

Instructions for building the speed controller.

Colin Edmondson June 2026

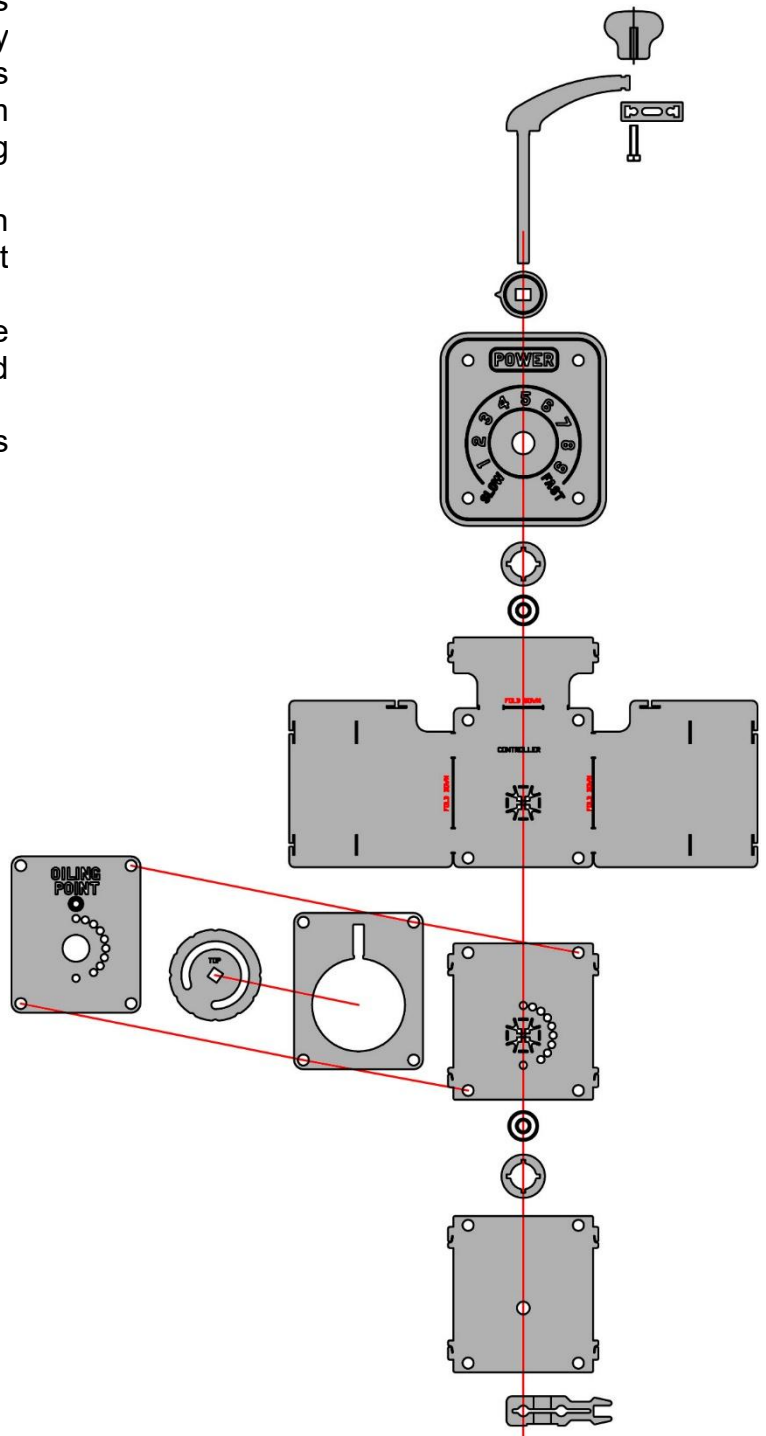
The Chinese speed controller as bought comes with a rotary potentiometer which in this case is fitted into a brushed stainless 'tram style' speed controller with spring loaded 'notches'.

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

This kit is supplied in good faith as one enthusiast to another, you build and use it at your own risk.

Consider rounding off sharp edges before fabrication.

Take care and have fun, **Colin Edmondson**



First tackle the controller handle, which is cut from stainless steel so doesn't need painting.



< Take one of the 8mm bearings and file a tiny amount off the corners of the square section so that it will just slide into the hole in the bearing, take it a bit at a time and keep checking it as a sloppy fit will spoil the feel of the controller. Round off the corners of the controller handle to your choice, keeping the very end with the two slots in it square cornered. Use fine emery cloth to polish the arm, keeping all the scratches running along the arm for the best appearance and aiming to match the appearance of the brushed stainless steel used for the top panel.

> Place a 5mm drill in the vice with about 5mm protruding and put the small bracket on top, followed by a 6mm drill.



< Using your fingers and pressing down on the drill fold the bracket back on itself until the 5mm drill sits snugly in the holes.

> The bracket clamps into the slots on the end of the arm.



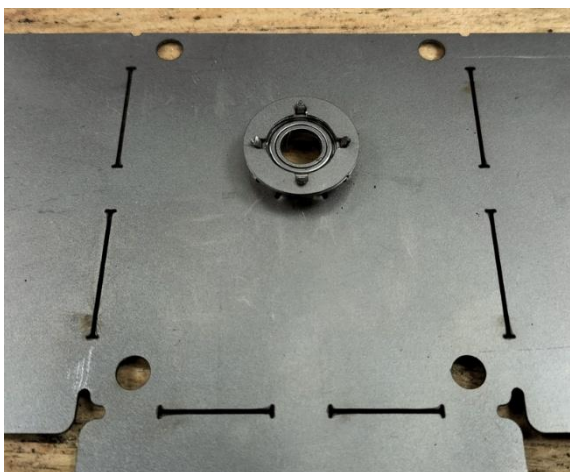


< Now pass an M5 x 20 screw through the hole and screw on the knob. It's a good idea to use glue on the thread to stop the driver accidentally unscrewing it in the future!

> Take the centre tray of the controller, align the holes as shown and use pliers to bend up the four brackets. Insert a bearing, it should be a snug fit.

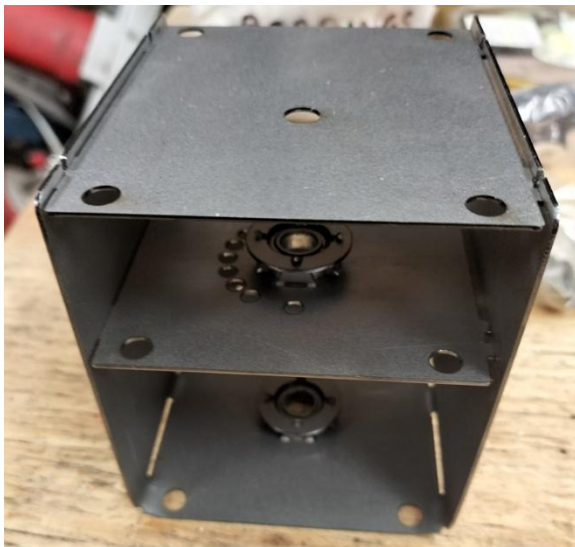


< Add a collar and bend the tabs out to secure it.



< Do the same for the bearing mount in the main body, either way up will do as it's a mirror image.

> Fold up the sides as shown, locating the tabs in the short side in the slots in the long sides.



< Place the centre tray in position with the holes aligned as shown and the bottom tray with the centre hole in line with the other two holes, insert the tabs into the slots and close it up tightly.

> Twist the tabs with pliers to lock the body together.





< File any roughness left by the laser cutting of the detent wheel as smooth as you can, the spring loaded ball will follow this edge and you will feel any ridges through the control handle. Take off as little material as you can.

> Try the detent wheel for fit on the arm spindle, it should just push through by hand. If it is loose then a couple of punches with a centre punch as shown will spread the metal and make for a better fit.



< Take the top plate and turn it over and place an M6 x 16 screw in each hole.

Add the detent body and wheel. The wheel is marked 'TOP', turn it over as this assembly is put together upside down. Add the spring and the ball bearing. Be careful, both ball and spring are prone to springing out and disappearing into the darkest corner, never to be seen again. It may help to assemble this inside a cardboard box to catch flying balls.



< Holding the body of the controller upside down with your fingers supporting the screws slide the detent unit into place and add the four nuts, plain nuts are easier to fit. Add a few drops of oil through the hole marked 'oiling point'.



> Add an M4 screw and nut in the single hole as shown. Offer up the control handle to see that everything rotates as it should, work it back and to so that the oil is spread around, it should now have a nice smooth 'clicky' feel to it.

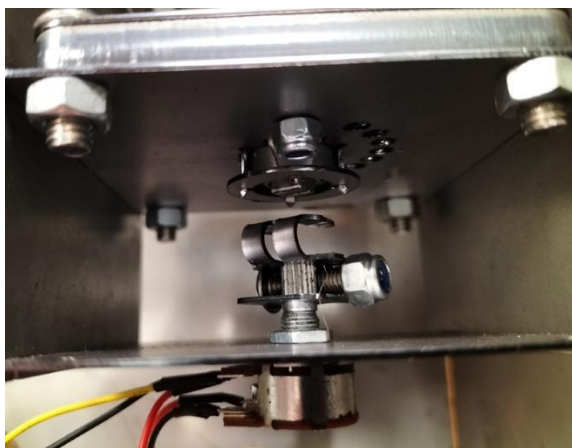


Bending the 'claw' connecting the control handle to the potentiometer

> Place a 6mm drill in the vice with 6mm projecting, slide the claw over it, place a 5mm drill on top and use fingers and a rubber hammer to bend the claw round the drill, trying to achieve the upper 6mm hole lining up with the top of the drill and the parts parallel.



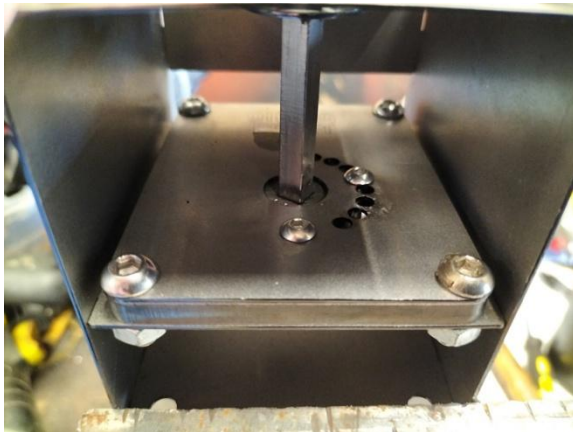
Push the drill a little further out of the vice and repeat to get the second 'U' bend.



< Add an M5 x 25 screw and nyloc nut to the claw but don't tighten them yet, one side of the arm has cutaways to hold the nut and prevent it turning as you tighten the screw.

The potentiometer is pushed up from underneath, wiggling the claw into place as you do so, and the spindle nut lightly nipped up.

> The claw is set quite high on the potentiometer shaft so that it doesn't limit movement, and the clamping screw tightened until it grips the shaft. The control handle is pushed into the fork in the claw with the handle set to the off position (fully anticlockwise). The potentiometer is then rotated from underneath until it's off position matches the handle, then the spindle nut tightened. The handle should reach it's stops before the potentiometer does, so protecting the latter from physical damage.



< An M4 screw can be dropped into any of the other holes to provide a physical stop to the travel of the handle, preventing it from being turned to full speed.

Electrickery.

Generally speaking the convention is that **red is positive, symbol +ve**, and black is negative, symbol -ve. The supply from the batteries goes to the controller, this has to have the correct positive and negative connections.

All the wires used should be of a minimum of 4mm square cross section multi strand. I prepare the ends of the wire as shown, one twisted strand is placed either side of the screw, or alternatively buy forked connectors and crimp them on the ends of the wires.

> Open the black plastic case of the controller box by inserting a small screwdriver in the slot and twisting it.



Finally the controller knob wires are connected to the controller, just plug them in.



< You will need to enlarge the hole in one end of the black plastic controller box to fit round the large wires, then clip the two halves of the box together and fit it in the space provided as shown, bending the clips if required to hold it in place.

> Use the controller top plate to mark your loco panel for drilling, one centre hole and four screw holes. The controller is fitted to the loco with four M6 x 16 stainless button head screws and plain nuts.

