

## Instructions for assembling the WARS Powerpole Distribution Kit. (V2)

**Warning:** The construction of this project should only be undertaken by persons with the requisite skills and knowledge and should only be used in accordance with the current limits stated.

Your kit should contain the following parts:

- 1 x Jiffy Box
- 2 x Label
- 1 x Printed Circuit Board EVE-0101
- 7 x 30A Anderson Powerpoles with contacts
- 6 x Blade fuses (1 each of 5A, 10A, 15A, 20A, 25A & 30A)
- 1 x Blade fuse puller tool
- 12 x Spade sockets
- 7 x 1k 0.5W resistors
- 6 x 3mm High output red LED
- 1 x 5mm Dual Colour Led
- 1 x 35cm length of #13 enamelled copper wire
- 2 x Self-adhesive label for the top of the box.

### Suggested Tools:

- Vice
- Sidecutters
- Sandpaper, file or sharp edged tool for scraping enamel
- Metric Ruler
- Powerpole crimping tool
- Soldering iron(s) with both a fine tip(for leds and resistors)  
and a large hot tip (for the thick copper wire)
- Solder
- 2mm Allen key or 2mm diameter round metal shaft
- Needle nose pliers
- Small hammer
- Drill with small drill bits
- Cutting implement: Stanley knife, or Dremel drill with cutting blade.

### Initial Preparation

Prepare the wire by removing all the enamel from it. This can be achieved by scraping or sandpaper to leave a clean copper surface.

Once cleaned, put about 1cm into a vice and stretch slightly to straighten the wire.

Cut 12 x 2cm long pieces and 2 x 3cm long pieces. There will be about 7cm excess left over.



Crimp a Powerpole contact on to one end of each of the cut pieces of wire. Tin the rest of each piece. The solder may be flowed into the contact as well but be careful not to get too much in as it might flow onto the contact surface which is not desirable at all as it will increase the contact resistance of the contact.

Install the contacts into their housings with the two long ones in one housing and the pairs of short ones in the rest.



Set these aside for now.

### Board Assembly

Now take the 12 insulated spade sockets. The contact portion needs to be removed from the insulation.

The best way I have found, is to use a 2mm Allen key or similar held in a vice with about 10mm protruding. Hold the insulation with a pair of long nose pliers and push it down over the Allen key in where the wire normally goes. Tap the pliers down with a small hammer which will push the contact out of the insulation.

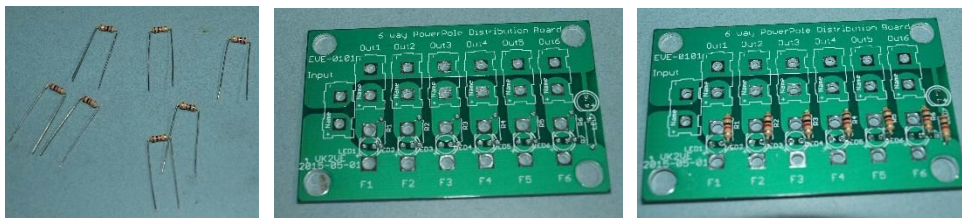


Push a contact onto each blade of each of the fuses. This will be used for the installation onto the board later. Make certain that they are both in the same direction on the fuse as otherwise the fuses will end up at an angle when installed.

The insulation pieces are not required and may be discarded.



Next, take the PCB and the 7 x 1k 0.5W resistors. Bend the resistor leads 90 degrees down at each end right next to the resistor body. Place these into the board in the positions R1 to R7 and right down onto the board. Solder them in place and trim the wire ends close to the board.



Next take the 6 small LEDs. Place them into the board in the LED1 to LED6 positions. Note that the longer lead is the positive and must go into the hole marked +. Depending on the batch of LEDs, the flat may or may not align with the flat marked on the board overlay. Push the LEDs flat to the board, turn over and solder them in place.



Trim the leads back to the board.

Now we are going to install the Powerpoles and the Fuses. I have found that the best way is to work from the OUT6 end and put in the Powerpole and then Fuse6, then do Powerpole 5 and FUSE5 etc.

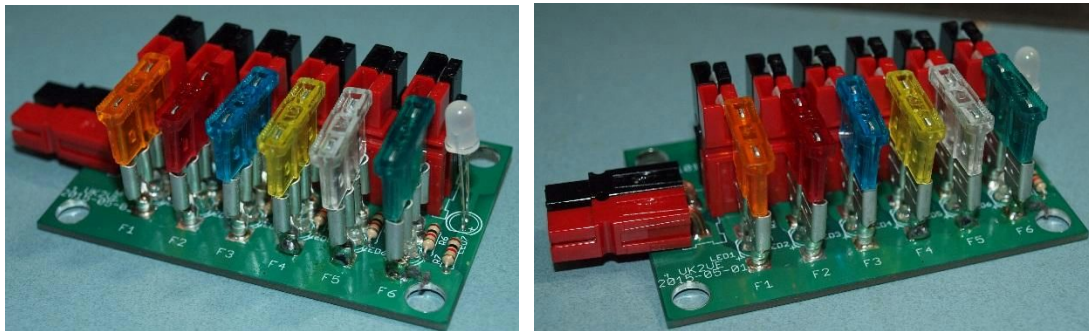


Place the Powerpole leads through the board making sure that the red side of the Powerpole goes into the + hole and they are pushed right down onto the board. If they are not right down flush on the board, the fuse socket contacts will not go onto the board correctly. Turn over the board and solder. Trim the leads back close to the board.

Note that soldering the Powerpoles and fuses will require a hot soldering iron as there is quite a bit of copper around them.

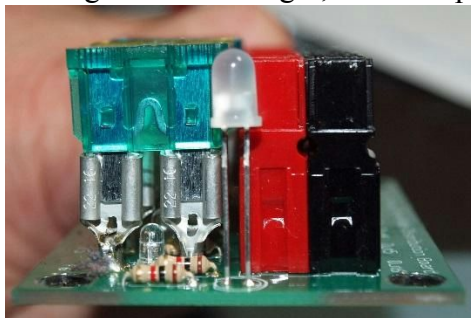
Next take the 30A fuse and put the spade contacts through the fuse holes. Place it such that the flat side of the contacts is towards the input end of the board. Holding it approximately in place, tack solder one side. Now turn the board over and adjust the other contact so that it is flush with the bottom of the board and solder it. You can now reflow the tacked one and adjust it so that it is also flush with the bottom of the board and finish soldering it.

Repeat for the other 5 Powerpoles and fuses.



Now take the Powerpole with the long leads. Bend the leads at 90 degrees so that the Powerpole will sit down onto the board with the leads going through the board and the red (+) side towards the fuses. Turn over, solder and trim. If you wish to connect cables directly to the input, rather than the Powerpole, omit this step and solder the input wires into the + and - holes instead.

The last component to be installed is the polarity LED. This one needs to be installed so that the long lead is in the negative hole. In this case, the flat on the led should match the flat marked on the board overlay. The height of the LED should be approximately even with the tops of the fuses. I have found the easiest way is to turn the board over and rest it on the bench with the LED also resting on the bench. Making sure it is straight, solder in place and trim the leads.



Your board is now complete and you should test it by placing it on a non-conducting surface and connecting 12V to the input connector. The polarity LED should come on Green. If the polarity of the input is reversed it should light up Red. If this is wrong you may need to remove the LED and turn it around.

You should also check the fuse fail LEDs by removing the fuses and shorting each output socket in turn with an input supply connected. The corresponding LED under the fuse holder should light when its output is shorted.

## Box Preparation

Next item is to prepare the box. Take the sticky label and cut it out around the border. Remove the backing and align the sticker with the top surface of the box and stick it down. This will provide both the drilling/cutting template for the top of the box as well as the labelling of the finished project. Two labels are provided so that you can use one for the cutting and then replace it with the other if the first one gets damaged during the cutting & drilling process. You may also wish to put a layer of clear tape or similar over the label to protect it.

First drill the hole for the Polarity LED. I suggest starting with about a 2mm drill through the middle of the marked hole on the label and then the 5mm final hole size.

Now you can cut out the hole for the sockets and fuses. A Stanley knife or similar may be used to cut along the lines of the outline of the cut out going a little deeper each time you go around until you cut through the plastic box and can remove the centre. Use a straight edge to make sure you cut the lines straight. A Square is useful here as it can be placed along the outer edge of the box to help align the ruler parallel with the edges. Alternately, you could use a Dremmel with a small saw blade to do the cut outs. Both ways have been used successfully.

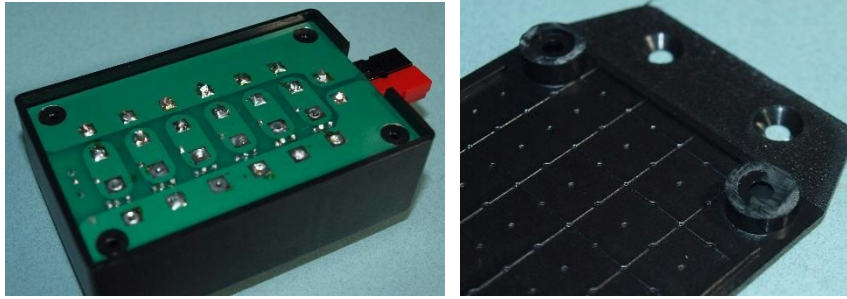
The last part to be cut out is the slot at the input end of the box to accommodate the input socket. This slot is 18mm wide and 15mm high from the edge of the box where it mates with the bottom.



If you elected to install a cable rather than the input Powerpole, replace the input slot with either a slot or hole to suit the cable being used. The board will take wires up to 2.5mm in diameter, which equates to about 4.5mm<sup>2</sup> cable.

## Final Assembly

You can now insert the board into the box. It should slip straight over the 4 corner posts and limit on the ribs on the sides and around the posts. You will need to trim about 1mm off each of the cups on the base of the box so that it will sit right down and clamp the board when you close it. The 4 screws can now be used to close the box and the little plastic feet inserted to hide the screws.



### Final Notes

A blade fuse puller is included with the kit to assist in removing and replacing fuses.

The kit comes with one each of 5A, 10A, 15A, 20A, 25A & 30A fuses. You can replace one or all of them with whatever rating fuses you need but remember that, when using the Powerpole input connector, that its rating is 30A so that should not be continuously exceeded as a total continuous current.

The PCB is designed with double the normal thickness of copper and is double sided with plated through holes so should have no problem carrying currents well in excess of the 30A rating of the Powerpole connectors.

The PCB is also designed to be RoHS compliant so may also be built using lead free solder. All the supplied components should be RoHS compliant.