



## FX Fan Replacement Instructions

There is a fan located over the transformer and attached to the top cover inside the FX inverter. This is very apparent if you have a vented FX (“VFX”), but not so apparent if you have a sealed FX. Sometimes this fan malfunctions in either its electrical circuitry or its housing. The housing of the fans in older FXs were plastic and they were susceptible to warping in very high heat. The fan sent to replace the one currently within your FX has a metal housing that is impervious to the heat produced by the FX. Replacing your defective fan is easy as long as you follow these directions.

Tools required to service the FX are:

- #2 Phillips screwdriver
- 3/8” flat blade screwdriver
- 4mm hex wrench (included with the boards shipped to you)
- Rubber-band wrench (usually used for opening jars)
- 9-volt batteries (three if you have a 12V or 24V FX, six for a 48V FX)

### STEP 1:

If you have a generator or utility grid power, use a bypass to isolate the inverter system. Turn off all breakers feeding into and out of the AC and DC leads of all inverters and whatever else could possibly cause harm. Disconnect the AC and battery connections. Unless you want to get really frustrated when you try to put the unit back together, take the extra 2 minutes to remove the unit from the wall so that you can work in the “gravity assist” position. (You may really hate life if you don’t do this)

### STEP 2:

Remove the red and black plastic nuts with the rubber-band wrench (Figure 1). It doesn’t scratch or dent anything. Break down, go to Sears and get yourself one, (It opens jars too!) or else use a flat bladed screwdriver like you are loosing up a conduit locknut.



Figure 1

**STEP 3:**

Use a #2 Phillips tip screwdriver and remove the six screws inside the AC wiring compartment (Figure 2, Phillips). These are 6-32 x 1/2" stainless steel pan head screws (In case you lose any). Before getting into the unit you need to make sure you do not have a static charge built up on you or your clothes. The safest way to accomplish this is to stand naked in a mud puddle while disassembling the inverter. Another method would be to make sure you are wearing only 100% cotton clothes. Cotton does not build up a static charge. In addition, ground yourself by touching something like a water pipe, electrical ground conductor etc. in order to bleed off any charge. Static can destroy boards. The form of static that is harmful is much less than what actually makes sparks. 30 volts can damage parts, so don't take chances and don't handle any boards unless static control measures have been taken.

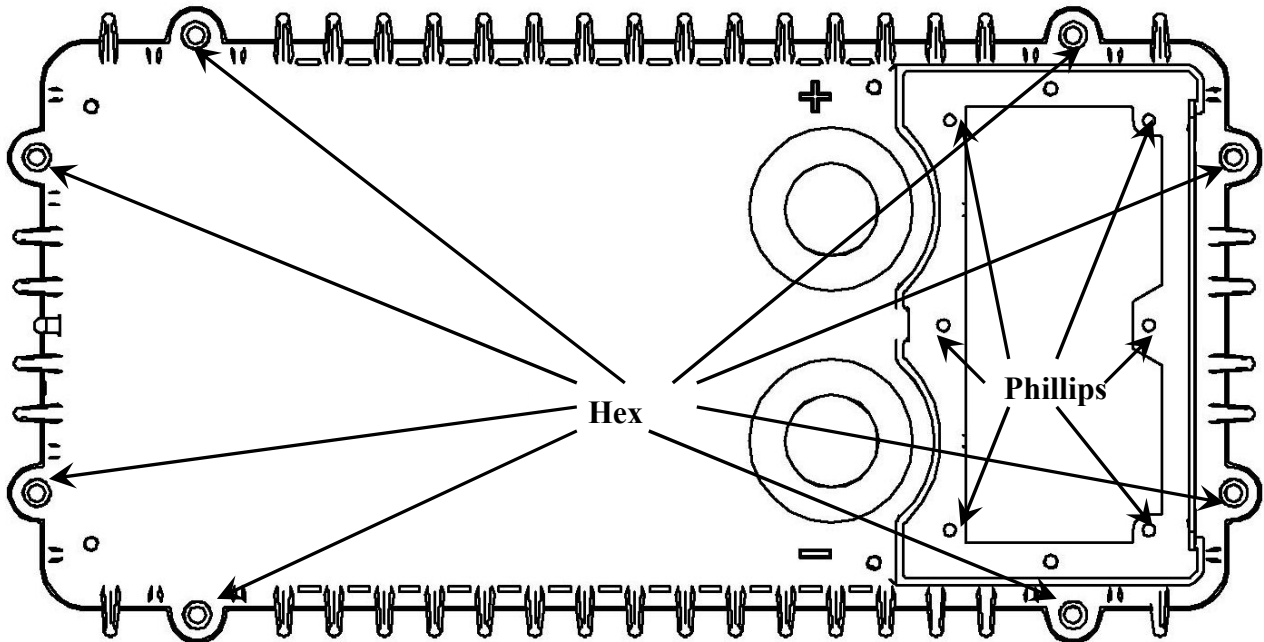


Figure 2

#### STEP 4:

Pay attention to this one or you'll hate yourself later! Use a 4mm Allen wrench (included) to remove the 8 stainless steel socket head cap screws that connect the top to the bottom casting (Figure 2, Hex). The FX's fan is mounted to the top cover. It plugs into the FET board. If you pull the top cover off without thinking, it will rip the wires right out of the connector. (This is where you will start swearing and your customer will become alarmed!) If this happens, you have two choices; (1) get new Molex crimp terminals and the special crimp tool to correctly fix the problem, or (2) after replacing the fan, solder the fan wires onto the sockets that are still attached to the mating connector on the FET board. Hint: cut some of the plastic away first so you can get to the pins. The red wire goes towards the bottom casting (the latch side of the connector). Figure 3 gives you an idea how long the wires are. There are two small O-rings that fit into slots of the battery terminals. If they aren't in their slots, they may be stuck to the underside of the top cover. Remove these small O-rings so they don't get lost. There is also a very large O-ring that travels the perimeter of the chassis. This doesn't need to be removed but if it comes out it should be reinstalled before the top cover is put back on. If this O-ring is too small, it can be stretched. There also is a rectangular gasket in the AC and AUX wiring section that prevents water from entering the FX. This gasket may or may not be attached to the AC board. If the gasket isn't attached, check the underside of the FX. The last thing that should be noted is the square piece of "Nomex" attached to the underside of the top cover (see Figure 3). Sometimes this piece falls out or is loose. If this is the case please use some silicone to glue it back in place. Make sure it is fairly dry before attaching the top cover.



Figure 3

### STEP 5:

Refer to Figure 4 for this step. Locate the fan on the underside of the FX's top cover and make a mental note of what corner the fan's wires come from (may not be the same as in Figure 4). Remove the fan using the #2 phillips screwdriver. Position the new fan noting the corner the wires came from and that the fan's label is visible (facing you). Insert the two copper guides in opposite screw holes of the fan to line it up. Next insert two of the screws that came with the new fan into the two remaining holes. Screw these screws down snugly but not too tight, the fan housing is a little brittle. Remove the copper guides and add the other two screws.

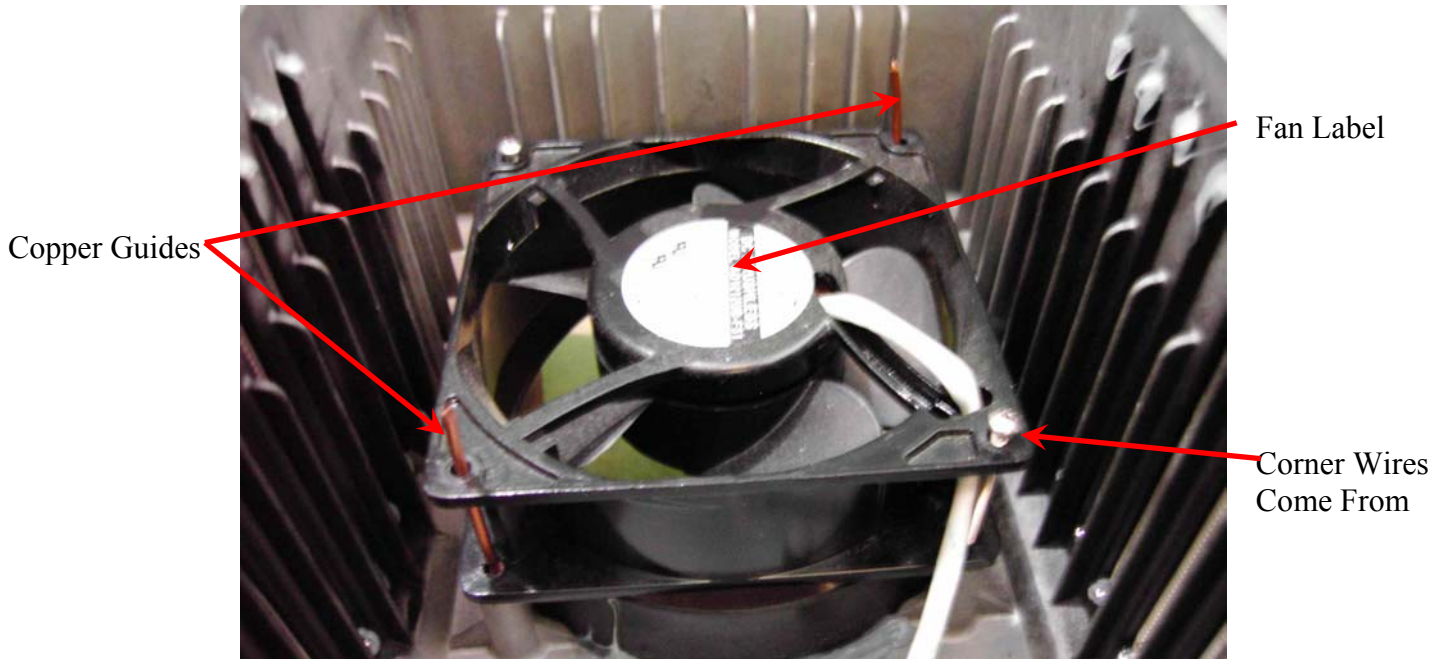


Figure 4

### STEP 6:

Once the fan is properly seated and attached, you need to install the AC gasket and the O-rings. You may also need to bend the ribbon cable that connects the FET board to the control board so that it doesn't get pinched when attaching the top cover.

**AC GASKET:** Between the AC assembly and the top cover is a gasket that keeps water from entering and also functions as isolation. Some AC assemblies have this AC gasket permanently attached while some don't. If you have received a new AC assembly chances are it will come with a separate AC gasket. This gasket has six holes for screws to pass through. Place the AC gasket on the AC assembly so that the holes in the gasket line up with the holes in the AC assembly.

**O-RINGS:** There are two small O-rings that need to be placed in the slots on the FET board battery terminals. They may be stuck to the underside of the top cover or they may have stayed in the FET board itself. These O-rings are necessary if you have a “Sealed” FX that is in a corrosive environment. If not then you may lose them and not feel too stressed out. There is also a very large O-ring that fits in the slot that travels the perimeter of the chassis. It also may be stuck to the top cover or it may be in the slot already. Same deal applies to your stress level.

**RIBBON CABLE:** Curl the “Bend” in the ribbon cable towards the inside of the FX (see Figure 5). This will pull the ribbon cable inward and then it will be less likely to be pinched between the chassis and the top cover when you put on the top cover. This is a major source of problems, pinching the ribbon cable will destroy the boards! Make sure the ribbon cable is pushed all the way into its connectors and then tape the ribbon cable to the clear relay if bending it doesn't pull it far enough inwards.

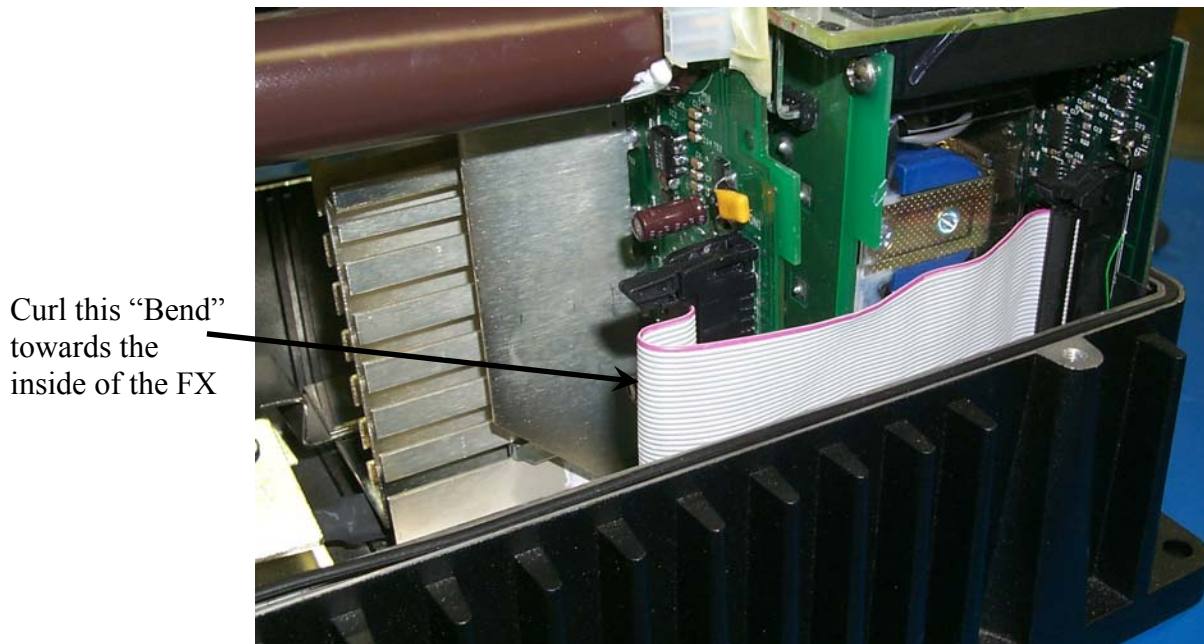


Figure 5

#### STEP 7:

Now you can attach the top cover to the chassis and throw (figuratively speaking) the FX back up on the wall. The easiest way to do this is to situate the FX so that the transformer is to your left and the AC terminal block is to your right. Make sure that the O-rings and the AC gasket are in place.

#### **Plug the fan into the FET board !**

Now lift the top cover over the chassis and lower it down so that the battery terminals come through the holes provided. You may have to push the battery terminals towards the AC terminal block and push down a little bit to lower the

top cover. Before you lower the top cover all the way, make sure the AC gasket is not pinched under the top cover. Next, insert (but do not tighten) the six “phillips” screws that connect the top cover to the AC assembly. Now, put on the battery terminal nuts and tighten down. Now you can tighten the six screws on the AC assembly to 6 inch-pounds. Finally, insert the eight hex screws that attach the top cover to the chassis. Tighten these down to 12 inch-pounds in the accepted “Star” process, going from side to side until they are all tightened. Re-tighten the screws once the unit is warm or hot. The screws compress the rubber gasket and complete the grounds for AC as well as the unit’s own filters.

#### STEP 8:

The fan has now been successfully installed. Test: Now that the unit is electrically back together, it should be tested on a bench power supply or a series of 9-volt batteries prior to applying battery power. For 12-volt and 24-volt FX’s use three 9-volt batteries in series (alligator clips work nicely) but for 48 volt FX’s use at least five, maybe six 9-volt batteries in series. These batteries will probably be toast afterwards but it’s cheaper than blowing up another FX board. 9-volt batteries and power supplies are current limited and therefore forgiving of assembly errors. Large battery banks are not forgiving at all and can turn all of your hard work into a lot of smoke due to a simple assembly error.

Hook up your bench supply (Or your 9 volt batteries) to the battery terminals making sure the battery voltage is set according to the unit under test. The inverter should go through a boot up routine. The red “Low” battery LED will go on and then change to the yellow “OK” LED and then it may change to the green “Full” LED. The fan will also come on (did it?) if plugged in. After about 5 seconds the FX will produce AC and the green “Inverter” LED will glow. Check the output terminals with a volt meter or small load to confirm the presence of AC power. It should read about 110-120VAC unloaded for a Domestic FX or 210-230VAC for an Export FX. Once you have confirmed the inverter power up sequence, turn the unit off.

#### STEP 9:

Put the FX back into the system and connect the proper wiring. Turn on all the DC battery breakers (if you have a HUB, try to turn all of them on at the same time). On the AC breaker side, go from “Bypass” mode to “Normal” mode (FXs power the load panel). Turn any other AC breakers on as necessary (X-240, AC input).

G’Day Mate!