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NSWGR NN 4-6-0
Locomotive and Tender Kit

E196 Manufactured Exclusively for AR Kits by DJH Engineering from Patterns owned by AR Kits

PLEASE READ INSTRUCTIONS THOROUGHLY BEFORE COMMENCING ASSEMBLY

CONSTRUCTION

The NN (later C35) locomotives of the NSWGR had three distinct phases in their lifetime. Firstly, as originally built, secondly as the "intermediate" stage, and lastly as rebuilt with new cab and side valances. Within each of those phases there were some minor differences between locomotives. This kit has been designed to represent the locos as originally built, however sufficient optional parts are included to allow the building of the "intermediate" stage. The rebuilt C35 is available from Footplate Models as a separate kit.

Before commencing construction, it is important that you decide the particular locomotive and period you are modelling. As there does not appear to have been any real consistency in the way modifications were carried out to these locos, particularly in the "intermediate" stage, modellers are advised to refer to photos when building their chosen prototype. For example, if you are building the locomotive as it was used on the Caves Express, you will need to modify the cab sides and roof, drill additional holes for some detail, and fill some holes for detail items not used. Note that some locomotives were built with staff exchangers on the L/H cab side, however because not all modellers will want to fit the staff exchanger, we have left the cab side plain (it is a lot easier to make a small cut-out for the exchanger than to fill one in). After making a selection, modellers are advised to carefully read the instructions right through to ascertain exactly what parts (if any) need altering.

This kit contains sufficient optional parts to allow the building of the "intermediate" stage. Variations are shown on the drawings, therefore during assembly refer to the parts listing where alternative parts are marked *. Modellers are also advised to refer to the Datasheets plan of the NN, and the excellent article on these locomotives in the AMRM of June 1994 (Issue 186, Vol 16, No 9).

Based on information available at time of writing, our understanding of the two early phases of the NN locos is as follows:

ORIGINAL:

- No generator or electric lighting.
- No ladder or handrail post on the locomotive buffer beam.
- No hungry boards on top of the tender sides.
- Large dia. steam pipe mounted under the R/H running board.
- Optional smokebox doors - either plain or drumhead (with dog bolts).
- Optional speed recorder mounted under the cab on either R/H or L/H side.
- Optional large kerosene lamps sometimes mounted on the loco buffer beam and tender buffer beam.

INTERMEDIATE:

- Vertical handrails on front of the cab sides removed.
- Ladder and hand post fitted to the locomotive buffer beam.
- Oil boxes removed from side of the boiler.

- Clack valves relocated to front of the boiler.
- Piston tail rods and superheater relief valves removed from front of the cylinders.
- Superheater relief valve removed from the back of smokebox.
- Electric lighting fitted - generator; headlamp; and marker lamps fitted to the smokebox and rear of the tender.
- Hungry boards fitted to tender, with taller rear coal partition.
- Ladder fitted to rear of tender.
- Tap handle removed from cab sides.
- Optional - top front corner of cab sides cut back to remove flare - roof cut back accordingly.
- Optional long step mounted under air tanks (both sides).
- Optional smokebox doors - either with dog bolts or as per rebuilt C35.
- Optional large injector pipe mounted under R/H running board.
- Optional "town" whistle removed.
- Optional front safety valve removed.

Construction

It is important to ensure that all parts are clean, free of "flash" (excess metal on the 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 hard 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 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 spigot sizes of the fittings, because some holes will be difficult to drill after parts are assembled.

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, i.e. you must double check every step. Check that the axles turn freely in their bearings, check again with the coupling rods on, then again with the connecting rods on, etc, etc.

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 between 70 degrees and 200 degrees Celsuis. 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. Whichever 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 chassis by plastic bush 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. Alternatively an excellent pressure pack

flux remover is also available from Dick Smith stores. Then wash 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.

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, 0.7mm, 0.8mm, 0.9mm,l.Omm, l.lmm,1.2Smm,l.7mm, 2.Omm.

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 the part numbers are shown in brackets.

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`

Drawing 1 (Parts 1 - 40)

Note: For the ***intermediate stage*** only you will need to drill the tender back (2) to accept the ladder (22), junction box (23) and electric lamps (24x2) or oil lamps (20x2) and grab handle (0.4mm wire) before assembly.

Take the tender base/sides (1) and fold the sides up as shown - note that fold lines are etched on the inside of the base to assist in folding. Now locate the back (2) into the tender base (1) and solder to the tender sides, working from inside the tender. Locate the tender front (3) into the tender base (1) and solder to the tender sides. At this point solder the bogie pivots (31x2) to the underside of the tender base.

Fold the front steps (6) as shown. Fold up the edges of the front step treads (7x2 marked T) and add to the front step (6), before fitting the completed step assembly and the valance plate (5) to the tender.

Fold the two reinforcing plates on each side valance (9xpair) as shown before fitting to the tender base (1). Fold the buffer beam (11) as shown and fit to the tender base (1), noting that the two vertical spigots form the lamp irons. Fold the front valance (8) as shown and fix to the tender.

Fold the tender floor (4) and fix to the tender front (3). Secure the drawbar pin (29) to the front valance (8). Bend and fit the pipes (0.7mm wire) either side of the side valances (9). Fit the brake cylinder (30) to the tender base.
Fix the turned brass side frame mounts (34x4) to the bogie side frames (32x4). For good electrical pickup low melt solder is recommended here. The bogie stretchers (37x2) are on the etched nickel silver valve gear fret -remove them and check that the holes either side fit over the brass side frame mounts (34), you may need to enlarge the hole slightly. Check also that the holes for the screws (35x4) are large enough. Fold the stretchers as per drawing 1, using a pair of flat nosed (non-serrated) pliers.

Push the brass wheel bearings (33x8) in the bogie side frames using low melt solder if necessary, and attach the side frames to the stretcher with 4.Omm long brass spacer screws (36x4) and washers (36 x 4) (also from the nickel silver fret).

Tighten the screws then gently ease the side frames apart to fit the wheel sets (38x4) in place, making sure the insulated wheels are on the same side for each bogie - see drawing 1 (LS =1ive side), these wheels can be identified by the small brass collar between the wheel and axle.

Attach the assembled bogies to the tender using the spacer screws (40x2) and bogie bearing washers (39x2) making sure that the insulated wheels are on the R/H side.

Note: Intermediate version only. Working (soldering) from inside the tender, fit the junction box (23), marker lamps (24x2), grab handle (0.4mm wire). Fold the ladder (22) as shown and fit to the tender back.

Fit the lamp iron (21). Fix the brake hose (26) to the buffer beam (11), followed by the buffers (25x2).

To assist those building the intermediate version, the support lip for the hungry boards has been left on the tender top (12). As the original version did not have hungry boards on the tender, file the hungry board support lip off the tender top (12), and fit the rear coal partition (14A).

Note: Intermediate version only. Fit the hungry boards (13x2) and rear coal partition (14B).

Fit the toolbox (15), air vent (16), water filler (,17) and jacks (18x1or2) to the tender top (12). Note that when fitting the tender top (12) you will have to cut out a small section at the rear of the tender top (12) to clear the lamp iron (21). Now fit the tender top (12) to the tender body, placing the rear section under the ladder uprights (if fitted) before final positioning of the tender top.

At the front of the tender fit the brake handle (28) into the brake stand (27) and fix the assembly into the tender floor (4). Using 0.4mm wire fit the vertical handrails either side of the tender front.

Fit the fire irons (19x2) now or after coaling. Note that there was no fire iron standard (bracket) on this tender. There are two styles of

builders plates, refer to photographs to choose those applicable to your locomotive.

Locomotive Drawing 2 (Parts 43 - 84)

As mentioned previously all holes shown on the drawings should be drilled prior to assembly.

Clean up the footplate (41) and remove any feed sprues from the centre cutout under the boiler. Use a file to remove 1.Omm from the front of this cutout as shown on the drawing. Fix the smokebox/boiler (48) to the firebox (47) then fit the completed assembly to the footplate (41), fixing at the rear, and using the M2 C/S screw (49) at the front.

Note: Intermediate version only. Many intermediate version locomotives had a modified cab for improved vision. If modelling this cab style trim the top front corner of each cab side (42) level with the leading edge. Trim the front of the cab roof (46) back 3.5mm to match. We suggest modellers refer to photographs for this task.

Fold up the cab (42) and fit spectacle plate (45) as shown. Fold and fit the cab under tray (43) to the cab floor (42).

At this stage we recommend fitting the following parts to the cab (some are from drawing 3). Fit the tap handles (92&124) and short handrail knobs (101x2& 133x2) to make up vertical handrail - Note: these parts are not on the ***intermediate version.***

Fit the cab step treads (103&135). Fold and fit the side horizontal handrails using 0.4mm wire. Fit the air tank (112) to the rear of the footplate (41). Fix the cab (42) to the footplate (41) ensuring that the cab is also secured to the firebox (47). Fit the cab floor support (44) into the cab (42). The cab roof (46) is probably best fitted later, after the cab is detailed.

Note: Intermediate version only. Drill the buffer beam (50) to fit the front step (72) and handrail post (73). Fix the buffer beam (50) to the footplate (41) followed by buffers (70x2), dummy coupling (71) and brake hose (77).

Smokebox doors - the kit contains three types, select the style appropriate to your version.

Original: Door (56) fitted with handle (68), lamp iron holder (98), lamp iron (99), shorthand rail knob (100) and two handles (0.4mm wire).

Intermediate A: Door (57) fitted with handle (69), lamp iron holder (98), lamp iron (99), short handrail knob (100) and one handle (0.4mm wire).

Intermediate B: Door (67) fitted with handle (68), headlight (54), short handrail (100), step tread (67) and two handles (0.4mm wire).

We recommend that the smokebox door be fitted later to allow the securing of some detail parts, eg the pump, from inside the smokebox.

Commence detailing the top and right side of the locomotive, fitting the chimney (53), dome (52), safety valve (51), small whistle (58), safety valve (59), steam generator - *intermediate version* only (60 - add 0.5mm wire), large whistle (61), globe valve (62), pipe connection (63), oil boxes - not on *intermediate version* (64x2), clack valve - ***intermediate version*** move to the front of the boiler (65), superheater relief valve - not on *intermediate version (66),* lubricators (74x2 - add 0.4mm wire). Fit the pump (78). Continue detailing adding short handrail knob (93), short bracket (94), medium bracket (95), long bracket (96), short handrail knobs (97x2) and pipe bracket (102).

Fit lamp irons (75x4) and oil lamps (76x2) - not fitted to ***intermediate version.***

Fit the electric lamps - ***intermediate version*** only (79).

Fix the sandbox filler cap (80), air tanks (81x2) noting that the cutout underneath each tank is to the front. Cab footplate (82) incorporates the long steps which were optional on the ***intermediate version*** only - cut these off where shown on the drawing if not required, before fitting.

Make up the cab step by folding and fitting small step treads (88 marked W) and large step tread (89 marked V) to step (87). Fix the completed assembly to the cab footplate (82). Note that the speedometer assembly can be fitted to either the R/H or L/H side of the locomotive - check photographs. Fold speedometer bracket (84) before fitting speedometer (85) then fit assembly to cab footplate (82).

The large injector pipe comprising parts 83, 90 & 91 was fitted to the original version but is optional on the ***intermediate version.*** If fitting, fix injector pipe front (91) into the smokebox (48). Pass injector pipe rear (83) through speedometer bracket (84), connect injector pipe middle to injector pipe front (91) and injector pipe rear (83). Fix injector pipe rear (83) to the back of the step (87). Fit 0.4mm wire to speedometer unit (86) before fixing the unit to the cab footplate (82).

Locomotive Drawing 3 (Parts 104 - 136)

Continue detailing the L/H side of the locomotive fitting the junction box (104) ***intermediate version*** only, clack valve *(105)* ***intermediate version*** move to the front of the boiler, pipe bracket (106), reversing box (107), oil boxes (108) - not on ***intermediate versions,*** pipe fitting (109), sandbox filler cap (110), globe valve (111). Take the fall plate (114) and fold the tab down 90 degrees, then glue the plasticard (113) to the underside, trimming so that it overlaps the three outside faces by 0.8mm to preventing it shorting out against the tender.

Take the cab floor *(115)* and fold down the two long tabs as shown, locate the tabs on fall plate (114) into the holes in the footplate then fix the cab floor *(115)* in place.

Fit the reversing hand wheel (118) and regulator (117) to the boiler back head (116) and fit the completed assembly to the rear of the firebox. Fix the brake handle (119) into the brake stand (120) and fix the completed assembly in place. Add the cab seats (121x2) to complete the cab detail.

Using the 0.7mm wire join the reversing rod (123) and reversing lever (122) and fix this assembly to the footplate (41).

Make up the cab step by folding and fitting small step tread (126 marked W) and large step tread (127 marked V) to step (125). Fix the completed assembly to the cab footplate (82).

Fit short handrail knob (128) to the firebox, and for the ***intermediate version*** only, short brackets (129x3). Fit medium brackets (130x2), long brackets (131x2), short handrail knobs (132x2) and again for the ***intermediate version*** only, long handrail knobs (134x2).

Note that the spacer screws (136x2) are used later to secure the body to the chassis.

Locomotive Drawing 4 (Part 137)

This drawing shows the wire and pipe layout for both versions. Modellers should choose the wire and pipe detail appropriate to complete detailing their version of this locomotive. Note that the pump governor (137) is fitted to the R/H side piping as shown.

Locomotive Drawing 5 (Parts 138 - 157)

Note that this kit contains a pre-assembled motor/gearbox unit. This is a precision mechanism and must be handled with care. Lubricate only with plastic compatible oil such as La Belle 102, Peco Electrolube or Faller 489. Do not use "household " or "sewing machine" oils.

Test the gearbox by temporarily adding the axle gear (150) and axle (149). Check that axle (149) runs freely in the axle bushes (138x2) before securing the axle gear (150) with the grub screw (151). **Warning:** over-tightening the grub screw may result in shearing off the head. Apply power to the motor terminals to check that the gearbox runs freely. Remove the axle (149) and the axle gear (150) to allow later fitting of the gearbox to the chassis - be careful not to lose the grub screw !!

Locomotive Drawing 6 (Parts 158 - 192)

Take the L/H frame (158) and R/H frame (164) and fold the rear tabs and front guard irons as shown on the drawing. Lightly solder the folds for added strength. Secure the two frames together using the spacers (160x2) and spacer screws (159x4) tightening these screws only enough

to allow fitting of the front chassis spacing plate (161) folded as per drawing, keeper plate fixing plates (162x2) and insulator mounting plate (163) folding the tab as shown. Align the spacers (160x2) so that the cross hole is vertical and tighten the spacer screws (159x4). Solder the plates (161, 162x2 and 163) to the frames.

Fit the horn blocks (168x4) and centre horn blocks (169x2) to the chassis. Note that the thin flange of the horn block goes to the inside of the chassis and the centre horn blocks (169x2) have thinner outside flanges. The horn blocks are a "snap" fit into the chassis.

Before fitting the driving wheels (165x3 and 171x3) note that the insulated wheels are on the L/H side as viewed from the top facing forward. Note also that the insulated driving wheels can be identified by the thin insulation strip between the tyre and the wheel. Fit the driving wheels (165x3 and 171x3), axles (149 and 170x2) and axle washers (167x6) to the chassis with the axle nuts (166x6), quartering the wheels so that the crankpin on the right hand wheel leads that of the left hand wheel by 90 degrees when the axle rotates forward. Use a Romford axle nut driver to tighten the axle nuts. Make sure that all axles rotate freely in the horn blocks. Remove the etched counter weights (173x2 centre axle and 174x4) from the fret and glue to the wheels as shown. Axle covers (172x6) should be fitted after the final assembly and painting.

Now fit drawbar/tender pickup placing the insulated bush (177) on the M2 screw (176) and pass this through the insulator mounting plate (163). Add the insulated washer (178), power tag (179), tender/locomotive connector (180), spring plate (181), spring (182 cut to 5.Omm) and M2 nut (183). The motor mounting block (175) should be fitted later, in conjunction with the motor/gearbox.

Make up the front bogie, fitting the wheel insert discs (187x4) to the bogie wheels (185x2) before fitting the wheels to the bogie (184) -note that the insulated wheels are on the L/H side of the bogie. Retain the wheels using the keeper plates (186x2). The front bogie is later fixed to the chassis using spring (188 cut to 7.Omm), spacing washer (189), spacing washer (190) and M2 nut (191). The sandboxes (192x2) should be fitted after the valve gear.

Locomotive Drawing 7 (Parts 193 - 216)

Fit the springs (194x4) to the keeper plate (193) before fitting the completed assembly to the locomotive chassis using the spacer screws (195x3). Pass four 22mm lengths of 0.7mm wire through the keeper plate and chassis rear before fitting the brake pull rods (199xpair). Fit the long brakes (197x4) and short brakes (196x2) followed by the brake shoes (198x6), then trim off the excess 0.7mm wire. Trim M2 screw (214) to 13mm and fix to the front chassis spacing plate (161) using M2 nut (215).

Make up the cylinders using cylinder blocks (202x2), front cylinder covers (203x2) and rear cylinder covers (204x2). Drill the rear cylinder covers 1.4mm to accept the crosshead and 0.9mm to accept the slide rod bars. Fit the drain cocks (208x2) to the bottom of the cylinder blocks. For the original version only, fit the tail rods (205x2) and cylinder valves (206x2). Fix the completed cylinder blocks to the chassis. Fix the coupling rods (200xpair) to the driving wheels using short crank pin screws (201x4) and long crank pin screws (213x2). Check that the rods revolve freely; should binding occur, locate where this 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.

Trim the crossheads (211xpair) to 16mm as shown and attach the connecting rods (210xpair) using the 14BA screws (209x2) and 14BA nuts (212x2). Fit the crossheads to the slide bars (207xpair) ensuring that they slide freely. Fold the slidebars (207xpair) as shown, locate the front spigot into the cylinders, and fix to the chassis. Fix the other end of the connecting rods (210xpair) to the centre driver using long crankpin screws (213x2). Check that the wheels and valve gear operate freely.

To fit the motor/gearbox unit, remove one coupling rod and one centre driving wheel and withdraw the centre axle. Position the motor/gearbox between the frames and locate axle gear (150), then replace axle (149) followed by centre driving wheel and coupling rod. Align the axle gear (150) before tightening the grub screw (151). Fix the motor mounting block (175) between the frames then use a small dab of silicon glue to retain the motor to the block.

Take two suitable lengths (approximately 30mm each) of pickup wire, solder to each motor terminal and mark the positive (+) lead, then solder this to the insulator mounting plate (163). Solder the other lead to the power tag (179).

Fit the locomotive body to the chassis using spacer screws (136x2) at the rear and M2 screw (216) at the front. Attach the front bogie as previously described in drawing 6.

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

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Drawing 1

1.	Tender Body	E
2.	Tender Back	E
3.	Tender Front	E
4.	Tender Floor	E
5.	Valance Plate	E
6.	Steps	E
7.	Step Treads x 2	E
8.	Front Valance	E
9.	Side Valances x 2	E
10.	Sandbox Sides x 2	W/M
10A.	Sandbox Tops x 2	W/M
11.	Buffer Beam	E
12.	Tender Top	W/M
13.*	Hungry Boards x 2	E
14A.*	Rear Coal Partition	E
14B.*	Rear Coal Partition	E
15.	Toolbox	W/M
16.	Air Vent	L/W
17.	Water Filler	W/M
18.	Jacks x 2	W/M
19.	Fireiron x 2	E
20.*	Oil Lamps x 2	L/W
21.	Lamp Iron	E
22.*	Ladder	E
23.*	Junction Box	L/W
24.*	Marker Lamps x 2	L/W
25.	Buffers x 2	W/M
26.	Brake Hose	L/W
27.	Brake Stand	W/M
28.	Brake Handle	L/W
29.	Draw Bar Pin	T
30.	Brake Cylinder	W/M
31.	Bogie Pivots x 2	T
32.	Bogie Side Frames x 4	W/M
33.	Pin Point Bearings x 8	T
34.	Bogie Side Frame Mounts x 4	T
35.	Spacer Screws x 4	T
36.	Sideframe Bearing Washers x 4	E
37.	Bogie Stretchers x 2	E
38.	Bogie Wheels 10.5mm x 4	T
49.	Bogie Bearing Washers x 2	E
40.	Bogie Mounting Screw x 2	T
	*A Builders Plate	E
	*B Builders Plate	E
	0.4mm dia. Wire	
	0.7mm dia. Wire	

Drawing 2

41.	Footplate	W/M
42.	Cab	W/M
43.	Cab Under Tray	E
44.	Cab Floor Support	W/M
45.	Spectacle Plate	E
46.	Roof	W/M
47.	Firebox	W/M
48.	Smokebox/Boiler	W/M
49.	M2 C/S Screw	T
50.	Buffer Beam	W/M
51.	Safety Valve	L/W
52.	Dome	W/M
53.	Chimney	W/W
54.*	Headlight	L/W
55.*	Smokebox Door	W/M
56.*	Smokebox Door	W/M
57.*	Smokebox Door	W/M
58.	Small Whistle	L/W
59.	Safety Valve	L/W
60.*	Steam Generator	W/M
61.	Large Whistle	L/W
62.	Globe Valve	L/W
63.	Pipe Connection	L/W
64.	Oil Boxes	W/M
65.	Clack Valves	L/W
66.*	Superheater Relief Valve	L/W
67.*	Step Tread	E
68.*	Smoke Box Door Handle	L/W
69.*	Smoke Box Door Handle	L/W
70.	Buffers x 2	W/M
71.	Dummy Coupling	W/M
72.*	Front Step	E
73.*	Hnadrail Post	L/W
74.	Lubricators x 2	W/M
75.*	Lamp Irons x 4	E
76.*	Oil Lamps x 2	L/W.
77.	Brake Hose	L/W
78.	Pump	W/M
79.*	Electric Lamps x 2	L/W
80.	Sandbox Filler Cap	W/M
81.	Air Tanks x 2	W/M
82.	Cab Footplate	W/M
83.*	Injector Pipe (Rear)	W/M
84.	Speedo Bracket	E
85.	Speedo	L/W
86.	Speedo Unit	L/W
87.	Step	E
88.	Small Step Tread	E
89.	Large Step Tread	E
90.*	Injector Pipe (Middle)	W/M
91.*	Injector Pipe (Front)	W/M
92.	Tap handle	E
93.	Short Handrail Knob	T
94.	Short Bracket	E
95.	Medium Bracket	E
96.	Long Bracket	E
97.	Short Handrail Knobs x 2	T
98.*	Lamp Iron Holder	E
99.*	Lamp Iron	E
100.	Short Handrail Knob	T
101.	Short Handrail Knobs x 2	T
102.	Pipe Bracket	E
103.	Step Tread	E
	0.4mm dia. Wire	
	0.5mm dia. Wire	

Drawing 3

104.*	Junction Box	L/W
105.	Clack Valve	L/W
106.	Pipe Bracket	E
107.	Reversing Box	W/M
108.	Oil Boxes	W/M
109.	Pipe Fitting	L/W
110.	Sandbox Filler Cap	W/M
111.	Globe Valve	L/W
112.	Air Tank	W/M
113.	Plastic Card	P
114.	Fall Plate	E

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115.	Cab Floor	E
116.	Cab Detail	W/M
117.	Regulator Lever	L/W
118.	Reversing Hand wheel	E
119.	Brake handle	L/W
120.	Brake Stand	W/M
121.	Cab Seats x 2	W/M
122.	Reversing Lever	E
123.	Reversing Rod	E
124.	Tap handle	E
125.	Step	E
126.	Small Step Tread	E
127.	Large Step Tread	E
128.	Short Handrail Knob	T
129.*	Short Brackets x 3	E
130.	Medium Brackets x 2	E
131.	Long Brackets x 2	E
132.	Short Handrail Knobs x 2	T
133.	Short Handrail Knobs x 2	T
134.*	Long Handrail Knobs x 2	T
135.	Step Tread	E
136.	Spacer Screws x 2	T
	0.4mm dia. Wire	
	0.7mm dia. Wire	

Drawing 4

137.	Pump Governor	L/W
	* A Name Plate	E
	* B Name Plate	E
	0.4mm dai. Wire	
	0.5mm dia. Wire	
	0.7mm dia. Wire	

Drawing 5

138.	Axle Bushes x 2	T
139.	Gearbox Frames x 1 Pair	E
140.	Motor	-
141.	Motor Fixing Bracket	E
142.	Motor Fixing Screws x 2	T
143.	Stepped Axle	T
144.	Stepped Gear	P
145.	Spacing Washer	E
146.	Stepped Axle	T
147.	Toothed Gear	T
148.	Spacing Sleeve	T
149.	Axle	T
150.	Axle Gear	T
151.	Grub Screw	T
152.	Fixing Screws x 5	T
153.	Short Gearbox Spacer x 2	T
154.	Bearing Plate	E
155.	Long Gearbox Spacer	T
156.	Short Gearbox Spacers x 2	T
157.	Bearing Bush	T

Drawing 6

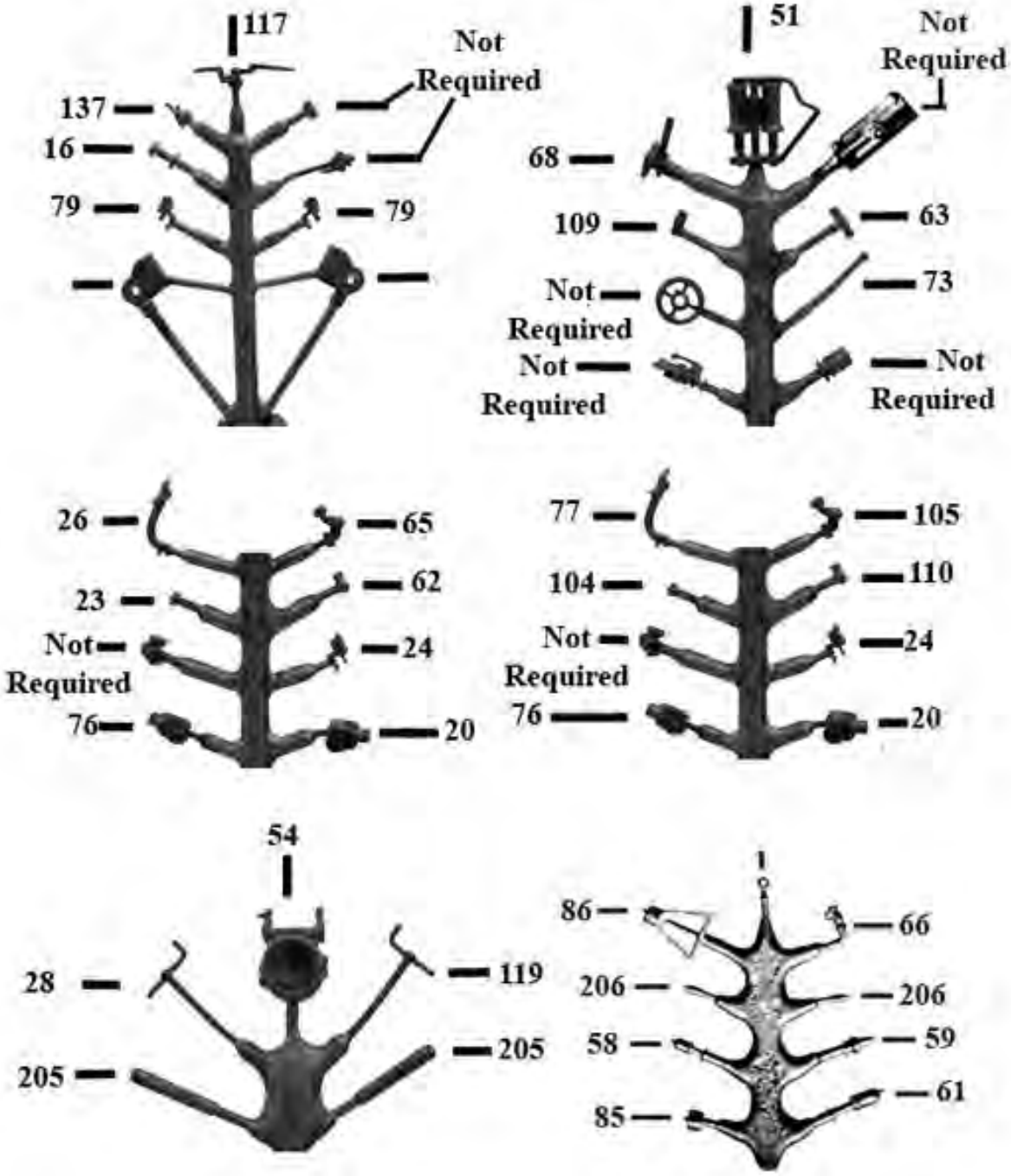
158.	L/H Frame	E
159	Spacer screws x 4	T
160.	Spacers x 2	T
161.	Front Chassis Spacing Plate	E
162.	Keeper Plate Fixing Plates x 2	E
163.	Insulating Mounting Plate	E
164.	R/H Frame	E
165.	20mm Non-Insulated Driving Wheels x 3	T
166.	Axle Nuts x 6	T
167.	Axle Washers x 6	E
168.	Hornblocks x 4	T
169.	Centre Hornblocks	T
170.	Axles x 2	T
171.	20mm Insulated Driving Wheels x 3	T
172.	Axle covers x 6	E
173.	Large Counter Weights x 2	E
174.	Small Counter Weights x 4	E
175.	Motor Mounting Block	W/M
176.	M2 x 8mm C/H Screw	T
177.	Insulated Bush	P
178.	Insulated Washer	P
179.	Power Tag	E
180.	Tender/Locomotive Connector	E
181.	Spring Plate	E
182.	Spring	-
183.	M2 Nut	T
184.	Bogie.	W/M
185.	10.5mm Bogie Wheels x 2	T
186.	Keeper Plates x 2	W/M
187.	Wheel Insert Discs x 4	E
188.	Spring	-
189.	Spacing Washer	E
190.	Spacing Washer	E
191.	M2 Nut	T
192.	Sandboxes x 2	W/M
	0.4mm Dia. Wire	
	0.7mm Dia. Wire	
	Insulated Wire	

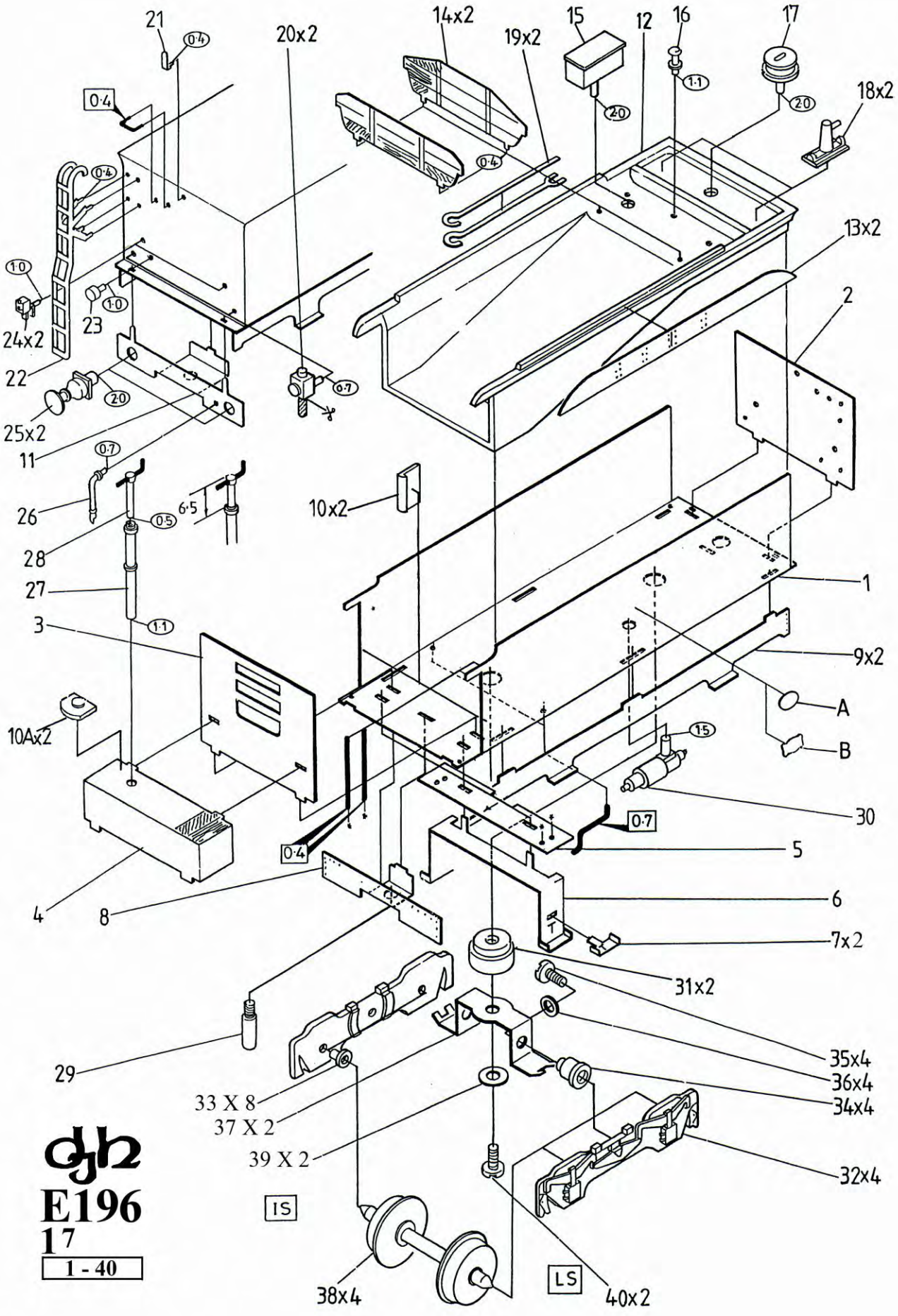
Drawing 7

193.	Keeper Plate	W/M
194.	Springs x 4	W/M
195.	Spacer Screws x 3	T
196.	Short Brakes x 1 Pair	E
197.	Long Brakes x 2 Pairs	E
198.	Brake Shoes x 3 Pairs	E
199.	Brake pull Rods x 1 Pair	E
200.	Coupling Rods x 1 Pair	E
201.	Short Crankpin Screws x 4	T
202.	Cylinder Blocks x 2	W/M
203.	Front Cylinder Covers	W/M
204.	Rear Cylinder Covers x 2	W/M
205.	Tail Rods x 2	L/W
206.	Cylinder Valves x 2	L/W
207.	Slide Bars x 1 Pair	E
208.	Drain Cocks x 2	E
209.	14BA x 1/8" C/H Screws x 2	T
210.	Connecting Rods x 1 Pair	E
211.	Crossheads x 1 Pair	L/W
212.	14 BA Nuts x 2	T
213.	Long Crankpin Screws x 2	T
214.	M2 16mm C/H Screw	T
215.	M2 Nut	T
216.	M2 x 8mm C/H Screw	T
	0.7mm dia. Wire	

Legend: W/M = White Metal E = Etched Brass
L/W = Lost Wax Brass Casting T = Turning
P = Plastic O - Optional

(E196) - NN - Lost Wax Brass Castings





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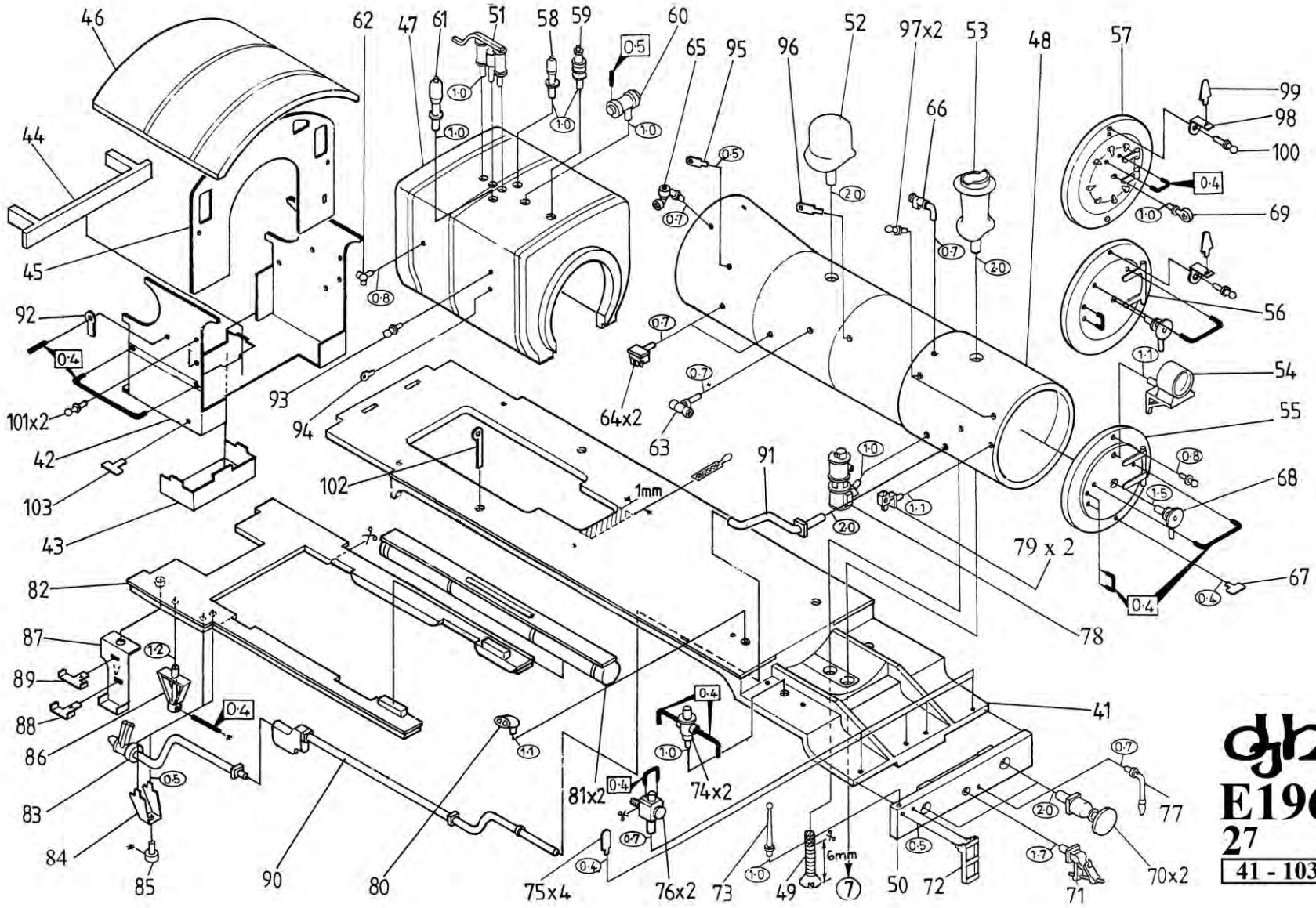

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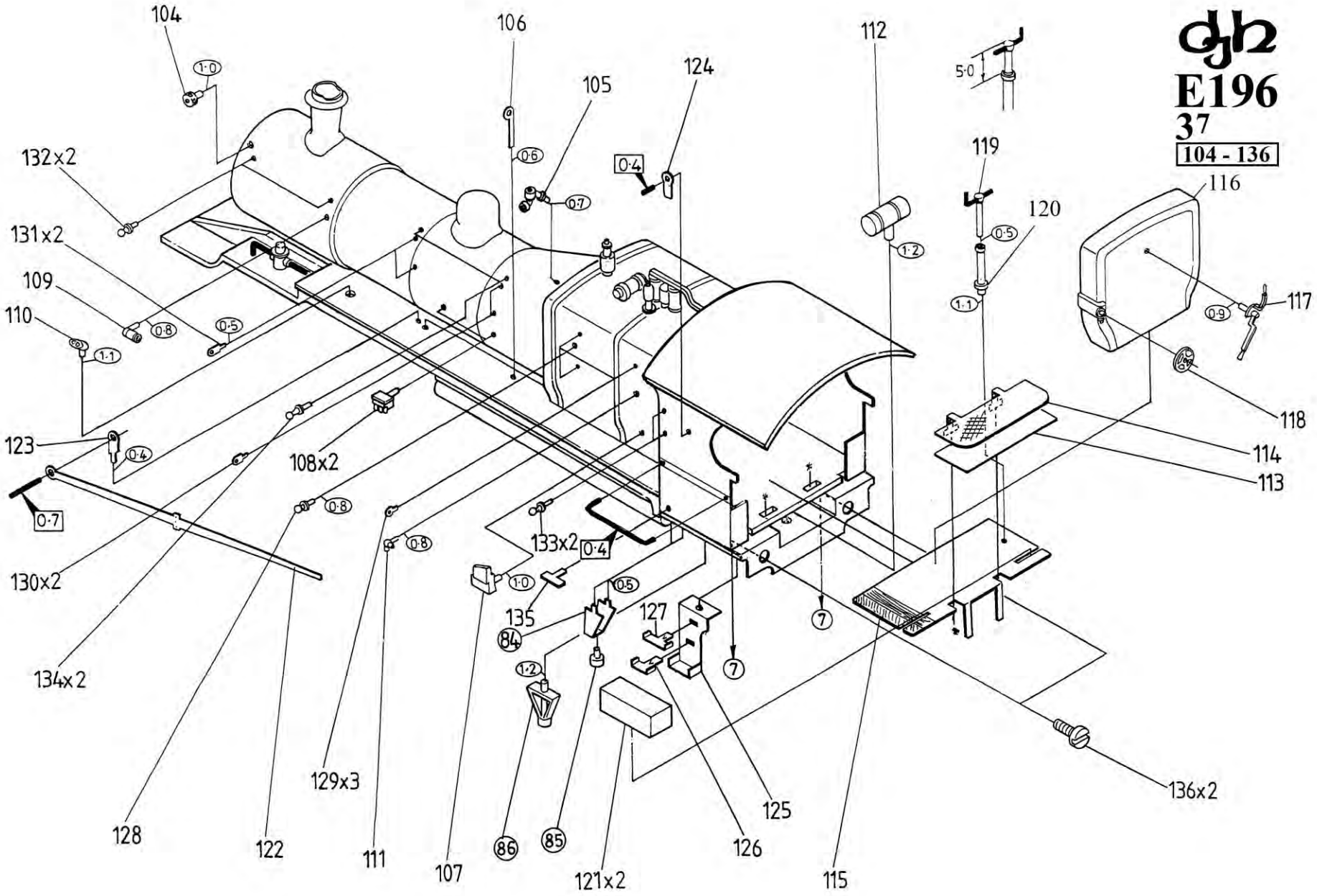

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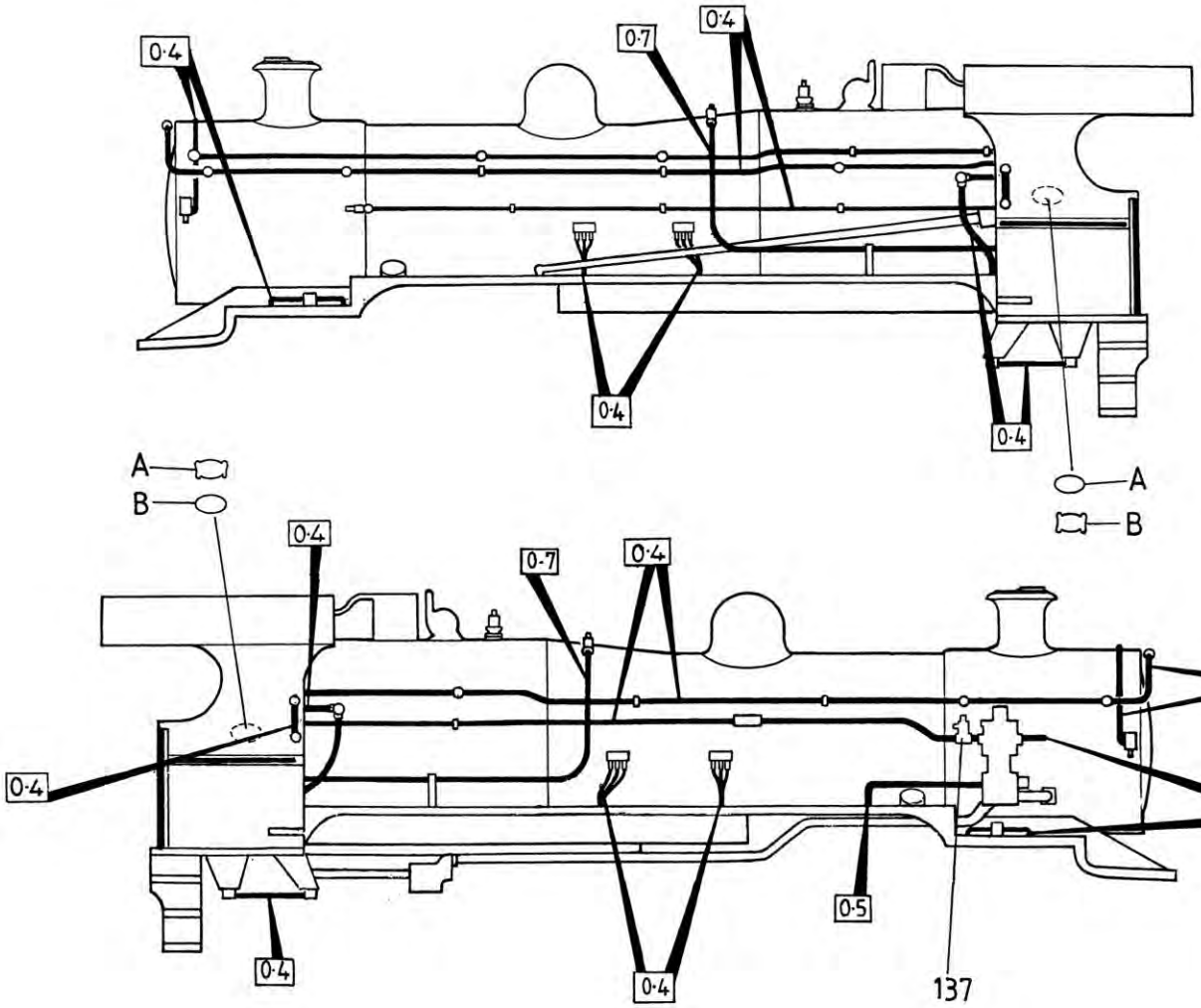

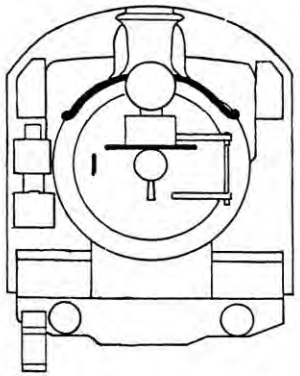

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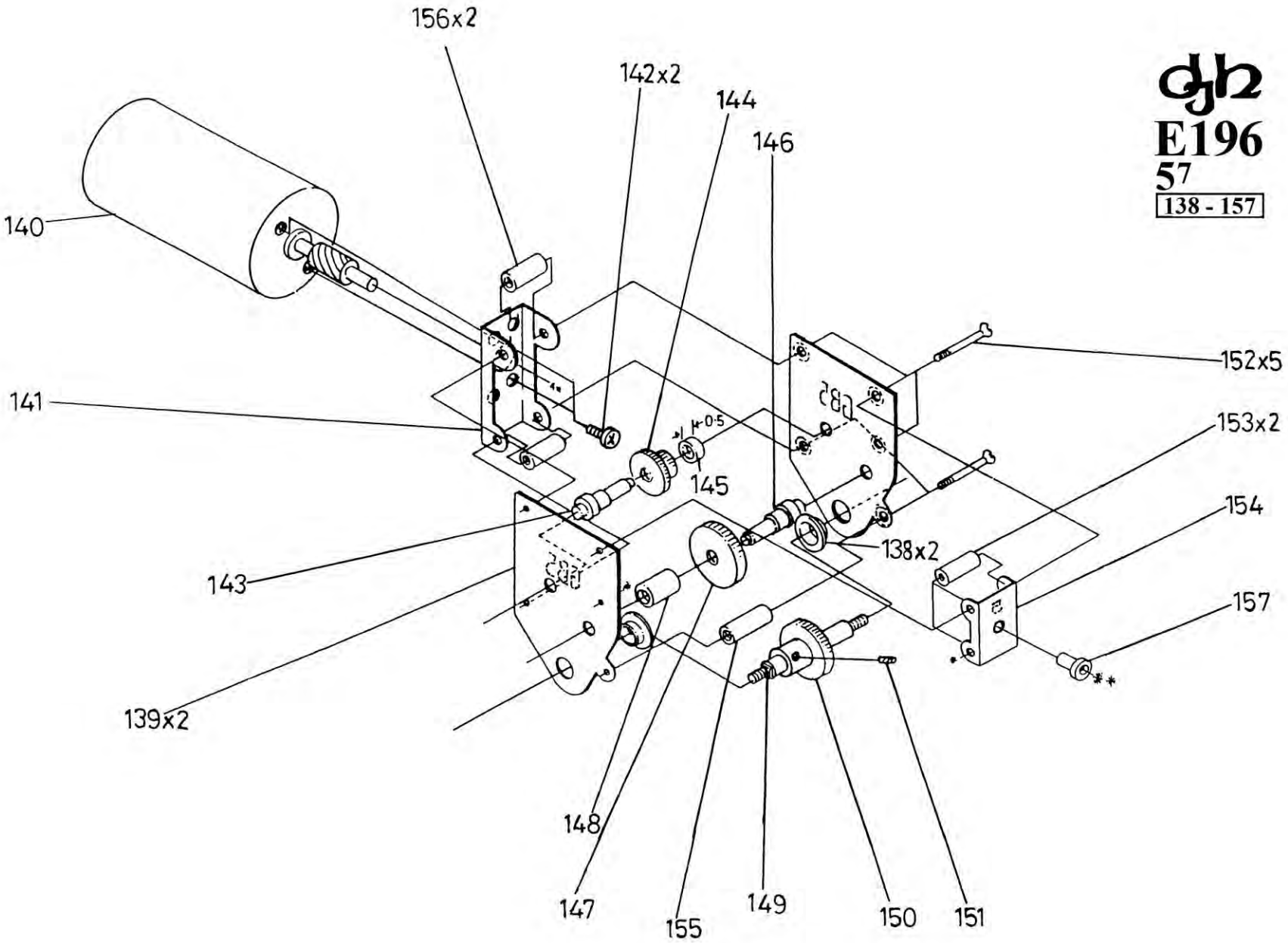

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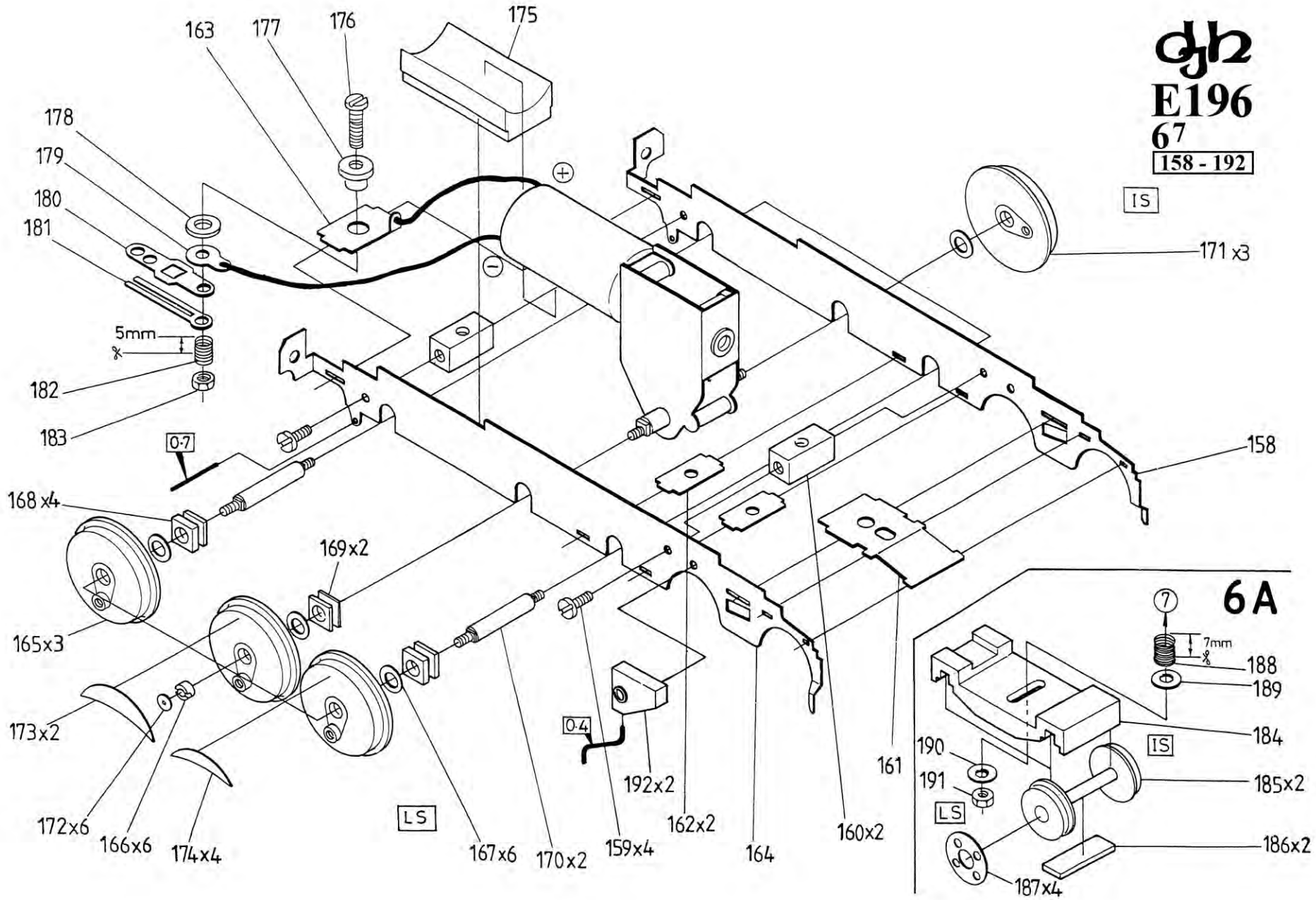

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