

Flyer build instructions 2025



Please use these instructions in conjunction with the shopping list provided at the end.

I supply this kit in good faith as one enthusiast to another, but as this is a speedy machine and is capable of causing harm if incorrectly used you therefore build it and use it at your own risk.

Most of 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. To aid paint adhesion clean the dark coating off the cut edges and lightly sand or scour the surfaces before fabrication, it is a lot easier than doing it afterwards.

As development of the design is frequent, some of the parts supplied to you might not look exactly as they do in the construction photographs.

Use thin 'form B' washers under every screw head, it prevents the screw marking the paint and gives the screws the correct clearances in the slots.

Remove the nibs left by the laser cutting process from all parts, including inside holes.

Tools required

I am assuming that you already have the basics, drill, spanners, screwdrivers etc

An angle grinder with a flap disc is handy for removing sharp edges.

Pop-rivet gun.

Wire strippers and crimping tool.

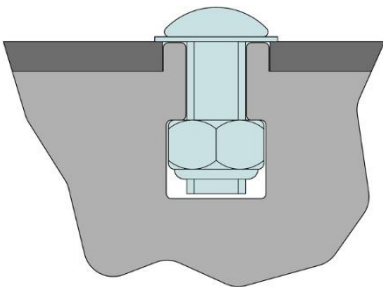
A battery drill or screwdriver with adapters for allen keys and a small socket set will speed things up a lot.

Need I remind you, SAFETY GEAR, buy it and wear it, especially gauntlets and goggles when using the angle grinder.

The Flyer in use

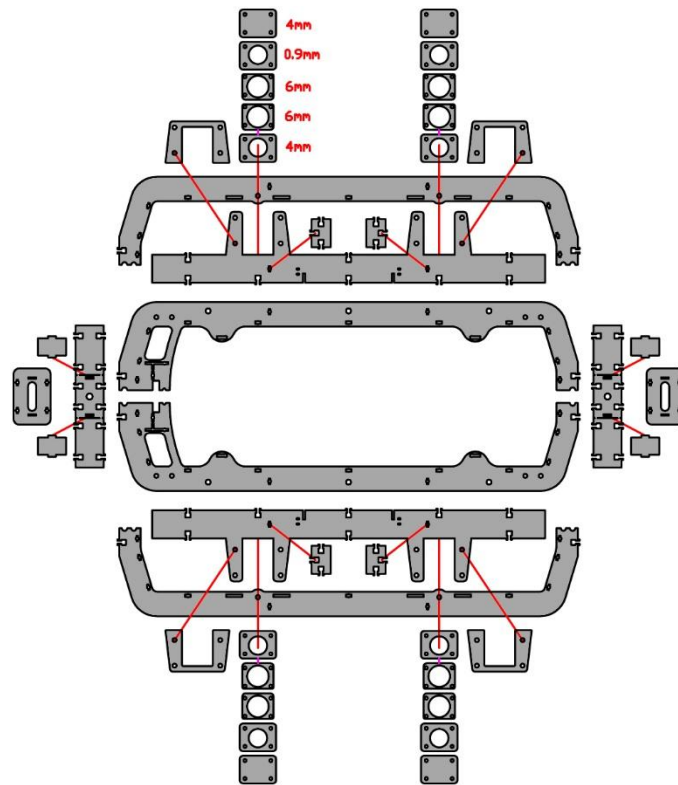
The battery box and seat of the Flyer are quickly removable both to ease transport. Removing the chain and brake cable and six screws allows the footplate to be removed complete with the motor and control box to quickly return the Flyer to use as a flat wagon. The brake lever can then be mounted in the original holes in the end of the frame and the brake cable reconnected, at which point a standard tipper wagon body can be bolted straight on. Always check that the controller is in the 'neutral' position and the breaker in the open position before connecting the battery box.

The basic construction method



The frame is bolted together as shown. The tab is inserted in the slot, a nyloc nut slid into place and the screw with a thin washer fitted is tightened by hand at first, then with an electric drill with an Allen key adaptor and set on it's highest torque setting.

The frame



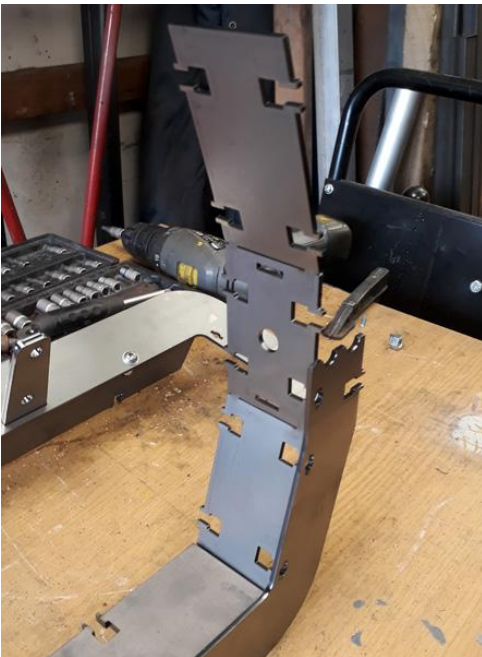
First lay out all the frame parts provided with the kit. This shows the parts of the basic frame. The build of the brakes will be covered later in the instructions.



Assemble the gussets on to the two side frames with M6 x 16 button head screws, thin washers and nyloc nuts. The gussets will hold the upper and lower plates accurately to form a strong 'channel' frame.



Slot the bottom plates into place and fix to the frames and gussets with M6 x 16 screws, thin washers and nyloc nuts.



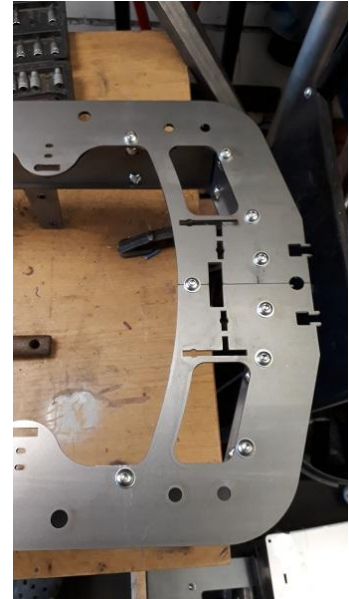
Fold the ends by hand so that they fit in the slots and fix to one side of the frame with M6 x 16 screws, thin washers and nyloc nuts..



Join the two halves together with M6 x 16 screws, thin washers and nyloc nuts.

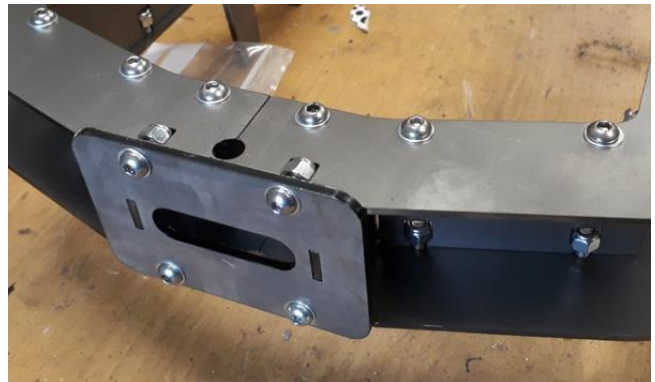


Add the two top plates and fix with M6 x 16 screws, thin washers and nyloc nuts, one end of yours will look like the photo on the right. Note the extra M6 x 16 screw on the centreline holding the two halves in alignment.



Tap in the two coupling pocket sides. These are intended to be a tight fit, as you will probably want to remove the coupling front to paint the frame, and you will want them to stay in place.

Add the coupling fronts and fix with M6 x 16 screws, thin washers and nyloc nuts. This completes the basic frame.



Axleboxes and springs

The wheels are pressed on to the axle and the laser cut axle sprocket is welded to the axle by CMD Engineering. As a personal preference I like to see the axle and wheels painted rather than left to go rusty, but leave the end portion that will go into the bearing clear of paint.

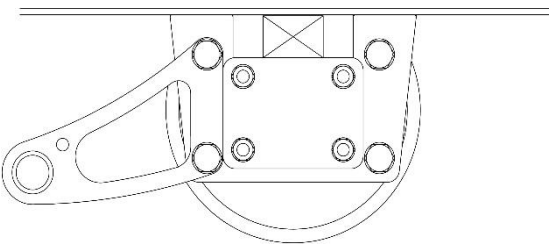
Take two 6mm thick axlebox pieces and clean any projections inside the hole with a half round file. Take a look at the bearing housings and you will see that the surface next to the cut is slightly discoloured on one side and clean on the other. The two discoloured faces face inward, fit the bearings in from the discoloured side first as the hole is fractionally larger. Press a bearing into one piece using the vice as seen in the first photo below, doing your best to keep it square, turning it frequently and doing it a bit at a time. You will find it suddenly enters the hole and presses in smoothly. Then press a second piece on to the bearing, closing up the gap and finally setting them on top of the vice jaw and tapping them with a hammer to get them perfectly aligned.



Assembling the axleboxes. First comes the plain outer cover in 4mm plate, then the 0.9mm thick spacer, the assembled axlebox parts with the bearing fitted, then the inner 4mm cover with the hole in it, aligning it to match the bearing. Use M6 x 25 hex head screws with no washers and plain nuts on the inside. The tops of all four pieces are level, forming the top surface on which the rubber spring sits. Now try them for size in the slots in the horns. Ease with a file or grinder if required.



The M8 threads on the rubber mounts need to be cut down to 3mm long before assembly, I place two washers over them as a guide and use a cutting disc on the angle grinder, but you could equally easily use a hacksaw. Check that when placed in position in the holes in the frame that the body sits on the spring mount plate, not the tip of the thread. This ensures that all four axleboxes sit at the same height.



Push the axleboxes onto the axle ends, using a good dollop of decent grease as the ends of the axles will bear against the insides of the covers on the bends. Omit the grease at your peril, I have seen axle ends get so hot that they have welded themselves to the inside of the cover. Slide the axle assembly into place on the upturned frame and slide the 'U' shaped keeps into place on the outside of the frame, fixing them with M8 x 25 screws, thin washers and nyloc nuts on the inner holes and adding the derailing bar brackets and using M8 x 30 screws on the outer holes. As these will have to come apart for painting, using washers will help to protect the paint.

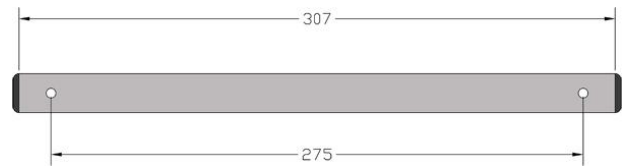
Derailing bars



Slide the derailing bars into the holes in the brackets and fit the tabs to hold them in place. The tangs on the tabs fit into the holes that you have just drilled and are screwed to the frames.



This concludes the build of the basic frame.



Cut your derailing bars 307mm long from the 20mm diameter by 2mm wall steel tube. Drill two 5mm holes in one side only of each derailing bar at 275mm centres, taking care to keep them in line. This is most easily done by clamping the tube in the vice and drawing the flat edge of a ruler, kept level, along the top of the tube to mark a line.

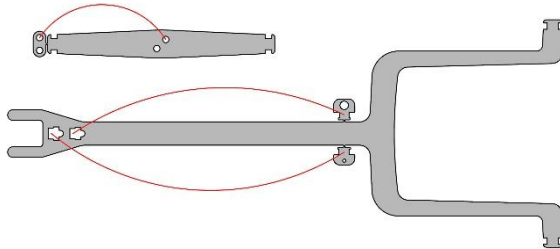


Brake linkage



The PNP glass filled nylon brake shoes are drilled 6mm and assembled to the brake hangers as shown. To make the job of drilling the holes easier PNP have produced a video on YouTube which shows just how to do it. Search for 'Video showing how to drill brake blocks for model and miniature railway locomotives & rolling stock.' The shoes are handed, the curved face is tapered and the narrower side fits towards the flange of the wheel, the top side in this photo. Therefore you have to make two right hand and two left hand assemblies.

The brake hangers are assembled in the slots in the top plate as shown, making sure that the tapered block sits correctly against the tapered tread of the wheel. A screw keeps the brake hanger from falling out, there is a washer between the underside of the plate and the nyloc nut,



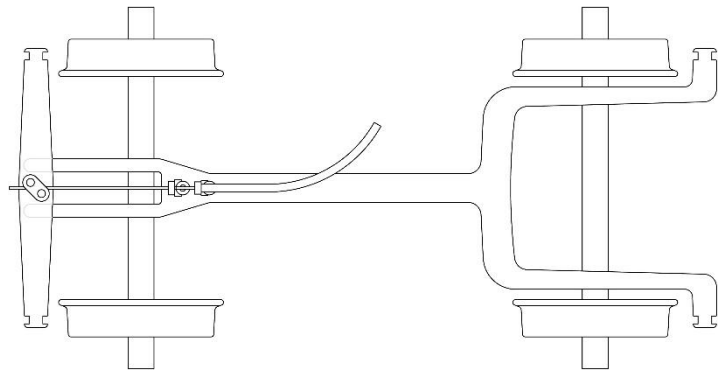
The taper on the brake shoes should match the taper on the wheel tread as seen here.

The tabs need to be twisted off their respective equalising bars and the nibs cleaned up with a file, then they are inserted into the holes in the arms (if they won't go in, you have them in the wrong hole!). An M6 x 16 screw and nyloc nut holds each in place.



The equalising beams drop into the holes in the ends of the brake hangers and rotate to lock them in place, the brackets end up underneath the brake beams. (note that the design has changed since this photo was taken).

The diagram on the right shows the brake beams from beneath, the brackets guiding the cable and the clamp are underneath to give a smooth path for the inner cable. The strange shape of the brake beam is due to the fact that the same brake rigging is used on the tipper wagon, which has a trapdoor in the bottom.



Footplate

The footplate simply drops on top of the fully assembled tipper frame and is fixed with six M8 x 20 screws. The seat is mounted facing forwards and the handbrake lever is mounted between the rider's legs, more suited to use as a speeder as the driver (rider?) can lean into the curves. The battery box is hooked into place under the seat, and the control box and motor are bolted to the footplate. With the removal of the driving chain and disconnecting the brake cable the complete footplate can be lifted off leaving a useful wagon frame. The brake lever is moved to the holes on the frame and reconnected.



Take a good look at this photo before you do the footplate assembly, as the footplate has to be fitted the correct way up with the handbrake lever slots to the left and the controller to the right.

Motor and sprockets

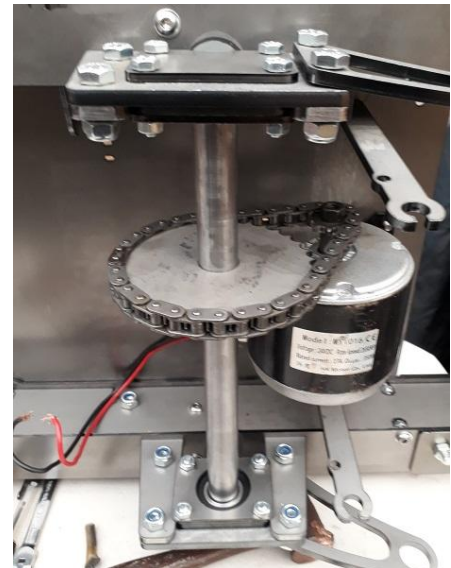
The motor sprocket supplied has to be replaced with a 9 tooth 06B (9.5mm pitch) one to suit British chain standards. Note that the nut is a **left hand thread, turn it clockwise to undo it.**

The edges of the motor and axle sprockets need to be chamfered as shown to give a gentle lead in to the chain, just using a file is sufficient or stick it over a bolt in the vice and use a flap disc in the angle grinder, the sprocket will spin fast so don't let it escape.

Alternatively fit the sprocket to the motor and spin it on a



battery while you use a file to chamfer the sprocket and smooth the edges. No loose clothing!



You may need to clean up the 'pip' occasionally left on the inside of the hole by the laser cutting process, and then you should be able to tap the new sprocket on. Do it gently to preserve the motor bearings and tap on a socket placed over the shaft to avoid accidentally damaging the end threads. If it still seems tight then you may need to ease the hole with a fine file. Nut lock adhesive on the thread is a good idea, use the lock washer and don't over tighten it as the metal is not of the best quality. The motor simply bolts into place under the footplate as per the photo above, using four M6 x 25 screws, nyloc nuts and washers. Some motors have tapped holes in the base, in which case you can leave the nuts off. The wires from the motor run under the footplate and up into the base of the controller through the hole provided. Simply swap the wires over if the motor runs the wrong way.



I find that this is the easiest way to cut chain to length if you don't have a link extractor, cut through with a cutting disc in the angle grinder.

Take it a touch at a time so that you only cut through the outer link. Cut both sides and the chain will part leaving the pin to be pushed out.

When fitting a connecting link position the two ends of the chain on the sprocket and push the link into place, then move it to a position where you can access both sides, a lot less fiddly than trying to do it in the middle of a run. It is good practice to fit the link with the closed end of the spring link pointing in the usual direction of travel, so that if anything catches it then it won't spring off. Don't over tighten the chain, as it robs power and leads to accelerated wear in the chain and the motor bearings.

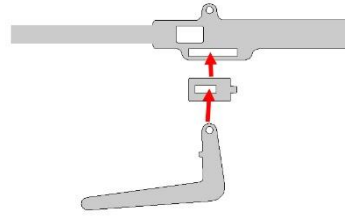
The chain should be fitted with a tiny bit of slack, rotate the axle to make sure it doesn't tighten at any point.



Brake lever



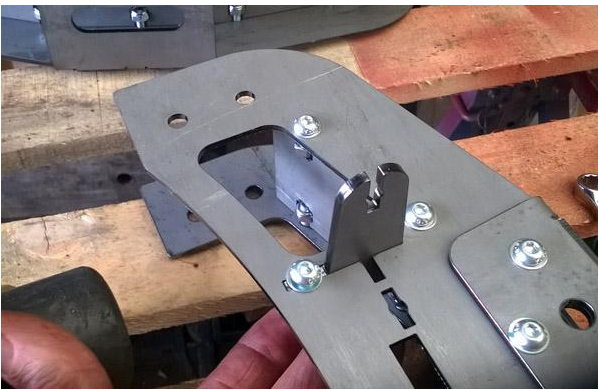
File a chamfer on the pawl as shown and smooth sharp edges.



Assemble the parts of the lever top as shown on the right. The straight side of the pawl is towards the left in this photo. Tighten the screws until the parts are just nipped up, make sure that the latch and latch lever can operate freely, then finally tighten the screws. Add the spring and drive a 100mm length of 20mm diameter, 2mm wall tube over the projecting stub and cap it with a bung. If it is a loose fit then squeeze the tube in the vice and fit it again.



I'm afraid that the detail photos below and on the next page show the brake lever being fitted into the slots in the end of the frame, you will fit it into the slots on the footplate instead as seen on the right. I apologise for forgetting to take the relevant photos at the time.



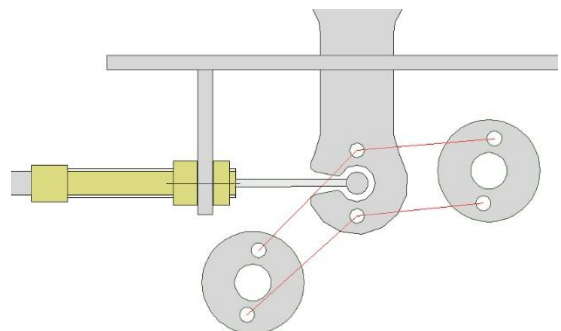
Push the stiffening bracket into the slot from below, slide in the nut and tighten the screw with washer in place. Place the handbrake quadrant in from the top and add the three fixing screws.



Fit the lever with an M8 x 20 screw as a pivot, with washers both sides and between the lever and the quadrant, and a nyloc nut. The tightness of the nut controls the stiffness of the brake lever, don't over tighten it. Leave the oiling of the moving parts until after painting.



The heavy duty handbrake cable is trapped into the slot at the bottom of the lever by the two discs which are fixed with two M4 screws. It is clipped in place below the top frame member with two cable ties in the holes provided.



The cable outer has to be cut to length to suit, best done with a cutting disc in the angle grinder. You can try cutting it using an old pair of side cutters and cleaning up with an old file. The inner cable is then pushed through and clamped in the other bar as shown. You want a bit of play between the blocks and the wheels when the lever is in the off position, or the blocks will chatter. Finally cut off any excess at the end of the inner cable, again easiest with a cutting disc in an angle grinder as it leaves a clean end.

The battery box

This has been designed to take two 12v mobility scooter batteries. **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 parts are easily folded by hand by simply pressing the flanges against a flat table top or holding them in a workmate, combination of vice and pliers or mole grips. Just make sure that the flange is folded in one go and doesn't end up being twisted and stretched.



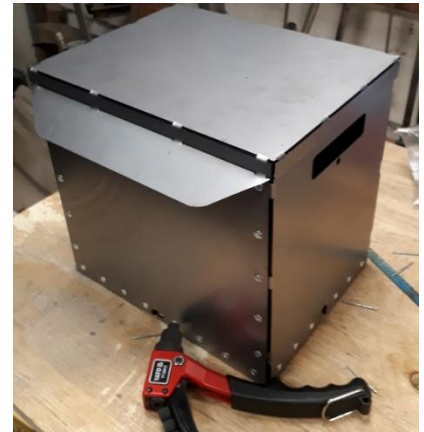
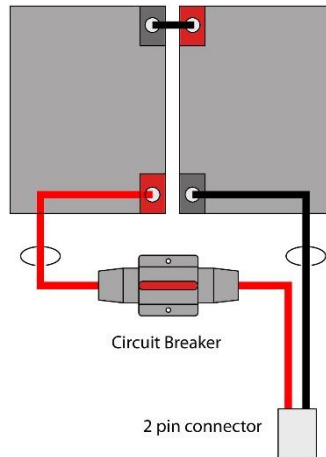
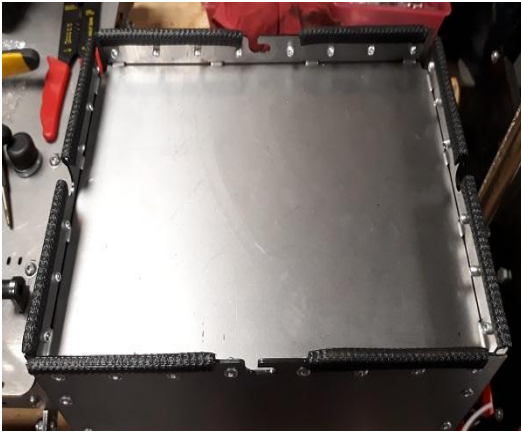
The two side panels have their edges folded to ninety degrees, the bottom has all four sides folded up or down, and the lid (right), has all the edges folded up or down with the two little lugs seen at the top folded facing inwards with pliers and the final 'rain flap' at the bottom folded out at 45 degrees, see photo of the finished box below.



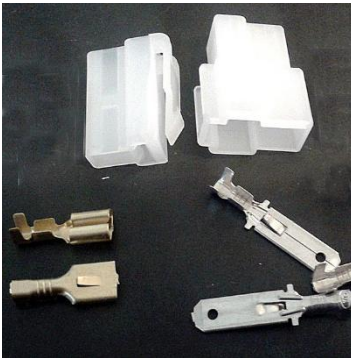
The flat sides are pop-riveted to the base with 4mm x 10 long aluminum pop-rivets with the slots matched up, check the photos below for the correct orientation of the side panel which carries the breaker.



The folded ends are now added, along with the plates which carry the hooks to fix the battery box to the footplate. The photo left shows the correct orientation with the lug end at the same side as the holes for the wires and breaker. Both hooks are fitted at the same side of the box. Add two strips of edge trim to the upper edges of the lifting slots in the ends and round the base. Screw the breaker and battery indicator into place with M3 screws and cut off any protruding screw on the inside. Add the grommets to the holes. Cut a piece of thin rubber matting or sheet to line the inside of the battery box and try lowering the batteries into place.



The batteries are a tight fit in the box as the box was originally designed to fit under the existing Scamp bonnets. You might find that you need to use a pair of side-cutters to shorten the protruding ends of the rivets to make sure that they won't rub and possibly wear their way through the battery sides.



This is the type of connector used. You will need a different crimping tool to make a proper connection. If you find that you have a problem getting the wires to stay put then solder them in place for extra security.

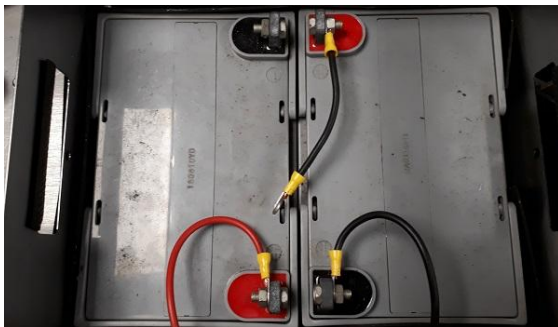


The smaller half of the plug is connected to the battery box wires as its terminals are protected from accidental contact. I put the positive terminal to the vertical and negative to the horizontal on all my locos so that battery boxes will fit on any of them.

Run a 4mm square red wire from the nearest positive terminal through a hole punched through the grommet to one end of the breaker and from the other end of the breaker to the connector, making sure that the wire is long enough for the connector to reach the bottom of the box, where it will mate up with the connector on the controller. Run a black cable from the negative to the other side of the connector.

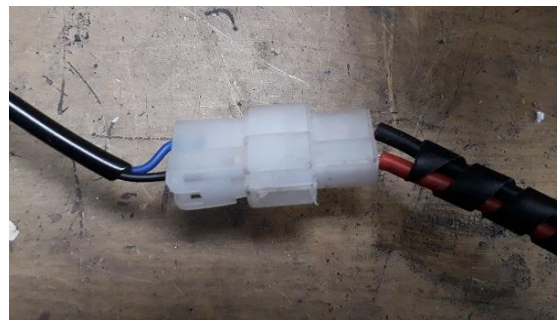
Finally connect a wire between the two terminals on the other ends of the batteries, it is now live so be careful. I like to protect external wiring with either tubing slipped over before adding the end connections, or spiral wrap as seen here.

Cut a length of M6 studding long enough to go 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 shorting on the inside of the lid. I certainly recommend rounding off the end threads of the studding as they are quite good at removing skin.



I use crimped ring connectors and I also bought the more expensive crimping tool to ensure that I got a well crimped joint that is capable of handling the currents involved.

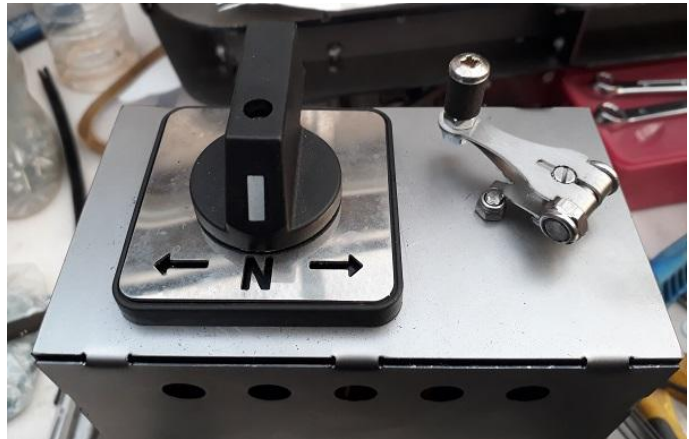
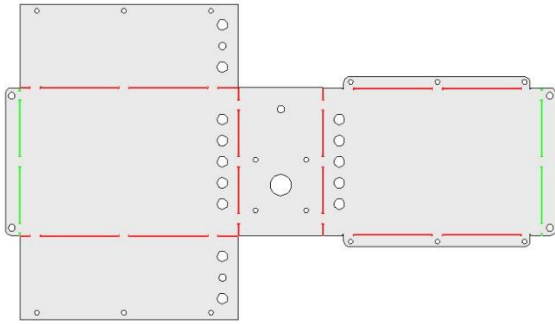
Cut the plug off the 24v wire on the mains battery charger and use a meter to find out which wire is the positive and which the negative. Using one half of the second 2 pin connector, make a connection with the connector you have just put on the battery box output wires.



To charge the batteries you simply unplug the battery box from the control box and connect it to the charger instead. Do make sure that the breaker is closed before charging, as if it is open the charger will still show a green light as though the batteries are fully charged but nothing will happen. I fitted a battery monitor to the prototype, but as a charge will last a full weekend's playing I removed it as superfluous.

Because the battery box is held in place on the footplate only by the hooks and its own weight, 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. I suggest that whenever you are not using the Flyer or leave it unattended that you press the test button on the breaker and set it to open.

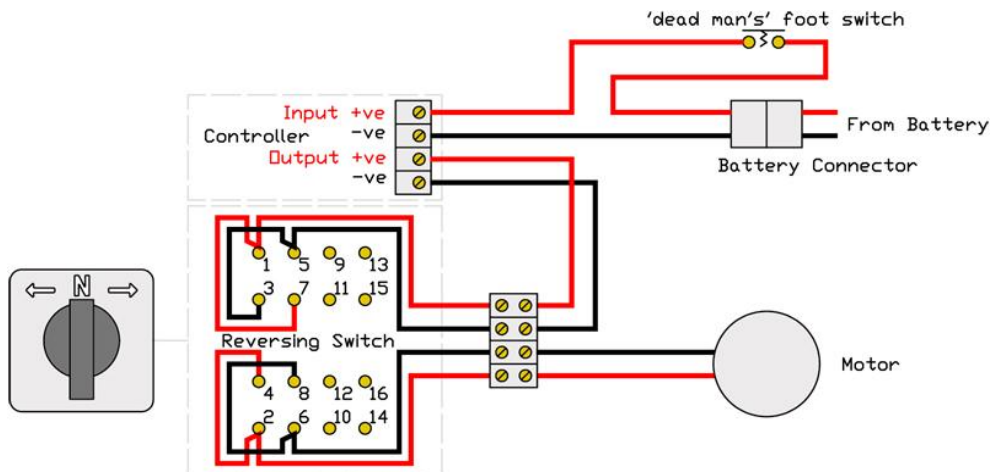
Control box



This provides a housing for the reversing switch and the controller. Fold all folds marked in red down 90 degrees by hand, green up 90 degrees, and assemble with 4mm x 10 long pop-rivets. The long flanges should end up on the inside of the box. Use a flap wheel in the angle grinder to dress the outside of the folds smooth if you so wish. The switch box mounts to the footplate with four M6 x 16 screws passing through the base into rubber well nuts placed in the holes in the footplate.

Electrickery.

Red is positive, symbol +ve, Black is negative, symbol -ve.

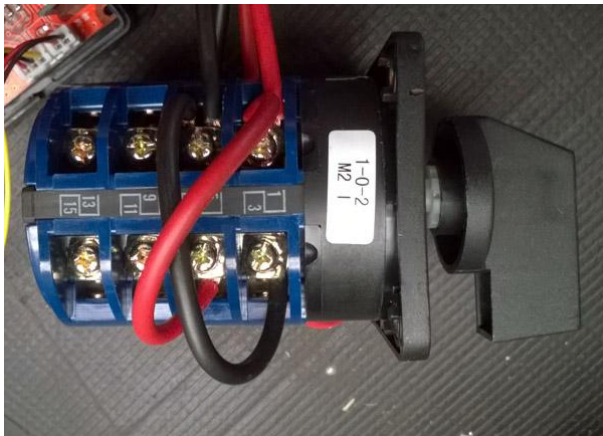
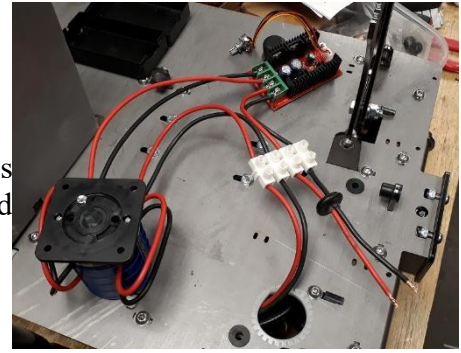


Ignore the 'dead man's switch' on the diagram, it only applies to the 'IMP' loco.

This is actually the footplate of an 'IMP' but it conveniently shows you what you are aiming to fit into the switch box. The supply from the battery box on the FLYER comes in from bottom right (socket not yet fitted), through the grommet in the control box to the connector block, from the connector block to the controller, then via to the reversing switch and back to the connector block. The wires to the motor

leave through the hole in the footplate, which is suitably protected with a length of grommet strip to prevent the wires from chafing.

The connector block sits above the footplate level out of harm's way but the wires should be left long enough to let it be pulled down through the hole for easy testing.



The positive wire from the controller goes to terminal 1, then loops to 7. The negative goes to 5 and loops to 3. Turn the switch over and connect the output wires, positive to 2 looping to 4 and negative to 6 looping to 8. When the switch is turned one way positive connects to positive and negative to negative, centre position is off and the other way positive connects positive to negative and negative to positive to give reverse.

A rather tricky bit is to fit an M4 x 10 screw into the hole in the box top from below, then hold it in place while you screw a nut onto it. This provides a positive stop for the new control handle, which replaces the normal control knob. The handle provides enough leverage to break the plastic stop inside the potentiometer, thus allowing you to go past 'stop' to 'full speed', with interesting results. To prevent this the handle incorporates a lug which engages with the top of this screw and protects the delicate potentiometer, so ignore it at your peril.

The screw needs to be trimmed to leave about 2mm of thread exposed and the end cleaned of sharp edges.



The control handle

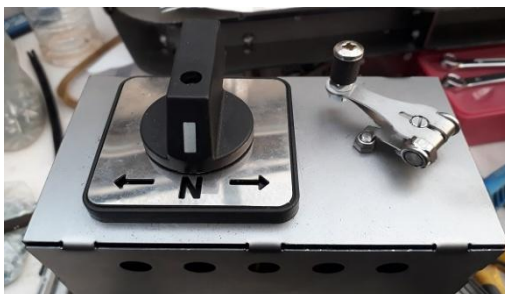


To bend the controller handle to shape place a 6mm drill in the vice with about 7mm projecting, pop the handle over it and place a 5mm drill behind it as shown. Holding the 5mm drill down with your thumbs use your fingers to pull the top part back as tightly as possible over the 5mm drill until it sits with the 6mm hole above the top of the 6mm drill. It may need a bit of gentle persuasion with a rubber mallet.

The bottom leg has two bends in it to bring the parts together, these are simply done with a pair of pliers. The two small lugs are bent down close to ninety degrees as shown here. An M5 x 25 screw and nyloc nut serve to clamp the handle onto the spindle of the potentiometer.



The upright of the handle is formed from an M5 x 25 screw, with a 16mm diameter ball knob screwed on. A further screw clamps the handle to the potentiometer spindle.



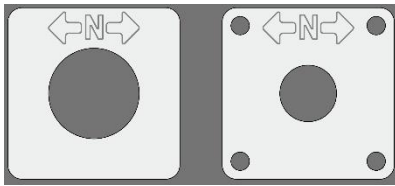
Pop the potentiometer into place in the hole on the top of the switch box and gently tighten the retaining nut. Fit the control handle, making sure that its travel matches exactly the travel of the potentiometer and that it hits the screw acting as an end stop at the same time as the internal stop

reaches the end of its travel, then tighten the M5 clamping screw.

Cut a slot in the end of the plastic controller box to make room for the wires, then snap the controller lid shut and fix it in place inside the control box with either double sided tape or preferably self adhesive magnetic tape where shown.



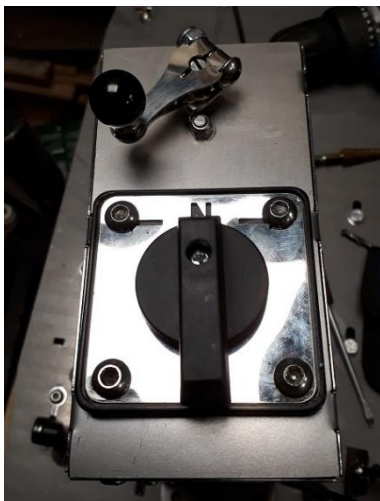
Undo the screw in the top of the knob on the reversing switch and pull the knob off.



Type A

Type B

Type A. Spring out the black ring in the middle and release the silver plastic insert. You can now fit the switch into the control box with the screws included in the box, first pop the knob back on to check that you have got it the right way round (pointing to the speed control) as it only fits on the spindle one way. The body of the switch has trapped nuts, don't press too hard on the little screws as you drive them in or the nut may push out and it is a very fiddly job trying to get them back in. Once the black plastic cover is screwed up fit the new stainless insert, pop the black ring back in to hold it in place and refit the knob.



Type B. This type has a square steel shaft and the knob will fit on any of four ways, so the alignment of the switch doesn't matter. Prise out the silver plastic top and replace it with the stainless top with the four holes in it. The separate nuts are almost impossible to fit, so fit it with four M6 x 16 button screws, just drive them into the holes in the plastic body. The wires to the battery are led out of the control box via a grommet fitted into the slot in the side down near the base and terminated in the other half of the two pole connector, the wires obviously need to be left long enough to reach the connector on the battery box. The other half of the connector is fitted to the battery wires, red to red and black to black.

Never operate the reversing switch unless the loco is at rest with the control knob switched off, the stop will be so sudden it may throw you off and things may go bang.

The control box is mounted to the footplate by dropping four rubber 'well nuts' into the holes in the footplate, placing the box on top and inserting four M6 x 16 screws and washers through the holes in the box. As the screws are tightened the rubber well nuts swell up and grip the footplate. They act as a useful isolator to keep high frequency vibration away from the controller.



You will have to extend the motor wires so that they can reach the connector block at the base of the controller, clip them up out of the way using cable ties in the holes provided in the footplate.

Driving the Flyer is a matter of using the direction control, throttle knob and brake lever, and hopefully a certain number of brain cells as well. Don't attempt to go fast backwards, you can't see what is coming to lean into the bends. **As there is no 'dead-mans pedal', with the throttle open the Flyer will continue to move even if the driver is not aboard so great care should be taken especially if allowing children to operate it.**

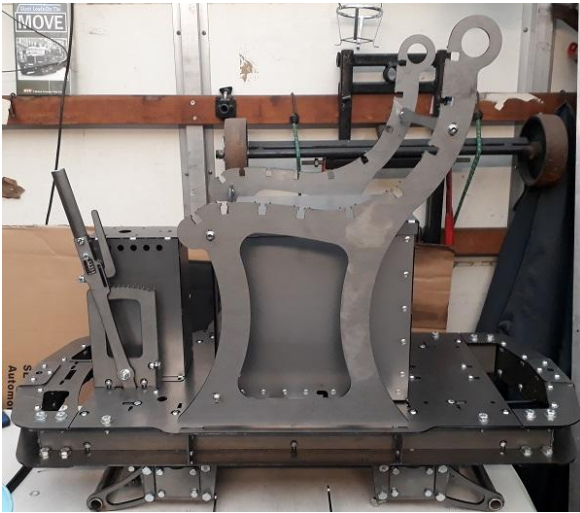
The seat

The seat frame is assembled as shown with the small stretcher at the top of the back, using M6 x 16 screws, thin washers and nyloc nuts.



The frame is fitted with nine strips of 25mm x 50mm 'planed all round' timber each 400mm long, drill 6mm using the template provided. (Using a drill press rather than a hand held battery drill aids in accuracy).

They are assembled to the frame in the same way as the steelwork with M6 x 35 button head screws and stainless washers into nyloc nuts, points on the frames bite into the wood as the bolts are tightened. Finish to your choice, I used a breathable stain. The assembled seat clips into slots in the footplate as shown.



This photo shows how the seat fits, with the battery box mounted slightly to the rear of the centreline.

Painting

I prefer to build and test, then strip and paint. I suggest breaking the Flyer down into the following assemblies for painting; axles with ends masked up, complete frame (with coupling fronts removed for the primer coat), footplate, battery box, control box, seat frame, axleboxes, keeps, brake rigging and derailing bars.

Shopping list for the Flyer, search Ebay for most of the parts.

Prices given are intended only as a rough guide.

Wheels and axle assemblies,

5" diameter narrow gauge profile, CMD Engineering.
(CMD supply the wheels already fitted to the axles).

2 off

20mm ERW Mild steel round tube with 2mm wall thickness.

650mm

Bearings 6004 2RS 20 x 42 x 12

4 off

Springs - vibration isolators 30 dia x 20 thick
with male M8 thread one side. Search for 'vibration mounts'.

4 off

(These come from China, delivery times of a few weeks are not uncommon)

Brake shoes are available from PNP, www.pnp-railways.co.uk

Search for their pack of four 7 1/4" narrow gauge brake shoes

Motorcycle heavy duty universal cable set for brakes
as per photo

1 off

Control lever spring,

Search '13.5mm OD compression springs' in ebay,
find the photo, choose 1.0mm wire and 35mm long.
Also available from CMD.

1 off



Small Flexible Metal Reinforced Rubber Edge Trim
6.5mm - 9.5mm Fits 1mm - 2mm 150mm



PAIR of 12v 33AH mobility scooter batteries
Maximum size 195 x 130 x 155 tall to top of terminals. Pair



50A



12V DC 30 AMP Car Audio In-line Circuit Breaker 1 off

Terminals Crimp On ring Connector, yellow 6mm. 4 off



Crimp On straight Connector, yellow 6mm. 2 off

2 pin connector, 6.3mm spade terminals 2 off



2mm cable tie for brake cable and wires 10 off

20mm Black Rubber Blanking Closed Grommets, 4 off



20mm tube end cap / bung 5 off

24v 5 Amp MOBILITY SCOOTER
WHEELCHAIR Charger



Electric motor Reversing switch, 4pole, 32amp
as per photo 1 off



Rubber sheet,
I suggest a thin rubber door mat 1 off

12-50V 2000W MAX 40A
PWM DC Controller
As per photo. 1 off



Connector block, 30 amp to suit 6mm² cables 6 way
(cables with a cross section area of 6mm, not diameter)



Motor, 24v 350W Unite ZY1016 1 off

4mm² cross section multi strand wire,
1m each of red and black



06B-1 (3/8") chain with spring link 0.5m or 2 feet £8

M6 x 15mm well nuts
(also known as motorcycle fairing nuts) 4 off

25mm x 50mm planed all round timber
@ 400mm long 9 off



Fixings and fastenings

4mm x 10mm long aluminium pop-rivets 60 off

M3 x 20 screws with washers and nyloc nuts 2 off

M4 x 10 socket head screw
with washers and nyloc nuts 3 off

M5 x 25mm pan or button head screw
with nyloc nuts 2 off

M6 'all thread' 300mm

M6 x 16 stainless button head screw 80 off

M6 x 35 flanged button head stainless screw 20 off (for slatted seat)

M6 x 25 hex head screw bzp 30 off

M6 thin 'form B' stainless washer 120 off

M6 thin nyloc nut bzp 130 off

M6 plain nut bzp 20 off

M8 x 20 hex head screws 7 off

M8 x 25 hex head screws 8 off

M8 x 35 hex head screws 8 off

M8 form b washer bzp 25 off

M8 thin nyloc nut bzp 25 off

M10 x 100 screw 2 off (coupling pins)

M10 nyloc nut 2 off