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Altronic Research Inc.

Preservation and Corrosion Prevention Techniques

for

Omegaline® Air-Cooled RF Loads

Improving product life in hostile environments

1. Purpose

The purpose of this manual is to provide instructions for technical personnel who are required to operate and maintain air-cooled RF loads in hostile environments.

2. Applicability

These instructions are applicable to equipment designed and manufactured by Altronic Research Inc. for use by the broadcast and scientific industries. These instructions do not apply to equipment manufactured by others which may, from time-to-time, be supplied as accessory equipment for use with Altronic Research Inc. loads or systems.

3. General Procedure

The object of any preservation program is to maintain and extend the useful life of the target equipment. The essential elements of the program are:

A. Preservation of the finish

B. Prevention of dissimilar metals corrosion

C. Prevention of surface corrosion and pitting

D. Preservation of the electrical components

E. Resistor maintenance

The procedures set forth in this manual are the same procedures that one would use to preserve and protect an aircraft exposed to hostile environments. We have consciously copied the basic procedures recommended for aviation because of the similarity of materials and the requirement for active intervention to prevent damage.

In many cases, the remedy prescribed will be the same regardless of the material. The primary emphasis in any corrosion prevention program is cleanliness. When components are clean and dry, they do not corrode.

It is important for the technician to understand that the chemicals and procedures prescribed are the minimum satisfactory measures. It may be necessary to alter the frequency of application in order to obtain satisfactory control. Therefore, frequent inspections of the equipment are recommended until the operator has experience with the equipment and site conditions and can predict with some accuracy the need for preventive measures.

4. Safety Precautions

This equipment presents an extreme hazard to technicians and mechanics if it is not properly prepared for servicing. Prior to any attempt to work on this equipment, take the following safety precautions:

a. Disconnect or lockout all sources of RF energy

b. Disconnect or lockout AC Mains power

c. Prepare a safe area to receive the louver assemblies from the load.
[These assemblies are lightweight and subject to being blown about. Use 2 persons to handle them and lay them flat if they are detached from the load.]

5. Specific procedures

A. Preservation of the finish.

This equipment is finished with a durable semi-gloss enamel paint system applied over a pretreated surface. The finish is very durable and needs only regular washing to maintain its appearance and corrosion protection properties. There is no advantage to using strong detergents on the finish. We recommend that products suitable for washing an automobile be used at the dilution recommended by the manufacturer.

In the event that the finish of the load has been mechanically damaged, it will be necessary to prepare the surface and recoat it. We recommend that this procedure be undertaken by a person who has dealt with corrosion on aircraft surfaces.

a. Clean the surface to be repaired. Use fresh water and mild detergent to remove all traces of sand, salt or oil.

b. Lightly sand the damaged area with 360 grit wet or dry silicon carbide paper. Use care to feather all edges of broken paint. Never use steel wool, a steel brush, jeweler's rouge or emery abrasives for this step.

c. Some areas may have progressed to a stage where pitting is evident. Pits should be treated with a phosphoric acid base corrosion removing compound and thoroughly cleaned prior to conversion coating and painting. Use MIL-C-10578D Compound, Corrosion Removing and Metal Conditioning, Type IV in accordance with the included instructions. Available from Altronic Research Inc. [Part Nr. 000-77000-CCR].

d. Clean the surface again.

e. Use Gardobond EPP pretreatment (formerly called Permatreat EPP) available from the factory or www.ChemetallOakite.com to prepare the surface of the metal for new paint. Ensure that the directions are followed and that excess product solution is properly disposed of.

f. Allow the conversion coating to air dry, then wipe the surface with a clean cotton towel.

g. The surface is now ready to be painted, if that is required. For areas less than 12 square inches [about 80 square centimeters], it is best to brush the paint on the surface. Use a single coat and allow it to air dry for ~2 hours before handling. In cold or damp conditions, the paint may require much longer to dry fully. We do not recommend application of paint or conversion coating when the temperature of the surface is less than 50°F [15°C].

h. Paint which matches the finish and color of the load is available from the factory. Order Paint, Modular Ivory, Touchup [Part Nr. 000-77000-PNT].

In the event that the finish of the base frame of the load has been mechanically damaged, it will be necessary to prepare the surface, prime the base metal and recoat it.

i. Clean the surface to be repaired. Use fresh water and mild detergent to remove all traces of sand, salt or oil.

j. Lightly sand the damaged area with 360 grit wet or dry silicon carbide paper. Use care to feather all edges of broken paint.

k. Some areas may have progressed to a stage where pitting is evident. Pits should be treated with a phosphoric acid base corrosion removing compound and thoroughly cleaned prior to conversion coating and painting. Use MIL-C-10578D Compound, Corrosion Removing and Metal Conditioning, Type IV in accordance with the included instructions. Available from Altronic Research Inc. [Part Nr. 000-77000-CCR].

l. Clean the surface again.

m. Use the Altronic Research Inc. Paint, Oil Base Metal Primer [Part Nr. 000-77000-PRI] to prepare the surface of the metal for new paint. Ensure that the directions in the kit are followed and that excess product is properly disposed of.

n. Allow the primer coat to air dry.

o. The surface is now ready to be painted. For areas less than 12 square inches [about 80 square centimeters], it is best to brush the paint on the surface. Use a single coat and allow it to air dry for ~2 hours before handling. In cold or damp conditions, the paint may require much longer to dry fully. We do not recommend application of paint or conversion coating when the temperature of the surface is less than 50°F [15°C].

p. Paint which matches the finish and color of the base frame is available from the factory. Order Paint, Rust Resist, Seal Brown [Part Nr. 000-77000-BSP].

B. Prevention of dissimilar metals corrosion

This is a matter which was addressed in the design of the load to the extent possible. There are areas where dissimilar metals are necessarily in close proximity, if not in contact. These areas need more frequent attention, including regular washings and treatment with a moisture-displacing corrosion preventive compound. These areas are: the resistor clip/resistor interface, the resistor clip/mounting strip interface, the RF conductor/load face panel interface and the RF conductor/RF connector center conductor interface.

a. Make unit safe for servicing in accordance with paragraph 4 above.

b. Open all louver assemblies on the load.

c. Wash entire unit inside with potable water. Pay particular attention to the resistor strips.

d. Allow the inside of the unit to completely dry.

e. Spray a light coating on the resistor ends, the resistor clips and the RF conductor attachments with “Boeshield T-9®”.

f. Allow the T-9® to air dry. When the load is brought back to full power, smoke could be present temporarily.

C. Prevention of surface corrosion and pitting

Generally, this process is devoted to maintaining the integrity of the finish on the load components. Surface corrosion and pitting are the result of electrolytic cells on the surface of the material. These cells are usually composed of mineral or metallic contaminants, moisture and the base metal. There must be a break in the surface finish for a cell to be established. The paint system prevents cell establishment by encapsulating the metal underneath it. A conversion coating prevents corrosion by reacting with the upper layer of the metal and “passivating” it. The process of passivation is basically one of capturing all of the metal ions which might react with contaminants and moisture to form a cell. The conversion coating is not a sacrificial element, but instead one which forms a very thin layer of non-reactive metal on the surface of exposed material. Any break in the non-reactive layer will quickly allow corrosion attack.

Prevention of corrosion attack on the surface of metals requires cleanliness and denial of access to the metal underneath the finish. It is obvious that this requires cleaning, inspection and prompt treatment of problem areas.

a. Inspect the exterior of the load, especially seams, crevices and the area around bolt heads. Look for white deposits which may indicate the presence of corrosion. Use a soft brush, similar in stiffness to a toothbrush, to brush away any deposits found. Examine the freshly brushed area for signs of failure of the conversion coating or the paint.
b. If any failed areas are found, treat them in accordance with paragraph 5A.

D. Preservation of electrical components

The electrical components of the load are designed for continuous service in hostile environments provided that the integrity of the control box is maintained and provided that it remains latched except when required to be opened for service.

We do not recommend the application of sprays, conformal coatings or dielectric compounds inside the control box. The factory treatment of all electrical components is designed to minimize exposure rather than encapsulate the components.

In the event that the interior of the control box becomes contaminated and there is the possibility of corrosion, we recommend that the user wash the interior of the control box and installed components with a fine mist of distilled water. Following the washing process, dry the box completely with a dry source of warm, clean air.

E. Resistor Maintenance

During the course of operation of the load, the contact between the ends of the resistors and the clips may deteriorate. This problem has only been reported in situations where corrosive atmospheric conditions prevail. We have applied extra metallization to the ends of the resistors in this load and do not expect this to be a problem. However, the user should be aware of the nature of the problem, the probable indications of the problem and the solution.

- Since this is a contact degradation problem, the usual indication is some degree of arcing in the resistor bank. This is very modest arcing and may go unnoticed for some time. For this reason, it is good practice to periodically observe the operating load, especially if it is possible to do so in low light conditions.

- Look for arcs, and even if intermittent, attempt to identify their location. It will be necessary to investigate further to determine the extent and nature of the problem.

- The solution is to remove the resistors and return them to the factory for reprocessing. If the condition is discovered early in the failure, there is every likelihood that all of the resistors can be reused. If the failure is allowed to progress, resistor replacement becomes necessary.

6. Materials

a. Compound, Corrosion Removing and Metal Conditioning, Type IV [P/N 000-77000-CCR]

This is a kit of the materials required to clean pits and larger areas of physical damage. The kit contains 250ml of compound, an assortment of corrosion removal brushes and acid

application brushes, 360 grit silicon carbide abrasive paper and a supply of paper towels. Instructions are enclosed in the kit.

b. Gardobond EPP Pretreatment (formerly called Permatreat EPP)

This product is available from the factory or at www.ChemetallOakite.com.

c. Paint, Oil Base, Grey, Metal Primer [Part Nr. 000-77000-PRI]

This product is available in quarts (.947liters) and gallons (3.785 liters). It may be purchased locally or from the factory.

d. Paint, Rust Resist, Seal Brown [Part Nr. 000-77000-BSP].

This product is available in quarts (.947liters) and gallons (3.785 liters). It may be purchased locally or from the factory.

e. Boeshield T-9® This is a preservative compound which dries to leave a waxy surface film. It is available directly from the manufacturer, PMS Products, Holland, Michigan, USA. The Sales Department telephone number is 800-962-1732.

7. Factory Assistance

The technicians at the factory are always available for advice and assistance. You may contact them via FAX, e-mail or telephone. Our numbers are:

FAX 001-870-449-6000

Email customerservice@altronic.com

Telephone: US WATS = 800-482-5623

Direct dial: 001-870-449-4093