an indication of the amount of mineral salts in solution. This ability is derived from the presence of charged ion particles, and to a lesser extent, ionization of water itself. Electrical conductivity is non-specific for a particular salt and all salts present in the solution contribute.

The model 1500 EC sensor measures conductivity using a pair of magnetically coupled toroid transformers while the solution being measured forms the "core" of the transformer pair. The more conductive the water is, the better the magnetic coupling. This is a *non-contact* measurement method and is immune to the effects of electrode deterioration.

Frequently Asked Questions

What maintenance will my 1500 sensor require?

The only maintenance required is to ensure the hole through the sensor head is kept free of debris, algae and silt. Correct installation in slow flowing water will ensure the sensor head is self cleaning by maintaining a water flow through the head.

Can my 1500 EC sensor measure Total Dissolved Solids?

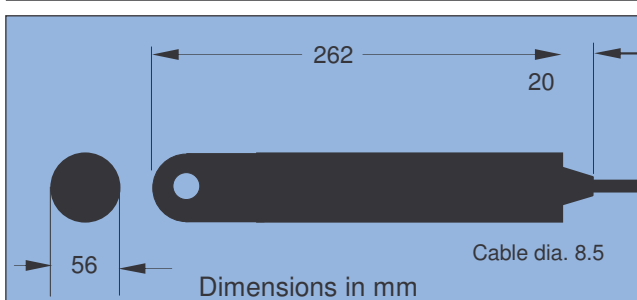
The 1500 EC sensor measures conductivity in units of $\mu\text{S}/\text{cm}$ (the inverse of resistance per cm or Ω/cm). For most applications however, the concentration of all dissolved minerals may be of higher interest. This measure is collectively called Total Dissolved Solids (TDS) or Salinity and is expressed as milligrams per litre (mg/L) or as parts per million (ppm). A reasonable estimate of mg/L may be obtained by multiplying the EC value by 0.6.

E.g. $2,000\mu\text{S}/\text{cm} = 1,200 \text{ mg/L TDS}$

What is temperature correction?

Electrical conductivity is temperature dependant. An increase in temperature will cause an increase in conductivity because electrons can flow more freely through a solution at higher temperatures. Measurements must be expressed in relation to a reference temperature (25°C) even if the water temperature is not. A temperature compensated EC output is the EC of a solution (at any temperature within the measurement range), extrapolated as if the temperature is 25°.

While it is often sufficient to use a temperature corrected output 1500 EC, higher accuracy can be achieved by using the raw EC and temperature outputs and manually calculating compensated EC. The 1500 EC sensor can be factory calibrated to output either temperature compensated or raw EC and must be specified.



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