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Incorporating Main West Models

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# NSWGR D58 4-8-2 LOCOMOTIVE AND TENDER KIT

**E193 Manufactured Exclusively for AR Kits by DJH Engineering from Patterns owned by AR Kits**

**PLEASE READ INSTRUCTIONS THOROUGHLY BEFORE COMMENCING ASSEMBLY**

## **CONSTRUCTION**

### **ASSEMBLY**

It is important to ensure that all parts are clean, free of "flash" (excess metal on castings) and fit properly. The "flash line" is easily removed from most areas by scraping gently with a sharp hobby knife - a round blade is more effective than a straight pointed type. Pull the blade along the "flash line" - several light strokes are better than a single one. Some areas are better cleaned up with 6" jewellers' files. Take care not to flatten round parts by filing too heavily. All locating holes for detail fittings should be pre-drilled to the size specified in the instructions. Sometimes it is necessary to clean out these holes with a "rat tail" file; take care not to snap off the tip of the file. Gently wash the castings in warm soapy water to remove mould release residue.

Etched brass items are best removed from the fret by placing the fret on a scrap piece of timber (e.g. Pyneboard) and cutting the tabs with a large Stanley knife - cut the tab at the point furthest away from the part, then trim the tab off close to the part with a small pair of quality side cutters. Hold small etched parts with a pair of flat nosed (not serrated jaws) pliers while cleaning up with jewellers' files. Be careful not to distort the etchings; they are difficult to straighten if bent or twisted. Drill all required holes before assembly, noting the sizes shown on the drawing, because some holes will be difficult to drill after parts are assembled.

As with all classes of NSWGR locomotives, individual D58s varied in minor details from time to time in their life. Unfortunately the Data Sheet's plan of the D58 is now available and is a handy reference guide to the construction of the locomotive. However, good photos and a side elevation plan are contained in Ken Groves' excellent book "The Big Engines". Alex Grunbach's book "Compendium of Steam" in particular contains a very good section on the D58.

Modellers are advised to check photographs of the particular locomotive they have chosen to model, also keeping in mind the era they are modelling.

These kits are designed to give many years of operating pleasure. A little extra time taken during construction will ensure that your kit will do this. It cannot be emphasised too strongly that the basis of a smoothly operating model is care when constructing the chassis and valve gear, ie you must double check every step. Check that the axles turn freely in their bearings, check again with the siderods on, then again with the connecting rods on, etc, etc.

In order to keep cost down on this low volume kit we have utilised etchings from the D57 kit where possible. You will find therefore a number of parts are not required, and also that the etched pump mounting plate (55) requires slight modification. There are two additional etched frets E193-1 and E193-2 which contain the new etched parts for the D58.

### **Assembly methods**

The two main construction methods are:

(a) Low melt solder - Low melt solder is an excellent medium for use with white metal kits. It is quick and easy providing a stronger joint than can be achieved with glue. It has the added advantage of easily repairing minor casting flaws, and because of the relatively low temperature, many parts can be held in the fingers while soldering. Brass to white metal joints can also be made by "tinning" the brass first with normal solder. Low melt soldering requires the correct type of soldering iron (e.g. Dick Smith T2200). These irons have temperature control, as low melt solder only requires temperature between 70 degrees and 200 degrees centigrade. You must use special low melting point solder, such as that available from AR Kits.

### **IT IS ADVISABLE NOT TO ATTEMPT TO SOLDER ANY CASTINGS WITH A STANDARD SOLDERING IRON**

(b) Glue - Superglue and Plastibond are two types of glues suitable for use with this kit. Some modellers prefer to superglue major joints first then "fillet" the joint with Plastibond. Small detail parts are best glued with Superglue. Glue is not recommended for those parts needing good electrical contact, such as the tender bogies.

It does not matter which ever method you choose, "dry fit" parts first to ensure a good fit.

### **Electrical pickup.**

The electrical system used on these kits is called "half live". Looking from the top facing forward the locomotive chassis collects current from the live wheels on the right-hand side, shown as LS (live side) on the drawings. The tender is insulated from the locomotive and current is collected from the wheels on the left-hand side of the tender.

### **Cleaning up/Painting**

On completion, any areas which were soldered should be washed using a soft brush and methylated spirits to remove all traces of flux; if this not done the paint will not adhere properly to these areas. Alternatively an excellent pressure pack flux remover is available from Dick Smith stores. Then wash the complete model thoroughly in warm soapy water. Rinse with clean water and allow to dry thoroughly before applying a suitable self-etch primer.

### **Spare Parts**

Spare parts are available on a replacement basis. Should any part be missing or damaged contact AR Kits for a replacement. Should you have any problems with the Mashima motor please do not attempt to repair it yourself - return the motor to us. Mashima will not replace motors which have been tampered with. Also, please take particular care when fitting the worm gear to the motor shaft. Do not use force, and do not allow glue or Loctite to come into contact with the motor bearings.

Should you have any queries or problems with construction please drop us a note and we will do our best to advise. Likewise we would be pleased to hear any suggestions you may have for improving the kits or instructions.

### **General**

The following drill sizes are required: 0.4mm, 0.5mm, 0.6mm, 0.8mm, 0.9mm, 1.0mm, 1.1mm, 1.2mm, 1.3mm, 1.5mm, 1.6mm, 1.8mm, 1.9mm, 2.0mm, 2.1mm, 3.0mm, 3.7mm.

During construction refer to the drawings at all times. A number of parts are quite similar, so double check if in doubt. Note that attached to the instructions is a photocopy of the lost wax brass castings sprues with each part numbered for easy identification. In the general instructions, part numbers are shown in brackets. On some drawings, for example Drawing 6, the number 8 shown in the circle (bottom centre of page) indicates that the part or assembly links to another shown on Drawing 8.

The instructions sometimes refer to the right hand (R/H) and left hand (L/H) side. This is taken as viewing the model from above and looking forward.

To minimise the risk of losing parts, do not remove them from the etched fret or the plastic packing until you are ready to use them. We recommend that you start construction with the tender.

### **Safety First.**

These models are not toys and are not suitable for young children. White metal castings contain lead and modellers are advised to wash their hands after working with unpainted white metal castings. When using superglue, solder or when spray painting ensure your work area is well ventilated

### **Tender Drawings T1 and T2 (Parts 1 - 46)**

The tender is mainly comprised of etched brass, much of which requires folding to shape. It is important to remove and clean up all holding tabs on the etched parts before they are folded to shape. On small pieces, use a pair of flat nosed pliers (non serrated jaws) to hold the part while filing the tabs flush.

Take the tender body (1) and fold the back up to fit between the sides. Adjust one rear corner so that it is square with no overlaps, and solder from the inside taking care not to get excess solder through the joint onto the external rivet detail. Repeat for the other corner. At the front make up the angled bulkheads. Fold at the first etched line to form a 90° corner, then fold the "flap" down to form the angled section of the bulkhead, and solder the resulting joint. Now fold at the second etched line to form the bulkhead. Make sure these front corners fold sharply, they tend to "round off" due to the adjacent half etch relief where the toolbox doors fit. Next fold the front of the floor down as shown.

Add the side gusset strips (8xpair) underneath the tender. When removing the holding tabs from these, be careful not to remove the straps which support the pipe work at the front - there are two straps on the R/H side and three on the L/H side. Fix the gusset strips in position, locating the tabs through the tender floor and folding them over. Check that the gusset is square with the tender floor and solder the folded tabs in place.

Take the tender sub-floor (6) and fold the sides down as shown. Place the sub-floor in position, locating the tabs either side into the tender floor, and solder in place. Fix the tender footplate (16) to the top of the sub-floor. Fold up the edge of the tender step treads (5x4) and fix to the folded down section of the sub-floor. Fold up the edges of the two bulkhead step treads (2x2) and fix in place. Fix the handbrake bracket (3) to the R/H bulkhead. Using a 21mm length of 0.5mm wire and the handbrake wheel (17), make up the handbrake assembly, passing the wire through the handbrake bracket and the tender floor. Using 0.4mm wire, make up the two front handrails and fix in place. Locate the bogie bolsters (24x2) in the holes in the tender floor and fix in place, then fix in place the brake cylinder (22) followed by the air tank (25).

At the rear, fold up the tender buffer beam (26) as shown. Fix the four lamp brackets (30x5) in place before folding the coupler base over. Locate the folded tabs of the completed assembly into the tender floor and solder in place. Solder inside the corners where the side gussets meet the buffer beam. If necessary, use a small file to clean up the outside edge of these corners. Remove the two rear buffer bases (27x2) from the etch, fold and fix in place. Working from inside the tender, solder in place the rear grab handle (0.4mm wire) and the rear marker lamps (32x2), followed by the top lamp bracket (30x5).

Fold the drawbar pin bracket (7) as shown and solder it to the underside of the tender floor. Screw the threaded drawbar pin (9) in place.

Remove the tender front bulkhead (4) from the fret, cut out the detailing pieces from the coal door opening, and clean up any remaining tabs. Fix the mechanical stoker detail (11) into the hole in the tender front plate (from behind) and fix the tender front plate into the tender body. Take the coal doors (10) and using 0.4mm wire make up and fit the two grab handles before folding the doors inwards as shown to the same angle as the cut-out in the tender top. Fold back the four side tabs on the doors and fit them through the slots in the tender front plate and fix in place.

Take the tender top (13) and check that it fits into the tender body - remove for later fitting. Take the turret back/sides (14) and fold the etch as shown to form the back and sides, locate bottom tabs into the slots in the tender top and fix in place. Add a length of 0.5mm wire to the L/H side of the tender top to protrude 3.5mm above tender top. Fix in place the turret partition (15), followed by water filler (21), small toolbox (33) and large toolbox (34). Fix in place the toolbox doors (20xpair).

Remove any flash from the tender top supports (12x2) and test fit them inside the tender body, ensuring that the cut outs along the bottom edge of the supports clear the tender gusset tabs previously soldered in place.

Check carefully that the supports rest fully on the tender floor, and are an equal (and even) distance down from the top of the tender sides. With the supports correctly located inside the tender, align one edge of the tender top against the top of the tender side and use a pencil to mark where the underside of the tender top will meet the top of the support - repeat for the other side. Now remove the supports and solder them to the underside of the tender top, flush with the outside edge - make sure they are aligned with your pencil marks. Test fit the assembly into the tender before applying glue to the supports and fixing the completed assembly in place. Note: Superglue will probably not allow you enough time to align things, therefore contact cement is recommended. Hold the tender sides in while the contact cement sets.

Fold the steps (18xpair) and fix to the front of the tender before folding and adding the step treads (19x2). Remove the tender ladder (31) from the etch and fold to shape as shown. Locate the end of the ladder into the top of the tender. then locate the four "legs" into the tender rear, before soldering the bottom ladder tabs into the buffer beam. Now add brake hose (29) to the buffer beam, followed by the buffers (28x2). Using 0.7mm wire make up the two water pipes as shown and add to either of the gusset strips.

Add the fire iron bracket (36) to the L/H front of the turret followed by the fire irons (35x2). Now add the medium hand rail knobs (37x14) to the top of the turret ensuring that the cross holes are correctly aligned (this is best done by threading the knobs onto a piece of 0.4mm wire before fixing in place). Next add medium hand rail knobs (23x2) to the front bulkhead before adding hand rail (0.4mm wire). Fix in place the builders plates (A) (smaller plates) - check a photo or plan for the exact location.

Fix the turned brass side frame mounts (40x4) into the bogie side frames (38x4). For good electrical pickup low melt solder is recommended here. The bogie stretchers (43x2) are on the etched nickel silver value gear fret -remove them and check that the holes either side fit over the brass side frame mounts (40x4), you may need to enlarge the holes slightly, then fold the stretchers as per Drawing 2.

Push the brass wheel bearings (39x8) into the bogie side frames using a low melt solder if necessary, and attach the side frames to the stretcher with spacer screws (41x4) and washers (42x4). Tighten the screws and gently ease the side frames apart to fit the wheel sets (44x4) in place, making sure the insulated wheels are on the same side for each bogie - see Drawing 2. Using the bogie mounting screws (45x2) and the washers (46x2) attach the assembled bogies to the tender.

#### **Chassis Drawings 4 and 5 (Parts 130 - 221)**

Remove the frames (130) and (131) from the fret and cleanup any holding tabs. Clean out the bearing holes with a 3.7mm drill bit. Push the axle bushes (132x8) in from the outside face of the frames (the  $\frac{1}{2}$  etch folding line at the rear is on the **outside** of the frame). Place each frame on a flat piece of scrap timber to hold the bearings in place (outside face of the frame down) and run solder around the edge of the bearings to secure them in the frames.

Using the spacer screws (134x4), fix the two turned brass chassis spacers (133x2) to the inside of one frame. Align the cross hole in each spacer vertically before attaching the other side frame. Position the front spacer plate (136) (from the chassis etch) as shown, then position the rear spacer plate (135) in position. Fold the rear of each side frame outwards 90°. Remove the motor mounting bracket (139) from the chassis etch and fold the end upwards to 90°, then fold the two side tabs down 90°. Test fit the motor mount in the chassis as shown - to achieve a neat fit you may need to file off the lip caused when the holes in the side tabs were threaded. Fix the motor mount in place using spacer screws (145x2). Trim M2 screw (143) to a length of 11mm before fitting to the rear chassis spacer (135) with nut (144). Fit M2 screw (216) to the front spacer plate (136) using nut (217).

Temporarily fit the axles and wheels to the front and rear axle holes and place the chassis on a section of level track to check that the chassis sits properly on the track. If necessary, loosen the spacer screws and adjust, then remove the wheels and axles and solder the front and rear spacer plates (136 and 135) in position.

#### **Brake gear.**

Trim four pieces of 0.7mm wire to a length of 25mm, pass these through the holes in the top of the mainframes and solder in place. Clean out the holes (top and bottom) in the brakes (170x6) and brake detail plates (171x6) to accept 0.7mm wire before removing them from the fret.

Turn the chassis on its side and place the strip of timber supplied over the axle bushes and slip the brakes (170x6) and the rear brakes (168xpair) onto the 0.7mm wire - the timber ensures they are correct distance off the frame. Align the brakes vertically and solder in place. Cut another four

25mm lengths of 0.7mm wire and pass through the holes in the bottom of the brake shoes, at the same time adding the brake roding (172x2) which sits against the inside edge of the frame. Now add the brake detail plates (171x6) and the rear brake shoes (169x2). Snip off the 0.7mm wire flush with the outside of the brakes - at the rear the wire must be trimmed off flush with the inside of the brake roding to allow later fitting of the rear bogie.

### **Driving wheels and side rods.**

Fit the driving wheels (158x4 and 162x4) (insulated wheels on the L/H side -see drawing), axles (159x4) and axles washers (160x8) to the chassis with axle nuts (161x8), placing the axle gear (137) (from the gearbox packet) on the third axle from the front as shown on Drawing 6. If necessary, clean out the hole in the axle gear with a 1/8" reamer or 1/8" drill bit. Move the gear to one side of the axle, place a small spot of superglue or Loctite 601 on the centre of the axle and push the gear into the centre of the axle. Make sure that the gear is "square" with the axle. Be careful not to get any glue or Loctite in the axle bushes.

The wheels are quartered so that the crankpin on the right hand wheel leads that of the left hand wheel by 90 degrees when the axle rotates forward. Make sure that all axles rotate freely in the axle bushes. Use a Romford axle nut driver to tighten the axle nuts. Remove the etched counterweights (165x4), (166x2) and (167x2) from the fret and glue to the wheels as shown. Using a Romford axle nut driver, fit the crankpins (164x8). Fit the coupling rods (173xpair), (174xpair) and (175xpair) followed crankpin fixers (176x8) - note: for easy removal of the coupling rods during testing, painting etc, strip a short length of insulation from some fine electrical wire and push this "tubing" onto the crankpins as a temporary retainer.

The crankpin fixers (176x8) and axle covers (163x8) should not be permanently fitted until the chassis has been completed and painted. Check that the rods revolve freely; should binding occur, locate where this is happening and gently ease out the offending hole in the coupling rod with a rat-tail file, removing the minimum amount to achieve free movement. Sometimes swapping the coupling rods around (ie left to right) can overcome binding.

### **Cylinders.**

Take the cylinder block (177) and drill as shown to accept the spigots on the four crosshead guides and covers. At this stage it is also best to drill all holes as shown in the front footplate (187), before fixing the front footplate to the cylinder block (177). Fix the rear valve crossheads guides (180x2) and drill through 0.9mm to later accept the radius rod assembly (204xpair). Fit valve crosshead guides (185x2) - remove from the etch and fold as shown. Fit the front valve covers (181x2). Now add the front cylinder covers (178x2) and rear cylinder covers (179x2). Drill the dimples on the rear of the cylinder block 0.9mm to a depth of around 2mm for later fitting of the slide bars. Fix in place rear cylinder cover (centre) (182), and add cylinder drain cocks (183x2) followed by drain cock cowlings (184x2). Now fit the completed cylinder block to the chassis using screws (186x2). Now add the front footplate (187) to the chassis followed by front footplate cowling (188). Drill the dimples either side of the cowling 0.4mm for later fitting of the two small crab handles.

### **Motion bracket.**

Fold the motion bracket (195) as shown and add motion bracket backing plates (196xpair) and motion bracket facing plates (197xpair). Do **not** fix to the chassis yet.

### **Valve gear.**

Note that asterisks (\*) are used to show the relationship between parts in different areas of the drawing.

Take one radius rod assembly (204xpair) and trim the front rod to a length of 10mm as shown. Now pass the rear end of the radius rod assembly through the small hole in the front of the motion bracket (195) so that it locates in between the motion bracket backing plate (196) and the motion bracket facing plate (197). This is a tricky job, have patience, it does fit. Repeat for the other side. Correctly position the rear end of radius rod assemblies (204xpair) in the motion bracket (195) and add the expansion link assemblies (207xpair) before retaining these with 14BA screw (206x2) and nut (208x2). At the rear, the radius rod assembly is pinned to the motion bracket with 0.7mm wire. Fit the completed motion bracket (194) to the chassis at the same time locating the front of the radius rod assemblies (204xpair) into the valve crosshead guides (185x2).

Take the crossheads (200xpair) and trim to 16mm as shown. Remove the slidebars (199xpair) from the etched fret, fold as per inset drawing and locate the crosshead (200) into the slide bars. Check that the slide bars move freely. Place the front pin of the slide bars into the rear of the cylinder and fix the tabs on top of the slide bar to the motion bracket (195) -note that they fit against the inside edge of the motion bracket backing plates (196). Trim the vertical leg on each slide bar facing plate (201xpair) as shown before fixing these to the slide bars, taking care not to get solder or glue inside the slide bars.

Using 14BA screws (202x2) and nuts (205x2) fix the connecting rods (203xpair) and the small arm of the radius rod assembly to the crosshead (200pair) - do not over tighten the screw, these parts must move freely. Place the other end of the connecting rod (203xpair) onto the crankpin of the second driving wheel followed by the spacing washers (209x2) on the crankpin of the third driving wheel. Position central coupling rods (210x2) and crankpin fixers (211x4) in place then add the eccentric arm of the expansion link assembly (207xpair). As previously advised this can be kept in place temporarily with small diameter tubing. The setting of the correct angle of the eccentric arm (as per Drawing 8) should be left until the model has been completed.

Fit dummy crosshead and slide bar (198) between rear cylinder cover (centre) (182) and motion bracket (195). Drill the front brake cylinders (155x2) 0.5mm and locate the spigot on the brake roding (172x2) into the cylinder before fixing it to the recess in the chassis. Fix saddle plate (218) to the top of the cylinder block.

Solder power clips (141) and (147) to the motor leads as shown. Mount the motor (140) to the motor mounting bracket (139) using screws (142x2) at the same time fixing the positive power lead. Now assemble and fit the drawbar using (146) through (154) as shown.

Add frame support plates (138x2) to the rear of the chassis followed by bogie support bracket (157), then add the mechanical stoker (156).

Assemble the gearbox (213) as per the accompanying instructions trimming the worm shaft as shown. Do not force the worm onto the shaft. Carefully ream the worm bore using a 2.0mm drill or hand reamer so that the worm fits the shaft without undue force. Use a spot of superglue of Loctite 601 to permanently fix in place. Clean the shaft of excess glue or Loctite thoroughly.

Trim the flexible tube (212) to length as shown and fit to the worm shaft of the gearbox - check that the ends of the worm shaft and motor shaft are free of sharp edges which could damage the tubing. Fit the tubing to the motor and fit the gearbox onto the axle gear. Fit the gearbox keeper plate (214) using screws (215x2). Oil the mechanism and apply power to test the chassis.

Complete detailing the front of the locomotive adding lamp irons (189x4), brake pipe (190), buffers (191x2), guard irons (192x2). Fold front steps (193x2) as shown and add front step treads (194x2) before fitting to the buffer beam.

### **Bogies Drawing 6 (Parts 222 - 231)**

Make up the rear pony truck using rear pony body (222), 12mm disc bogie wheel (223) and keeper plate (224). Attach the assembled bogie to the chassis using M2 nut (231). Add wheel inserts (228x4) to the 9mm disc bogie wheels (226x2). Make up the front bogie using front bogie body (225), bogie wheels (226x2) and keeper plates (227x2) - ensure that the insulated wheels are on the same side. Attach the assembled bogie to the chassis using spring (220), bogie bearing washers (221) and (229), and M2 nut (230), with the insulated wheels on the L/H side.

### **Locomotive Body Drawings 1, 2 and 3 (Parts 47 - 129)**

Remove the cab (47) from the etch and fold as per Drawing 3, folding also the small locating tabs at the bottom front of the cab. Take the window frames (50x2) and fix to the inside of the cab windows. Fix the mechanical stoker detail (49) to the rear spectacle plate (48) before fixing the spectacle plate to the cab. Take the boiler (51) and smokebox (53) and drill all holes as indicated in Drawings 3 and 4. Remove pump mounting plate (55) from the etch and fill in the top hole. Drill two 0.4mm holes in the top as shown for later fitting of a grab handle. Fold the pump mounting plate as per Drawing 3 and fix to the smokebox (53). Remove the saddle seating plate (54) from the etch, fold down one end as shown and fix to the underside of the smokebox (53). Now fix the smokebox (53) to the boiler (51) ensuring that they are correctly aligned. Fix the ash pans (67xpair) either side of the firebox. Fit the assembled cab to the rear of the boiler and fix in place.

Fix the air tank (102) to the L/H side of the boiler. Fix firebox supports (61x2) either side of the firebox, and fix centre support (62) to the R/H side of the boiler. Fix leading support (63x2) either side of the boiler.

Remove the footplates (64xpair) from the fret, note the L/H side has a large cutout to clear the air tank (102). Take the valances (66xpair) and solder them to the underside of the footplates (64xpair). Note that the valances (66xpair) have a half etched line at the front (inside) - fold this slightly to match contour of the front footplate cowling (188). **Do not attach the valances to the front footplate cowling or you will not be able to separate the locomotive body and chassis.**

Locate the tab on the rear of the footplate into the slot in the cab front and position the front of the footplate under the blast pipe spigot either side of the smokebox (53). Check the alignment before fixing in place. Add footplate access panels (86x2) to the top of the footplates. On the R/H side footplate add air tank (84) as shown on Drawing 3 (57mm from the cab). Fix the cab valance plates (65xpair) at the rear of the footplates. Test fit the locomotive body onto the chassis and check that it is a good fit.

Fix the short handrail knobs (94x6) to the front of the cab followed by junction box (68). Using 0.4mm wire, make up and fit handrails to the cab front. Commence detailing the boiler/firebox, fitting chimney (59), adding three 0.4mm handrails to the sandbox as shown, steam dome (58) safety valves (57), steam turret (56), R/H turret valve (85), and L/H turret valve (113), steam generator (69), boiler safety valve (70), clack valves (71) and (101), and whistle (81).

Fit the smokebox door (60) to the smokebox and drill all required holes in the smoke box door. Fit headlight (72) and smoke box door handle (73). Fold step treads (74x2) and fix in place. Fit the air pump (77), and the air pump filter (75). Fit front marker lights (78x2) and short handrail knobs (93x2). Short handrail knob (92) is best fitted later with the handrail wire - place it on the handrail wire before shaping the wire to suit the smokebox front.

At this stage it is recommended that the heavier pipe work (0.7mm wire) be fitted before the remainder of the small detailing parts.

### **Pipe work/handrails.**

Using double pipe brackets (95x3) fit the 0.7mm wire as shown on the R/H side of the locomotive adding pipe fitting (127) and R/H injector (126). Using pipe brackets (123x4) fit the 0.7mm wire as shown the L/H side of the locomotive adding L/H injector (128). Fit R/H blow-off cock (82) and L/H blow-off cock (112) to the ash pan and add 0.5mm wire as shown.

Continue detailing, fixing in place water release valves (76), (79), (104) and (105), adding 0.4mm wire as shown. Also add pump governor (125). Fix mechanical lubricator (106) and steam reverser (110) adding 0.5mm wire as shown. Take the reversing rod (111) and place the end into the steam reverser (110) and locate the vertical bracket into the slot in the footplate. Mark where the end section meets the footplate and drill a 0.5mm hole as shown to fix the reversing rod (111) in place.

Because the main locomotive hand rail is too long to be formed from a single length of wire, we recommend you make up and fit R/H and L/H sides, then form another length for the smokebox front/sides, joining the wire at a suitable point, eg medium hand rail knobs 91 and 118.

On the R/H side of the locomotive, add 0.4mm handrail using medium length handrail brackets (87x3), short length handrail brackets (88x2), medium length handrail bracket (89), long length handrail bracket (90), medium handrail knobs (91x2). Fold and fit boiler steps (80x2). Fit two cab steps (83x4).

On the L/H side of the locomotive add 0.4mm handrail using medium length handrail brackets (122x3), short length handrail brackets (121x2), medium length handrail bracket (120), long length handrail bracket (119), medium handrail knobs (118x2). Fix in place regulator detail ring (107), regulator lever (108), regulator rod bracket (114), medium rod bracket (115), short rod bracket (116) and medium rod bracket (117). Fold and fit boiler steps (109x2).

Complete the addition of handrails, adding 0.4mm wire to the handrail knobs previously fixed to the front of the smokebox. Using 0.4mm wire, make up and fit a grab handle to either side of the front footplate cowling (118). Also using 0.4mm wire fold and fix handrails to the back of the cab.

### Cab Detail Drawing 2.

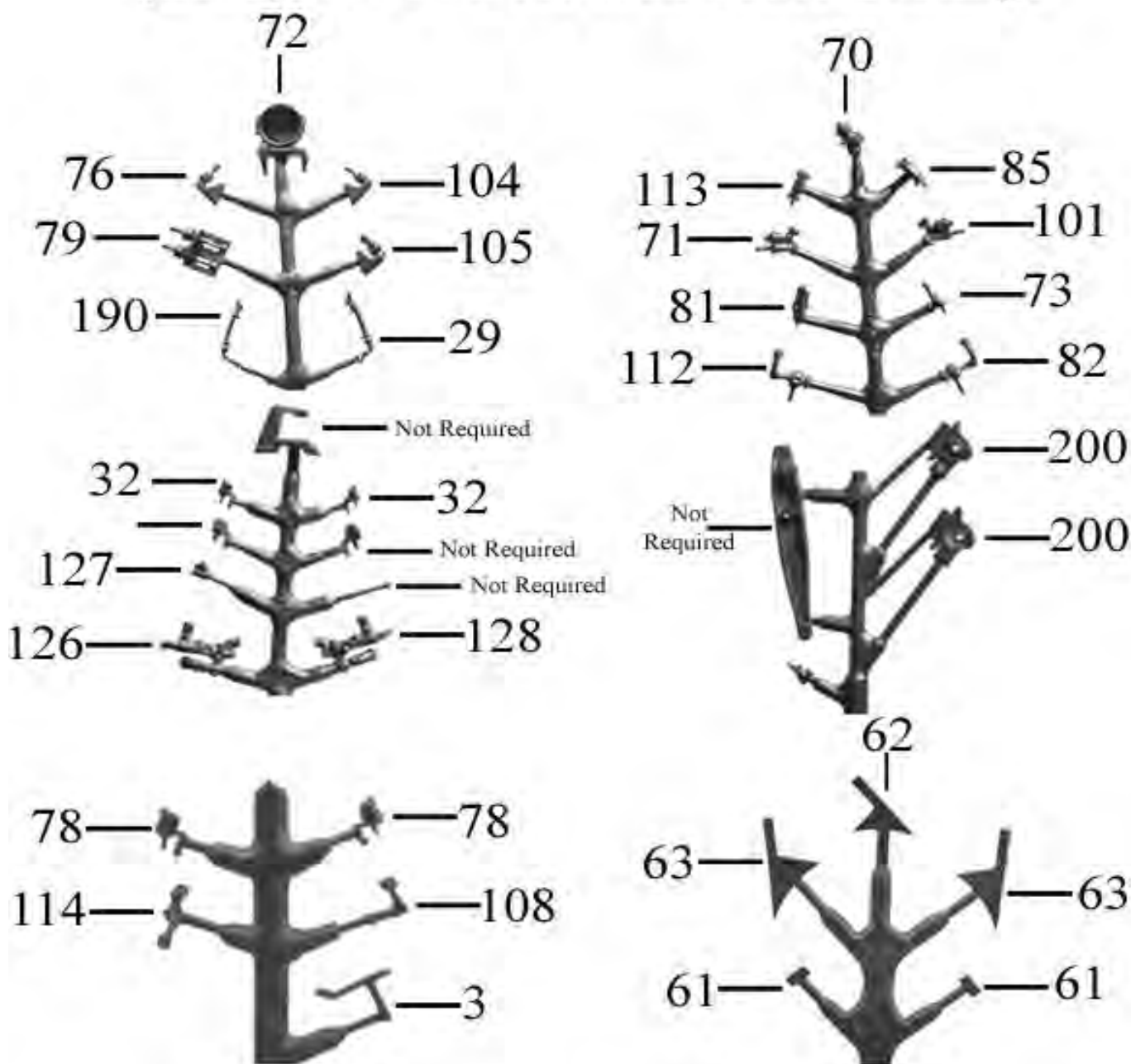
Add cab floor (98) to the cab. Take the fall plate (96) and fold the tabs down 90°, then glue the plasticard (97) to the underside trimming so that it overlaps the three outside faces by 0.5mm to prevent it shorting out against the tender. Attach to the cab floor (98) using 0.7mm wire as shown. Add cab detail (99) and cab seats (100x2). Add builders plates (B) (larger plates) to the cab sides, checking a photograph or plan for exact location. Some modellers may prefer to fit the cab roof (52) after final painting.

Fit the locomotive body to the chassis using spacer screws (124x2) at the rear and M2 screw (219) at the front.

Lightly oil the mechanism and test run, checking for possible electrical "shorts" on sharp curves. Also check that the motor does not overheat due to chassis binding.

3 Feb  
2010

## (E193) - D58 - Lost Wax Brass Castings





## (E193) - D58 - PARTS LIST

### Drawing T1

1.	Tender Body	E	50.	Window Frames x 2	E
2.	Bulkhead Step Treads x 2	E	51.	Boiler	W/M
3.	Hand Brake Bracket	L/W	52.	Cab Roof	W/M
4.	Front Bulkhead	E	53.	Smokebox	W/M
5.	Floor Step Treads x 4	E	54.	Saddle Seating Plate	E
6.	Tender Sub-Floor	E	55.	Pump Mounting Plate	E
7.	Drawbar Pin Bracket	E	56.	Steam Turret Cover	W/M
8.	Gusset Strips x 1 Pair	E	57.	Safety Valves	W/M
9.	Drawbar Pin	T	58.	Steam Dome	W/M
10.	Coal Doors	E	59.	Chimney	W/M
11.	Mechanical Stoker Detail	E	60.	Smokebox Door	W/M
12.	Tender Top Supports x 2	W/M	61.	Firebox Supports x 2	L/W
13.	Tender Top	E	62.	Centre Support	L/W
14.	Turret Back and Sides	E	63.	Leading Supports x 2	L/W
15.	Turret Partition	E	64.	Footplates x 1 Pair	E
16.	Footplate	E	65.	Rear Valance Plates x 1 Pair	E
17.	Handbrake wheel	E	66.	Valance Plates x 1 Pair	E
18.	Steps x 1 Pair	E	67.	Ash Pans x 1 Pair	W/M
19.	Step Treads x 2	E	68.	Junction Box	W/M
20.	Toolbox Doors x 1 Pair	E	69.	Steam Generator	W/M
21.	Water Filler	W/M	70.	Boiler Safety Valve	L/W
22.	Brake Cylinder	W/M	71.	Clack Valve	L/W
23.	Medium Handrail Knobs x 2	T	72.	Headlight	L/W
	0.4mm - Wire		73.	Smokebox Door Handle	L/W
	0.5mm - Wire		74.	Step Treads x 2	E
	0.7mm - Wire		75.	Air Pump Filter	W/M

### Drawing T2

24.	Bogie Bolsters x 2	T	76.	Water Release Valve	L/W
25.	Air Tank	W/M	77.	Air Pump	W/M
26.	Buffer Beam	E	78.	Marker Lights x 2	L/W
27.	Buffer Bases x 2	E	79.	Water Release Valve	L/W
28.	Buffers x 2	W/M	80.	Boiler Steps x 2	E
29.	Brake Hose	L/W	81.	Whistle	L/W
30.	Lamp Brackets x 5	E	82.	R/H Blow Off Cock	L/W
31.	Ladder	E	83.	Cab Steps x 4	E
32.	Marker Lamps x 2	L/W	84.	Air Tank	W/M
33.	Small Toolbox	W/M	85.	R/H Turret Valve	L/W
34.	Large Toolbox	W/M	86.	Footplate Access Panels x 2	E
35.	Fire Irons x 2	E	87.	Medium Length Handrail Brackets x 3	E
36.	Fire Iron Bracket	E	88.	Short Length Handrail Brackets x 2	E
37.	Medium Handrail Knobs x 14	T	89.	Medium Length Handrail Bracket	E
38.	Bogie Side Frames x 4	W/M	90.	Long Length Handrail Bracket	E
39.	Wheel Bearings x 8	T	91.	Medium Handrail Knob	T
40.	Bogie Sideframe Mounts x 4	T	92.	Short Handrail Knob	T
41.	Spacer Screws x 4	T	93.	Short Handrail Knobs x 2	T
42.	Washers x 4	E	94.	Short Handrail Knobs x 6	T
43.	Bogie Stretchers x 2	E	95.	Double Pipe Brackets x 3	E
44.	10.5mm Bogie Wheels x 4	T		0.4mm - Wire	
45.	Bogie Mounting Screws x 2	T			
46.	Bogie Mounting Washers x 2	E			
	0.4mm - Wire				
	0.5mm - Wire				
	0.7mm - Wire				

### Drawing 1

47.	Cab	E
48.	Rear Spectacle Plate	E
49.	Mechanical Stoker Detail	E

### Drawing 2

96.	Fall Plate	E
97.	Plasticard	P
98.	Cab Floor	E
99.	Cab Detail	W/M
100.	Cab Seats x 2	W/M
101.	Clack Valve	L/W
102.	Air Tank	W/M
103.	NA	
104.	Water Release Valve	L/W
105.	Water Release Valve	L/W
106.	Mechanical Lubricator	W/M
107.	Regulator Detail Ring	E
108.	Regulator Lever	L/W
109.	Boiler Steps x 2	E
110.	Steam Reverser	W/M



111.	Reversing Rod and Lever	E
112.	L/H Blow Off Cock	L/W
113.	L/H Turret Valve	L/W
114.	Regulator Rodding Bracket	L/W
115.	Medium Rodding Bracket	E
116.	Short Rodding Bracket	E
117.	Medium Rodding Bracket	E
118.	Medium Handrail Knob x 2	T
119.	Long Length Handrail Bracket	E
120.	Medium Length Handrail Bracket	E
121.	Short Length Handrail Bracket x 2	E
122.	Medium Length Handrail Brackets x 3	E
123.	Pipe Brackets x 4	E
124.	Spacer Screws x 2	T

0.5mm - Wire

0.7mm - Wire

### Drawing 3

125.	Pump Governor	L/W
126.	R/H Injector	L/W
127.	Pipe Fitting	L/W
128.	L/H Injector	L/W
129.	Builders Plate Fret	E

0.4mm - Wire

0.5mm - Wire

0.7mm - Wire

### Drawing 4

130.	L/H Frame	E
131.	R/H Frame	E
132.	Axle Bushes x 8	T
133.	Chassis Spacers x 2	T
134.	Spacer Screws x 4	T
135.	Rear Spacer Plate	E
136.	Front Spacer Plate	E
137.	Axle Gear	T
138.	Frame Support Plates x 2	E
139.	Motor Mounting Bracket	E
140.	Motor	-
141.	Power Clip	E
142.	Motor Mounting Screws x 2	T
143.	M2 x 16mm C/H Screw	T
144.	M2 Nut	T
145.	Spacer Screws x 2	T
146.	M2 x 12mm C/S Screw	T
147.	Power Clip	E
148.	Insulated Washer	P
149.	Insulated Bush	P
150.	M2 Nut	T
151.	Spring Plate	E
152.	Tender Loco Arm	E
153.	Spring	-
154.	M2 Nut	T
155.	Front Brake Cylinders x 2	W/M
156.	Mechanical Stoker	W/M
157.	Bogie Support Bracket	W/M
158.	17.5mm Live Driving Wheels x 4	T
159.	Axles x 4	T
160.	Axle Washers x 8	E
161.	Axle Nuts x 8	T

162.	17.5mm Insulated Driving Wheels x 4	T
163.	Axle Covers x 8	E
164.	Crankpins x 8	T
165.	Small Counter Weights x 4	E
166.	Medium Counter Weights x 2	E
167.	Large Counter Weights x 2	E

0.7mm 0 Wire

Insulated Wire

### Drawing 5

168.	Rear Brakes x 1 Pair	E
169.	Rear Brake Shoes x 2	E
170.	Brakes x 6	E
171.	Brake Detail Plates x 6	E
172.	Brake Rodding	E
173.	Rear Coupling Rods x 1 Pair	E
174.	Leading Coupling Rods x 1 Pair	E
175.	Centre Coupling Rods x 1 Pair	E
176.	Crank Pin Fixers x 8	T
177.	Cylinder Block	W/M
178.	Front Cylinder Covers x 2	W/M
179.	Rear Cylinder Covers x 2	W/M
180.	Rear Valve Crosshead Guides x 2	W/M
181.	Front Valve Covers x 2	W/M
182.	Rear Cylinder Cover (centre)	W/M
183.	Cylinder Drain Cocks x 2	E
184.	Draincock Cowlings x 2	W/M
185.	Valve Crosshead Guides x 2	E
186.	12 BA x 3/16" C/H Screws x 2	T
187.	Front Footplate	W/M
188.	Front Footplate Cowling	W/M
189.	Lamp Brackets x 4	E
190.	Brake Hose	L/W
191.	Buffers x 2	W/M
192.	Guard Irons x 1 Pair	E
193.	Front Steps x 2	E
194.	Front Step Treads x 2	E
195.	Motion Bracket	E
196.	Motion Bracket Backing Plates x 1 Pair	E
197.	Motion Bracket Facing Plates x 1 Pair	E
198.	Dummy Crosshead and Slidebar	E
199.	Slidebars x 1 Pair	E
200.	Crossheads x 1 Pair	L/W
201.	Slidebar Facing Plates x 1 Pair	E
202.	14 BA x 1/8" C/H Screws x 2	T
203.	Connecting Rods x 1 Pair	E
204.	Radius Rod Assemblies x 1 Pair	E/T
205.	14 BA Nuts x 2	T
206.	14 BA x 1/8" C/H Screws x 2	T
207.	Expansion Link Assemblies x 1 Pair	E/T
208.	14 BA Nuts x 2	T
209.	Spacing Washers x 2	E
210.	Facing Centre Coupling Rods x 1 Pair	E
211.	Crankpin Fixers x 4	T
212.	Flexible Tube	P
213.	Gearbox	-
214.	Gearbox Keeper Plate	P
215.	Keeper Plate Fixing Screws x 2	T
216.	M2 x 12mm C/S Screw	T
217.	M2 Nut	T
218.	Saddle Plate	W/M
219.	M2 x 16mm C/H Screw	T
220.	Spring	-

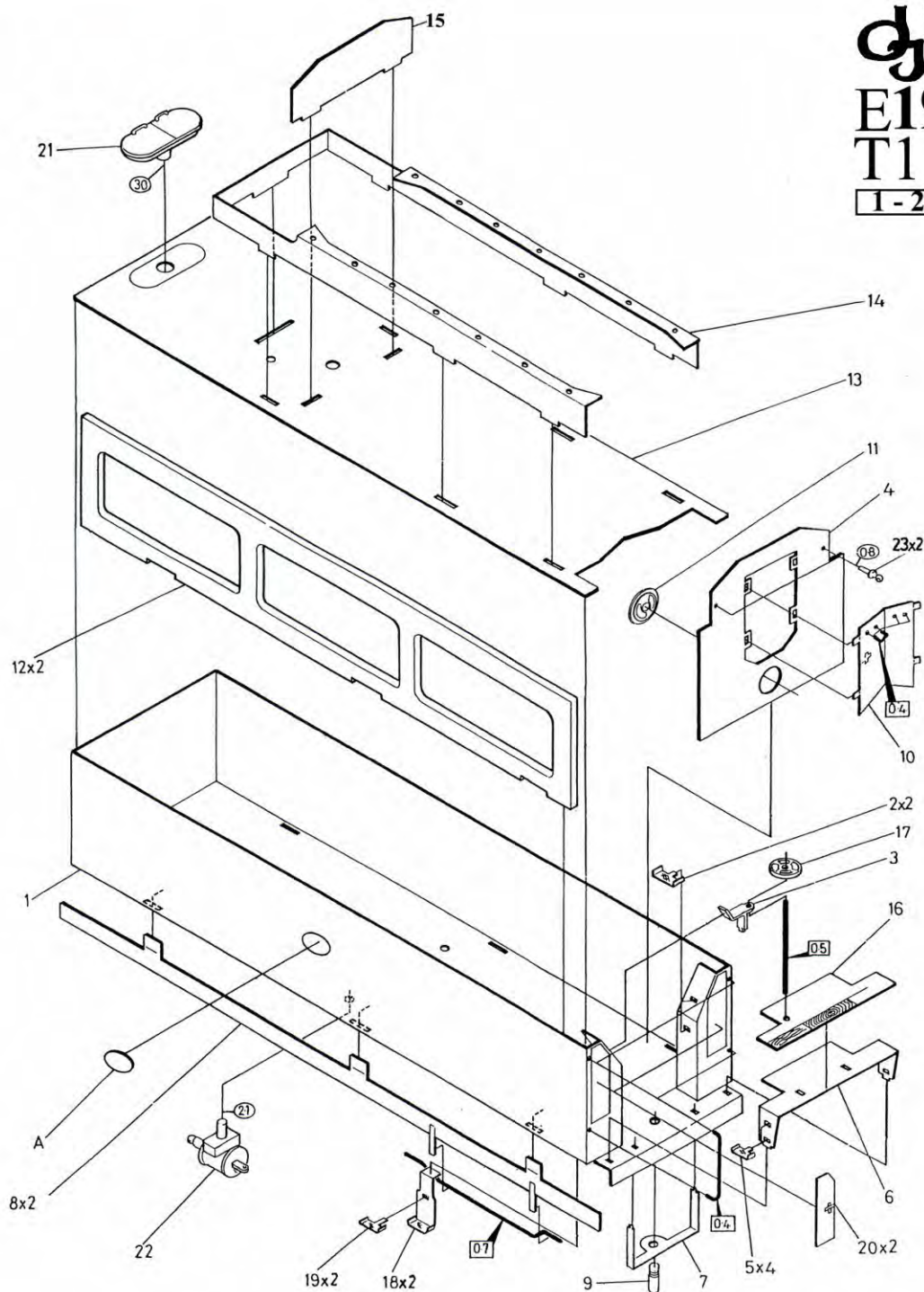


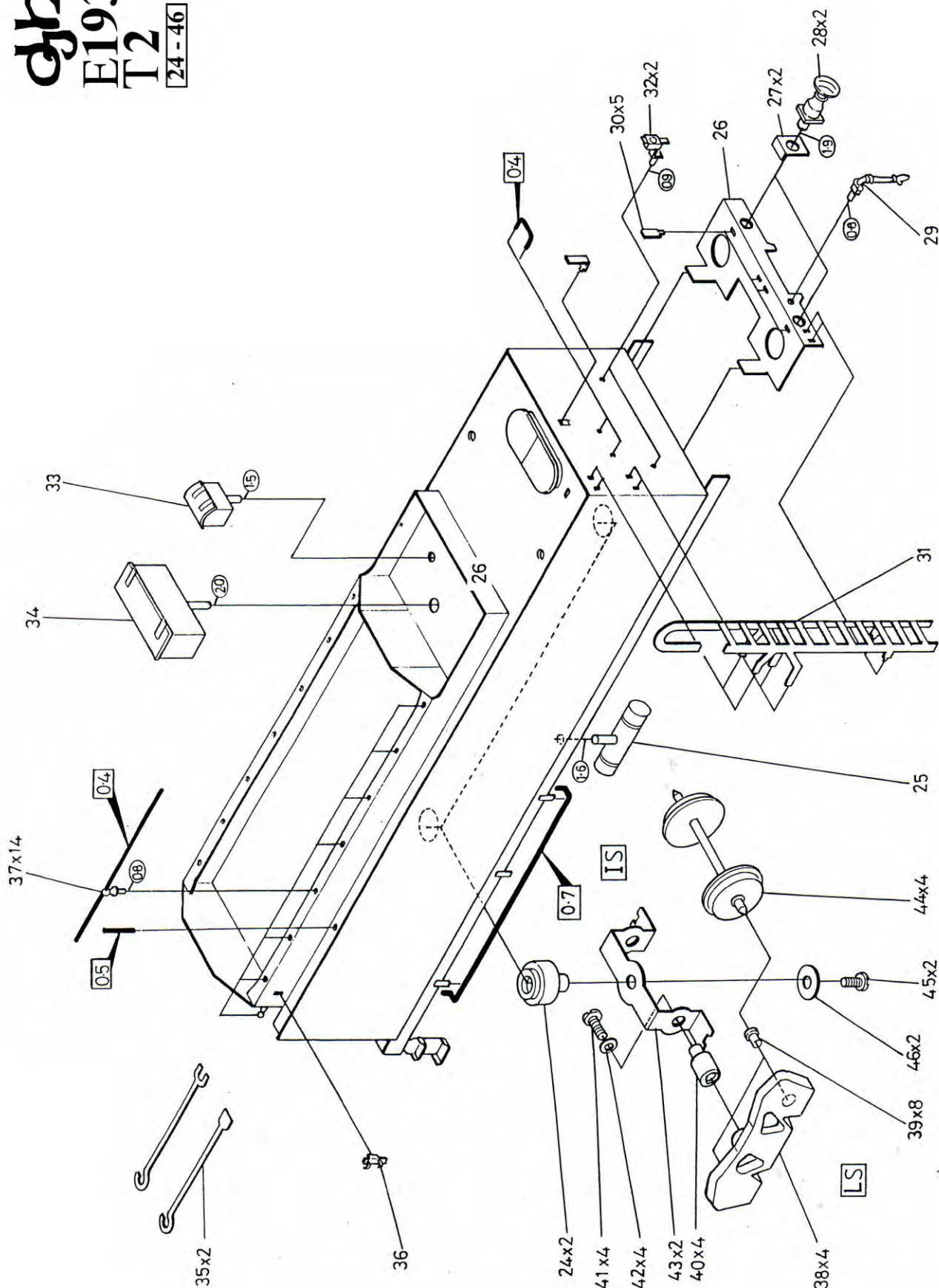
221.	Bogie Bearing Washer	E	228.	Wheel Inserts x 4	W/M
	0.5mm - Wire		229.	Bogie Bearing Washer	E
	0.7mm - Wire		230.	M2 Nut	T
			231.	M2 Nut	T

**Legend:**

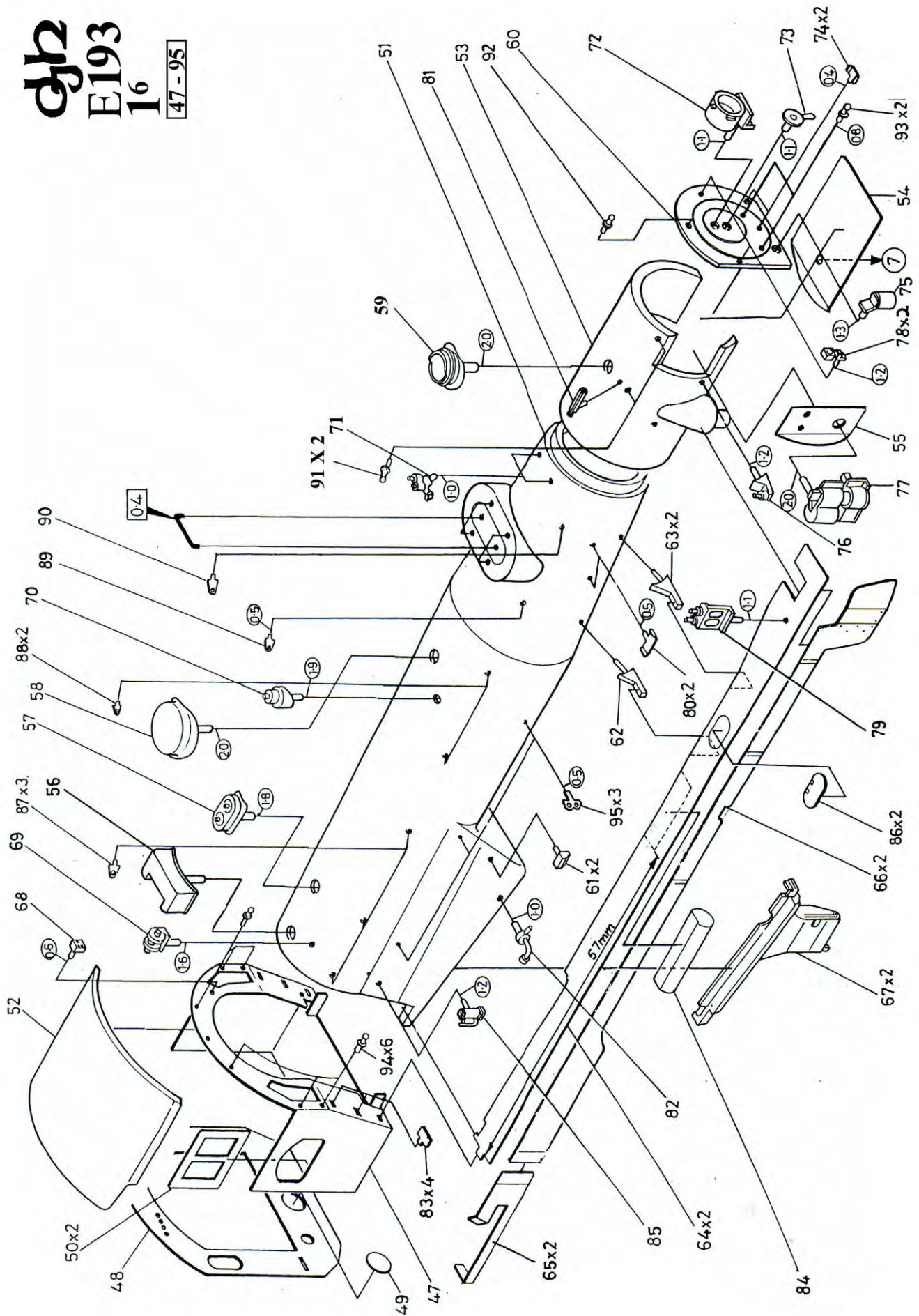
**Drawing 6**

222.	Rear Pony Truck	W/M	W/M - White metal
223.	12mm Disk Bogie Wheel	T	E - Etched brass
224.	Keeper Plate	W/M	L/W - Lost wax brass casting
225.	Front Bogie Body	W/M	T - Turning
226.	9mm Disk Bogie Wheels x 2	T	P - Plastic
227.	Keeper Plates x 2	W/M	

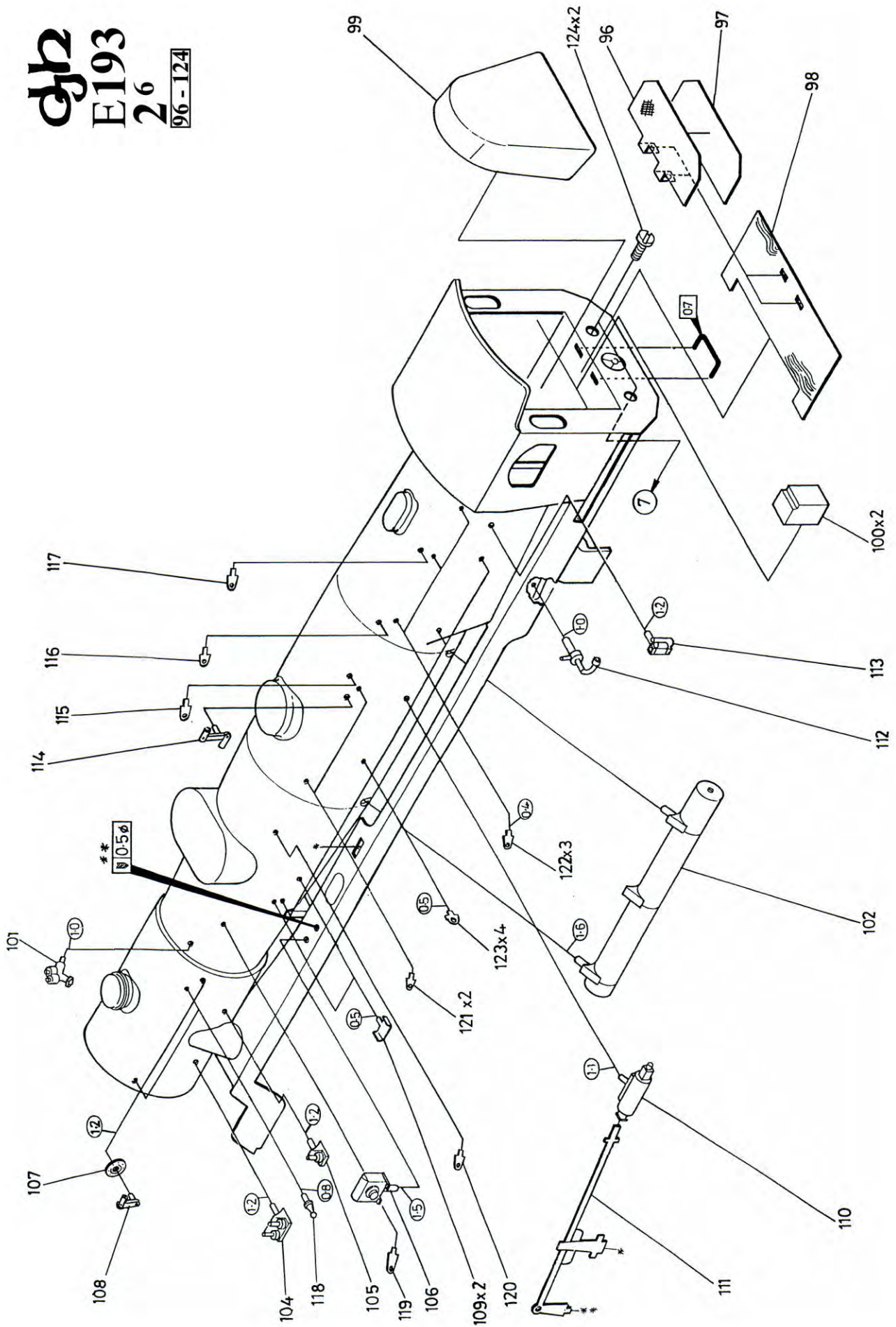




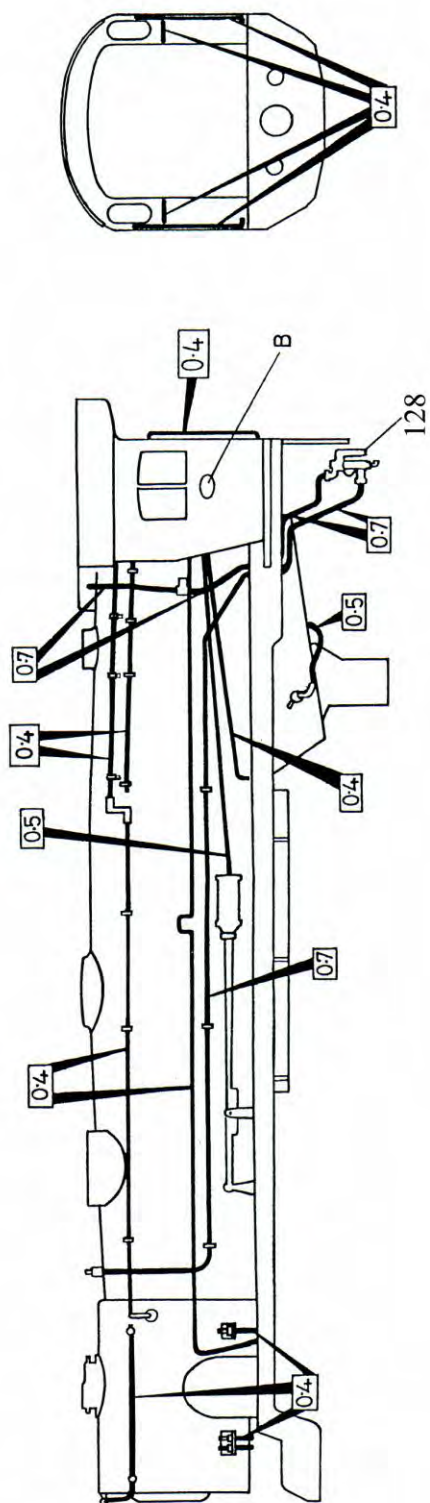
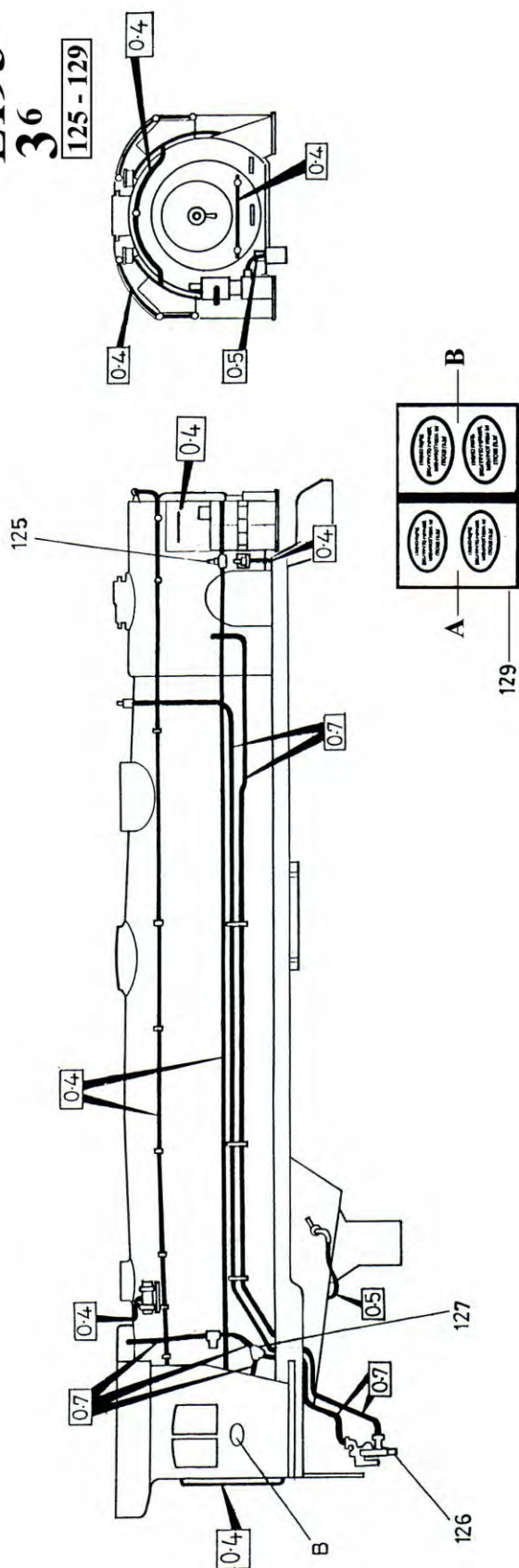




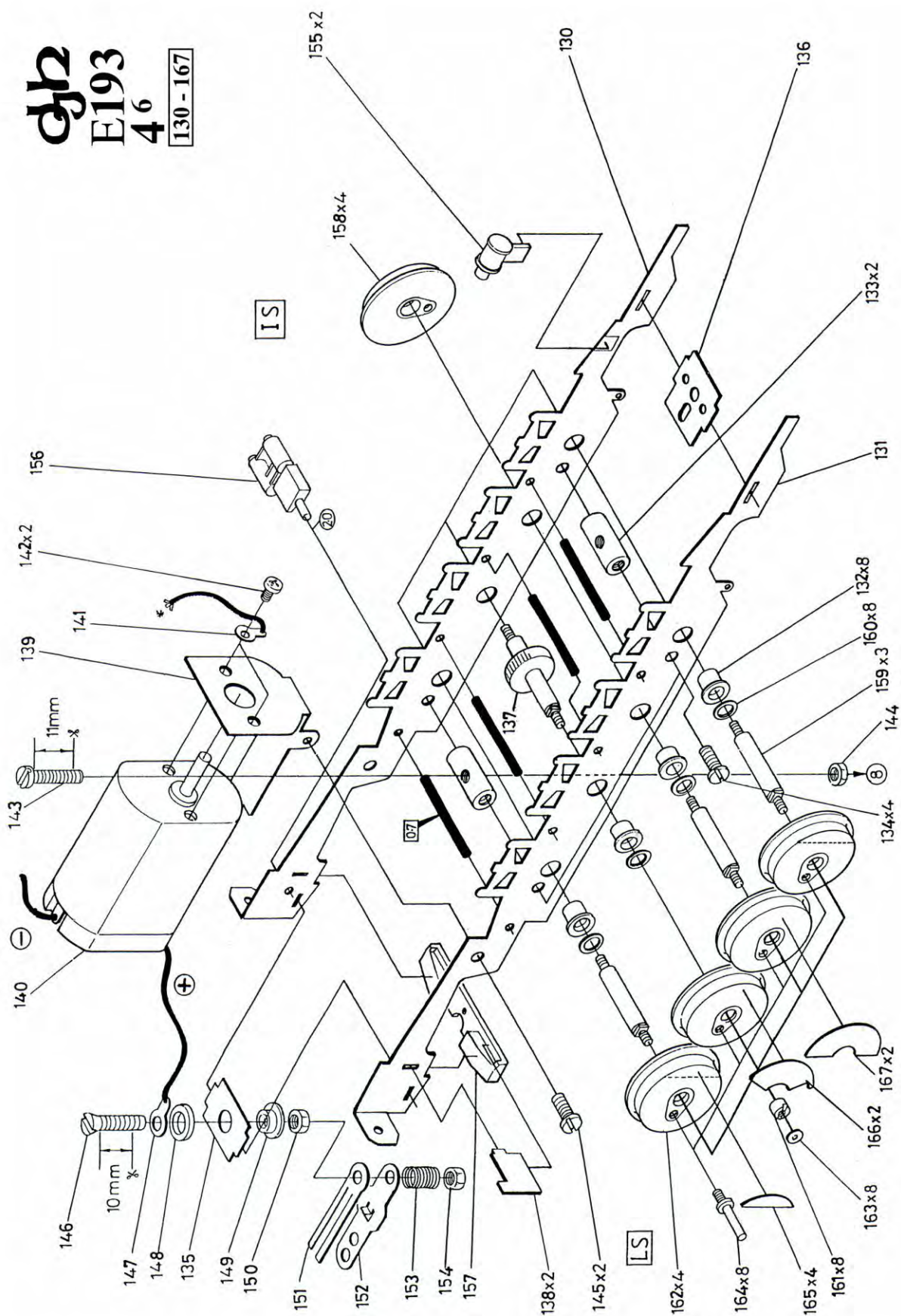
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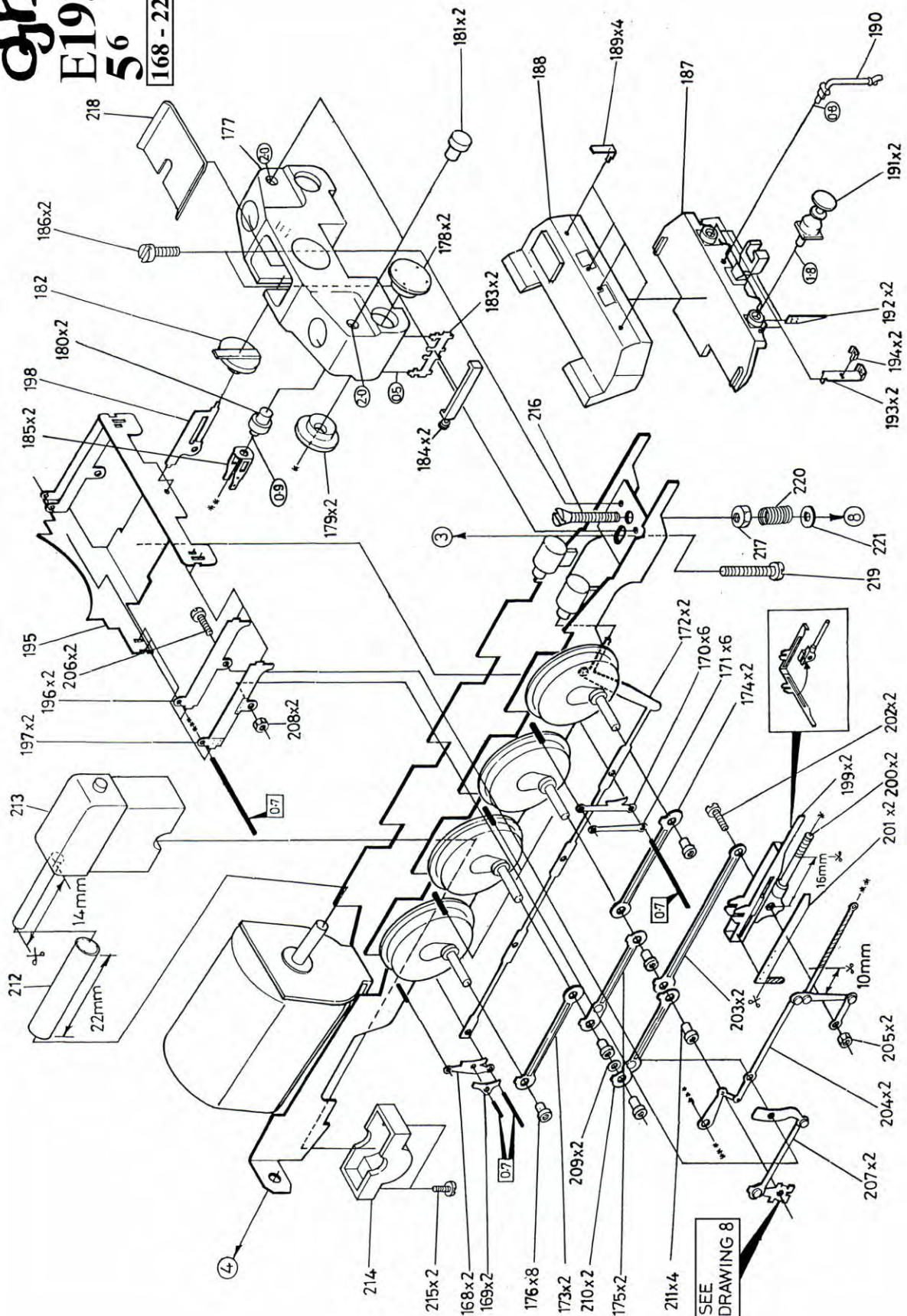


# **qb2** **E193** **4<sup>6</sup>** **130 - 167**





# **gjb** **E193** **5<sup>6</sup>** **168 - 221**



# **gh** **E193** **6<sup>6</sup>** **222 - 231**

