


Electrical Safety Precautions and Electrostatic Discharge Prevention

1.0 Description

These instructions provide electrical safety and Electrostatic Discharge (ESD) prevention guidelines while servicing inverters made by Magnum Energy.

 **Note:** This document is part of a series of Service Instructions to help qualified personnel replace components that have failed or been damaged.

Before performing any maintenance or service on Magnum inverters, read this entire document carefully and follow all instructions.


2.0 Electrical Safety Precautions


Follow the following safety precautions to help protect yourself from potentially deadly electrical shock hazards and also to protect the inverter from further damage.


These safety precautions are provided as a reminder, they are not intended to be a substitute for adequate training and experience in safety procedures when performing maintenance or service on electrical equipment.

2.1 Safety and Information Symbols

The following symbols appear in the Service Instructions to indicate dangerous and important safety information; they must be followed to reduce the risk of safety hazards.

 **Warning** - This symbol indicates that failure to take a specified action could result in physical harm to the user.

 **Caution** - This symbol indicates that failure to take a specified action could result in damage to the equipment.

 **Note** - This symbol indicates information that emphasizes or supplements important points of the main text.

2.2 Working Safely on Electrical Equipment

The following electrical safety guidelines must be followed when performing repair or maintenance on Magnum Inverters:

- Before beginning any procedure that requires access to the inverters interior, remove power by disconnecting all DC and AC power to the inverter.
- Do not work alone when potentially hazardous conditions exist.

Never assume that all power has been removed from the inverter; always check with a voltmeter.

2.3 Qualified Personnel

Work inside the inverter/charger must only be done by qualified service personnel. Qualified service personnel are trained and competent in the skills and actions necessary to avoid injury and possibly death to themselves and others due to obvious electric hazards involved with electrical equipment and are familiar with standard practices for preventing accidents.

3.0 Preventing ESD Damage


Electrostatic Discharge (ESD) will cause damage to semiconductor components resulting in complete or intermittent equipment failures. It occurs when static electricity dissipates into electronic components that are improperly handled. Always follow these ESD-prevention procedures while working on the inside of the inverter or handling any circuit board:

- Wear a grounding wrist strap (available at most electronics stores) and attach it to a bare metal part of your inverter. If a grounding strap is not available, prevent any electrical difference between you and the electronic component you are working with. If you are removing a circuit board from its antistatic bag, always touch the bag first, then remove and hold the board by its edge (away from any metal edge connectors). If you are working inside the inverter, touch the case before you begin working and ensure your skin continuously touches any un-painted metal surface of the inverter case - by resting your arm or other hand on the case at all times.
- Avoid wearing any clothing that could build-up a lot of static charge, such as wool or synthetic materials; or using any static-causing surfaces such as carpets, plastic, and packing foam.
- Keep the new circuit boards protected in their antistatic bags until you are ready to install them in the inverter. When the circuit boards are removed from the inverter, place them in the antistatic bags as soon as possible to help prevent further damage to them.
- Always hold the circuit boards by their edges or their metal mounting brackets, avoid touching any electronic component on the board or any metal-edge connectors; try to minimize the time you physically hold the circuit boards.

Top Cover Removal and Replacement with Internal Component Identification (ME, MS or RD Series Inverter/Chargers)

1.0 Description

These Service Instructions provide information on removing and replacing the top cover on a ME, MS or RD Series inverter/charger; and provides illustrations to help identify major components inside these inverter/chargers.


 **Note:** This document is part of a series of Service Instructions to help qualified personnel replace components that have failed or been damaged.


2.0 Installation Preparation


Before removing or replacing the top cover, read this entire document carefully and follow all instructions.


2.1 Safety Precautions

Follow all electrical safety precautions and ESD prevention guidelines below and as provided in the Electrical Safety Precautions and ESD Prevention, Service Instructions: 64-1000.

 **Warning:** Hazardous voltages are present within the inverter when power is applied. Do not remove the inverter's top cover without first turning off and disconnecting all AC and DC power to the inverter. Always replace the top cover before reconnecting power.

 **Warning:** The capacitors inside the inverter store electric energy even after all AC and DC power is removed. After disconnecting all AC and DC power to the inverter, short the positive and negative DC terminals together to dissipate this energy.

 **Caution:** Observe all ESD safety precautions while working within the inverter. Failure to follow ESD safety precautions could result in damage to internal components and the inverter.

 **Note:** If you are attempting to remove the cover while it is still installed, verify you have at least 6" of clearance above the top cover to pull the cover straight up.

2.2 Required Tools and Equipment

You need the following equipment to remove and replace the top cover:


- T15 Torx head screwdriver - for #6-32 screw.
- T25 Torx head screwdriver (≥ 6" shaft recommended) - for #10-32 screws.

3.0 Removing/Replacing the Top Cover

3.1 Removing the Top Cover

3.1.1 Locate and remove the six #10-32 screws (T25 head) (figure 1, item B) holding the cover to the inverter base and the #6-32 screw (T15 head) (figure 1, item A) on the front of the inverter.

3.1.2 After removing the seven Torx screws, remove the top cover by lifting it straight-up out of the DC terminal plate (figures 2 and 3, item F).

 3.1.3 **Note:** The DC terminal plate has slots on its side requiring the top cover to be lifted straight-up; the top cover may seem tight as it is lifted out of these slots - this is normal.

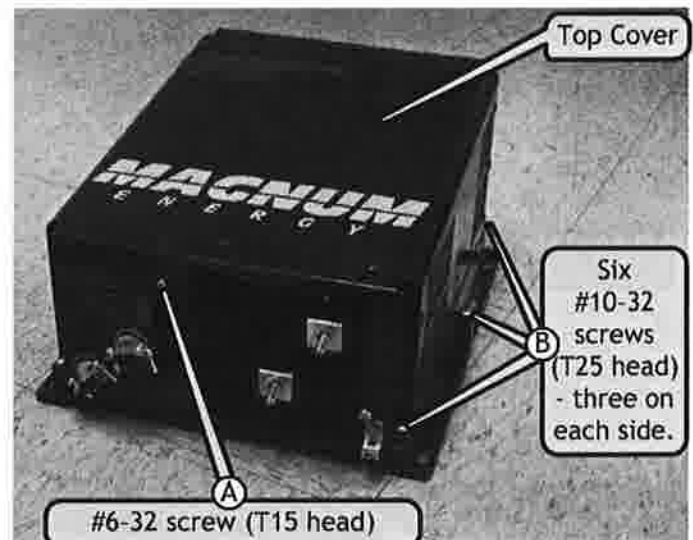



Figure 1, Top Cover Screws

3.2 Replacing the Top Cover

 **Note:** If the top cover has been removed to replace any component, ensure all connections are correctly made a final time before replacing the top cover.

3.2.1 Align the front of the top cover to slide in the slots on the DC terminal plate and push down slowly on the cover - ensuring the slots on both sides are lined up - until it sits flush on the inverter base.

3.2.2 After verifying the screw holes in the top cover align with the holes in the base and in the front of the inverter, screw in the six #10-32 screws (T25 head) holding the cover to the base and the #6-32 screw (T15 head) on the front.

3.2.3 The top cover is now replaced, review all the connections a final time and ensure they are correct.

4.0 Identifying Internal Components

Although Magnum Energy manufactures multiple inverter models, the location of the major internal components between the different models is identical. Use the illustrations below - for the inverter model - to identify the major components inside the inverter.



Note: The illustrations below may not exactly match the inverter and may include options not included on the inverter being serviced.

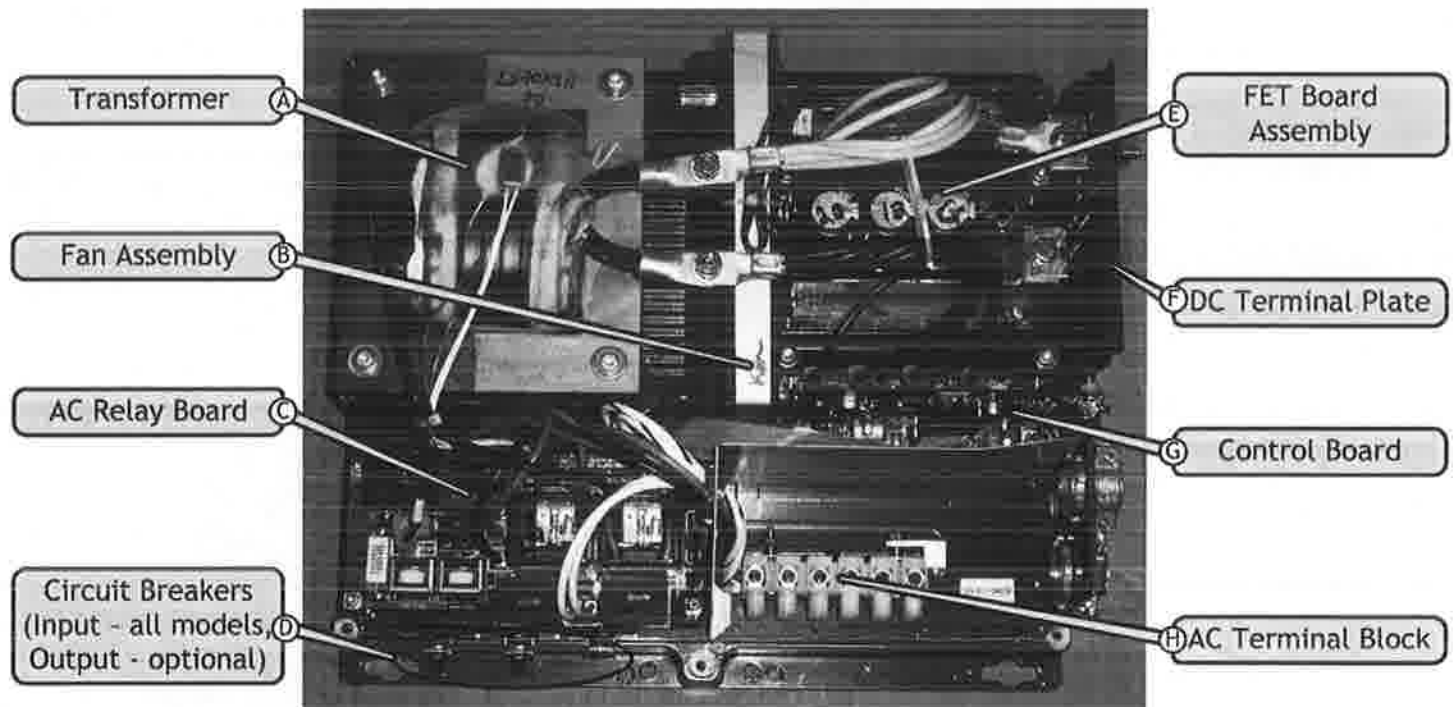


Figure 2, ME or RD Series Inverters - Internal Components

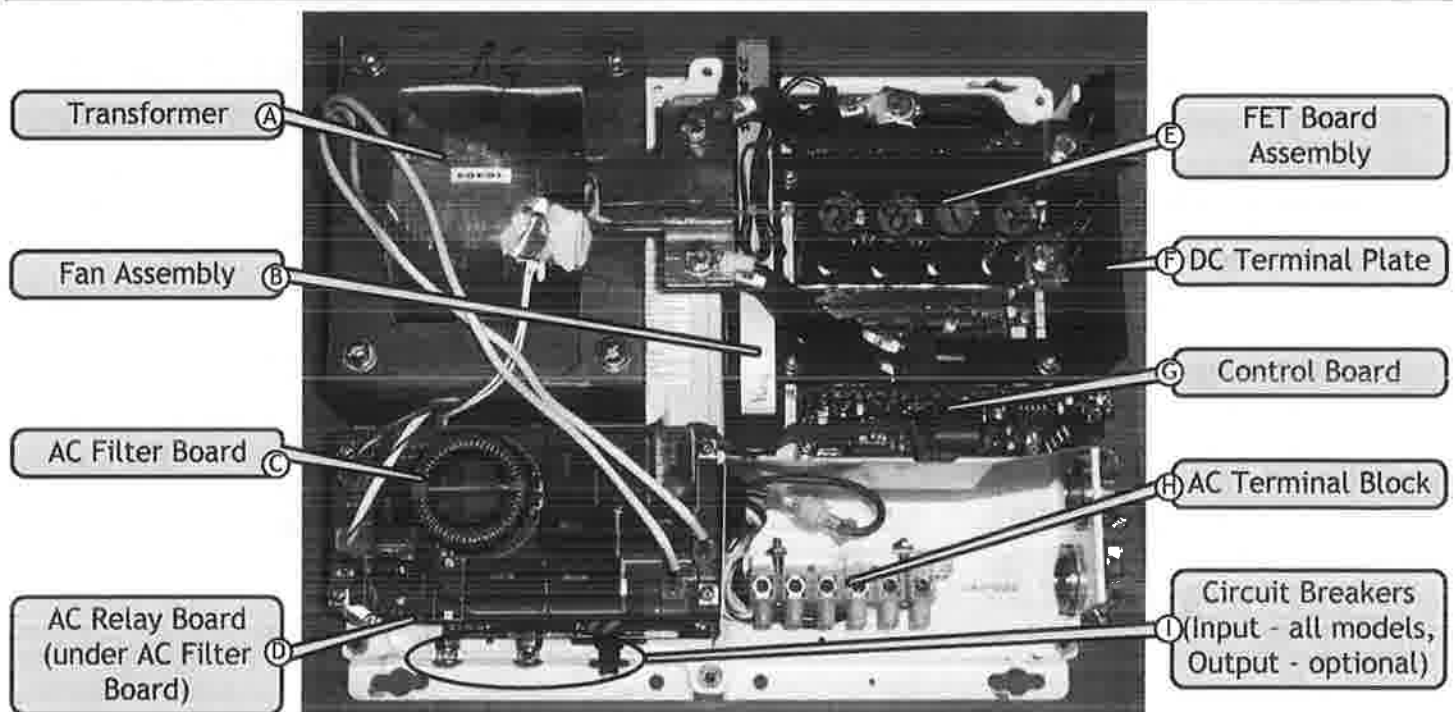


Figure 3, MS Series Inverter - Internal Components