

Ruston & Hornsby 20 DL Assembly Instructions



The Lincoln based firm of Ruston and Hornsby were one of the most prolific builders of narrow gauge locomotives in the country. These were produced in a variety of gauges from 18 inches up to standard gauge and their products were arguably the best on the market. One of the key features of Ruston's locomotives were their 3 speed constant mesh gear boxes which allowed single handed gear changing. This allowed the driver to control the locomotive while walking beside the locomotive.

The Ruston 20 DL locomotive was produced during the 1940's, nearly 600 of which were supplied to the Ministry of Supply for use of at military bases, docks, factories etc. Many of these locomotives passed into private use after the war and could be found in mines , quarries (including Penrhyn in North Wales) and other industrial railways until comparatively recently.

General Assembly Instructions

Do take time to read through the instructions and understand how the parts fit together before reaching for the glue pot. Where ever possible parts have been designed to be symmetrical but occasionally parts have to be left or right handed so take care to follow the instructions carefully at these points.

Gluing

Parts may be glued with epoxy resin, cyanoacrylate “super glues” however we highly recommend EMA “Plastic Weld” for this kit. This is a solvent that works by capillary action, i.e. hold the two parts together and apply the solvent to the join rather than applying to a surface and then pushing the parts together. *Please use in a well ventilated room!*

Please note that polystyrene glues or solvents (e.g. Mekpak) will not work.

Painting

We suggest that that you spray paint your model (bonnet, gearbox cover and back sheet) with either aerosols or an airbrush but by all means use brushes if you prefer. But the basic sequence is the same.

- 1) Prime
- 2) Address any surface defects either by light sanding or filling
- 3) Re-priming as necessary
- 4) Leaving the primer for a few days for it to harden
- 5) Lightly rubbing down the surface to leave it smooth
- 6) Painting with 2 or 3 thin coats of top coat
- 7) Picking out details such as the filler caps and bonnet grills in alternative colours

Tools

The following tools will be required:

- A sharp modelling knife or scalpel
- 1.5 mm and 3 mm drill bits
- A small file, sand paper or an emery board “nail file”
- A “0” size cross point screw driver

The following tools are recommended

- A cutting matt
- Round and flat section “needle files”
- Fine tipped permanent black marker pen

Radio Control

The kit comes with the chassis pre-wired for simple manual control (i.e. the switch gives you Forward:Off:Reverse). Tests have shown that the loco does a scale 8mph when run from a 9v PP3 battery.

However if you fancy fitting radio control there is sufficient room in the bonnet to accommodate up to 4 AAA batteries (or a 2 cell lipo battery) and a small radio receiver / controller such as a Deltang RX60.

Step 1 – Component Preparation

The 3D printed components in this kit are of two different types, both of which need preparing in different ways.

SLS Components

(Buffers, exhaust silencer, drivers seat, louvered side panels , radiator assembly, brake lever and control levers)



With the exception of the control levers, these components have been printed individually and need very little preparation apart from cleaning with a medium (clean 😊) toothbrush to remove any residual printing dust. The two control levers and two filler caps are joined together with little sprues (the dark areas in the picture) and will need separating with a sharp knife or scalpel. This will leave small white patches where cut which are best “coloured in” with a black permanent marker pen.

FFF Components

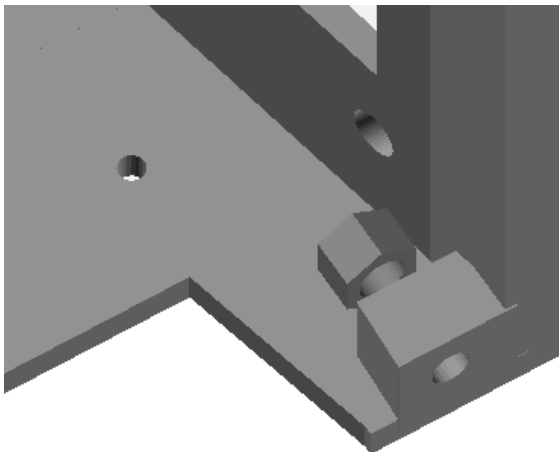
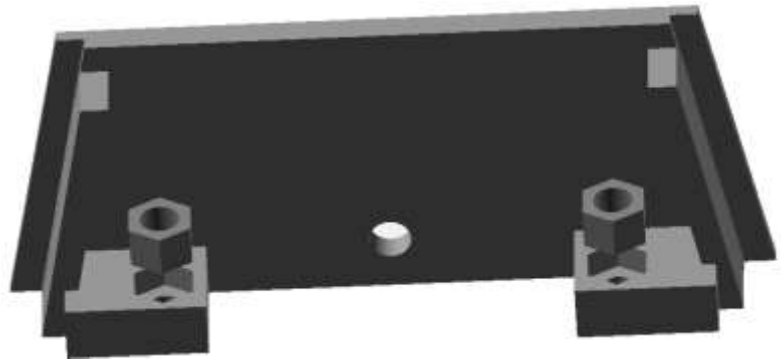
(main bonnet frame, bonnet top, bonnet front, wiring shroud, gearbox and cab back sheet).

The locating holes in the back and right hand side of the bonnet frame need cleaning out with either a 1.5 mm drill bit or miniature reamer. The 3mm starter handle hole in the left hand side and the two bonnet top locating holes need similar treatment.

These have been printed on a machine which leaves visible layer lines which you may or may not want to live with. We have found that rubbing down with a professional nail file (one is included with the kit) is very quick way of removing these lines. Other surface pits or grooves can be filled with a smear of model filler. Also priming with an automotive “high build” or “filler primer” from a “rattle can” is a quick way of imparting a nice smooth finish to the component.

Step 2 – Fitting Captive Nuts

Fit two M2 nuts into the hexagonal recesses in the locating lugs in the bonnet front sheet. The holes are deliberately slightly too small. Place a nut half into a hole and apply a little solvent to the sides of the nut which will soften the plastic slightly. Gently push the nut into hole with a paint brush handle or similar.



Fitting the captive nut into the bonnet frame is a little more difficult. Push one of the supplied M2 machine screws up through its hole. Now “start” the nut onto the thread and lightly pull into its hexagonal recess. Apply a couple of drops of solvent to the edge of the nut to soften the plastic and pull gently on the screw to pull the nut fully into its recess. Alternatively use a fine tipped soldering iron to apply heat on to the nut (not the plastic) and press nut into its recess.

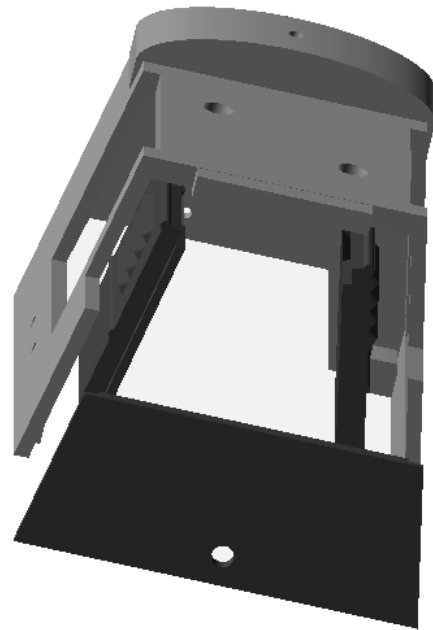
Step 3 – Switch Lever Extension

Glue the 14mm long piece of steel rod into 18mm long piece of brass tube. The important thing is to create a socket 8mm deep so that it sits on the switch toggle leaving sufficient clearance so the switch can still work. Glue (epoxy resin works well for this) this assembly onto the control switch on the chassis making sure that no glue fouls the toggle’s motion.



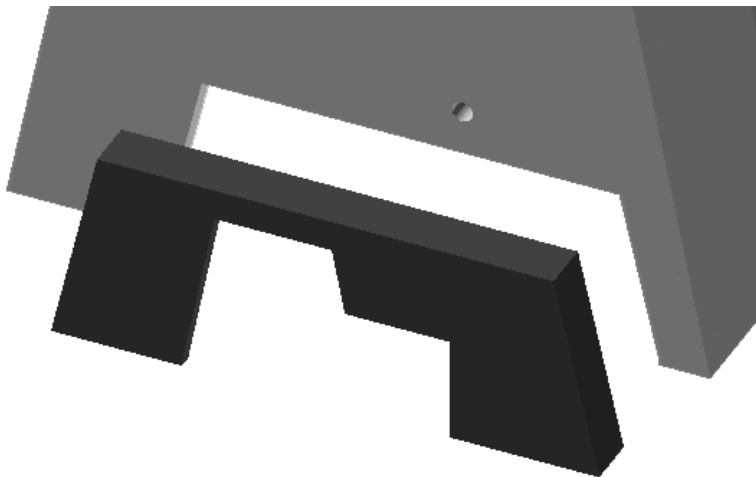
Step 4 - Bonnet Assembly

Glue the bonnet's lower front plate and the two side panels onto the main bonnet. Note that the side panels are fitted from the inside.



Then fix the curved bonnet top and the radiator onto the assembly.

If desired fit the wiring shroud to the back of the bonnet. This was not on the prototype but has been designed to hide the motor and wires. If you decide to fit a cab (not supplied) to your locomotive then you may omit this part.



Step 5 - "Gear Box" preparation

Trial fit the "gear box" cover onto the chassis covering the switch and connector block. You may need to file a little out of the switch lever slot, the switch nut



clearance slot and the front opening so that the cover fits flat on the floor and the two location holes in the footplate align correctly with the sockets in gear box cover.

Step 6 - Painting

Now is a good time to paint the complete bonnet assembly, gear box and cab back in the livery of your choice. See page 2 for further details on this.

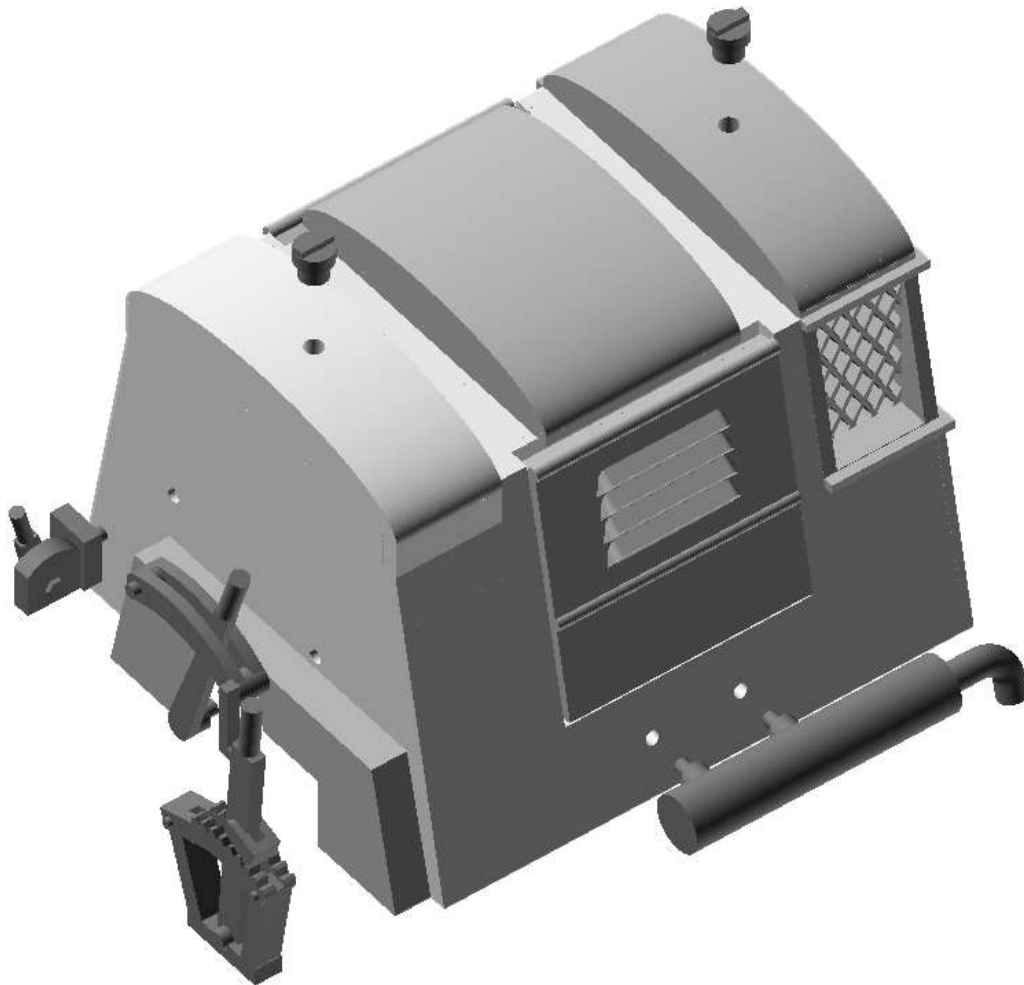
Step 7 - Drivers Seat

Attach the driver's seat to the gear box with a small self-tapping screw



Step 8 – Control Levers

Glue the filler caps, control levers and exhaust silencer to the bonnet. A good quality super glue may be best for this step if you have already painted the bodywork as “plastic weld” will take the paint off!



Step 9 – Buffer Beams

Bolt the buffer beams to the chassis front and back with M2 nuts and bolts. Note there are 2 pairs of mounting holes so you can choose the buffer height to suit your wagons.



Step 10 – Gearbox Cover

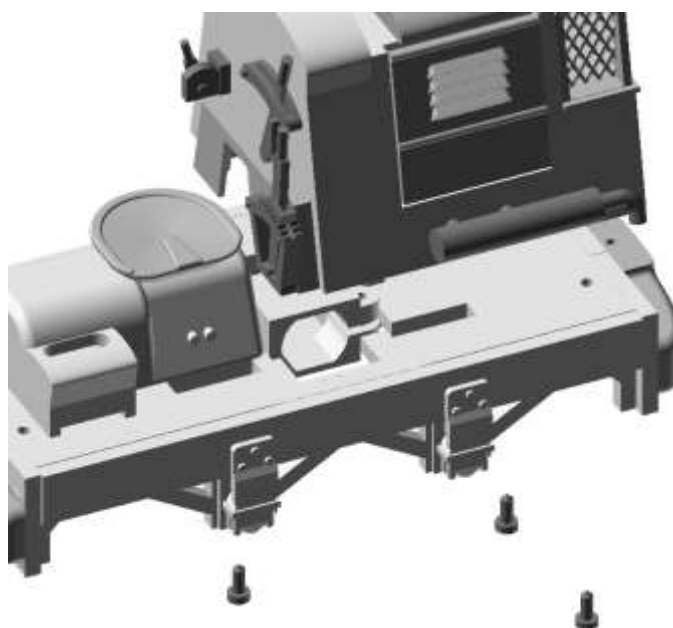
Fit the gearbox to the chassis covering the switch and connector block. The wires to the motor and battery should be routed through the front opening either side of the central support spine. Secure with two small black self-tapping screws.



Step 11 – Fitting Bonnet

Fit the bonnet assembly to the chassis front with 3 M2 bolts into the captive nuts. If your battery rattles about we suggest you use a bit of Velcro (not supplied).

Also supplied in the kit are some tyre weights. Depending on what battery you choose to use, stick some of these weights under the bonnet in odd corners to increase the loco's adhesion.



Step 12 – Back Sheet



Fit the cab back sheet to the back of the loco again using two black self-tapping screws

Job Done!