

Sentry log operating instructions

Introduction

Sentry log is an intelligent, microprocessor based, multi-zone corrosion monitor with data logging capability.

Used as a monitor, an LCD display and LED's provide indication of the vessel's level of cathodic protection.

Used as a data logger, the corrosion history of the boat can be recorded and examined. Corrosive events, which may be short lived, can be detected.

The multizone capability of the **Sentry log** allows different zones on a vessel to be simultaneously monitored. For example, the external hull may represent one zone, other zones may include the insides of sea chests, ballast tanks, water jet tunnels etc.

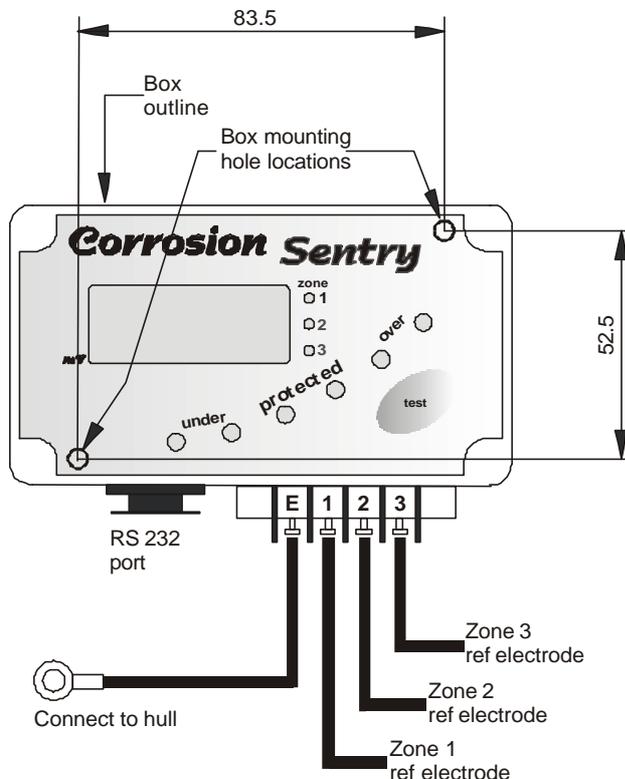
Each zone requires a reference electrode to be installed.

Up to 3 zones can be monitored with one **Sentry log**.

The **Sentry log** kit comprises a **Sentry log** monitor, mounting screws, 3 AA batteries, an earth lead, an RS232 cable for computer connection and a software disk.

Note: Because each installation is potentially unique reference electrodes are purchased separately.

Installation & test



- The **Sentry log** can be bulkhead mounted in any convenient location such as in the engine room or in the vessel's bridge/pilot house. The box dimensions are 115 mm x 65 mm x 40 mm deep.
- Drill two 3.8mm diameter holes at 83.5 mm by 52.5 mm centers on the hull bulkhead or other suitable mounting location. See Figure 1
- Remove the **Sentry log** lid taking care to keep it supported to avoid damaging the connecting wires. Mount the **Sentry log** box using the two 8g x 12 mm self tapping screws provided.
- Insert the 3 AA batteries supplied. Refasten the **Sentry log** lid.
- Connect terminal E to the hull with the earth lead provided.
- Connect terminals 1 to 3 to separate reference electrodes.

Figure 1

Mount the **Sentry** and reference electrode as described above.

A convenient location should be chosen where the 'test' button may be operated and the indicator lights viewed.

Install the three batteries taking care that they are all correctly orientated.

Refit the cover ensuring that the enclosed pack of desiccant remains inside the unit.

Once re-assembled press the 'Test' button and check that all lights illuminate briefly.

Monitor operation

Press the 'test' button.

For a short time the lamps will all light and LCD will display the material being monitored.

The **Sentry log** will then commence displaying the protection level of zone 1 on the lamps and LCD.

After a few seconds the **Sentry log** will cycle on to zone 2 and so on.

In order to conserve battery life the **Sentry log** normally operates in 'power down' mode. The **Sentry log** will auto power down after one minute.

The **Sentry** lamps indicate the current level of cathodic protection.

Providing that the **Sentry** has been set up for the correct **material** being protected then two green lamp indication shows that the material is correctly protected against corrosion.

Red indication warns of under protection or over protection. Under protection indicates corrosion can take place. Over protection can also indicate that corrosion or other problems are occurring.

Extreme over or under protection is indicated by a single flashing red lamp.

An extreme over protection indication may also be caused by faulty connection to the electrode or the electrode being out of the water.

For a particular zone, a reference electrode must be connected to the corresponding terminal on the **Sentry log** and it must be in contact with sea water. Only then will the **Sentry log** correctly indicate the cathodic protection level.

Logger operation

Whenever the logger is running the LCD will display it's current operation.

When awake the LCD will alternately display the protection levels of the three zones in mill-volts.

When asleep the LCD will either display the word "Log" or "OFF".

Whenever the **Sentry log** is logging data the word "Log" will be displayed. Only if logging has been turned off using the 'Sealog' software or the logging memory is full will the word "OFF" be displayed.

Using the **Sentry log** as a corrosion monitor by pressing the "test" button, will over-ride the "Log" or "OFF" message and the mV readings will re-appear on the LCD screen.

Whilst logging the **Sentry log** continuously scans the protection levels of each zone recording the minimum and maximum readings. At pre specified intervals, set using the Sealog software, the **Sentry** stores a complete set of log data in non-volatile memory.

Once written the logged data is safe from accidental removal of the batteries or battery replacement.

As soon as the **Sentry** has power again it will resume from where it left off.

Each data set consists of the minimum and maximum readings for each zone measured since the last data was stored along with the time that the log was taken.

In this way any corrosion events that are shorter than the logging interval and would otherwise have been missed are captured.

Data logger setup

Logger setup is achieved using the 'Sealog' software running on a standard PC or laptop. Connection to the PC is made using the data cable provided.

Further details of the operation of this software may be found in the "Sealog Software Manual" which is supplied with the software or may be downloaded from the Seaguard web site at www.seaguard.co.nz.

In summary the **Sealog** software may be used to adjust:

- The number of zones to be displayed on the LCD

- The 'material' type that is being protected.

- The reference electrode type.

- The logging 'interval'.

- The Sentry 'name' - which is usually set to the name of the boat to which the unit is fitted.

- The 'description' of the 3 zones – which are used to identify what is being monitored by each zone.

- The 'time' stored within the **Sentry** which is used for time-stamping each log.

Additionally the software displays the serial number, battery state and internal software version of the **Sentry**.

Data retrieval

Data retrieval is again performed using the **Sealog** software and interface cable provide.

By selecting the "Log Data" page on the PC screen access may be gained to the internal data log of the **Sentry**.

From this page data may be retrieved, stored into a file on the computer and the **Sentry** data may be erased.

Clearing the **Sentry** causes this data to be deleted permanently.

Sentry fault finding

Check that the LCD is displaying "**Log**", "**OFF**" or a milliVolt reading and that the "**Low Bat**" indication is not visible. If the above is not correct then replace the batteries in the unit with 3 x alkaline AA cells.

Press '**test**' and check that all lights illuminate for about one second and that the LCD displays the material being monitored.

Disconnect the electrode wire from terminal '1' and check that the top red led flashes and that the LCD reads between -1200 and -1300mV when zone 1 is being displayed. Repeat this for electrodes 2 and 3.

Link terminals 'E' and '1' and check that the LCD reads between -10 and +-10mV when zone 1 is being displayed. Repeat this for electrodes 2 and 3.

Reconnect terminal 'E' to the hull and terminals '1', '2' and '3' to their individual electrodes.

If all of the above tests pass then it is possible that there is a bad connection between the **Sentry** and the electrodes. If the associated zone display is permanently reading highly over protected (top red lamp is flashing) then it is likely that the wire to the electrode is damaged and not making proper contact.

If the associated zone display is permanently reading very close to 0mV then it is likely that the wire to the electrode is shorted to the hull at damaged and not making proper contact.

Calibration

The **Sentry log** is factory calibrated and does not need further adjustment.

Cathodic protection levels

The **Sentry log** has LCD and LED indication of the cathodic protection level. Providing the **Sentry log** has been set up for the correct **material** and **reference electrode type**, green LED indication shows that the material is protected from corrosion. Red LED indication warns of under protection or over protection. Under protection indicates corrosion can take place. The rate of corrosion is influenced by a number of variables such as the type of material, the oxide layer present, the quality of the electrolyte and the potential relative to the reference electrode. Moderate over protection can be accepted but may be uneconomic for steel, bronze and brass. Over protection can cause paint disbondment, hydrogen embrittlement in high strength steel, and cause amphoteric attack to aluminum.

LCD readings can be evaluated from the table below for Seaguard zinc electrodes and typical materials in use in the marine sector. For Ag AgCl reference electrodes, subtract 1000 from the numbers below:

Material	Freely corroding	Protected	Over protected
Carbon steel	+390	+150	
304 Stainless steel (active)	+470	+230	
Aluminum	+260	+50	-100
Bronze	+680	+350	
Brass	+640	+310	

Specifications

Dimensions	115 x 65 x 40mm	Battery life	2 years
Mounting	bulkhead	Ref. electrode	Zinc or AgAgCl (1, 2 or 3 required)
Power	3 alkaline AA cells	Log capacity	510 readings per zone 2000 & 4000 log options available.
Operating temp.	0 to 50 ⁰ C	Log time	User selectable (1min to 24 hours)
Range	-1200mV to +1200mV	Data connection	RS232 (cable supplied)
Resolution	+/- 5 mV	Computer	Laptop or PC, 486 or higher
Protection Rating	IP 65	Software	'Sealog' software supplied. Windows 95, 98 and NT supported
Zones	Up to 3 zones		