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MANUAL CONTROL MODEL 105

Installation and Operating Instructions

Installing zinc anode plates

1. The anode plate(s) should be installed on the bottom of hull, preferably toward the back of the boat. The actual location will vary from boat to boat due to individual characteristics of the underwater hull and the interior arrangement of machinery and living space. The anode location is almost always a compromise between the ideal and what is possible. The ideal is to be in the area where the highest concentration of metal being protected is located. What is possible for locating any necessary thru hull penetrations is generally determined by the accessibility on the inside of the hull for locating any such thru hull penetrations.
2. Each anode plate should be mounted on two insulated bolts. Follow the detailed instructions supplied with the bolts.
3. No anode should be located closer than 12" to the reference assembly.
4. If an anode plate is mounted in an exposed location, where it possibly will catch or be damaged by debris in the water, a fairing block should be installed in front of it.
5. **ANODE PLATES SHOULD NEVER BE PAINTED.**
6. Anode zinc must be of a very high quality alloy. Only zinc that meets or exceeds U.S. Navy military specification A18001H should be used. Ask your local factory authorized Electro-Guard dealer if you don't know or are in doubt about the quality of the zinc anodes available in your area. Using zinc anodes of inferior quality may result in inadequate protection.
7. The table below shows zinc plate sizes and number relative to the boat size. All plates indicated are one half inch thick.

Boat Length	Single Screw	Twin Screw
00' to 28'	4" x 6" - 1 ea.	4" x 6" - 1 ea.
29' to 34'	4" x 6" - 1 ea.	3" x 12" - 1 ea.
35' to 40'	3" x 12" - 1 ea.	6" x 12" - 1 ea.
41' to 54'	6" x 12" - 1 ea.	6" x 12" - 2 ea.
55' to 60'	6" x 12" - 1 ea.	6" x 12" - 2 ea.

8. Following the above table will provide enough zinc in ninety percent of the cases. If in doubt, put on more than called for in the table. For vessels longer than 60', consult your factory authorized Electro-Guard dealer to determine the size and number of anodes required. Painting the underwater metal fittings will help reduce the electrical current

drain on the anodes and, therefore, extend the life of the anodes. One half inch thick zinc anodes are commonly used. However, one inch thick plates will last almost twice as long.

9. **REMOVE ALL ZINCS WHICH ARE AFFIXED TO OR CONNECTED TO ANY BONDED UNDERWATER FITTINGS**---DO NOT REMOVE zincs that are on unbonded fittings or are installed in the machinery inside the boat.

Installing the reference assembly

1. Install as close as possible to (but not touching) a protected fitting.
2. Never paint the reference.
3. Keep at least 12" away from the nearest anode.
4. Follow detailed instructions attached to reference assembly.
5. The alloy of the Electro-Guard reference plate is critical. Replace only with an appropriate Electro-Guard RE-100 reference plate. Do not try to substitute as this may lead to failure of the system to operate correctly.

Installing controller

1. This unit may be flush mounted by making a cutout of sufficient dimensions to allow for internal components. If flush mounted, the box should be installed on the reverse side of panel to protect the electronic components. The unit may also be box mounted.
2. For flush mounting, make cutout 2 7/8" x 5 1/4".
3. On smaller vessels which do not have walk-in size engine spaces, it is preferable to locate the controller near the helm or in some other suitable location in the main cabin.
4. The controller should be mounted in a highly visible location. It should not be located behind a door, inside a cupboard, or anywhere else where it may be hidden from view.
5. Do not locate controller where it may get wet or be exposed to weather.
6. Do not locate controller closer than 24" to any magnetic compass or auto pilot compass.
7. Before mounting controller box, drill a hole through the side, back, or bottom to allow for controller cable entry.

Installing controller cable assembly

1. Feed cable assembly from engine room to controller location.
2. Mount terminal barrier strip in clean dry location in engine room.
3. Any excess cable should be coiled near controller. Do not cut, shorten, or otherwise alter cable assembly.
4. Follow color code when connecting to controller. The code is as follows: Brown - ZN, Red - CB, Yellow - MB, Green - RF.

Connecting the reference and anode(s)

1. The wire color code should be followed when installing system hookup wiring. Wire of the correct colors is available at most marine hardware stores. The most common reason for new system malfunction is incorrect connection of hookup wiring. If the color code is followed, it is impossible to connect the system wiring incorrectly.

2. Follow the detailed instructions in the controller cable hardware envelope for connecting each of these items.

Bonding the boat and connecting to barrier strip

1. A heavy gauge trunk line should be installed near the center line of the boat. It should start at the most forward thru hull fitting and end near the transom. For boats up to 40' long, a 12 gauge solid, plastic insulated copper wire should be sufficient. Larger boats should use 10 gauge or larger wire.
2. Solder and seal branch wire to connect all exposed underwater fittings. It is desirable to make the bonding to the major fittings redundant. For instance, a branch wire may be connected from the trunk line to a rudder log, from the log to two strut bolts, from the strut to two shaft log bolts, and from the shaft log back to the trunk line. Branch wires should be 12 gauge or larger. **ALL UNDERWATER FITTINGS MUST BE ELECTRICALLY BONDED TOGETHER TO BE PROTECTED.**
3. Any existing bond wires which will be used should be inspected for corrosion and/or poor connections.
4. Cross bonding between engines and between strut or rudder logs is recommended.
5. A coiled, flexible wire should be connected between rudder log bond and the rudder post.
6. Each propeller shaft should have a shaft wiper assembly installed on the inside of the boat. Use Electro-Guard Model SB-6B wiper assembly or HD-SB if the shaft size is 1 1/2 plus. The shaft wiper(s) should be connected directly to the terminal barrier bond connection. The connecting wire should be 12 gauge or larger.
7. Any iron, steel or aluminum fitting should be electrically isolated from this bonding system and protected separately. These metals **are not** adequately protected at the same electrical potential that the copper alloys and stainless steel are protected.
8. The bonding system should be connected directly by one or more 12 gauge or larger wires to the controller terminal barrier strip.

Operation

1. With control set at minimum (to left), the meter should indicate somewhere in the "LOW" or "SAFE" zones. Turning the control clockwise should cause the meter to read down scale to "SAFE" or "HIGH". Allow some time for meter to stabilize after changing level. Even with control at minimum, about 10% protection is fed through.
2. Center of the "SAFE" zone is ideal level for the average boat with **nonferrous fittings** such as brass, bronze, monel, lead, and stainless. As conditions vary around the hull, the needle may rest anywhere in this zone from time to time. Tidal currents, temperature, salinity, and other boats may cause temporary changes in the meter reading. Some protection is present in the "LOW" zone on a tapering level down to the "UNDER" zone. When moving into brackish or fresh water, the meter will not indicate correctly. Leave control set at normal until you return to salt water areas.
3. Operation of the control with meter in the "HIGH" and particularly in the "OVER" zones wastes zinc and can lead to **CAUSTIC ATTACK** to wood (whitish salt around metal thru hull fittings and subsequent deterioration of the adjacent wood areas). **On some boats prone to this, it may even be necessary to reduce the protection level lower than**

normal, to the right hand edge or the "SAFE" zone, or even part way down into the "LOW" zone. This is a matter of trial and error on each particular hull. Any salting should be brushed off and the area treated with white distilled vinegar to counteract the alkaline salt. This unit does not protect engines or other metal parts inside the vessel.

Trouble shooting Electro-Guard control system Model 105

1. Meter needle remains at extreme left side of dial: No movement when control knob is turned- probably loss of connection to small zinc reference plate. Could also be loss of connection from control unit to bonding system.
2. Meter needles remains in LOW or UNDER zone: No movement when control knob is turned- probably loss of large zinc anode plate, loose nuts holding it, or broken or corroded wires to control unit.
3. Meter needle remains in HIGH or OVER zone: Some slight or moderate movement when control knob is turned- probably an extra piece of zinc under hull fastened or connected to a bonded fitting. It could also be a zinc shaft collar on propeller shaft or zinc on radio ground plate. This generally happens after a haul out or new installation.
4. Meter needle remains in HIGH or OVER zone: No movement when control knob is turned- probably large zinc anode plate is connected directly to or is touching the bonding or a bonded fitting someplace, thereby bypassing the control unit.
5. Meter needle has moved from the normal position in SAFE zone to HIGH or OVER zone and control doesn't bring it back. Possibly:

(a) Stray currents from battery system leaking into hull fittings or equipment. Watch meter for any change while turning master switches on and off or while lifting battery terminals off batteries.

(b) Interference from other boats at dock fed in through your 110 volt dock cord. Watch for any change in meter while disconnecting dock cord. If you have a three wire cord to dock receptacle with the third wire (green) utility ground connected to engine or bonding at any point, you have a potential corrosion problem. This is most prevalent on boats with 110 power plants where the grounding may occur at the plant or in changeover switch. Request Bulletin #6 for more information on this subject.

(c) Break in a section of the bonding wires or poor connections so that control is only furnishing protection to one or a few fittings thereby protecting these fittings only.

6. Meter needle varies within the range of the SAFE zone while boat is sitting at rest- This is normal and caused by tides, currents or wave action on the zinc plates and bonded fittings and by other local electrical factors around the docks.
7. Occasional erratic meter action can be caused by wave action on transom zincs while docked into the wind. Zincs also can have slightly loosened nuts causing intermittent contact as well as corroded bond or control wires. Meter will not read accurately in fresh or brackish waters- leave control knob in normal position until return to salt water.

