

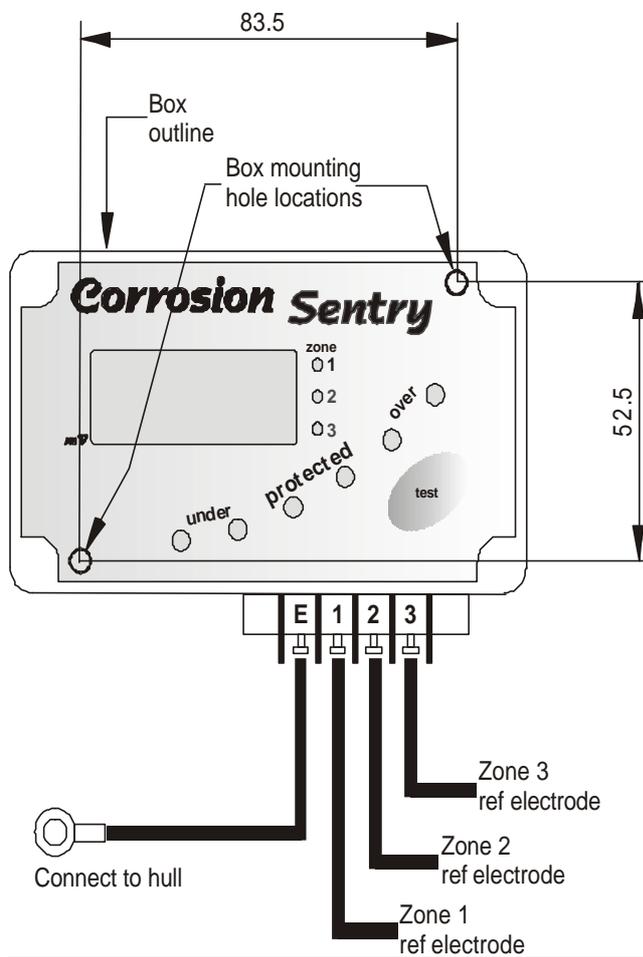
Sentry multizone instructions

Introduction

Sentry multizone is a microprocessor based multi-zone corrosion monitor. An LCD display and LED's provide indication of the vessel's level of cathodic protection. The multizone capability of the **Sentry multizone** allows up to three independent 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. The **Sentry multizone** kit comprises a multizone monitor, mounting screws, batteries and an earth lead.

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Sentry multizone installation



- The **Sentry** 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 3.7/3.8mm diameter holes at 83.5 mm by 52.5 mm centers on the hull bulkhead or other suitable mounting location.
- Remove the **Sentry** lid. Mount the box using the two 8g x 12 mm self tapping screws provided.
- Insert the 3 x AA batteries supplied. Refasten the **Sentry** lid making sure that the desiccant pack remains inside.
- Connect terminal E to the hull with the black earth lead provided.
- Connect terminals 1,2 & 3 to the blue reference electrode wires for zones 1,2 & 3 respectively.

Note: The reference electrode is purchased separately.

Sentry test

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

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

During this lamp test check that the appropriate material is displayed on the LCD ('ALU' for Aluminum, 'FE' for Steel or 'Br' for bronze).

Sentry operation

Press the 'test' button.

All the LED's will briefly light in the initial lamp test mode.

The yellow LED corresponding to zone 1 will then light and the protection level for zone 1 will be shown by two LED's on the protection level display and the millivolt reading will be indicated on the LCD.

After a few seconds the yellow Zone 2 LED will illuminate and the protection level LEDs and LCD will show the protection level within this zone.

After a few seconds more the yellow Zone 3 LED will illuminate and the protection level LEDs and LCD will show the protection level within this zone.

The cycle will then recommence with the Zone 1 display.

Note. If only two zones have been specified at the time of ordering then zone 3 will not be displayed.

In order to conserve battery life the unit operates for 30 seconds and then powers down.

In case of low battery voltage a 'Lo Bat' indication will appear in the top left corner of the LCD.

The **Sentry** LED's indicate the current level of cathodic protection.

Providing that the **Sentry** has been set up for the correct **material** being protected then the 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. Over protection can also indicate that corrosion or other problems are occurring.

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

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 mutizone and it must be in contact with sea water. Only then will the unit correctly indicate the cathodic protection level.

Sentry calibration and options

The **Sentry** has been calibrated prior to dispatch from the factory and needs no further adjustment.

Three material settings are available on this model for correctly displaying the protection level of Aluminum, Steel or Bronze. This is set at the factory.

Sentry fault finding

In order to test the operation of the **Sentry** press 'test' and check that all lights illuminate for about one second and that the LCD displays the material being monitored. If this does not happen check that the batteries are not flat and that they are correctly installed.

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.

Cathodic protection levels

The **Sentry mutizone** has LCD and LED (Light Emitting Diode) indication of the cathodic protection level. Providing the unit has been set up for the correct **material** and **reference electrode type** (factory adjustable only), green LED indication shows that the material is protected from corrosion. Red LED indication can indicate 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 problems with aluminum due to amphoteric attack.

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	

Corrosion Theory

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 and hydrogen embrittlement in high strength steel, and can cause amphoteric attack to aluminum.

Corrosion rates depend upon many factors and, for this reason, the protection should be monitored regularly under all operating conditions. These should include measuring the protection whilst the vessel is moored and whilst under way.

If the anodes on the vessel have been set up for seawater usage and the vessel is used in fresh water, the protection levels may fall and the **Sentry** will indicate the vessel is under protected. Under normal circumstances, this should not be a problem as corrosion rates in fresh water are significantly less than in seawater.

Care should always be taken where dissimilar metals are used next to one another.

Specifications

Dimensions	115 x 65 x 40mm	Battery life	2 years (when used once per day)
Mounting	bulkhead	Ref. electrode	Zinc
Power	3 x alkaline AA cells	Zones	1,2 or 3 zones
Operating temp.	0 to 50 ⁰ C	Resolution	+/- 5 mV
Range	-1300mV to +1300mV	Protection	IP 65

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Seaguard Ltd, P.O.Box 2628, Christchurch, New Zealand
Telephone: +64 (0)3 389 9032 Mobile: +64 (0)25 362 767 Fax: +64 (0)3 389 9042
Email: sales@seaguard.co.nz Web: www.seaguard.co.nz