

Battery box instructions

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The laser cut mild steel parts are supplied pickled and oiled, you will find it easier to clean and degrease them before bolting up the assemblies. The steel is then unprotected and needs to be kept dry or surface rust will form.

The laser cutting sometimes leaves a small amount of oxide on the lower edge of the cut, particularly on thicker steel. I use the back of a hacksaw blade and wire brush to scrape it off. You only need to remove anything that is loose.

Lightly sanding or scouring the surfaces before bolting together is a lot easier than doing it afterwards. If you are going to use acid etch primer the scouring or sanding is not really required.

The folded joints can be filled and smoothed or left 'as is' for a more industrial look.

Painting - I prefer to fold all the parts, prime with etch primer, assemble then top coat in gloss.

Tools required

Pop-rivet gun.

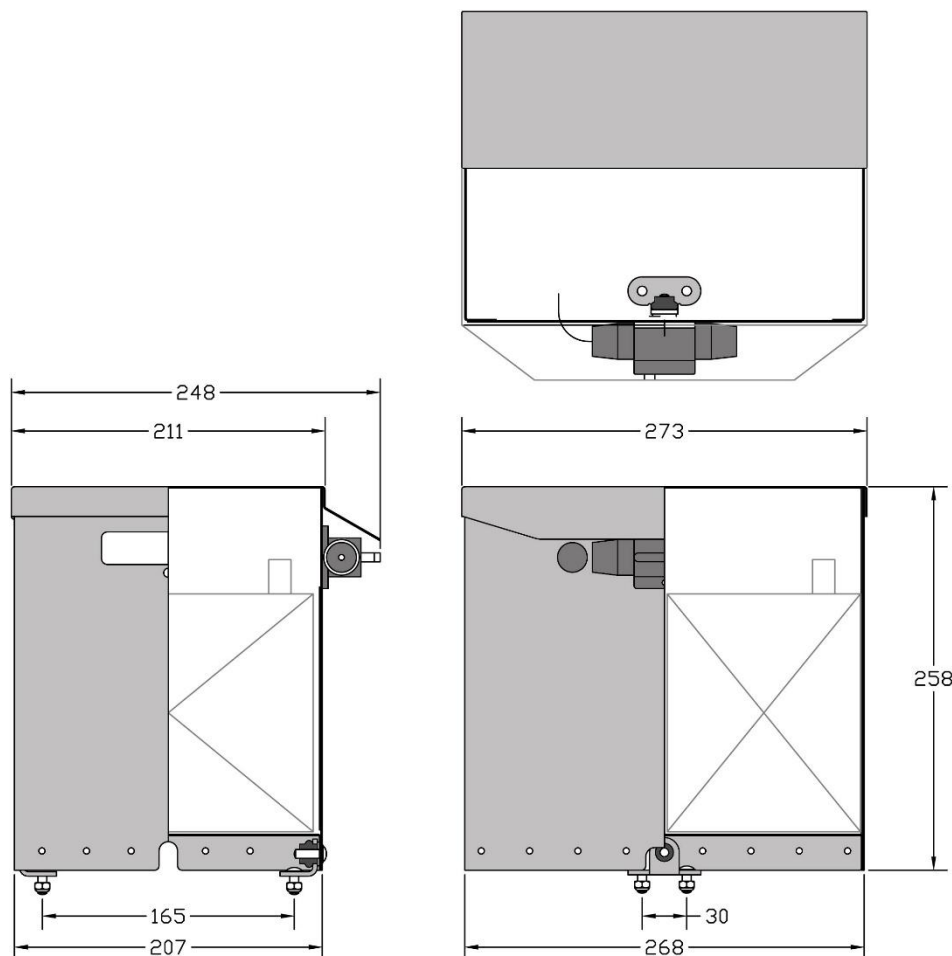
Wire strippers and a decent quality crimping tool.

Soldering iron?

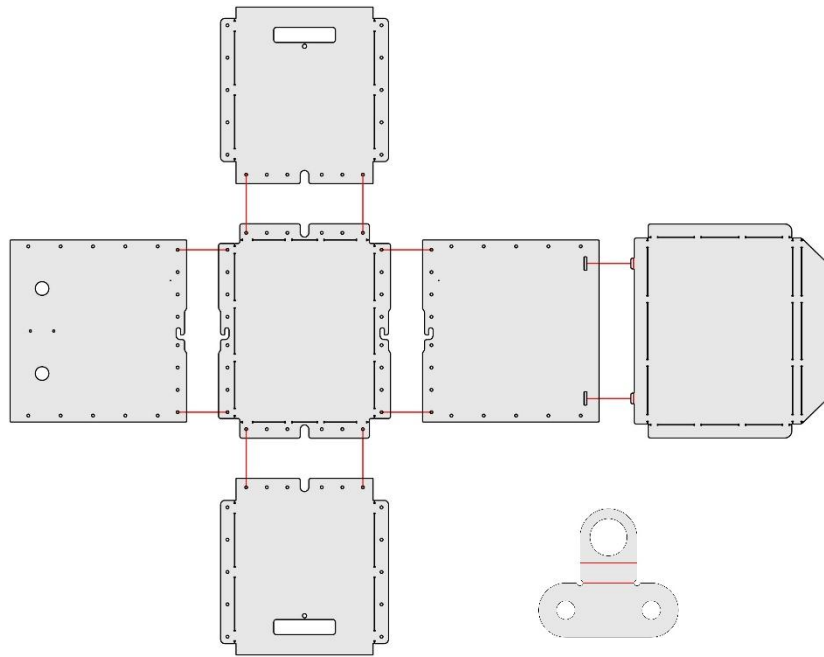
Vice.

Battery box overview

This battery box has been designed to take two or three 12 volt mobility scooter batteries to give a working voltage of 24v or 36v. It's based on the one used in the Scamp, Imp, Flyer and Tyke locos.



A pair of mounting brackets are included with the kit, using them allows the battery box to be removed quickly to assist in lightening a loco for moving it by hand into a car or trailer.



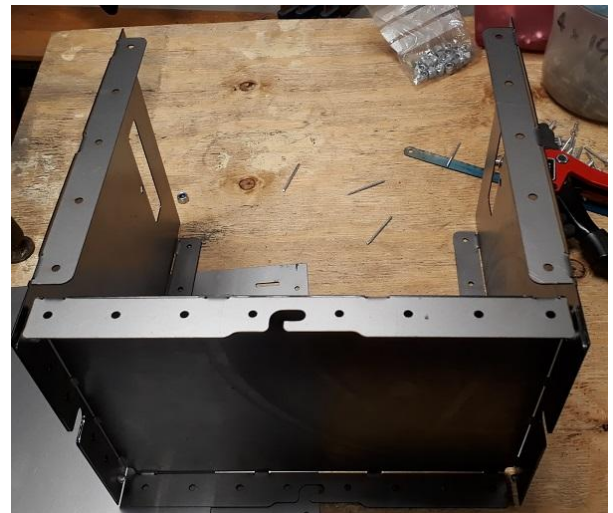
Parts supplied

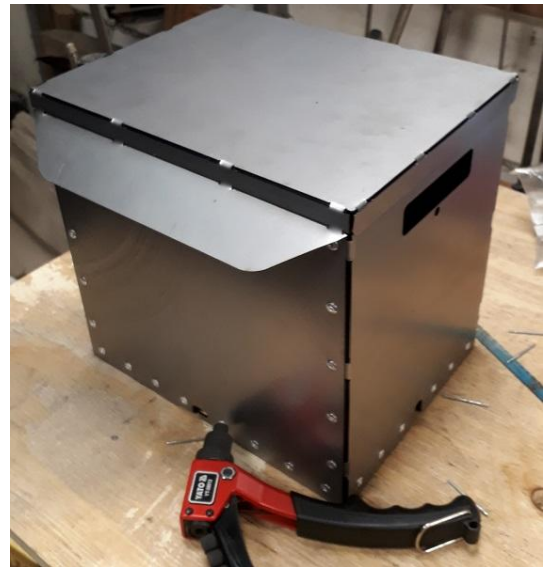
Assembly instructions



The flanges are easily folded by hand by simply pressing them against a flat surface. Just make sure that the flange is folded in one go and doesn't end up being twisted and stretched.

The two side panels have their flanges folded to ninety degrees and the bottom has all four sides folded the same way. The lid has all the edges folded up or down with the two little lugs on the edge of one flange folded facing inwards with pliers so that they will hook into the slots in the side, and the final 'rain flap' at the bottom folded out at 45 degrees to protect the breaker.





The flat sides are pop-riveted to the base with 4mm x 6mm long aluminium pop-rivets with the 'L' shaped slots matched up and the 'hooks' located inside the flanges opposite each other at one end as shown above left. Edge trim is added to the sides of the base at the opposite end to the hooks.



Clamp the sides of the brackets with the large hole in the vice up to the upper etched line and fold the brackets so that the folds lie between the upper and lower etched lines. The brackets are screwed to your frame and rubber well nuts popped into the holes. M6 screws are added so that the box can be dropped over them, slid along to lock it into place and the screws tightened, swelling the rubber nut so that it grips solidly. undoing the screws a little allows the battery box to be lifted off to lighten a loco ready for transport.



Instructions for installing and wiring the batteries, 24 volt and 36 volt versions

Be very careful when working with batteries, there is a lot of potential energy stored in one and a short circuit can create a great deal of heat in a very short time. Always be aware of this when connecting up and especially when working with a spanner inside the box, make sure that there is no chance of it touching the box or a bare wire of the opposite polarity. The breaker will guard against any short circuits or overloads outside the box, and can be used as an isolator switch when the loco is left unattended.

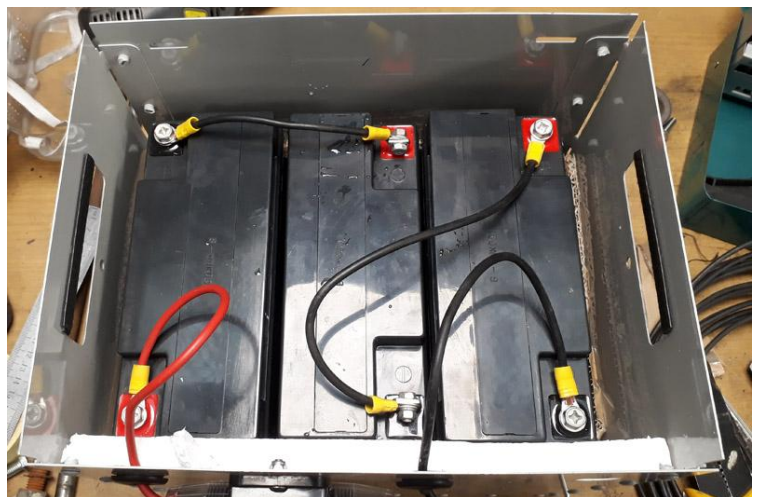


Fit the breaker into place with the M3 screws, cut off any protruding screw on the inside and smooth any sharp edges. Add the grommets and pierce their centres to take the wires.

Cut a piece of thin rubber matting to line the inside of the battery box and try lowering the batteries into place. The pair of larger batteries are a tight fit in the box as the box had to be sized to fit under the Scamp bonnets, you might find that you need to use a pair of side-cutters and a rough file to slightly shorten the protruding ends of the rivets inside the box to make sure that they won't rub on and possibly wear their way through the battery sides.



24 volt version



36 volt version

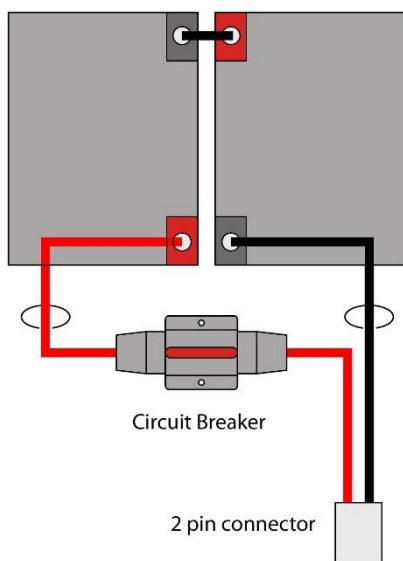
With the batteries in place thread a length of M6 studding through the holes in the ends and add a nyloc nut at each end, this keeps the batteries in place and prevents them jumping up and possibly shorting out on the inside of the lid (think of the loco on a trailer going over speed humps!).



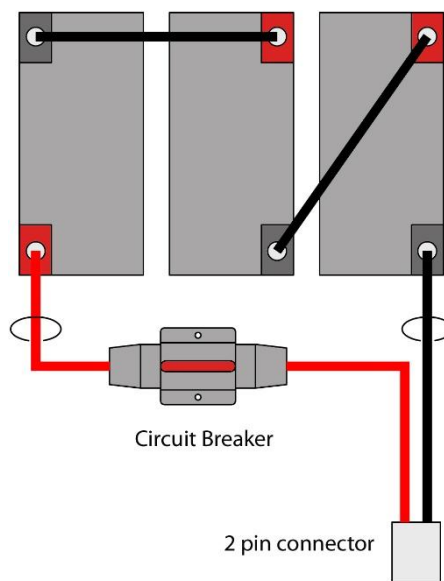
Edge trim is fitted to the upper edge of the lifting slots to protect your fingers when lifting it as the completed battery box is heavy. Because the battery box is held in place on the loco by only two screws, you need to think about adding an extra securing strap to hold it in place when you move it in the back of a vehicle or on a trailer.

You also need to fit a couple of lengths of edge trim to the bottom edges of the box to prevent it removing paint from the footplate, and if you have any left you can add some round the upper edges for the lid to sit on.

Wiring up



24 volt version

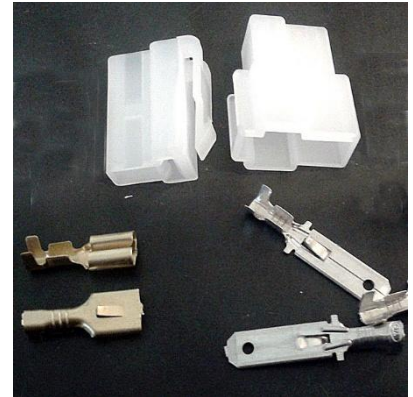
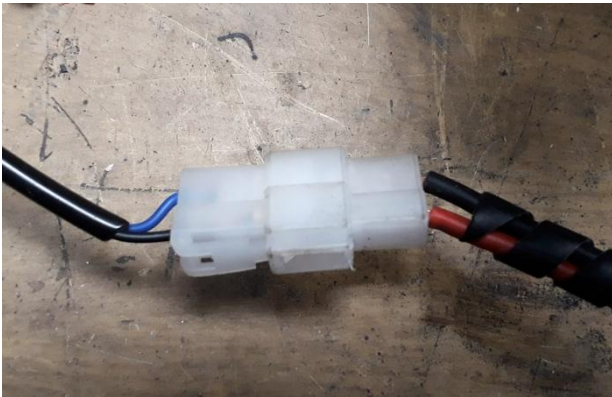


36 volt version

Run a 4mm red wire (this number refers to the cross sectional area of the wire) from the positive battery terminal through a hole punched through the grommet to one end of the breaker and from the other end of the breaker to your chosen connector. Run a black cable from the battery negative to the other side of the connector. As well as crimping the wires to the spade terminals in the connector I think it is safer to solder them as well. Make sure that the wires are long enough to reach the connector on the loco. Wrap cable tidy round the wires for protection.

Connect the other half of the socket you have bought to the charger lead as shown in the photos, it is a lot safer to use a meter to check the polarity of the charger wires, yours may be different to the photo below. Finally connect the other battery terminals together as shown in the diagrams and photos. As you can see, I use crimped ring connectors to connect to the batteries, I bought the more expensive crimp tool to ensure that I got a well crimped joint that is capable of handling the currents

involved. The battery box is now live, so take care. Pressing the button on the breaker both tests it and disconnects the supply, so it can be used as an isolation switch when the loco is left unattended.



Although a 24v or 36v mobility scooter charger is available from Ebay and will generally keep your batteries up to charge, because of small differences in the internal resistance of the batteries it will never bring all the batteries to a full charge and capacity will deteriorate over time. For this reason I recommend occasionally charging the batteries individually with a 12v intelligent charger.

Battery box shopping list

24 volt version

12v 33AH mobility scooter batteries 2 off
Maximum size 195 x 130 x 155 tall



24v mobility scooter wheelchair Charger
for lead acid or gel batteries, not Lithium 1 off



OR

36 volt version

Three off 12v 15-18Ah mobility scooter batteries 3 off
Maximum size L 180mm x W 76mm x H 167mm



36v mobility scooter wheelchair Charger
for lead acid or gel batteries, not Lithium 1 off



Both versions

12V DC 50 AMP Car Audio Inline Circuit Breaker 1 off



Terminals Crimp On ring Connector, yellow 6.4mm. 8 off



20mm Black Rubber Blanking Closed Grommets, 2 off



Edge trim, 2mm, 1m



Cable tidy 1.5mm – 7mm 500mm



2 pin spade connector, 6.3mm terminals 1 off



M6 Well nuts x16mm long (also known as motorcycle fairing nuts) 2 off



Rubber matting, a cheap car floor mat
4mm x 10 long aluminium pop rivets, 100 off
M3 x 20 screws with washers and nyloc nuts 2 off
4mm² multi strand wire, red 0.5m
4mm² multi strand wire, black 0.5m