

CT logger with new wiper function and new type sensor

Alec Electronics is pleased to introduce great new model to the COMPACT series of instruments. The new, COMPACT-CTW is an innovative instrument that allows stable measurements of water temperature and salinity without maintenance for long-term deployments.

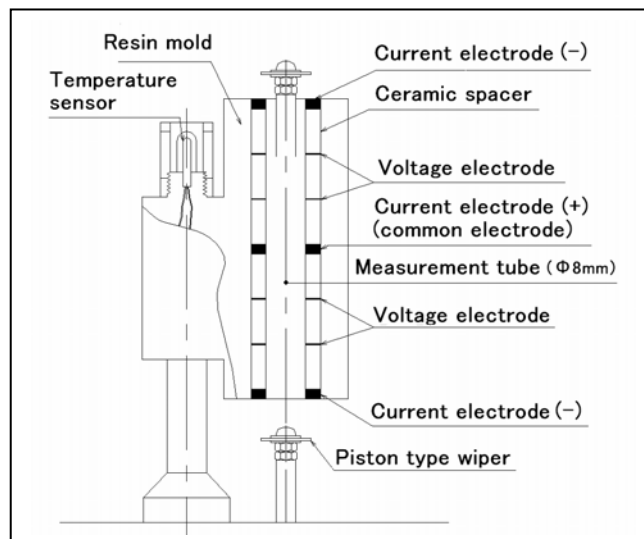


Development of the new CTW sensor

The original Alec Electronics COMPACT-CT sensor combines an inductive conductivity cell and a temperature sensor in a small, autonomous package. This rugged and compact design has proven to be an excellent solution for deployments up to one week. Various attempts were made to increase the deployment time of the COMPACT-CT which included covering the sensor with an anti-fouling net; housing the sensor in an anti-fouling chamber that was continually flushed with a pump; using a costly mooring system which employed a winch, where the sensor was kept in air during stand-by and lowered into the water only for the duration of the measurement. None of those attempts achieved reliable long-term fouling protection. Eventually, Alec Electronics developed the seven-electrode conductivity sensor with a piston type wiper.

Design of new CTW Sensor

The conductivity cell of the new Compact CTW is a seven-electrode cell with a plunger that periodically sweeps the measurement cavity, as shown in the schematic illustration on the right. A pair of electrodes of equal polarity (–) are located at the ends of the cavity and they share a common electrode (+) in the centre of the cell. The opposing electrodes drive a current that is completely contained in the inner cavity of the sensor. In this arrangement the measurements are not affected by any growth on the outside walls of the sensor. A pair of pick-up electrodes measures the potentials created by the drive electrodes (which are in the fluid contained in the cavity) and this potential is a function of the fluid's conductivity.



Compact-CTW Sensor Schematic

Piston type wiper

A piston wiper with a circular silicone blade gently brushes the inside of the cell at regular intervals (see pictures at right) to keep the electrodes and the inside cavity free of growth. In addition, the motion of the wiper helps to flush the cell and suck surrounding water into the cell, so that the measurement accurately reflects the conditions of the water surrounding the sensor.



Wiper retracted

Data logger

The COMPACT-CTW has been developed based upon the fundamental design criteria from our compact and lightweight COMPACT series of instruments. The unit's dimensions are 60 mm in diameter and 416.4 mm in length. It weighs 1440 g in air and 510 g in water.

The unit is fully autonomous and a cabled version is also available for integration into telemetry observation systems.

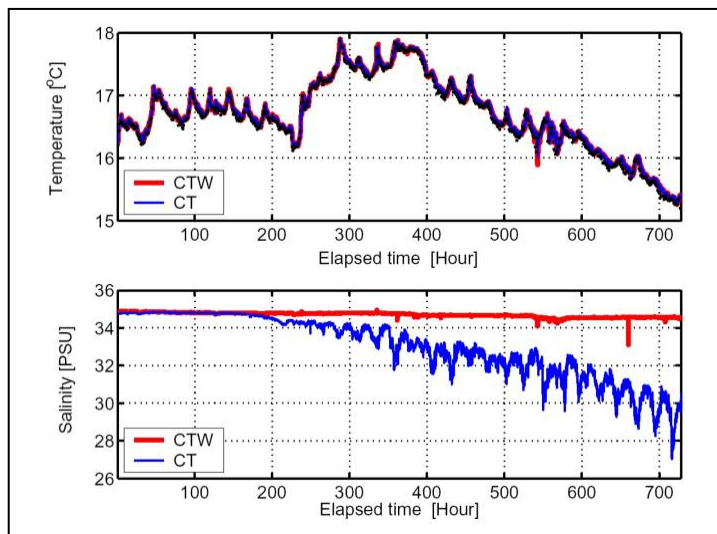


Wiper fully extended

Field Tests and Results

The Compact CTW was tested in Nomi Bay off Japan's southern island of Shikoku between February 6 and March 7, 2004. The total deployment time was 728 hours (30 days). The Compact CTW was moored on a raft next to one original Compact CT sensor at a depth of one meter. Each instrument recorded a data sample of conductivity and temperature every 10 minutes. The wiper mechanism on the CTW was activated once before each sample. Intense bio-fouling on both instruments was evident after their retrieval. The growth covered all instrument parts and sensing surfaces, except the cavity of the CTW instrument. Over the entire period of the deployment, the temperature data of both systems matched each other perfectly (within the instruments' accuracy). The salinity data of the CTW instrument (red trace) shows a nearly constant value of 34.9 PSU, which is typical for the Nomi Bay site. The occasional excursions towards lower salinities are due to rain events. The salinity data of the CT instrument (blue trace) departs significantly from the CTW measurement after 170 hours (7 days). After 240 hours of deployment, the CT's salinity values show erratic excursions.

These excursions cannot be correlated with any observed or known phenomena at the site, so the excursions must be an artifact of the bio-fouling. After 700 hours of deployment, the average difference between the salinities reported by the CTW and CT instruments exceeded 4 PSU, which is approximately 12% of the expected salinity value.



Temperature and salinity data from the deployment in Nomi Bay, February 6 to March 7, 2004.



Before deployment



CTW after retrieval

Summary

Bio-fouling is the bane of long-term measurements in the ocean. The new Compact CTW conductivity and temperature data logger provides an effective way of measuring conductivity and temperature during extended deployments.

