

"EASY-BUILD" HIGH DENSITY STOCK DMU ASSEMBLY INSTRUCTIONS.

SAFETY FIRST! CONSTRUCTING THIS KIT REQUIRES THE USE OF VOLATILE SOLVENTS, ALWAYS FOLLOW THE MANUFACTURERS INSTRUCTIONS AND ENSURE ADEQUATE VENTILATION. YOU WILL ALSO REQUIRE SHARP TOOLS AND THE EDGES OF THE ETCHED PARTS CAN BE VERY SHARP SO TAKE CARE WHEN HANDLING. WORK STEADILY AND SAFELY AT ALL TIMES.

INTRODUCTION

These instructions cover all versions of Easy-Build high density stock of the Derby, Pressed Steel Co. and BRCW classes 116/117/118. The main detail differences will be found in the interiors and number of doors. In order to get the most from your kit we recommend you read these instructions in full prior to commencing construction making notes as to any assembly options, or changes to the suggested order you think would suit your method of building better. However, we suggest you do follow to the order of construction as we know it works! The general idea for assembly is to construct a box with a removable floor. Photo references will be found throughout these instructions and consist of images taken of our other DMU units where methods, or details are the same. To help you find the images they are identified by class and name of photo. Additional images of a model 116 build can also be found on the disk and images of our class 121/122 will also be useful.

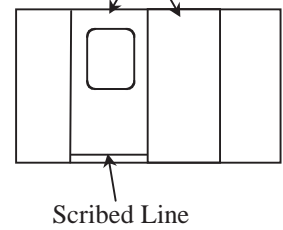
Let's get started by inspecting the components supplied, there's no point getting involved in construction only to find a damaged part. Start with the large moulded parts (ends, floor, sides, roof and bogie stretchers) checking for severe warping and/or twisting. The floor and roof sections will have a degree of bow along their lengths due to the production process, but you should be able to flatten out the bow without any real effort. Whilst we take great care to weed out sub-standard parts prior to packing, some still slip through occasionally, so remember that any severely mis-shaped parts will be promptly replaced upon return to Easy-Build. Once you're satisfied with the contents, wash all the plastic components with a household detergent to remove oils and contaminants left from the manufacturing process. Now...

PREPARING THE SIDES

- 1) Check each side molding against the edge of the end moldings. Whilst we take great care to ensure the ends of the side molding are true and square, take a few moments to check that the ends will make a good joint with the sides. Also, remove a small amount of the moulded rib on the inside of each side at the non-cab ends, i.e. the baggage end of the DMBS and the toilet end of the DMS - about 3mm is ample. Also check all window openings for cutting burrs and remove as necessary.
- 2) (DMBS) The driving brake power cars have guard's doors that, on the prototype, open inward. To help you identify the sides they are marked inside 1DMBS and 2DMBS in marker-pen. The guard's compartment is located in the baggage area, so the guard's door is the baggage door with a window

on each side. On the 1DMBS that is the first door with a window at the right hand end; on 2DMBS the first door with a window at the left hand end (as you look at the side flat on the table). To depict the guard's doors simply scribe a line between the two scribed lines that outline the door opening. This horizontal scribe mark should be 1.5mm up from the bottom of the body. DO NOT extend the scribed line past the door opening. DMBS GUARD'S DOOR CLOSE UP (Cl. 108 prototype).

DOUBLE 'BAGGAGE' DOORS



3) Drill through all the holes in the sides as follows:

0.7mm - Door hinges (there are no pre-marked drilling points for the guard's doors hinges as they would open inward). Guard's doors vertical handrails either side of the door.

1.0mm - Door bump-stops (these are the holes in the middle of the door panels with a corresponding hole to the left, or right of the door).

0.5mm - Guard's doors handles, baggage doors handles, passenger door grab handles and cab handrails.

1.2mm - All other door handles (T-handles).

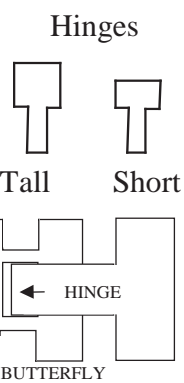
4) (DMBS only) From 0.7mm wire, form the 8 handrails for the guard's compartment doors (4x long and 4x short) to fit the holes drilled.

5) Check the depth of score lines at the door positions and deepen if you prefer. Carefully remove the raised burr from the door opening scores, work steadily and re-open score marks as necessary until desired effect has been achieved.

***TIP - Use a gentle scraping action followed by fine wet-n-dry (wet is best) for these two operations. Alternatively, a small chisel can be used to shave off the burrs. Old flat needle files can be ground into chisels and are ideal for this purpose. Be careful not to dig into the surrounding surface of the sides.*

6) Now would be a good time to give the sides a rub down with fine wet & dry abrasive paper to really see what the job looks like. At this stage you can go over any of the previous body prep. operations quite easily until you are fully satisfied with the results. Once the side details are in place it is much more difficult to do so.

7) Now it's time for the door hinges and there are a lot of them! Count the number of doors on each body side, remembering that the guard's doors (the baggage door with a window) do not have visible hinges. Also, you will not be able to fit hinges to the driver's door until the body has been assembled because the hinges go into the side/cab joint on that side. You will require 2 tall hinges and 1 short hinge per door, parts E18 (both types share the same part number) with the short hinge in the centre and tall hinges top and bottom. Also remove an equal number of 'butterflies' from the etch, part E19 one for each hinge. The hinge piece is pushed through a butterfly shaped backing piece then through the appropriate hole. Applying superglue to the hinge peg from the rear will secure the hinge in the body side thus trapping the butterfly in place.

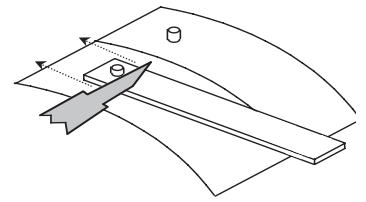


***TIP - You will find that the application nozzle on many brands of superglue will fit neatly over the hinge's spike. Once pushed through the body side push the nozzle over the protruding spike and gently squeeze a small amount of glue into the hole.*

8) Using the 1mm micro rod 'plug' the holes in the door centres and those to the left (and 2

right for baggage doors) of the doors to represent the door stops. The stops should be trimmed so that they protrude not more than 1mm from the sides. Note: door stops are not fitted to all doors (e.g. none on the guard's doors because they open inward). Do not fit door handles and grab irons until after painting.

***TIP - To ensure all the bump stops are trimmed to the same length: drill a 1mm dia. hole in a piece of 1mm (40 thou) thick scrap styrene (or other sheet material). Place the scrap styrene over the bump stop so that it protrudes through the hole and gently pare back the excess with a sharp knife, followed by a fine file. Remove the styrene and, once all bump stops have been so treated, give them all a gentle rub over with fine abrasive paper to round the edges slightly.*



That completes the sides for now.

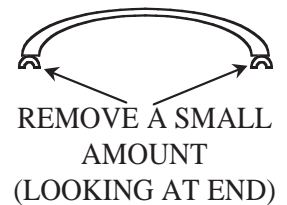
ROOF PREP

You will notice your roof is bowed down its length due to the moulding process, this is useful when fitted as it ensures the roof is a tight fit in the centre of your coach.

9) Clean off any burrs of plastic then put a strip of masking tape down the centre of the roof onto which you can mark the positions of roof vents etc. from the drawing provided (Drawing 2, p16).

10) Drill 2.8mm dia. mounting holes for the roof vents at the locations marked.

11) Remove a small amount of material (about 5mm in length) from the inner edge of the underside of both side locating channels at the shaped end of each roof (see right). This allows the roof to sit down over the end molding. DO NOT REMOVE THE OUTER PART OF THE CHANNEL AS THIS FORMS THE ROOF GUTTER. See photo: Inner roof channel mod (Cl. 105 - model).



Although you can fit the roof details now, leaving them until later can make the blending of the roof section to the cab roof easier.

FLOOR PREP

12) If the floor has not already been marked, the front of the DMS floor should be identified as that with the bogie pivot hole CLOSEST to the end of the floor moulding. The power car does not need marking because the motor cut-out in the floor makes orientation obvious.

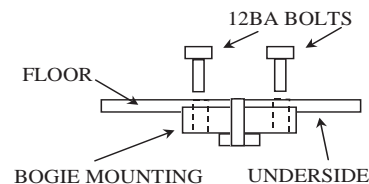
13) Check the floor molding for flatness - if it appears too distorted (some curvature is quite normal) gently bend it in the reverse direction to correct.

14) The floor mouldings will need to be reduced in width to obtain the best fit inside the body. Initially, reduce the floor width by about 2 mm (1mm each side) by carefully shaving off small amounts evenly from each side to keep the floor central to the body. This is best done using a scraping action with a sharp blade. This operation may need to be repeated when the body and underframe are assembled for the first time.

15) Locate the two aluminium bogie mounting turnings and prepare them by scoring their upper surface (the spigot faces downward when in use see right). Treat the mounting areas likewise. Use a strong adhesive fix the two round turned bogie mounts in the holes in the floor.

NOTE: See Modification To Floor on page 21 for details of a small modification necessary to allow the motor bogie to have full movement.

16) (Optional, but strongly recommended) To make a much stronger job of fixing the bogie pivots in place, you might consider a 'belt and braces' approach by adding a mechanical fixing to the mounting. Good results have been achieved by drilling two 1mm holes through the bogie mountings and floor (once the mounting has been fixed in place) either side of the bogie pivot bolt and tap 12BA. Now secure the bogie pivot in place by bolting down through the coach floor with short 12BA bolts (see bogie mounting diagram above right).

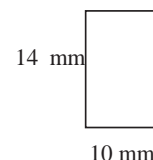


CAB ENDS PREP

17) The underside of the roof gutter (where the roof gutter meets the door opening) is slightly angled (a production process aid), carefully file this angle square in order to accurately fit the sides. Check the fit of the sides against the cab ends - make sure you've got the correct end of the side to work with, e.g. the non-baggage ends. The sides should be level with the bottom edge of the cab.

***TIP- Number the ends and sides on the inner surfaces to ensure each side mates with it's appropriate end later on.*

18) Prototype photographs reveal that not all units carried windscreen wipers on both left and right cab windows (the centre window never has a wiper). Drill two 0.4mm dia. holes in the centre of both, or right hand side window only (your choice) directly above the upper window beading to mount the windscreen wipers later.



19) Cut from scrap styrene 4 desk mountings as shown here (right) and fix to the floor of the cab against the cab front. See photo: Craven inside cab for example (Cl. 105 model).

20) Cut glazing to fit the windscreens now as this is very difficult to do once the body has been assembled. Start with six pieces 15.5mm x 24.5mm and then round the corners sufficiently to clear the moulded inside corners of the glazing recess inside the cab. DO NOT FIT just keep safe for now.

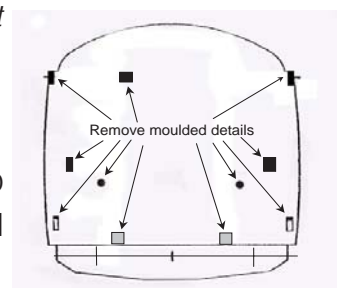
If you intend to illuminate the end lights these should now be drilled out as required. No provision is made for this in the kit and so it is up to the builder to determine how best to achieve the installation.

NON-CAB ENDS PREP

These are our standard BR Mk1 suburban coach ends and so have details that are not required.

21) Remove all the moulded details flush with the surface of the end.

***TIP:* This is best achieved by shaving small amounts off with a sharp blade, followed by a fine file and finally fine abrasive paper. See photo: End prep (Cl. 105 model).



22) Turning to the inside face of the end cut a rebate (darkened here in the photo, right) in the outer edges to clear the window openings. The rebates need to be about 20mm in length and 20mm up from the bottom of the side, but check against a side to confirm. You might also want to cut off the two round projections in the upper corners of the end (circled), see right.



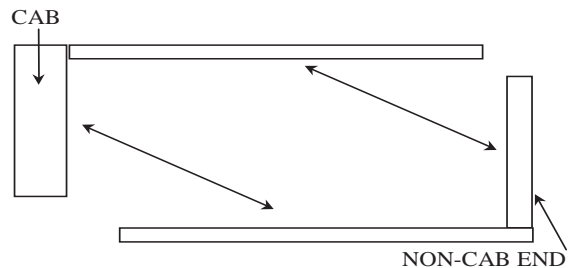
23) With a fine razor saw, cut off the moulded on bufferbeam level with the bottom of the end. Use the underside of the end as a fence to guide the saw blade and finish off with a flat file to remove any burrs.

24) Give the ends a final inspection to ensure the exterior surface of the end is flat and smooth and check the fit of the sides against the edges remembering to keep the sides level with the bottom of the end. Use fine abrasive paper to finish the surface before moving on.

*** NOTE. for some reason these ends come out a little too short to give the best fit against the sides. We advise you add a 1mm strip of scrap styrene along the bottom once the end prep has been completed. Sorry! ***

BODY ASSEMBLY - NOW FOR THE FUN PART!

Whilst the solvents used to assemble the components evaporate very quickly the joints they produce take considerably longer to achieve maximum strength. DO NOT RUSH THESE NEXT STEPS. Leaving ample time for the joints to harden is essential and you will be rewarded for your patience by not having unsound joints later on.



25) Fix a cab end to one side at the opposite end to the baggage compartment and the non-cab end to the other side adjacent to the baggage compartment to form an 'L' shape half box as shown right, note the non-cab end fits **inside** the ends of the sidewalls. Note, on the DMS the cab end of a side is denoted by the cab doors forming the first part of the side, so the doors abut directly to the cab moulding.

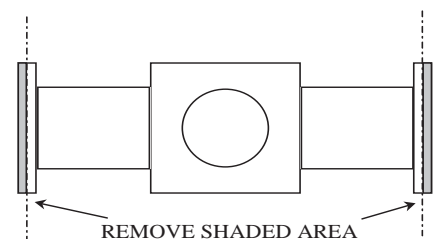
Assuming care was taken when preparing the ends and sides your sides will be level at the bottom. Ensure the outside faces of the sides are aligned with the top and bottom of the cab door cut-out. Allow the ends to harden before attempting the next step.

***TIP - Working on a sheet of glass, MDF, or melamine will aid accurate bottom alignment of the sides and ends.*

26) Assemble the two half boxes again using a flat surface to aid alignment. The box may twist a little to during this process due to the flexible nature of the materials, but do not worry unduly as the roof will bring everything back in line later.

LEAVE TO SET HARD AND BUILD THE BOGIES

The instructions here initially refer to an un-powered bogie. Note also that the bogie spues contain parts that are not intended for the DMU so please refer to the illustrations to identify the appropriate parts to use.



27.1) Remove three bogie frame stretcher plates from the casting sprues and cut off the ends level with the inside edge of the moulded angle (see right). Clean up and square off as necessary.

27.2) Push brass bearings into the axle holes making sure they are an easy sliding fit, but not sloppy - if necessary clean hole with a 2.5mm drill. Do not fix in position as adjustments will be made later.

27.3) Using a pin, add a tiny drop of oil (NOT WD 40) into the bearing surface.

27.4) Place two non-driving axles in the bearings of one side frame and, ensuring correct orientation of bogie frame stretcher plate (reinforcing cross members down), assemble the side frame to the frame stretcher.

27.5) Once the first frame is reasonably firm, assemble second side frame onto frame stretcher in the same manner. When the side frames are secure enough to hold themselves in place, make certain all is square and in line, minor adjustments can still be made at this stage by applying more solvent to soften the joints and adjusting as required. Note: wheels should be a loose fit in the bearings at this stage. Leave the bogie to set for at least 1 hour, 2 is better.

With the joints set hard you can now set the axle bearings:

27.6) There is less side-play evident in the DMU bogies than is found in our coach bogies. If care has been taken so far the wheelsets will require only minimal adjustment of the bearings to obtain optimal performance, If adjustment is necessary begin by inserting a thin piece of card between each wheel and the side frame to prevent lateral movement.

NOTE: Do not over-pack the wheelsets as this might cause the sides to spring when you remove the card later resulting in stiff wheel movement.

27.7) Push in the bearings from the outside until the bearings connect with the axle ends.

27.8) When satisfied that the bearings are (just) against the pinpoint ends fill the bearing hole with the 2.5mm sprue supplied, or microrod (not supplied) and fix with liquid solvent from the outside and leave to harden.

27.9) When set, remove spacing card and trim any excess rod flush with axle box face

27.10) Remove the bogie pivot mounting from the casting sprue and remove any flash. Test the bogie pivot bolt is an easy sliding fit in the mounting hole. If tight, open the slightly with a 3.5mm drill to ensure a smooth swivel movement.

27.11) Drop the bogie pivot mounting into its locating holes in the top of the bogie stretcher plate and, using only sufficient glue to attach the plates, fit keeper plates over pivot spindles. Ensure pivot remains free to move until the liquid solvent has evaporated.

You may prefer to use a larger piece of sheet styrene (not supplied) rather than the moulded keeper plates supplied.

27.12) If desired, fit the brake shoes on the inside of the sideframe. They should be positioned just off the wheels with the circle detail on the shoe just visible below the bottom of the side frame.

27.13) Fit the bolster detail (see photo: Bogie Sprue Labelled - Cl. 108 model) centrally to the inside of the sideframe by placing the square beam against the back of the sideframe and butt against the underside of the bogie stretcher.

While the basic bogie assembly sets, identify and remove the bogie front channel, guard irons, speedo drive mount and bogie steps from the etched sheet.



27.14) Fold up the bogie channels E27 (plain) & E28 (with slots for guard irons).

27.15) Locate the guard irons (E26) in the channel with the top of the guard iron firmly against the top of the channel section and passing through the slots and fix in place (these can be glued in place with superglue, or soldered). See Bogie end channel 1 (Cl. 105 model) for clear view of channel. Note that only the front bogie, i.e. the cab end, has guard irons fitted.

27.16) Glue the bogie channels to the front and rear of each bogie with the bottom of the channel level with the bottom of the sideframe (superglue is recommended for this). The arrangement of these channels should be:

Front bogie (both units): guard irons (front of bogie) and plain channel (rear of bogie).

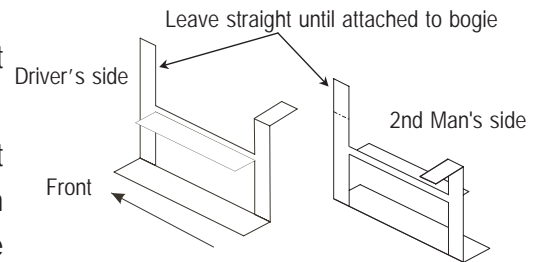
Rear bogie (both units): plain channels both front and rear of bogie.

See also Bogie end channel in place (Cl. 105 model).

27.17) Fold up the bogie step tread supports and mounting brackets (E5). See Bogie step and speedo drive (Cl. 105 model).

27.18) Glue the speedo drive mounting (E21) to the front left axle box. The spike faces right and down when fitted in place.

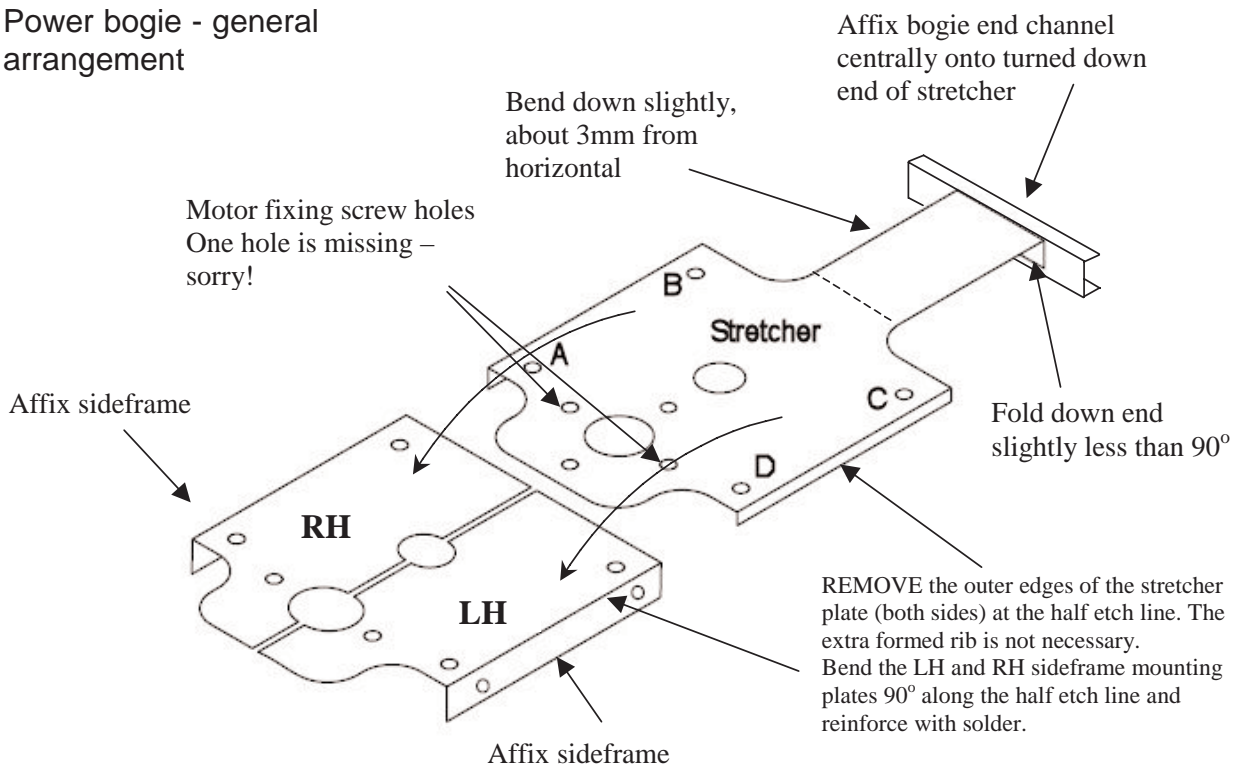
27.19) Glue the bogie step mountings in place. The front mounting is in line with the front spring hanger and the bottom step tread should be (approximately) level with the large spring mounting bobbin. Ensure the step is kept parallel to the side frame and attach the rear mounting to the top of the side frame. See Bogie step and speedo drive (Cl. 105 model) and Cab Steps Mountings1 & 2 (Class 116).



***TIP Flattening the front spring hanger 'bobbin' back to the level of the leaf spring greatly simplifies the fitting of the step mountings. Although un-prototypical, once painted the flatness is hardly noticeable.*

POWER BOGIE

Power bogie - general arrangement



28.1) Find the brass power-bogie stretcher-plate, the two sideframe mountings (LH & RH) and axle bearings. Put the bogie pivot 'top hat' to one side (safe!) until required to actually mount the bogie.

28.2) Fit axle bearings into the two remaining bogie sideframes as per the un-powered bogies.

28.3) Push the two moulded pins of each sideframe through the holes in a sideframe mounting (with the folded sides hanging down) and glue into place.

28.4) Fold down the end of the bogie stretcher plate at the half etch and the whole extension

about 3mm from the horizontal (this might need further adjustment later on).

28.5) Bolt one sideframe assembly to the bogie stretcher plate with 2x 2mm nuts and bolts provided.

28.6) Insert the wheelsets into the assembly ensuring the set with the brass gearwheel is at the same end as the motor mounting and that the two sprockets are both on the same side.

28.7) Fit the opposite sideframe assembly as before.

28.8) Form the bogie end channel with guard irons (E28 & E26) and affix to the folded down end of the stretcher plate. DO NOT GLUE TO EITHER SIDEFAME. As before, the bottom of the channel should be level with the bottom of the sideframe end, you might need to adjust the stretcher-plate extension a little to achieve this.

28.9) Finish off detailing the bogie assembly as outlined for the DTCL (rear) non-powered bogie except for the dynamo, not forgetting the central bolster details, which are superglued to the inside of the sideframe mountings.

28.10) The guard's door have additional steps fitted to the rear of the bogie in a similar manner to those at the front. Two extra step mountings are provided for the purpose. Align the steps with the guard's door. Fold the step mounting as for the main step, but fold over the top of both mounting legs. Follow the same construction methods as for the main bogie-mounted steps noted earlier - photo: Bogie Showing Guard Steps.JPG.

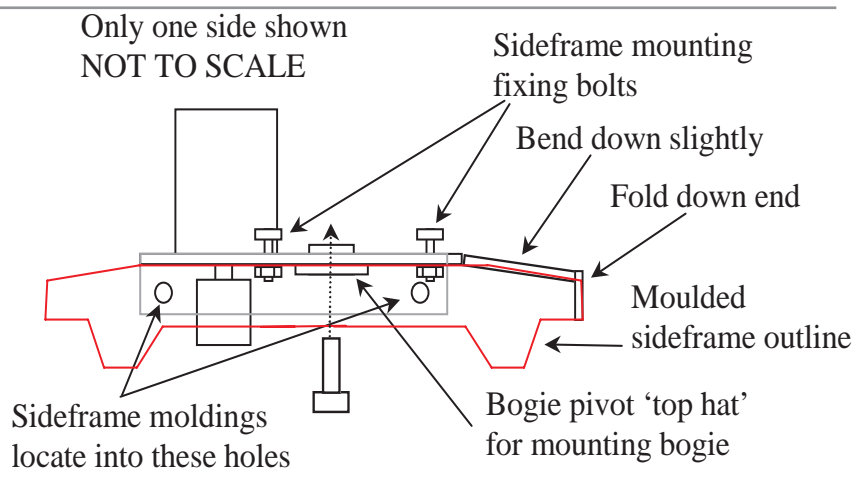
28.11) Fit the motor to the frame stretcher and glue the pick-ups to the stretcher underside ensuring the wipers have a good contact with the backs of the wheels. Trim back the pick-up wires as necessary.

28.12) Align the worm wheel with centerline of the gear and clip the drive chain in place. DO NOT MAKE THE CHAIN TOO TIGHT AS THIS WILL CAUSE EXCESSIVE GEAR NOISE AND WEAR IN THE COMPONENTS AND THUS PREMATURE FAILURE.

28.13) Lightly lubricate all moving parts and test.

28.14) There are two different types of axle box covers supplied in the kit, use the slightly domed Timken covers. Fit covers to all remaining axle boxes - photo: Bogie speedo drive.jpg.

28.15) Cut 8 (or 12 if fitting guard door bogie steps) 15mm x 5mm x 0.7mm (30 thou) step treads and fix to the step supports as required.



BODY ASSEMBLY CONTINUED...

NOTE: BEFORE PROCEEDING MAKE SURE YOU HAVE GOT THE CORRECT ROOF AND BODY PAIRED TOGETHER. DMBS WITHOUT WATER FILLER DETAILS TO THE REAR, DMS AND THE ROOF WITH THE WATER FILLER.

29) Fit the fixing captive nuts into the moulded channel on the underside of the roof. Slightly reducing of the width of the captive nuts will make their fitment easier, however don't overdo it as you don't want them sliding about when trying to screw the floor in place, nor have them dropping out!

30) Assuming everything has been assembled accurately the roof should fit neatly against the cab molding at the front with the rear flush with outer face of the end. When the roof is in place the top of the sides will locate in the groove under the gutter. You may find the central moulded channel on the underside of the roof needs trimming back to enable to roof to fit between the cab and the rear end moulding. Fix the roof in place by initially applying solvent from the inside along the joint of the cab/roof moulding then along the joint between the roof and the side molding, again from the inside. Be very generous with the solvent here as the ABS can be reluctant to soften.

31) Put floor in place and use the long bolts to clamp everything together. Put aside to harden.

32) Once the roof and sides are secure, you might wish to reinforce the sides/roof joint with 30thou (0.7mm) micro rod again with liberal amounts of solvent. Other methods can be used to reinforce the joints, but this method is both effective and neat.

LEAVE BODY TO HARDEN

33) Once the roof has set firmly, take time now to inspect the fit of the roof outline against the end moulding. Due to the different means by which the roof and ends are produced, it will be found that the alignment of the roof line and the ends requires blending with an appropriate car body, or modelling filler. Likewise, any gap between the underside of the roof and the top of the non-cab ends can be filled now as necessary.

Once again, do take your time with these steps not least because the roof and end joints will be very visible on the finished model.

34) If the roof vents were not fitted earlier now is the time to do so. The roof vents will also offer the body some extra stability when it is placed upside-down for the following steps.

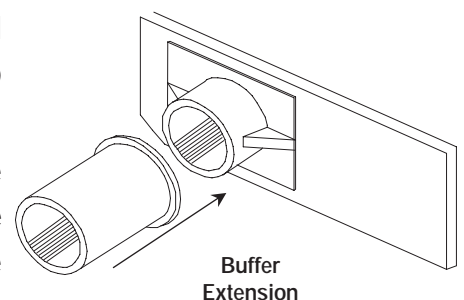
35) Finally, for the roof, create the roof overhang by attaching a strip of 2mm x 0.5mm styrene to the end of the roof at the non-cab end. Pre-form the strip by drawing it gently over a blunt edge (a fingernail works well). Starting at the centerline of the roof, align the strip with the upper surface of the roof and follow the roof contour round to the gutter applying solvent from the underside. Once secure, give the surface a rub over with abrasive paper to blend the joint with main roof, then slightly round the bottom corners of the extension.

UNDERFLOOR ASSEMBLY

NOTE: The molded ribs on the floor molding determine the underside of the floor moulding!

36) Check the floors will fit within the sides and end moulding. It is likely that you will have to adjust the floor width to gain the best fit. Do this carefully removing the minimum amount evenly from each side to keep the floor central to the body. This is best done using a scraping action with a sharp blade.

37) To improve the visual appearance of the underframe, cut the two lengths of 5mm wide 0.5mm styrene to 437mm and affix to the outside face of the molded solebars. Align the strips to the rear edge of the underfloor so that they protrude at the front (take care when

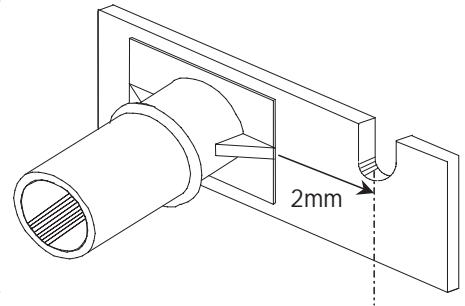


handling so as not to break the ends). Keep the strip firmly butted against the underside of the floor lip.

38) Remove the four bufferbeams from their sprues together with their associated extension collars, clean flash, etc. and check the fit of the buffer shanks into the holes. Use a 3mm drill bit to carefully open any tight holes to allow the buffers to slide easily. Use a buffer to align the buffer stock extension collar to the end of the buffer housing - affix with solvent and remove the buffer immediately. Once the joints have hardened run the 3mm drill through again to ensure the holes are clean.

39) Install the floor into the body and temporarily secure into position. Now fit the bufferbeams to the underside of the cab ends, aligned centrally across the cab and butted against the ends of the extended solebars to ensure vertical squareness. **DO NOT GLUE THE BUFFERBEAM TO THE SOLEBAR EXTENSIONS BECAUSE IF YOU DO, YOU WILL NOT BE ABLE TO REMOVE THE FLOOR AGAIN!**

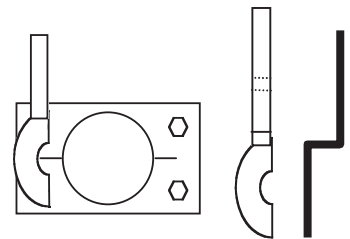
***TIP - Adding fillets of scrap styrene between the underside of the cab and the bufferbeam will greatly increase the security of the assembly. Aligning the fillets with the underframe ribs will ensure they will not interfere with fitting other details, or the couplings later.*



40) Create two 2mm x 2mm slots in the upper edge of the rear bufferbeam 2mm from the inside edge of the buffer stocks, see right showing lefthand side of bufferbeam only.

41) The rear bufferbeams should now be fitted directly to the floor moulding. Take care as it is quite difficult to achieve this without also gluing the floor to the end of the body. Initially tack the bufferbeam in place then remove the floor from the body and finish off the job, reinforcing the joint as appropriate.

You may wish to leave the bufferbeam details until later as they are quite vulnerable otherwise proceed as follows for both front and rear:



42) Lamp irons (E16) are fitted to the outer edge of the buffer stocks. First remove the outer two molded bolt heads from the face of the buffer stock. Bend the lamp iron to form a joggle using the half etched dimples as a guide and glue to the face of the buffer stock, see right. Superglue is recommended for this.

MU PLUGS

The MU plugs and sockets need a little explaining: the cabs have closed sockets and stowed cables, which are represented by C29 and C32 respectively. The rear has sockets with plugs inserted and cables in use (i.e. non-stowed), which are represented by C30 and C33 respectively.

What is required to prepare the MU sockets depends on your preferences. If you want to connect the two unit together with MU 'cables' some method of attaching cables is necessary, if not the castings can simply be fitted as is, with the exception of C29, which should always be prepared as described.

43.1) After cleaning up the castings square off the ends of the cable plugs (C29, C30, C32, C33) and make a pop mark in the ends.

43.2) Drill a small hole in the castings (0.6mm) just deep enough to secure a short length of wire. Insert short pieces of wire leaving about 3mm protruding onto which



the cable sleeve will be fixed. On part C32 there are four holes to be drilled because the cables are depicted as stowed so form a pair of loops.

43.3) Fit the castings to the underside of the bufferbeams centrally under each buffer as follows when looking end on: C32 cab left, C29 cab right, C30 non-cab left, C33 non-cab right. Remember you'll be working upside down so it's easy to get the order wrong! Since the rear bufferbeam is attached to the underfloor you might wish to leave them until you're adding those details, but if you do don't forget about them.

The floor moulding can now be removed from the body and the remaining details fitted to the body and underframe.

CAB BUFFERBEAM ADDITIONAL DETAILS

44.1) The vac pipes (casting C3) emerge from the bufferbeam at approximately buffer centre height and about 6mm either side of the coupling hook. Bend the 'flexible' part of the pipe so that it twists towards the adjacent buffer stock and glue the mounting bracket to the rear of the bufferbeam. The position of the vac pipes changed over time so if possible check photographs before fitting.



44.2) The air horns (castings C1) go to the driver's side on the inside of the solebar and are angled downwards. However, it's getting a bit crowded in there and they can also foul the bogie on tighter radius curves. We suggest fitting the horn to the bogie front against the guard iron. If you opt to do this, reduce the length of the mounting bar to just above the first horn and butt it up to the bottom of the front channel.

ADDING THE REMAINING BODY DETAILS

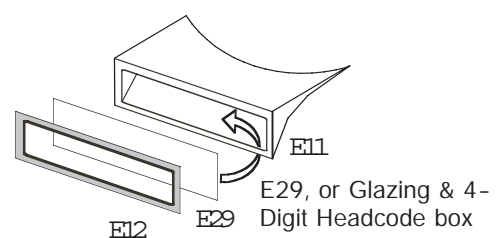
45) Now would be a good time to assemble the control desk details as per the diagram and check for fit inside the cab. Solder a 14BA cheesehead bolt (or a short pin) into the central hole of the brake wheel E4 to mount it onto the desk and a short length of thin wire (about 2.5mm long) through the hole in the wheel spoke to form a turning handle.

46) On the driver's side of the cab you will need to drill three 0.7mm dia. holes through the seam between the cab end and the body side moulding. These should be positioned to align with the other door hinges (approx. 4mm, 20mm and 28.5mm as measured from the bottom of the body). Also, open drill the holes for the long handrails E1 (approx. 4mm 21mm and 38mm as measured from the bottom of the body and 1.5mm from the right hand edge of the door). Check these measurements against the pilot holes provided in other locations to ensure accurate alignment on your particular model. These long cab handrails were painted body colour, so fitting now is appropriate.

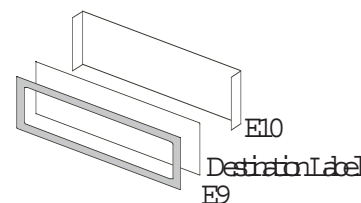
***Note - Door hinges are always on the left of the door.*

47) Decide whether to fit the small destination box (C6), or the larger headcode box (E11 & E12). Casting C6 (destination box) simply sits directly onto the cab roof gutter. Some trimming will be required to achieve a good fit of the boxes around the complex curves of the cab roof.

48.1) For the 4-digit headcode box that fits above the gutter use part E11. To use this, fold up using the half-etched lines as guides (to the inside). Ensure the folds produce neat square edges and use solder, or adhesive to secure shape. If you wish



to illuminate the headcode fix a piece of clear styrene (not supplied) behind the opening using E29 as a guide for size. Otherwise fix E29 inside the opening. Some minor trimming of the edges of the folded box might be required to achieve the best fit possible. You might also need to file the front of the cab roof a little flatter to allow the bottom of the headcode box to sit neatly against the cab roof (the cab front bows outward slightly). The completed box sits about 1.5 - 2mm up from the gutter on the front of the cab with the front face vertical. Part E12 is the front of the headcode box and should be fitted with a glazing panel in front of E29 once the unit is finished.



48.2) With the large headcode option, the destination board moves inside at the top of the cab centre window. Fold part E10 along the half etched lines and paint. A destination label is then glued between the folded ends and then the front E9 placed on top of that. The whole thing is then attached behind the centre cab window after painting the unit.

CREATING THE INTERIOR PARTITIONS

See Drawing 1 for layout of the interior of the two cars including the partitions as described in the following steps.

49.1) Carefully remove a cab partition E23 from the fret and check the width of the cab partition inside your body and trim as necessary to achieve a sensible fit. The partition should be able to sit between the moulded ribs at the base of the body sides. The half-etched door opening lines should show inside the cab.

49.2) Fold the bottom three sections along the half etched lines, making each fold towards the half etch. You should now have two short tabs and long central tab folded at 90o in opposite directions and have a partition that can be stood up, if not you've folded it up wrong! See photos: Cab Partition Bends & Cab Partition Bottom (Cl. 108 model) - these are of the original components, but show the principle of what to do.

49.3) Take four E8, fold 90o and fix (solder/glue) into the half-etch pads in the rear cab walls so that the folded projection forms a slot with the fold at the bottom of the cab partition. See photo: Partition with floor supports (Cl. 108 model) again using the original components.

49.4) Cut two styrene cab floors 14mm x 55.5mm (approx) and fit to the longer central folded base of the cab partitions to form a cab floor. Fit into position adjusting the various items as appropriate.

49.5) Clean and fit the cab seat (casting C31) to the short cab floor positioned to align with the curved recess in the cab desk and its back just clear of the partition. See photo: Cab Partition (Cl. 108 model).

50.1) Carefully remove partition E22 from the fret and check the width inside your body between the 4th and 5th passenger doors (DMBS), or 6th and 7th doors (DMS) counted from the cab, excluding the cab door and trim as necessary to achieve a sensible fit. Do not fit at this stage.

50.2) Fold the bottom three sections along the half etched lines as for the cab partition. See photo: Partition with floor supports (Cl. 108 model).

51) (DMBS) The final partition is created from the moulded ABS divider. This will need trimming as necessary to fit between the last passenger compartment window and the guard compartment window (the one immediately in front of the guard's door). Once prepared this partition can be

permanently glued into position against the relevant body stretcher ensuring its bottom is level with the top of the moulded rib on the body side.

52) Fix the moulded body stretchers inside the body on top of the moulded rib and aligned centrally with the 1st and 6th passenger doors - reinforce as necessary. These internal stretchers are used to support to the underfloor (which can sag under the weight of the metal castings) by drilling through the fuel tank, floor and stretcher and securing together with a screw. See photo: mid body strengthener and cab walls (Cl. 129 model) for this (much wider in this case) support as used on the Cravens Class 129.

53) (DMS) Fix the moulded body stretchers inside the body on top of the moulded rib and aligned centrally with the last passenger doors - reinforce as necessary.

UNDERFRAME DETAILS

Both underframes are the same, so only one description is given

54) Temporarily place the underframe into the body and mark the solebars to show where the doors are (both right and left hand edges of the openings).

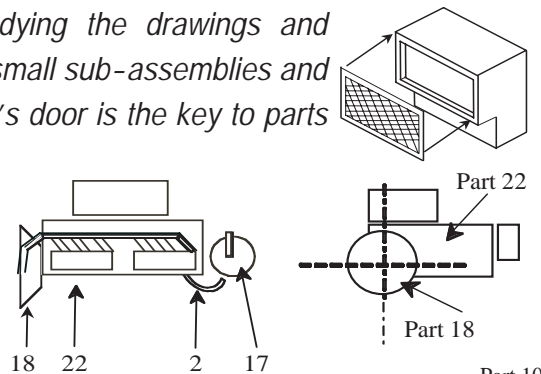
55) Before removing the floor, drill holes through the floor into the moulded body stretchers, these will be used later to secure the floor in place. Drill small (1mm dia.) holes initially and then open the holes in the floor to 3mm and the holes in the stretchers to 2.2mm.

Working with the front pointing to the right and with the underframe upside-down the solebar nearest to you is the driver's side. See photo: Drivers side and Second Man side and the diagrams DMBS/DMS UNDERFRAME DETAILS LAYOUT at the end of these instructions. You will probably find it easier to first create sub-assemblies of parts before fitting the parts to the underfloor

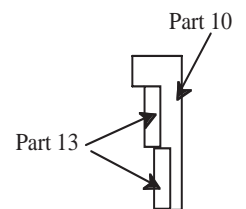
****TIP** - the underframe details are best tackled by studying the drawings and photographs. However it has been found helpful to construct small sub-assemblies and then attach these to the underfloor. The position of the guard's door is the key to parts positioning. So here goes...

56.1) Clean the flash from all castings.

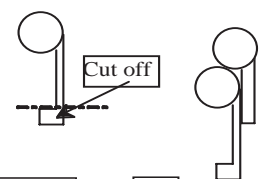
56.2) Fit the radiator grilles (E3) onto the front of the radiator castings C26.



56.3) Fit castings C2, C17 and C18 to the diesel engine C22 as shown right. See Diesel Engine.JPG (Clas 116)

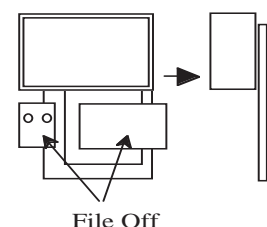


56.4) Fix castings 2 C13s to C10 as shown right.



We now need to modify a couple of castings...

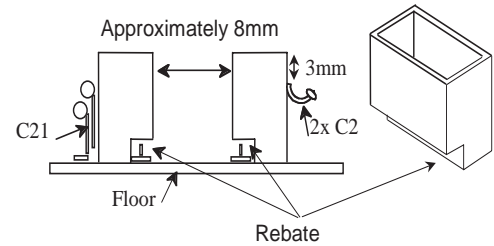
56.5) Modify one of the air tanks C21 by cutting off the bottom of its



mounting foot. Now piggy-back this air tank onto the other as shown right. NOTE: you should now have a single casting for this part, if so this step is not necessary.

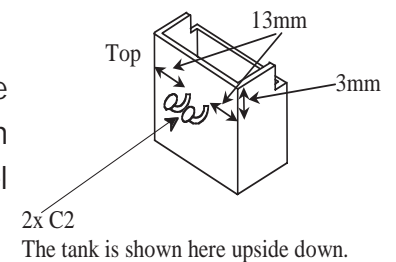


56.6) Cut and file the two small boxes from casting C8 and remove the mounting foot from the rear. This will leave you with (mainly) a single large box with a flat mounting, see right.

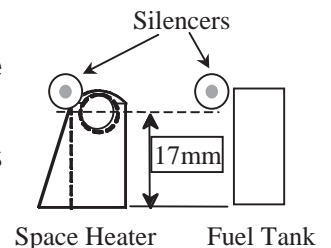


56.7) Cut the pipe extensions off the exhaust silencers C9 as shown right.

56.8) The fuel tanks require a simple modification as shown in the diagram (right). Cut a rebate in the bottom of the tanks so that they can overhang the moulded ribs on the underside of the floor. See Modified Fuel Tank.JPG (Class 116)



56.9) Add 2 fillers C2 to one tank as shown in the diagram, they should be positioned (vertically) so that the filler caps are just below the solebar. Prototype photo: Exhaust And Radiator.JPG & Modified Fuel Tank.JPG (Class 116).



56.10) Affix the two piggy-backed air tanks (C21) to the other fuel tank, again centred and positioned level with the top of the fuel tank as shown in the two diagrams here.

57.1) Having produced the basic sub-assemblies and necessary modifications, score the underside of the floor moulding in the appropriate positions and affix the parts in place using the underfloor diagrams as a guide (pages 18). Have a dry-run first and simply position the main components in place taking care to consider bogie movement, which can get very close to some details when on tight radii curves. It may seem obvious, but some castings will need to stand in front of others, so ensure the outermost casting will still fit behind the solebar with the rear casting(s) in place prior to applying glue. The easiest mistake to make is to mis-read the diagram; remember the floor is upside down and what is to your left during construction will be to the right when the underframe is completed. A 'NOT TO SCALE' diagram of the underside as you look at it during construction is provided for extra clarity.

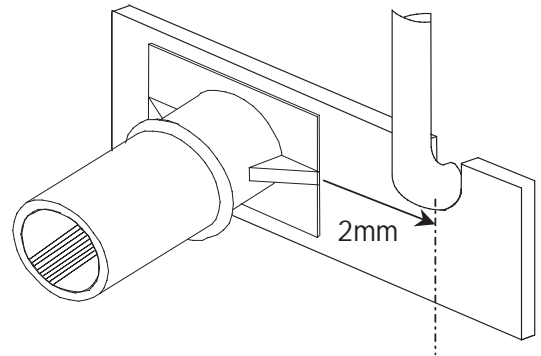
57.2) When fitting the fuel tanks notice that there should be a gap between them of about 8mm. It is important to ensure there is a sufficient space here to enable you to fit any body mounting screws later on.

58.1) With the basics of the underframe in place let's look at the exhaust systems. It is probably easiest to create these by reference to the numerous photos on the CDROM, both of the prototype and our demo model. Each system is made up of three components: pipe, silencer and pipe. Locating the modified silencers first is a good starting point then create the pipe from the manifold stub on the

diesel engine followed by the pipe that disappears into the underfloor.

58.2) So, fix a silencer to the front of one of the space heaters and the other to the front of a fuel tank, using the diagram opposite as a guide. The silencers are centered in length on the fuel tank and space heater.

58.3) First consult the diagrams on page 18 to get an idea of the pipe runs. Use the remaining 1.8mm nickel silver rod to make the pipe runs to and from the silencers - annealing will certainly be beneficial here. To fix the pipes to the engine manifold stub and the silencers, first tin the ends of the rod with 145 deg solder and then use a low wattage iron to attach to the cast pewter parts with 70deg solder. If soldering isn't for you, thoroughly clean the parts and use superglue to tack the items together; reinforce the joints with epoxy resin as necessary. If done with care and reinforced away from the main line of sight a very satisfactory job can be achieved without using solder. See Exhaust pix (Class 116)



58.4) Locate the remaining speedo drive parts (etched part E25 and small 'square' castings from C5). Fit the speedo drive backing etched part to the sole bar 45mm from end of floor moulding with spike pointing down with the smaller speedo casting glued in place on top.

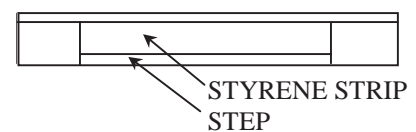
59.1) Fit the underframe into place and create two exhaust stacks that go straight up the back of the body. At the bottom, the exhausts bend tightly into the two slots previously made in the upper edge of the bufferbeam. The pipes extend to a point just above the roof line, 1 - 1.5mm is sufficient.

59.2) Mark the centerline of the pipes onto the unit end and drill two small holes 10mm up from the bottom of the end and down from the underside of the roof.

59.3) Make two loops of thin wire (for each pipe) or use E31, attach to the pipes and mount into the previously drilled holes with the bent end pushed into the slot in the bufferbeam. Do NOT permanently fix the exhaust pipe to the bufferbeam.

60) (DMBS) Cut 14 off 20mm x 5mm, 2 off 30mm x 5mm of 1mm (40 thou) styrene as step treads.

(DMS) Cut 20 off 20mm x 5mm styrene as step treads. NOTE: the steps are not aligned to the bottom of the solebars, but about 1mm above the bottom. Mount all step treads at the same height (both units) at the positions marked on the solebars previously (step 54).



Use the 20mm steps for the passenger and cab doors and the 30mm steps for the baggage/guard's door. Additional strength can be gained by adding a strip of styrene to the front of the solebar in line with the step, once painted it is hardly noticeable, see right. Remember to keep the step tread horizontal as it projects out from the solebar.

***TIP - The outer edges of the steps should not be left too square cut, i.e. round off the upper edges and slightly round the corners. The steps were made of wood and soon became worn.*

FINISHING

With the main construction now complete it is time to prepare the model for painting. Whilst this consists of mainly cleaning and washing of all the parts, it also gives you another opportunity to check the security of the various fittings. Anything that cannot stand cleaning will probably not withstand

long-term use, so it's better to have bits falling off now than later - refit as required!

INTERNAL DETAILS

61.1) Remove the appropriate number of seats from the sprues and prepare them by removing the ejection pin marks (small round marks on seat back) and moulding feed joints.

61.2) To form the seat, flex the moulding until the joint between the base and seat back shows a thin white line. Apply solvent, or superglue to the joint holding together briefly to prevent the back from initially springing apart.

61.3) Cut two floor strips from the supplied styrene sheet: 1x 20mm wide, 1x 26mm wide. For the DMBS, cut to length as measured from back of driver's cab partition to back of ABS divider for baggage area + 2mm (approx.). For the DMS: cut to length as measured from back of driver's cab partition to inside face of end, less 1mm (approx.) These measurements are not critical.

61.4) With the body upside down, lay each floor section in position butted up against the driver's cab partition and mark where the doors and dividers fall. I now paint the floor (the marks are on the underside) and seats.

61.5) Attach the seats either side of the door openings (and dividers) as necessary remembering to allow a gap between the seat backs where a divider will have to slot in.

FINAL ASSEMBLY

62) Find the windscreens you put in a safe place some time ago and fit using small amounts of adhesive. If you have some RC Modellers Glue (canopy glue) to hand, dilute a small amount with water and apply from the inside with a small brush to the edge of the glazing allowing capillary action to draw the liquid into the joint. Also fit the completed small destination box if you have used the large headcode box on the cab roof. There is a front (with an opening) and a rear create a sandwich with a destination label showing through the opening. Affix at the top of the centre window.

63) Install the glazing into the window openings from inside the body. Fit dry and secure in place by running dilute canopy glue around the edges with a small brush. Dilute the canopy glue to the consistency of milk and add a single drop of detergent to aid the flow of the glue into crevices.

64) If required, fit the destination board inside the centre window.

65) Fit the door windows and brake compartment windows

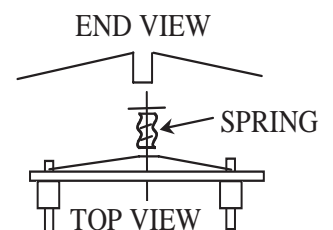
66) Fit the control desks on to the desk supports with two part epoxy.

67) Check the fit of the buffers in the stocks once again for a sliding fit, adjust as necessary. Fit the buffers into the stocks. To spring the buffers create a loop of the spring wire (supplied), pass each end of the loop through the hole in the buffer shank. Secure the spring in place by passing the coupling shank through the hole in the loop and trap with the coupling mounting spring and split pin, see right. If you didn't fit the vac pipes earlier, now is the time to do so.

68) Fit the cab partitions in place (you may wish to install a driver in one end at this stage) and the other partitions with doors making sure they are stood vertical.

69) Carefully negotiate the false floors into position and secure - we used tape to hold things together until the floor is in position.

70) Assemble the underframes onto the appropriate bodies and secure in place.



71) Mount the bogies and ensure they are free to rotate. The speedo drives can be connected to the solebar units using the silicon tubing supplied. Do not make the link too short as it will restrict bogie movement, however too long and it may snag on track side components. Start with about 35mm and work back from there until it looks right.

72) Bend the wiper 'blades' 90° to the arms (E24) so that they present a blade edge to the windscreen ensuring you create left and right handed wipers (should you decide to fit wipers to both screens). A small dimple on the rear near the blade will assist bending without distorting arm. Solder a piece of 0.4mm wire through the mounting holes in the arms, paint black and fix into the holes previously drilled above the upper edges of the windscreen beading. The wipers are intended to be in the parked positions, which is up against the outer edges of the windscreens.

73) Fit all door 'T' handles and grab handles E17. It should also be noted the guard's door has a special etched cranked door handle (E13) and the baggage door handles E14.

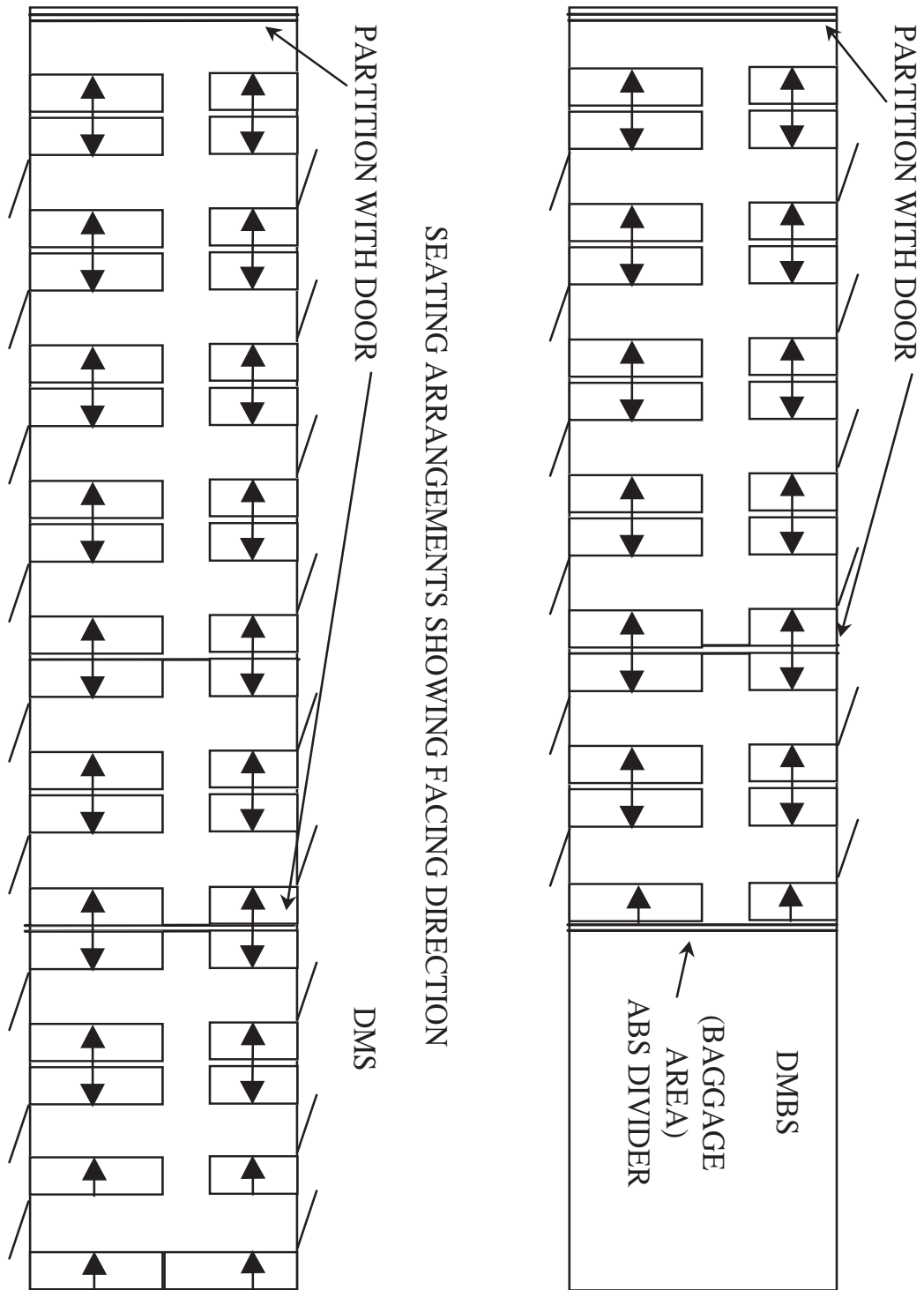
74) If required, fit the headcode front cover to the headcode box.

We hope you have enjoyed building this kit and welcome your comments.

SHAWN KAY JULY 2012

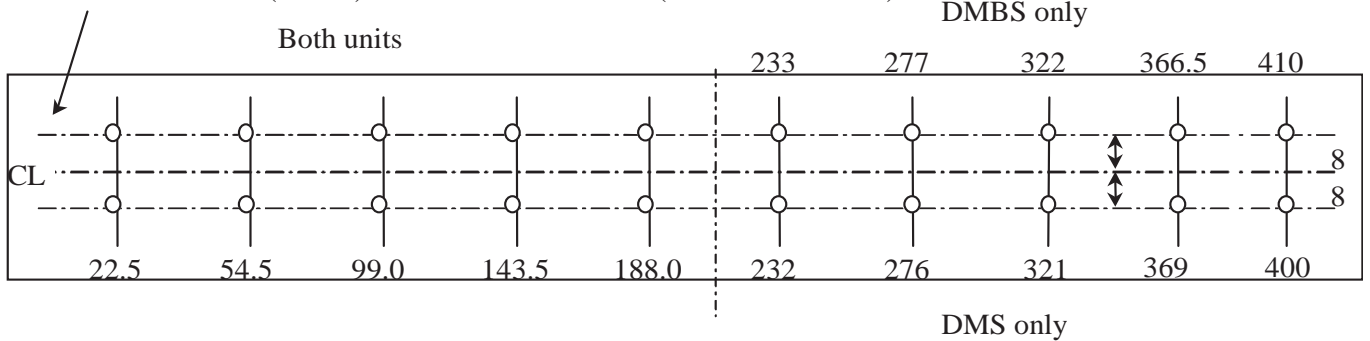
NOTES

DRAWING1



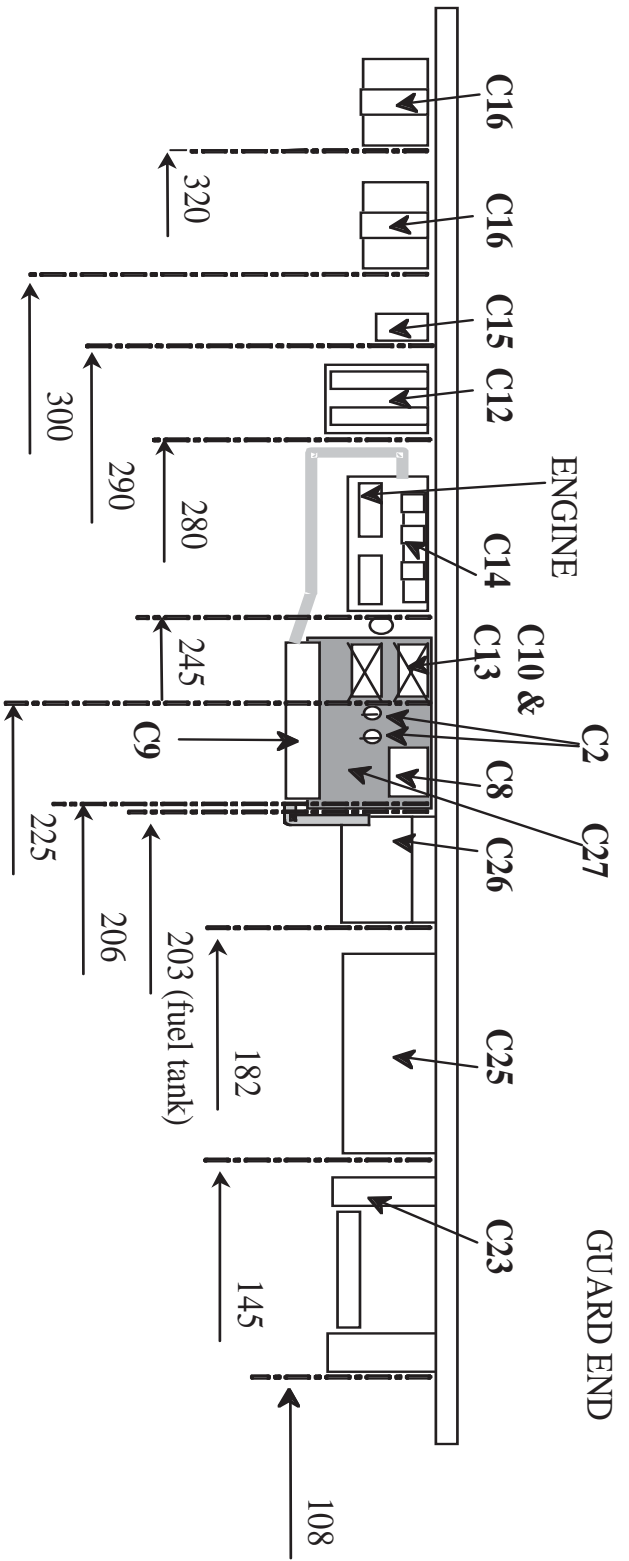
DRAWING2

All measurements (in mm) taken from the cab end (not drawn to scale)

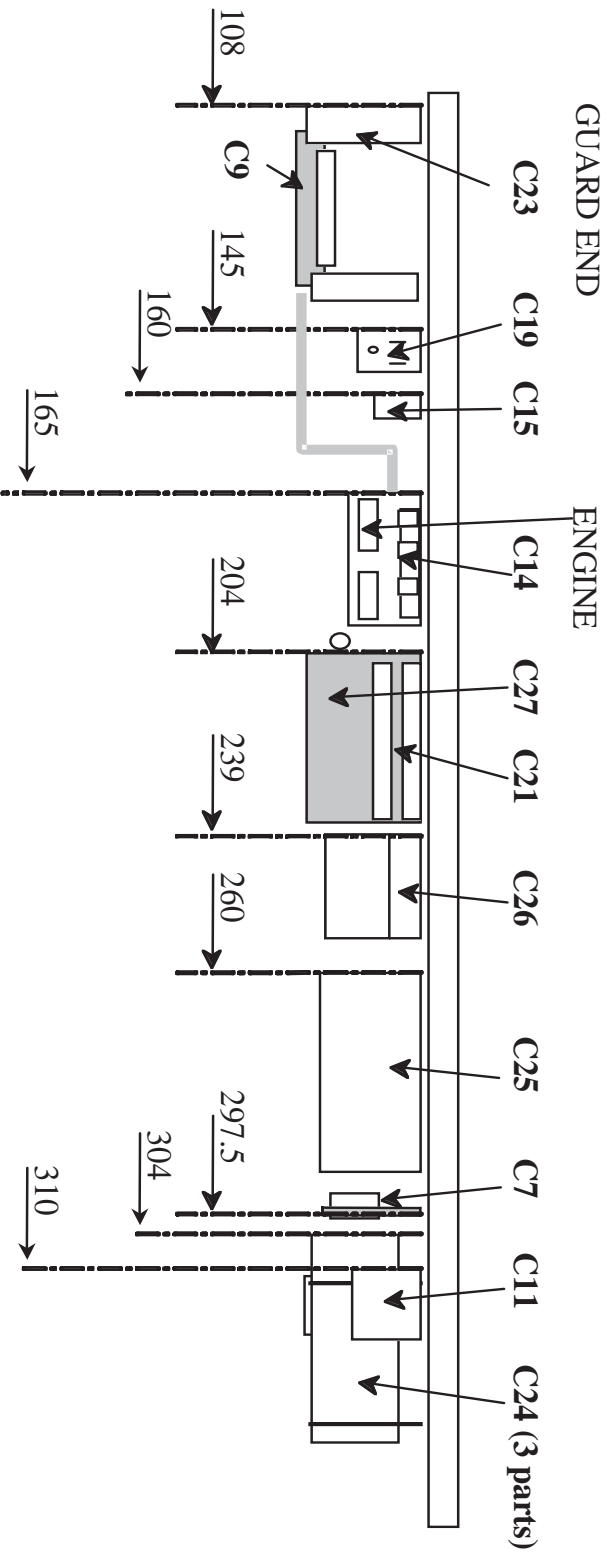


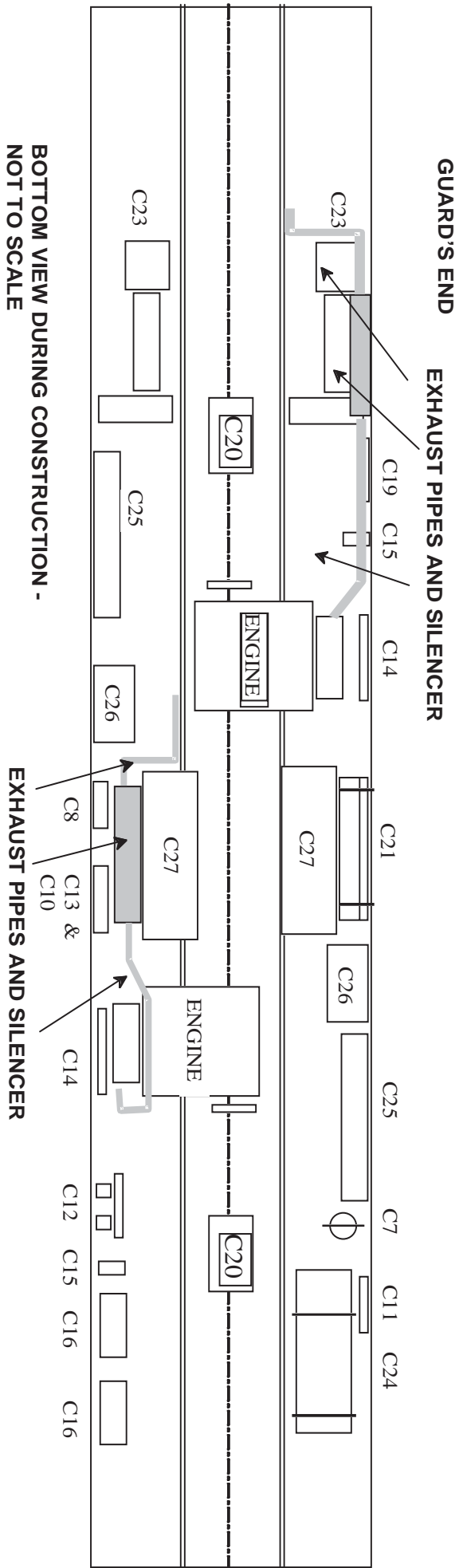
DMBS/DMS UNDERFRAME DETAILS LAYOUT

All measurements taken from the guard end of the floor



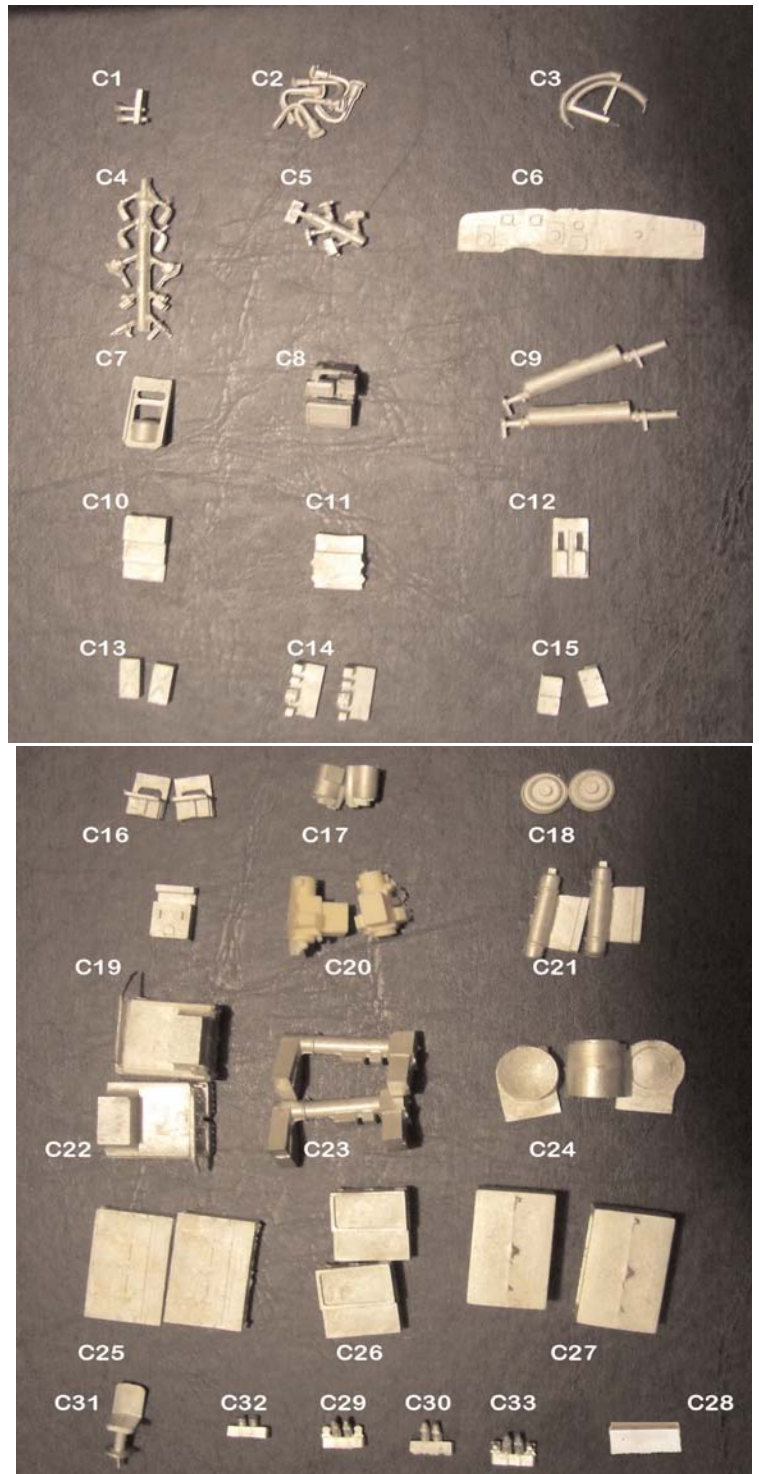
All measurements taken from the guard end of the floor





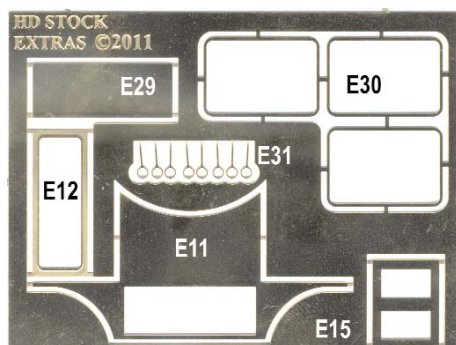
NOTE: the actual arrangement of castings may vary. **DMBS/DMCL CASTINGS**

- C1:** AIR HORNS x1
 - C2:** FILLER PIPES x6
 - C3:** VAC PIPES x2
 - C4:** CONTROL DESK DETAILS (1 in total)
 - C5:** SPEEDO DETAILS (1 in total)
 - C6:** CONTROL DESK x1
 - C7:** FILTER ASSEMBLY x1
 - C8:** ELECTRICAL BOX ASSEMBLY. x1
 - C9:** EXHAUST SILENCER x2
 - C10:** ELECTRICAL BOX MOUNTINGS x1
 - C11:** LIGHTING CONTROL BOX x1
 - C12:** RELAY BOX x1
 - C13:** ELECTRICAL BOX x2
 - C14:** SWITCHES ASSEMBLY x2
 - C15:** BUTTON BOX x2
 - C16:** RELAY BOX x2
 - C17:** ENGINE FILTER x2
 - C18:** ENGINE FLYWHEEL x2
 - C19:** BATTERY ISOLATOR BOX x1
 - C20:** GEARBOX x2
 - C21:** AIR TANK (**now a single casting**)
 - C22:** ENGINE x2
 - C23:** SPACE HEATER x2
 - C24:** VAC TANK (3 parts)
 - C25:** BATTERY BOX x2
 - C26:** RADIATOR x2
 - C27:** FUEL TANK x2
 - C28:** SMALL DESTINATION BOX x1
 - C29:** MUs STOWED x1
 - C30:** MU CLOSED SOCKETS x1
 - C31:** DRIVER SEATS x1
 - C32:** MUs IN-USE SOCKETS x1
 - C33:** MU IN-USE PLUGS x1
- Also included in casting pack are 14 turned brass door T handles (DMBS), or 20 (DMS).



KEY TO ETCHED SHEET OF DETAIL PARTS (SMALL)

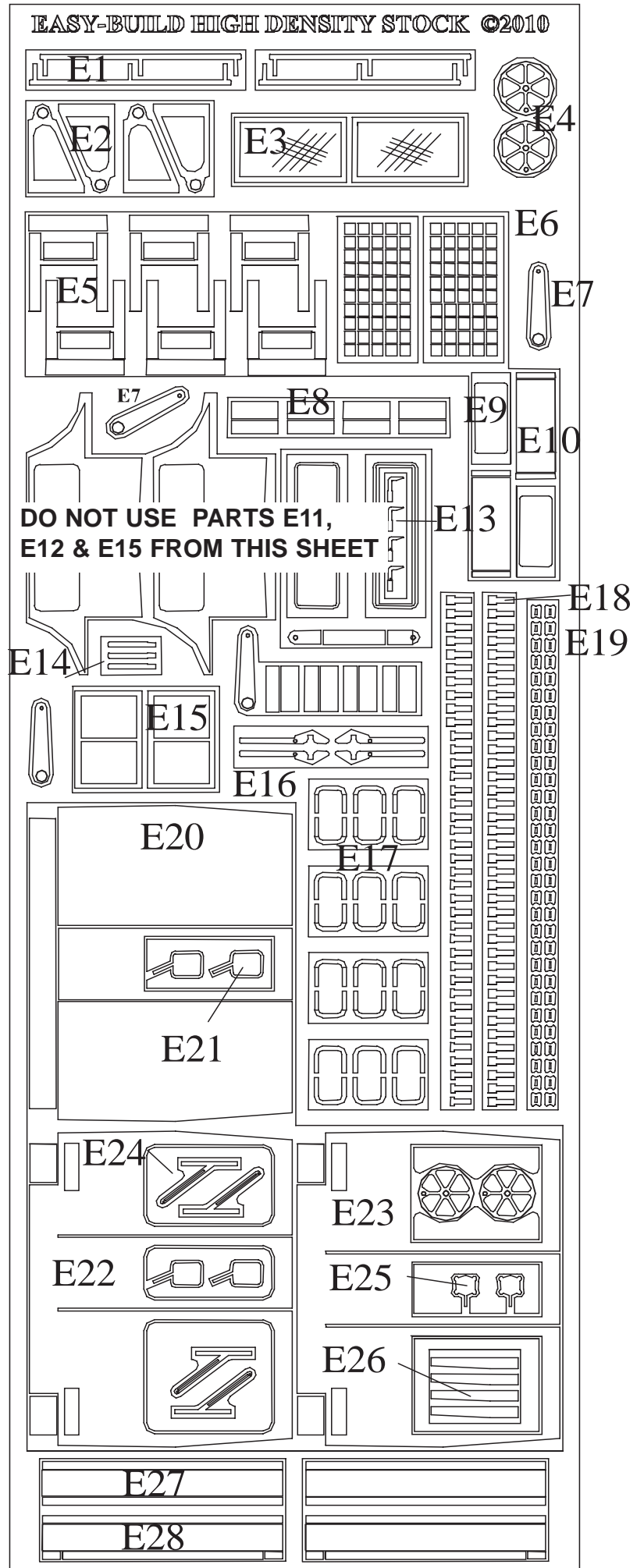
- E11: Roof headcode box
- E12: Headcode box front
- E15: 2-digit headcode frame
- E29: Headcode box front backing plate
- e30: replaCEMENT CAB WINDOW FRAMES
- e31: eXHAUST STACK MOUNTING RINGS



ETCHED PARTS

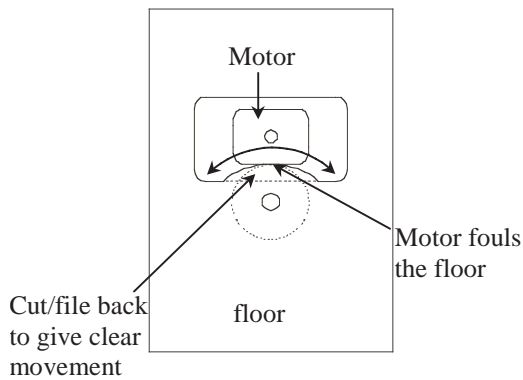
KET TO ETCHED PARTS

- E1: Cab Handrails
- E2: Brake Hangers (NOT USED)
- E3: Radiator grills
- E4: Control Desk Brake Wheels
- E5: Bogie Steps
- E6: Baggage Compartment Window Mesh (NOT USED)
- E7: Brake levers (NOT USED)
- E8: False floor support brackets
- E9: interior destination board front
- E10: interior destination board rear
- E11: DO NOT USE
- E12: DO NOT USE
- E13: Guard's door handle
- E14: Baggage door handle
- E15: 2-digit headcode frame (NOT USED)
- E16: Lamp irons
- E17: Grab handles
- E18: Door hinges (tall and short)
- E19: Door hinge butterflies
- E20: Cab wall (baggage end) (NOT USED)
- E21: Speedo backing (bogie mount)
- E22: Saloon divider (offset door)
- E23: Cab divider (passenger end)
- E24: Windscreen wipers
- E25: Speedo backing (chassis mouNT)
- E26: Bogie guard irons
- E27: Plain bogie channel
- E28: guard iron bogie channel



MODIFICATION TO FLOOR

Since the floor of the power car was designed we've had to obtain our gearsets from a different supplier. This change meant we had to alter the position of the motor, which in turn created a problem with the aluminium bogie mounting. If fitted as described the motor might foul the edge of the round bogie mounting. So, with the round aluminium mounting securely in place as described in the main text, file, or cut off the edge of the floor motor opening and mounting sufficiently to allow the motor to move through its full range. See diagram below.



CONTROL DESK DETAILS

