DISTRIBUTION BOX REBUILD

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Preliminary Step

Disconnect the earth lead from the battery on the other side of the Ferret (i.e. the one under the air cleaner). This should totally remove all voltage from the Ferret.

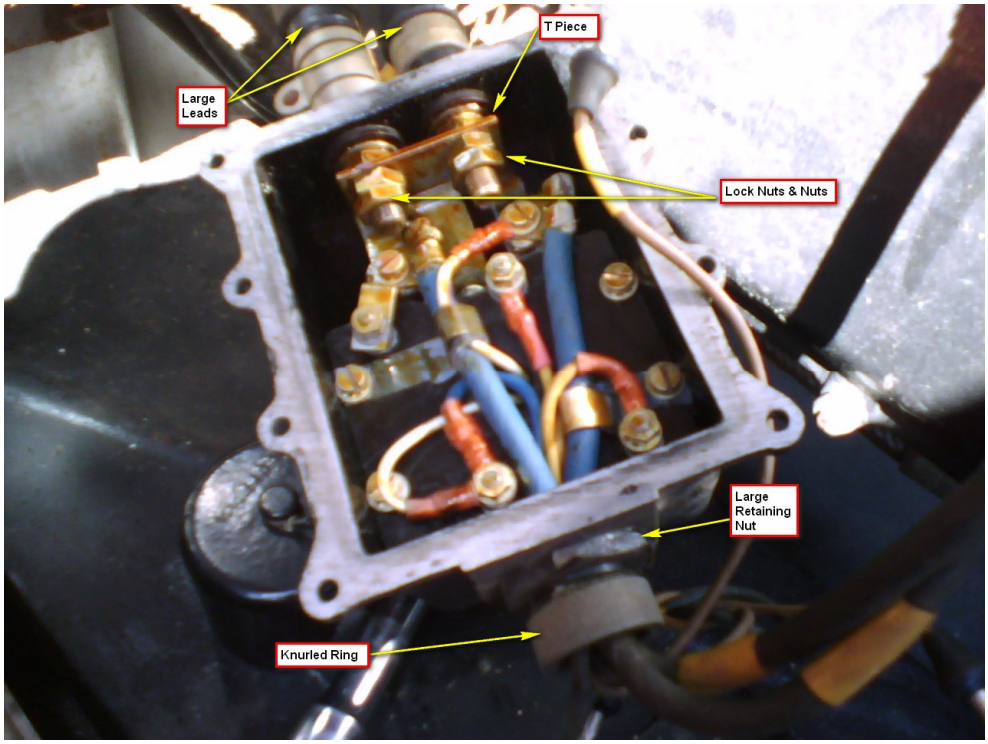
It is worth photographing the box at each stage of disassembly. This will provide an aide-memoire when reassembling it and give added confidence before the power is reconnected to the system!S

Remove the Distribution Box

There are about eight small nuts that hold the distribution box to its base. Remove those nuts and the distribution box will come free. You may find that some of the nuts are bound to the threads and the threaded stud will come out with the nut. This is not a problem…

Turn over the Distribution Box and you will see that there are two large leads coming in from the left. One of these is the +ve connection from the batteries, the other takes +ve back unfused to the starter motor. These are strapped together and to the centre connector of the Inter Vehicle Starter Socket by a brass T piece.

On the right hand side are two blue leads that are not as large as those on the left but still significant and three smaller leads.



To work on the Distribution Box you will need to undo the three leads from the connector mounted above the Box. Make a note of which lead unplugs from which socket.

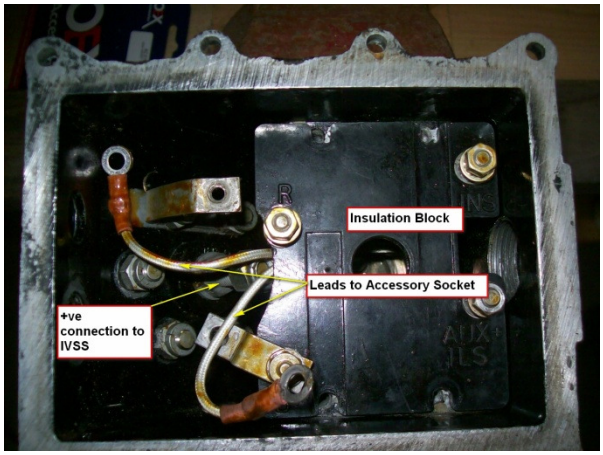
Undo the lock nuts and nuts from the heavy leads on the left of the box. Then undo the nut holding the T piece to the IVSS. You can now withdraw the T piece from the box.

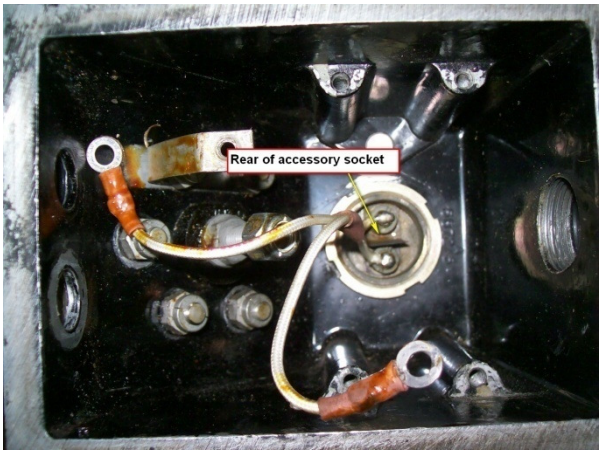
Now remove the nuts holding the two leads to the box. You can now withdraw the leads being careful not to lose any of the rubber insulation pieces.

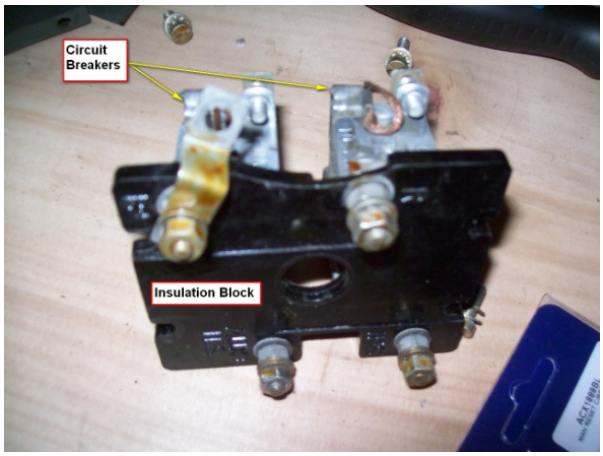
Disconnect the blue leads, three small leads and retaining clips from the insulation block. Then remove the two remaining retaining screws from the insulation block (you will have removed two when removing the retaining clips).

To remove the two blue leads and the three small leads, undo the knurled ring and then undo and remove the large retaining nut. The threaded fitting complete with rubber insulating insert can then be removed from the Box and the blue leads can be manoeuvred out of the Box.

The final step in disassembly is to remove the insulation block and two attached circuit breakers (30A and 10A). Be careful – the insulation block is relatively fragile and if dropped will break (my experience).







Before removing the circuit breakers make a note of the connections from each (10A, 30A) to the insulation block.

Fit New Circuit Breakers

You will need to purchase a 30A and a 10A circuit breaker. You can get automatic resetting breakers that are designed to mount on studs but I would recommend manual resetting breakers. These come with two screw terminals and must be wired into circuit.

The breakers I purchased had two screw mount holes that were to be fitted flush with the inside of the Box. In between them was the reset button which would pass through the Box and be accessible from the outside. The problem with those breakers is that the only way they can be mounted aligns one of the mounting holes with the large surround on the outside where the blue cables come through. I was only able to mount the breakers with one screw each.

Subsequently I have come across Hella 24V breakers that are designed for aircraft use (which I assume means they are of high quality and reliability) http://www.hellamining.com/Accessories/Thermal_Circuit_Breakers.html and are mounted by a single hole. The reset button passes through the Box and a ring nut secures it to the Box. This would be a much better solution. They have the additional advantage that they can be manually switched off, cutting off most of the power to the Ferret when it is parked/stored.

The Distribution Box is a soft alloy and the holes for the circuit breaker can easily be adjusted using a rat tail file. I applied silicon sealant to the surface of the breakers before mounting them in the hope it will provide a waterproof seal. I also applied loktite to the threads which should prevent them vibrating loose.

You then need to make up four leads with crimp ring connectors on each end: two leads must be capable of carrying 30A and two 10A. I had 25A rated cable so put four leads on the 30A breaker – two on each connector. As these connections will only be accessible if the full disassembly procedure is followed it is strongly recommended that a good quality crimping tool be used and that all joins be checked for electrical and mechanical integrity.

The leads are then connected to the insulating block in place of the original circuit breakers.

Reassembly

Reassembling the Distribution Box is simply a matter of reversing the disassembly procedure – reinstall the heavy cables and the T piece, reinstall the insulating block (only three mounting screws are fitted as the fourth is installed with the cables), reinstall the blue and small cables, reconnect those cables to the insulating block. Double check all connections against the photographs and check for short circuits. Good wiring practice should be applied to ensure none of the leads from the circuit breakers are squashed or otherwise at risk of having the insulation perforated.

Once reassembled and mounted in it's original position a good visual check is recommended and check with a multimeter for correct polarity on the accessory plug.

Reconnection

Ensure the circuit breakers are set. Before carrying out the next test make sure there is good ventilation and that you are not sitting in a perfect air/fuel mixture! Check that all switches, accessories, interior lights, etc are turned off. Tap the earth lead to the battery and watch for sparking. If there are sparks (and they should be minor if they do exist) something is connected/switched on. Locate it and disconnect it/turn it off. Again tap the lead and when there are no sparks connect the lead to the battery. Now try one of the interior lights to confirm that voltage has been applied to the system.

If the spark test gave off a decent spark or bang you should suspect a short in the Distribution Box. Check the circuit breaker reset button – if either/both have tripped the short is covered by the protection circuit. If neither have tripped it is likely that the short is around the T piece connecting the battery in/starter out/IVSS. If the cause can not be detected the Box should be disassembled and thoroughly checked.

Being a cautious type I recommend getting out of the Ferret and carrying out the starting procedure leaning through the hatch. At least then if there is a total disaster you need not worry about getting out in a hurry!

All should run fine. If either circuit breaker trips and the cause can not be located you will need to disassemble the Box and determine the cause.