Victorian Railways R Class 4-6-4 (Standard coal burner) Locomotive and tender kit

Ref.E218, Manufactured by DJH exclusively for Steam Era Models

Introduction

During the 1940s the Victorian Railways had many locomotives in its fleet nearing the end of their economic lives. A design was prepared by the VR for a new express passenger locomotive, but they did not have sufficient workshop capacity to construct the new class of 70 locomotives. An order was subsequently placed with the North British Locomotive Company of Glasgow to construct the R class 4-6-4. The locomotives were delivered by sea as deck cargo during 1951-53, with R703 having the honour of being the first member of the class to enter traffic on 27 June 1951. The twenty-six B class diesels were delivered concurrently and the R class soon found themselves downgraded from express passenger services to goods working. As further diesels were purchased by the VR, members of the R class were withdrawn and stored. The first to be permanently withdrawn was R715, on 4 May 1956, having run just 95,518 miles. During the early 1960s the VR was experiencing a locomotive shortage, and many R class were removed from storage, repaired and returned to traffic. Further withdrawals followed during the mid 1960s with R766 being the last engine to be withdrawn from regular traffic on 1 April 1968. Seven members of the class have survived to the present day, with R707, 711,766 and 761 currently available for special working.

Please read instructions carefully before commencing assembly.

Assembly methods

The two main construction methods are:

i) Low-melt solder. Low-melt solder is an excellent medium to use with white metal kits. It is quick and provides a stronger joint than can be achieved with glue. Joint strength is achieved as soon as the solder solidifies, enabling the next step in construction to be undertaken without waiting for adhesive to set. It has the added advantage of allowing repairs to minor casting flaws, and because of the relatively low temperature, many parts can be held in the fingers while soldering. To join white metal to brass it is first necessary to 'tin' the brass with normal solder. The white metal casting can then be attached to the tinned brass with low-melt solder. Low-melt soldering requires the correct type of soldering iron (e.g. Dick Smith T2000). These irons have temperature control, as low-melt solder only requires around 150 degrees Celsius. Do not use the same iron for low-melt and normal solder as solder mixed in this way has poor strength. Suitable low-melt solder and flux is available from Carr's. ***Do not attempt to solder white metal castings with a standard soldering iron.***

ii) Glue. Superglue and five minute Araldite are two types of adhesive suitable for use with this kit. Some modellers prefer to superglue major joins first and the fillet the joint with Araldite. Small detail parts are best attached with superglue. Solder must be used for electrical connections such as the wiring from the pick-ups to the motor.

Whichever method you choose, 'dry fit' all parts to ensure a good fit before attaching them permanently.

CONSTRUCTION

It is important that all cast parts are free of "flash" – (excess metal along the part line.) and fit properly. Flash may be removed from the white metal castings by scraping gently with a sharp knife. Files are required for cleaning up the brass and nickel silver detail castings.

All locating holes for wire piping and fixing details should be drilled prior to assembly. It is often simplest to drill holes in etched parts while they are still part of the etch sheet. "Tinning" of etched parts (eg. where they are required to be attached to white metal castings) can also be done while the part is still attached to the main sheet.

Etched items can be removed from the sheet by placing it on a scrap of hard timber (eg masonite) and cutting the tabs with a large Stanley knife. Take care not to distort the parts while cutting them free. Trim the remains of the tab off the part with needle files. All etched parts feature a "cusp edge". This cusp may require smoothing with needle files to allow parts to fit accurately. Etched parts requiring folding incorporate half etched lines to locate the bend. As a general rule, the half etch line goes ***inside*** the fold.

Always check the fit of the parts prior to fixing. Adjust as necessary before fixing them in place. In many cases it is possible to solder details from ***behind*** the surface to which they are fixed. When attaching white metal castings with low melt solder use plenty of flux. The flux acts as a heat transfer medium and helps the solder to penetrate the joint.

As with all classes of V.R. locomotives, individual R's varied in minor details over the years. Modellers are therefore advised to refer to photographs of the prototype if they wish the model to reflect a particular class member.

The following drill sizes are required: 0.4mm, 0.5mm, 0.6mm, 0.7mm, 0.8mm, 0.9mm, 1.0mm, 1.2mm, 1.5mm, 1.6mm, 2.0mm and 2.1mm.

During construction refer to the drawings at all times. Parts should be as drawn on the illustrations, so be careful that you have the right part.

Parts are identified on the drawings with a prefix:
W for White metal castings,
L for Lost wax brass or nickel silver castings
E for Etched parts.

The instructions sometimes refer to the right-hand **(R/H)** and left-hand **(L/H**) sides.
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 sheets or plastic packing until they are required. It is recommended that construction start with the tender, to develop your skills before tackling the locomotive.

SAFETY FIRST **These models are not toys and are not suitable for young children.**
White metal castings and solder contain LEAD and modellers are advised to wash their hands after working on construction.
When using superglue, solder or when spray-painting, ensure the work area is well ventilated.

TENDER Refer to drawings 1 to 4

Bogies

Insert the bearings into the holes in the back of the bogie side-frames. Make sure that the bearings are pushed all the way into the holes. Secure with a touch of low-melt solder. Drill 0.7mm at the marks on the bottom of the brake levers E 50.
While E 50 parts are still attached to the fret, lightly tin the ends of the brake levers and the area by which they will attach to the side-frames. Fold E 50 to shape and locate the slots over the pins in the backs of the side-frames. Secure with low-melt solder.

Attach the side-frames to the bogie stretchers E 24a and E 24b using the 12 BA cheese-head screws.
DO NOT over tighten the screws or they will strip the thread in the side-frames. Slacken off the screws and install the 10.9mm spoked wheels with the pinpoint axles. Tighten the screws and check that the wheels turn freely. If the wheels are tight, you can slacken the screws, remove the wheels, file a small amount from the end of each axle, then assemble the bogie once more.

Cut lengths of 0.7mm wire x 20mm long and install them in the holes in the bottom of the brake levers. These wires represent the brake beams of the prototype and reinforce the brake shoe/lever etching. Solder the wires to the levers so that approximately 0.3mm of the wire projects beyond the face of the lever.

Tank

Solder the bogie pivots to the tender floor E 62. Fold the underframe headstocks down at each end. Solder the side extensions E 67 and E 68 to the tender tank sides E 60. Use a minimum of solder, as the front E 58 will locate against these parts. Drill 0.4mm holes for the handrails while the tender is still flat.

Fold the bottom edges of the tender tank at 90° along the half etch lines. Bend the tank into a U shape using the half etch lines in the back corners to guide. Fold the tags down on the inner edges of the tank bottom and locate them in the slots in the underframe. Solder the tank to the underframe. After soldering, clip off the excess length from the tags that project through the underframe.

Solder the underframe side sills E 72 and E 73 to the right and left sides of the underframe respectively. Drill 0.5 mm holes at the mark on each side sill and add the towing hooks L 28. Solder from behind the side sill for a neat job.

Rear Details

Solder the tank anchors E 87 to the back of the tender. Drill holes in the back of the tank as marked and add the details L 36, E 88, E 89/97, L 16/22, L 29, L 23 and L 25. Alternative marker lamps L 16 (Pyle National) and L 22 (Newport) are provided. The locomotives were originally equipped with Pyle National marker lamps, but some locomotives had Newport style in later years. All these details can be soldered from ***inside*** the tank for a neat job.

Drill 0.4mm holes at the marks near the top edge of the tank and form a handrail from 0.4mm wire. Solder from inside the tank and trim flush. Form the ladder E 86 to shape, using the half etch areas to assist. Add the ladder to the tank and solder from inside the tank.

Form one end of the uncoupling lever to shape. Thread three brackets E 90 onto this wire and form the bends at the other end. Locate the brackets E 90 in the holes in the upper edge of the headstocks and solder from ***behind*** the headstocks.

Form slight joggles in the guard irons E 93 and E 94 at half etch lines. Reinforce the bends by soldering. Add guard irons and brake hose L 20 to the headstocks and solder from behind. Fold the steps E 95 to shape and solder to the headstocks. Position the buffers in the holes in the headstocks and solder from behind using low-melt solder.

Fold the coupler support E 61 at 90°. Insert the tag in the slot in the underframe and solder the support to the underframe and headstocks.

Underframe Details

Solder the air strainers and support L31 to the underframe. Add the brake cylinders W 48 to the underframe using low-melt solder.

Tender Front

Locate the tender footplate E 69 in the slots in the tender front E 58. Use a block of wood to assist in soldering these two pieces together at 90°. Drill 0.4mm holes at the marks in the coal doors E 66. Form handrails from 0.4mm wire and solder from behind the doors. Fold the doors into a “U” shape using the half etch lines to guide. Locate the coal doors E 66 in the slots in the footplate E 69. The return legs of E 66 should be flush with the opening in the tender front E 58. Secure with solder.

Fold the locker openings to shape. Solder the tops of the lockers E 75 and E 76 to right and left sides respectively. Add the steps E 81 and gussets E 82 and E 80. Solder these parts from ***behind*** the tender front.

Drill the handbrake gearbox L 34, 0.7mm at the mark. Solder a 19mm length of 0.7mm wire into this hole. Thread the wire through the notch in the tender footplate and locate the handbrake gearbox in the hole in the tender front. Solder from behind the tender front.

Insert the tender front in the tender tank. The tags in the bottom edge locate in the slots in the underframe and the notches in the edge locate against the side extensions. Solder the front to the tank sides and under frames from ***behind*** the tank front.

Fold the return lips on the front edges of E 71. Drill 0.4mm holes at the marks in the corners of the footplate support E 70. Fold E 70 to shape. Add centre supports E 74, locating the tabs in the slots. Solder this sub assembly of E 70, 71 and 74 together. Fold the return lip on the end of step treads E 84 and E 85. Solder these steps to the footplate support sub-assembly. Insert this sub-assembly between the underframe and the footplate. Solder to the footplate and underframe.

Form handrails from 0.4mm wire and install them in the holes in the side extensions and footplate supports.

Fold the tender front step frames E 77 and E 78 to shape. Add step treads E 79, locating the tabs on these parts in the slots of the frames. Solder from behind. Install these step assemblies on the underframe so that the slots in the frames locate around the headstocks and side sills. Solder from behind the step frame.

Tender Tank Top

Form the coal bunker collar E 64 and E 65 to shape. Locate the tabs in the slots of the tank top E 63. Solder from inside the bunker. Add the handrail of 0.4mm wire to the front of the bunker. Insert the handles E 91 and 92 in the holes in the tank top. Solder from underneath the tank top.

Drill 0.4mm holes in the tank filler W 44 and add a handle of 0.4mm wire. Drill two 0.7mm holes at the marks in the water treatment box W 43 and add two 5mm lengths of 0.7mm wire. Locate parts W 43, 44 and 45 in their respective hole in the tank top. Solder from underneath with low-melt solder.

Final Assembly of Tender

Solder the fire iron supports E 83 to the back of the tank sides. Half etch notches locate these parts. Solder the white metal supports W46 to the inside faces of the tank sides.
Position the tank top between the sides, under the return leg of the rear ladder and on top of the supports W46. There should be a step of approximately 0.7mm between the top of the tank and the top of the sides. Solder the tank top to the sides with a clean, well tinned iron and plenty of flux.

Solder the lifting eyes E 59 in the notches at the front of the tender tank. Attach the bogies with the cast screws L 26 and half a spring. Dress the ends of the cast screws to help get them started in the tapped holes. The cut out in one bogie stretcher E 24b is to clear the rear coupler and its mounting. Screw the front drawbar pin into the tapped hole in the front of the underframe.

Add a coal load in the bunker. Use crushed pieces of real coal, secured with PVA, or the cast white metal ‘coal’ supplied. If using real coal this should be left until after painting.

LOCOMOTIVE

Chassis (refer to drawings 6,7,8)

Bend the tags 90° at the rear of the chassis sides E 1 and E 2. Reinforce the bends with a fillet of solder. Assemble the chassis with the 2mm cheese-head screws and tapped spacers. Before tightening the screws, fit the etched cross members E 3, E 5 and E 6. The arrow on E 3 faces forward. Align the spacers so that the cross hole is vertical and tighten the screws. Solder the plates E 3, 5 and 6 to the frames.

Fold the motor mount E 9 to shape and reinforce the bends with solder. Attach the motor to the mounting bracket with short 2mm screws. Attach the motor bracket to the frames with 2mm pan head screws.

Fit the thrust washers and bearings onto the worm shaft as shown and lubricate with a little plastic compatible oil such as LaBelle 108. Fit the worm shaft/bearing sub-assembly and idler gear to one side moulding, then fit the other side with four M1.4 x 5mm long screws. Do not over-tighten the screws, which are designed to self-tap into the moulding. Make sure there is a little end float in the worm shaft, and that an axle placed in the axle slots is at 90° to the worm shaft.

Install the driving wheels in the frame with the geared axle in the centre slot. Check that the wheels turn freely and attach the cover plate W 29 with two M2 pan head screws.

Lower the gearbox onto the geared axle, then screw on the cover with two M1.4 x 5mm long screws. Trim the worm shaft to length so that motor and worm shafts are in straight alignment with just a small gap between

them. Connect the motor and worm shafts with the rubber tubing supplied. Connect a power supply to the motor and check that the centre, driving axle will rotate smoothly and steadily.

Brake Rigging

Cut six lengths of 0.7mm wire, each 19.5mm long. Drill 0.7mm holes in the cover plate W 29 at the points marked for the brake rigging. Drill 0.7mm holes at the two points marked on each brake shoe E 43 – 46. Thread three of the 0.7mm wires through the holes in the cover plate and thread the brake shoes onto the ends of the wires. Solder the shoes to the wires so that about 0.3mm of wire projects through the brake shoe. Fix the wires centrally to the cover plate. The bottom wires will be fixed ***after*** installing the pick-ups and wiring.

Pick-ups

Remove the cover plate. Fold the tag on the pickup E 116 at 90 ° and attach the pick-ups to the cover plate with the plastic fixings.

Make sure that the pick-ups can NOT touch the cross wires of the brake rigging.

Secure the plastic fixings by melting the pins with a warm soldering iron. Install the cover plate on the chassis and bend the wipers to rub on the backs of the driving wheels. Cut off the excess wiper.

Cut two pieces of hook up wire and strip about 6mm of insulation from one end of each. Twist the ends together and solder. Cut this soldered piece back to about 3mm long and solder to the tag on the ***rear*** pick-up. Be quick to avoid melting the plastic fixings. Poke one wire through the hole in the rear of the cover plate. Run the other wire forward, trim to length, strip and solder the end to the forward pick-up. Repeat this step for the other side. The wire from the R/H side goes to the + motor terminal.

Now that the wiring is in place, thread the remaining three lengths of 0.7mm wire through the holes in the bottom of the brake levers, and through the brake pull rods E 16 and levers E 10 a/b. Space the wires so that 0.3mm projects through each brake lever and solder the wires to the levers. Space the pull rods about 3mm from the backs of the driving wheels and solder to the cross wires.

Rods and Valve Gear

Now remove the motor and gearbox while the rods and valve gear are assembled. Check each stage of assembly for free movement before going on to the next.

The connecting and coupling rods E 12, 13 and E 14, 15 respectively are to be laminated in two layers, to produce scale thickness. Tin the mating surfaces of these parts and remove them from the sheet, but ***do not*** remove the tags connecting the front and back halves.

Fold the front half over the back half and align the holes and edges. Place the parts face down on a hard surface such as a ceramic tile and sweat the two layers together. As you solder, press the layers together with a pointed probe. After soldering, clean up the cusp edges of the parts and polish with a fibre-glass eraser. Attach the counterweights E 56 to the main driving wheels with superglue. The half etched steps on the back assist with the location.

Attach the coupling rods to the leading and tailing driving wheels with hex head crank pins. The crank pins will self tap into the moulded holes. Use an M4 grub screw as a wrench, and be careful that the axis of the screw is perpendicular to the plane of the wheel. ***DO NOT over tighten the crank pins.*** Check that the wheels rotate freely. If necessary, enlarge the crank pin holes in the coupling rods with a rat tail needle file. Remove only a very small amount and ***check often.***

Drill a 0.8mm hole at the mark on the cylinder cover W 38. This hole locates the crosshead guide. Assemble a right and left hand pair of cylinders, using W 36, 37, 38, 39 and 40 and L 17.

Solder the assembled cylinders to the frames with low-melt solder. Check that the crossheads L 1 / 8 will slide freely up and down the crosshead guides L 18. File and polish the parts until this is the case. Insert the tang on the end of the crosshead guide into the hole in the top of the rear cylinder cover. With the chassis on a hard, flat surface, support the guide on some plastic or wood packing so that it is horizontal and parallel to the chassis. Attach the guide support brackets W 41 to the frames and the crosshead guides. Attach the R/H connecting rod to the R/H crosshead with a 14 BA screw and nut. Solder the nut to the screw and file off the excess screw. Add two washers E 11 onto the main crankpin, then thread the crosshead into its guide and the valve spindle into the valve guide W 40. Check that everything moves freely and adjust as required before repeating for the L/H side.

Drill 1.0mm holes in the link support brackets L 33 and 35, where the expansion link will pivot. Drill 0.7mm holes through the bosses on top of these parts.

Place packer E 4 on top of the cross member E 5 and fix the link support brackets to the chassis with short 12BA cheese head screws. Attach the return crank to the main crank pin with a long 12BA cheese head screw. Check that connecting and coupling rods can still move freely. Thread a 14BA screw through the link bracket, expansion link and the end of the radius rod. The end of the radius rod goes ***through*** the centre of the expansion link. Thread a nut onto the screw, tighten and fix with solder.

Thread a length of 0.7mm wire through the bosses on top of the link support brackets. Place the central hole in each lifting arm E 19 and E 20 over the wire on the R/H and L/H side respectively. Thread a second length of 0.7mm wire through the lifting link etched as part of the radius rod, through the lifting arm E 19, across to the other side and through E 20 and the L/H lifting link. Solder the various parts to the wires. ***After*** soldering, clip and remove the central section of the forward wire – between E 19 and E 20. Add two short lengths of 0.4mm wire pointing vertically down from the rear holes in E 19 and E 20.

Engine Bogies

Assemble the leading bogie from castings W 34 and W 35, the 9.6mm spoked wheels and two 12BA cheese-head screws. Attach the bogie to the chassis with screw L27, washer E 38 and a length of coil spring.

Insert the brass bearings in the trailing truck side-frames. Ensure they are seated correctly and secure with low-melt solder. Drill 1.0mm hole in the side-frame for the brake cylinder. Drill 0.7mm into the end of the brake cylinder and in the large end of the brake lever E 25. Solder the brake cylinder horizontally to the side-frame. Solder the piston rod of E 25 into the cylinder so that about 2mm projects. Drill through the 0.7mm hole in the brake lever and into the side-frame. Insert a short length of 0.7mm wire and solder to the side-frame and lever so that the lever is parallel to the side-frame. Trim the wire so that 0.3mm projects from the face of the lever.

Assemble the truck frame with etching E 41 and 12BA cheese-head screws. Slacken the screws and install 10.9mm pinpoint wheel-sets. Tighten the screws and check that the wheels turn freely. If tight, remove the wheels and file a small amount from the end of each axle point.

Drill 1.0mm holes centrally in the pockets cast on the rear corners of the truck frame. Add the resistance rockers W33. Attach the trailing truck to the chassis with shouldered screw L26 and half a length of spring.

Solder the rear beams W 22 to the frames. Attach the tender drawbar, E 17 or E 18 to the rear cross member with a long M2 pan-head screw, nuts and half a length of spring. Leave the frame extensions E 7 and E 8 until ***after*** the body is fitted.

Locomotive Body

Cab **Refer to Drawings 5,9,10,11 and 12**

Fold the cab E 33 to shape along the half etch lines. Cut sections of clear plastic to fit the front window openings. The L/H one can be larger than the opening by 0.5mm all round, but the R/H one should be a neat fit. Put these aside in an envelope. Solder the door E 54 to the R/H side of the cab front.

Solder the window covers E 57 to the cab rear E 55, directly below the window openings. Drill the marks on the cab rear 0.4mm and add handrails of 0.4mm wire. Solder the cab rear to the sides so that the rear goes ***between*** the sides.

Fold the tags on the fall plate E 28 down at 90°. Check the fit in the floor piece of E 53 when E 27 is laid on top. Enlarge the openings in E27 until the fall plate hinges freely up and down by about 5° or so. Solder E 27 to E 53, trapping E 28 in position. Use a minimum of solder, along the edges only.

Drill the backhead 1.5mm for the regulator L 3, and 0.6mm for the reverser wheel L 6. Solder these details to the backhead. Solder the seats W 14 and W 15 to the L/H and R/H sides of the cab, respectively. Solder the staff exchanger lever E 32 to the bottom corner of the staff exchanger, angling up at 45° across the cab rear.

Drill 0.7mm in the outer flanges of the injectors L 21. Solder the injectors in the locating holes at the bottom of the cab rear.

Leave the backhead and cab roof separate for now.

Boiler and Footplate - Drilling

Drill holes in the boiler at the places marked. 0.8mm for handrail knobs and injector starting valves (on the sides of the firebox), 0.6mm for smoke deflectors and whistle shroud, 0.9mm for the whistle, three 0.7mm holes for conduit junction boxes on the smokebox and 1.0mm holes for the boiler feed check valves. Make sure that the holes for the check valves are vertical, and not radial to the boiler. Drill 0.4mm holes in the top of the dome for handrails, 2.0mm for the funnel and 1.1mm holes in the top of the firebox for safety valves. Drill the lower edges of the dome 0.6mm for the sand outlets.

Drill the smokebox front where marked with 1.5mm for the headlight, 0.8mm for the handrail knobs, 0.7mm for the marker lamps and central hand wheel and 0.4mm for the handles in the lower hinge strip and left side of the door.

While in drilling mode, drill the front of the footplate 2.0mm for the coupler and buffers, 0.4mm for handrails, 0.5mm for the coupler operating rod brackets, brake hose and steps and 0.8mm for the compressor delivery pipe. Drill the top face of the footplate 2.0mm for the reverser cover and lubricators, 1.2mm for the turbo-generator, 0.9mm for the air compressor governor and for the pipes that go through the footplate adjacent to the firebox and 0.5mmfor the feet of the ladder and the tail disc on the headstocks.

Valance

Tin the backs of the footplate valance strips E 51 and E 52. Fold a joggle in the front sections. At each bend there are three half etched lines, but use only the rear line of the rear group, and the central line of the front group. The front fold puts the half etch lines on the ***outside*** of the bend. Each bend is only about 10°. Check the fit of the valance against the footplate.

Turn the footplate upside down on a smooth hard surface. Place the valance against the edge of the footplate and solder with low-melt. Start at the front and work to the back, ensuring that the valance is pressed against the edge of the footplate.

Main Assembly

Attach the boiler to the footplate with an M2 pan-head screw into the smokebox. Adjust the screw until the rear of the firebox is flush with the step in the footplate. Tighten the screw and solder the inside of the firebox to the footplate. Solder the lower firebox sides W 3 and W 4 to the footplate.

Slacken the screw into the smokebox to allow the steam pipes W 27 to be placed between the boiler and cylinder saddle. Tighten the screw and temporarily install the boiler on the chassis. Attach the body with an M2 screw through the chassis into the smokebox. Solder the steam pipes to the smokebox so that they are aligned with the pipes cast on top of the cylinders. With the boiler still in place check the fit of the frame extensions E 7 and E 8. Trim the rear ends of E 7 and 8 as required. Remove the body and solder the extensions to the chassis. Bend the guard irons in a joggle, as shown on Drg.7.

Solder the footplate supports W 25 and W 26 to the footplate and boiler. Solder the lubricators W 28, reverser cover W 17 and turbo-generator W 16 to the footplate. Solder from ***underneath*** the footplate. Add the reservoirs W 21, stoker motor W 19 and the air compressor W 10 with its strainer W 13.

Fold the speed recorder drive support E 23 to shape and solder the joins. Fold the intermediate support E 22 and solder these parts to the underside of the footplate. Solder the gearbox L 32 to the bottom of E 23 and add a length of 0.4mm wire from the gearbox, through E 22 and behind the cab.

The lubricator drive linkage is represented with link E 21 and a piece of 0.5mm wire. Solder the wire to a 0.5mm hole drilled in the end of E 21. Then solder E 21 to the radius rod lifting link.

Cab Assembly

Check the fit of the cab and solder the cab to the firebox and footplate. Solder the backhead into the cab. Paint the cab front window frames black and paint the cab interior. The cab is black up to the bottom of the

windows and biscuit above. Pick out valve and reverser handles in red, gauges in white etc… Glaze the front windows with the clear plastic cut previously.

Drill two 0.8mm holes in the R/H end of the turret cover W 8 and one in the L/H end. Drill a 0.6mm hole in the front face and solder the turret cover centrally in front of the cab.

Tin the top edges of the cab sides and attach the cab roof with low-melt solder. Add the valance sections E 29 and E 30. Solder a length of 0.4mm wire down the cab side from the roof gutter to the bottom of the side. These 'down pipes' are set back from the front corner of the cab by about 0.3mm.

Smokebox

Curve a length of 0.4mm wire around a piece of ½" dowel and thread four short handrail knobs onto the wire. Insert the knobs into the holes in the smokebox front and solder from behind with low-melt. Now flux the handrail knobs and secure to the handrail with a touch from a clean tinned iron. Remove the centre section of the handrail to allow for the headlight. Trim the lower ends so the rail projects about 0.4mm beyond the bottom knobs. Add the central hand wheel L 4 and 0.4mm wire handles, soldering from behind the door.

File off the excess handrail knobs projecting from the back of the smokebox front and attach the front to the boiler with low-melt solder. Dress the edges of the front flush with the barrel of the smokebox. Solder the headlight to the smokebox front as well as your choice of marker lamps (Pyle National or Newport) to the brackets on either side.

Headstock Details

Bend a 'U' from 0.7mm wire and insert it in the holes in the vertical face behind the front headstocks. Add the three 0.4mm wire handles and the two etched steps E 35 after folding them to shape. Solder from behind.

Add the buffers W 23 and W 24 to L/H and R/H sides respectively, the brake hose L 20 and the coupler pocket (with narrow slot at the top) to the headstocks. Secure the auto coupler and screw coupler in the bottom and top slots respectively with a short length of 0.7mm wire. Fold the cowcatcher E 49 to shape and solder to the headstocks. Bend one end of the uncoupling lever to shape, thread four brackets E 34 on to the wire and bend the other end to shape. Solder the brackets to the headstocks. Drill 0.5mm at the mark above the coupler pocket and add a tail disc E 33 (folded) or E 96 (open).

Fold the bracket E 31 to shape with the half etch lines on the ***outside*** of the bend and solder it across the base of the smokebox front.

Boiler Details

Solder the funnel to the smokebox. Add three conduit junction boxes L 23 behind the headlight and adjacent to each marker lamp. Run conduit of 0.4mm wire from the R/H footplate through the junction boxes and terminate at the L/H junction box. Add a branch of 0.4mm wire to the headlight and to each marker lamp.

Drill a 0.5mm hole through the air pump governor L 19 and thread it on to a length of 0.5 mm wire. Solder the governor to the footplate beside the smokebox and poke the ends of the wire behind the footplate.

Drill 0.4mm holes in the smoke deflectors and add handrails of 0.4mm wire. Solder from behind, trim the excess wire and file flush. Fold a smoke deflector support to shape. Do this one at a time, so that E 39 goes on the L/H side and E 40 on the R/H. The bends with three half etch lines go at the bottom. Solder each support to its respective deflector and then to the smokebox.

Thread the reverser shaft E 26 through the cab front and solder the forward support into the hole in the footplate. Solder the front end to the reverser cover on the footplate.

Drill a 0.4mm hole in the end of the sand traps L 13 and L 14. Solder a 12mm length of 0.4mm wire into each trap to form two 'L' shaped subassemblies. Solder the castings to the boiler so that the flange on the upper end is against the dome skirt, with the 0.4mm wire pointing forward. Bend the wire down in a gentle curve around the boiler and behind the footplate. Add air supply pipes from fine fuse wire.

Bend handrails from 0.4mm wire and solder to the dome. Solder the sand hatches E 36 to the dome behind these handrails.

Drill 0.7mm holes in the square flanges of the check valves L 9. Install the safety valves L 10 and L 11 (the fatter, muffled valve goes closest to the cab) the whistle L39 and the two boiler-feed check valves in the holes drilled in the boiler earlier. The check valves should be horizontal, but angled at about 40° to the longitudinal centre line. Secure all these parts from inside the boiler with low-melt solder. Fold the whistle shroud E 42 to shape and solder it to the boiler behind the whistle. Add a whistle-operating rod made from fine fuse wire.

Form supply and exhaust pipes for the turbo-generator from 0.5mm wire. The supply runs from the hole in the front of the turret cover. The exhaust terminates with an upward kick of 45° just after the first boiler band on the firebox.

Form boiler feed pipes from 0.7mm wire so that they leave the check valves horizontally, but angle down and around the side of the boiler at about 45°. Secure the lower ends to the firebox sides below the footplate.

Solder short lengths of 0.7mm wire between the bottom corners of the firebox and the sockets on the sides of the blow-down mufflers. Bend 0.7mm wire exhaust pipes from the upper sockets, up through the holes in the footplate and up the side of the firebox. Cut the top end level with the top of the firebox.

Drill 0.7mm holes in the top and bottom flanges of the starting valves L 24. Drill 0.4mm holes in the rear flange. Solder a short length of 0.4mm wire into the rear flange (to reach the cab front) and solder the valves to the sides of the firebox. Add 0.7mm wire between the valves and the turret cover and from each valve down through the footplate. Add the compressor supply pipe of 0.5mm wire from the turret to the footplate, in front of the R/H starter valve.

With the ladder sides E 37 still attached to the sheet, drill the two handrail holes 0.4mm. Stand the sides up at 90° to the sheet, so they are 4.2mm apart. Lay a short length of 0.4mm wire in a notch in each side plate and solder both sides. Repeat for the other five rungs. When the ladder is complete trim any excess wire flush with the side plates and remove the ladder from the sheet. Thread a 90mm length of 0.4mm wire through the holes in the ladder. Add the handrail stanchions and attach to the R/H side of the boiler. Solder the bottom end of the ladder in the holes drilled in the footplate. Add the L/H boiler handrail.

Bend short lengths of 0.7mm wire to run from the injectors around behind the lower cab side sheets. Check that they will clear the rear beam of the chassis when it is installed. Solder the wires to the injectors and cab sides

Painting and Finishing

Disassemble the body from the chassis and remove the motor and gearbox. Wash the model in warm soapy water and give it a scrub with an artist's bristle brush and 'Ajax' liquid or similar. Rinse and allow it to dry. ***Do not touch the model with bare skin after cleaning it.***

Fill the cab with a wadded tissue to mask the interior. Mask the cab front windows with tape. Spray the tender tank and locomotive body with grey etch primer. Allow it to dry and spray on a coat of bright red. After this has dried mask the deflectors, front headstocks, footplate valance and a scale 6" wide stripe curving down from the valance, across the bottom of the cab sides and around the bottom of the tender tank. Spray the model and chassis with a mixture of grey and black etch primer, to produce a warm black. Remove the masking and then weather to taste. Etch primer can be removed from the wheel treads with a cotton bud dipped in methylated spirits and/or a fibreglass eraser.

Number Plates

Select a number from the plates provided and cut them from the sheet. Paint the plates white and allow several days for the paint to dry. Paint the background black. Attach the plates to the model with a touch of silicon sealant. Single 'R' goes to the left of the front coupler, with the number to the right. Combined R and number plate goes on the centre of the tender rear, with the top edge 10.5mm above the headstocks. Combined R and number plates go on the cab sides, with the top edge 14.5mm above the bottom of the cab side and the front edge 3.5mm from the front edge of the cab.

R704 had chrome plated boiler bands and chrome plated number plates (natural nickel silver for the model) with red background. The commemorative plates are located on the cab sides to the same dimensions as standard number plates.

E218

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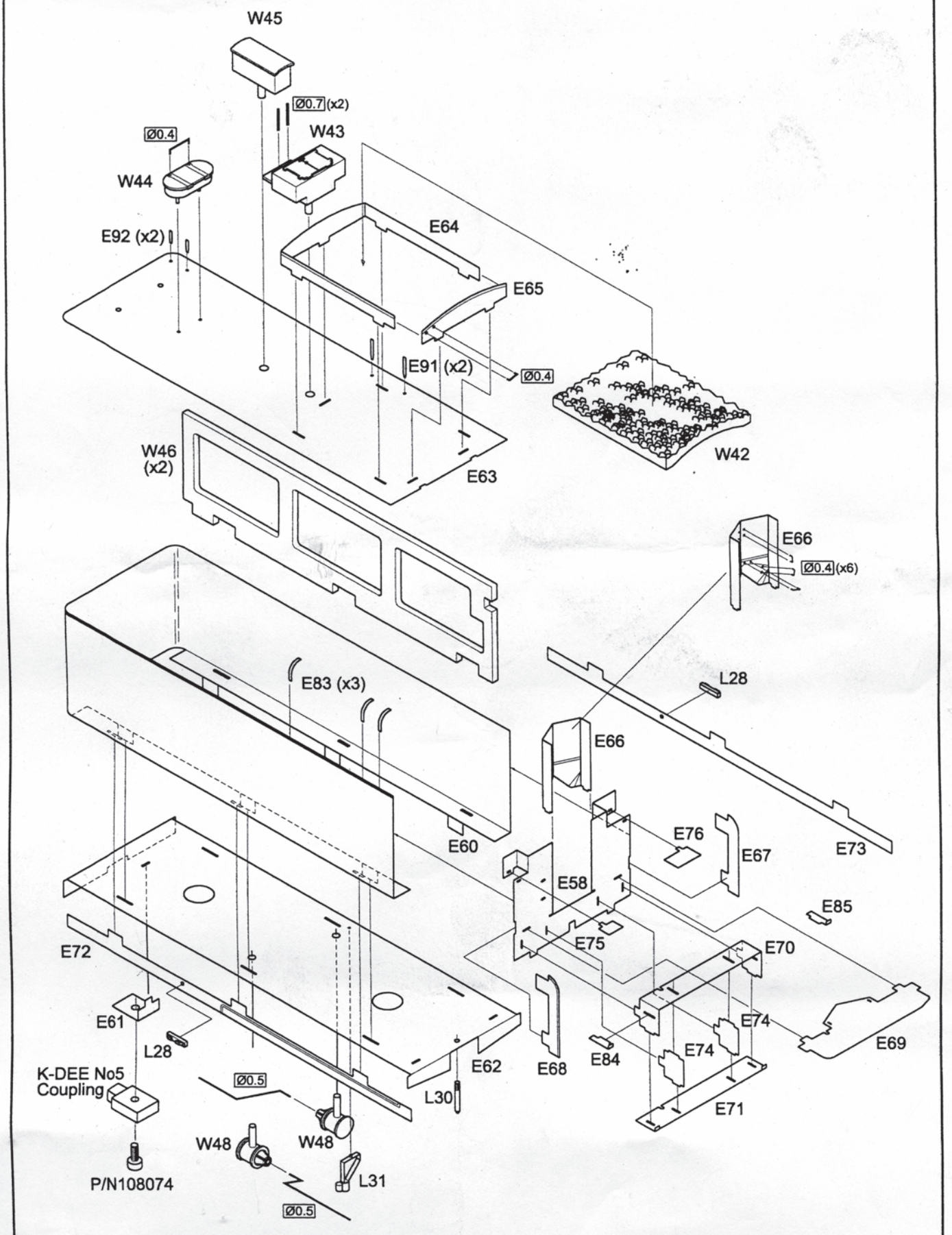

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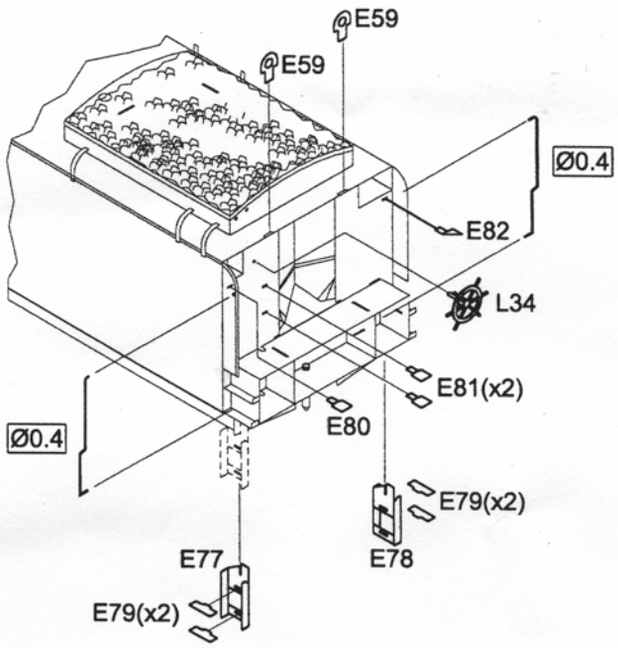

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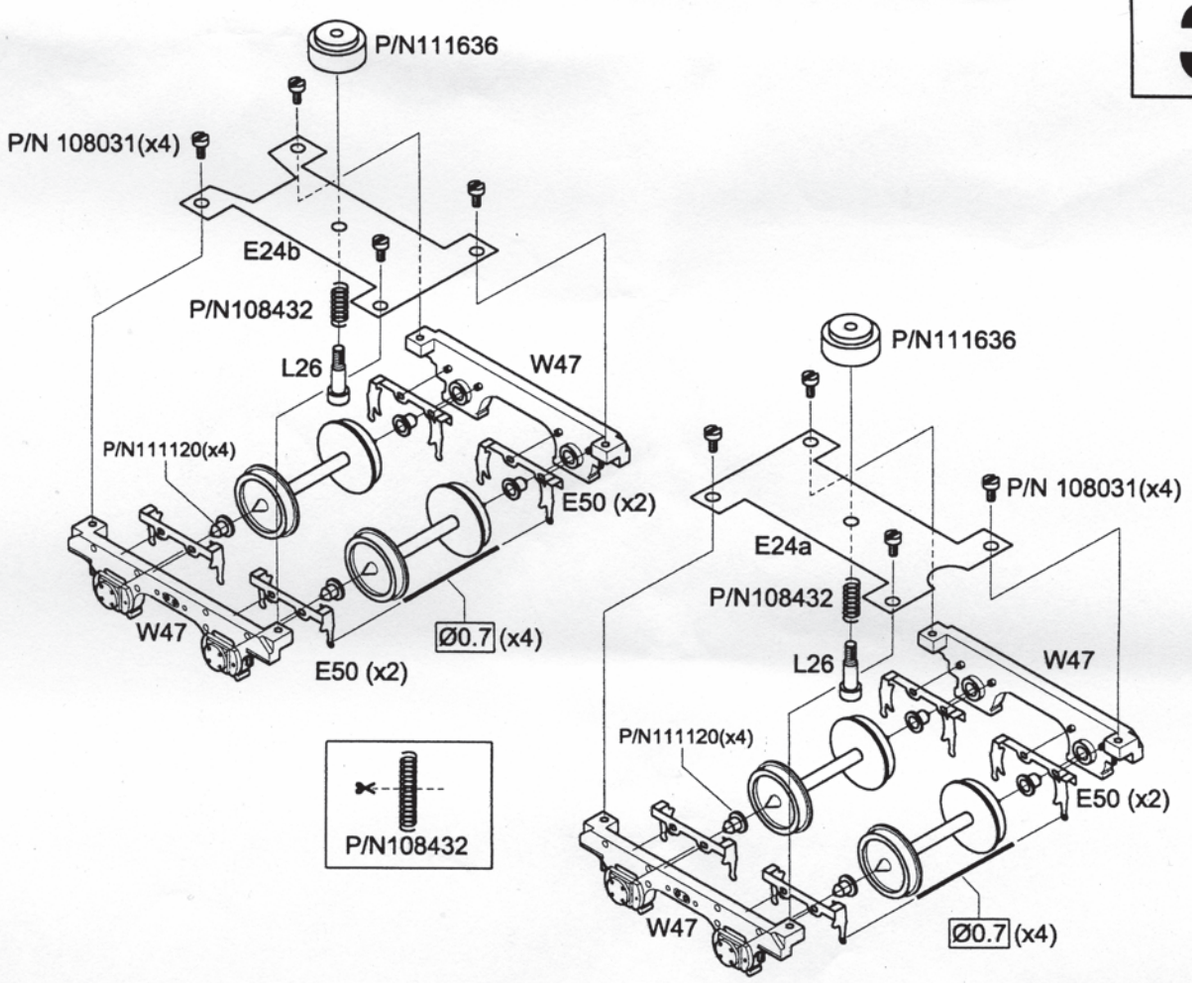

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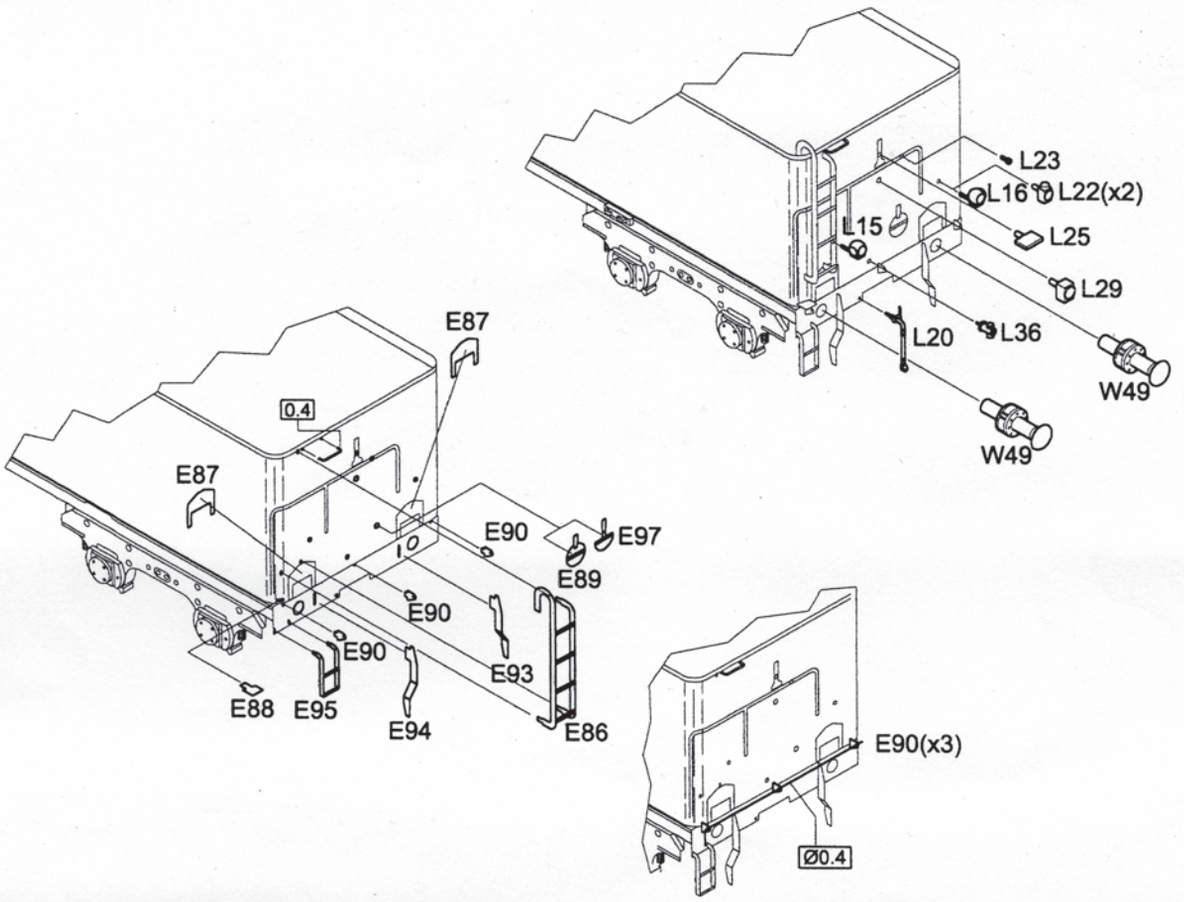

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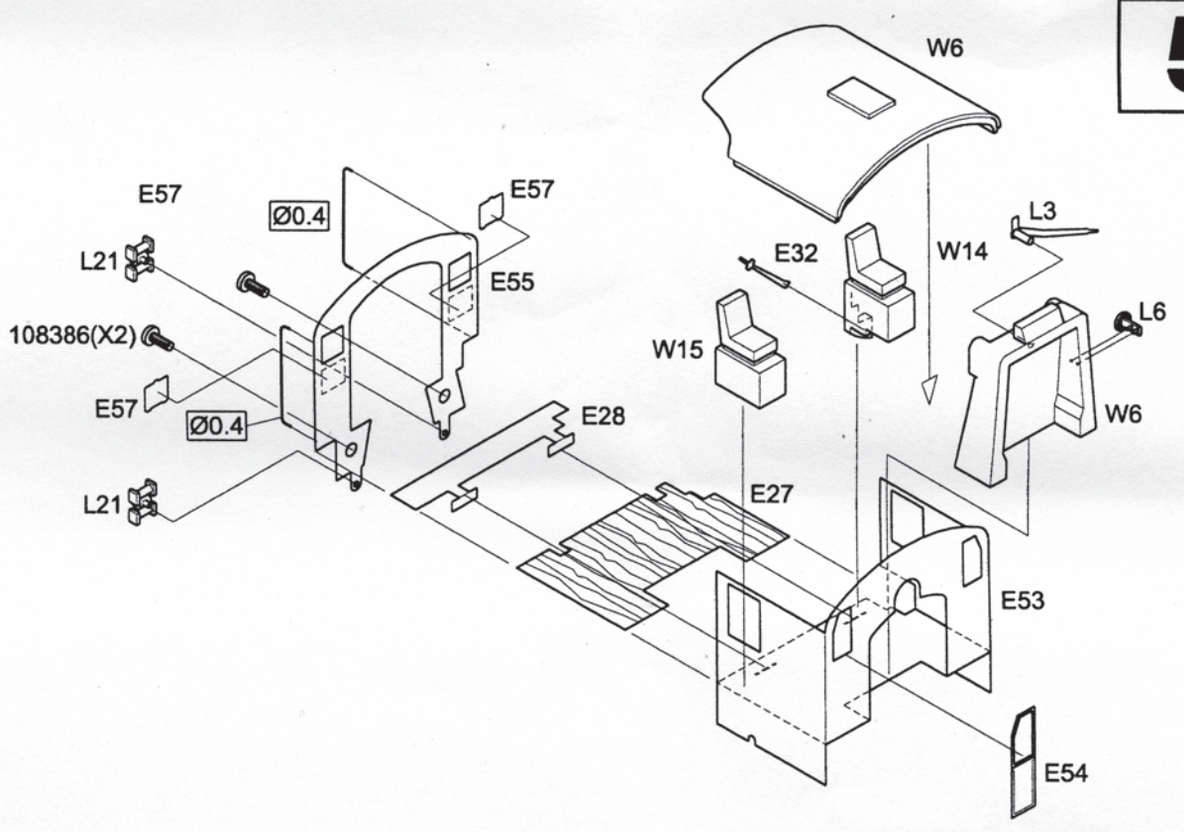

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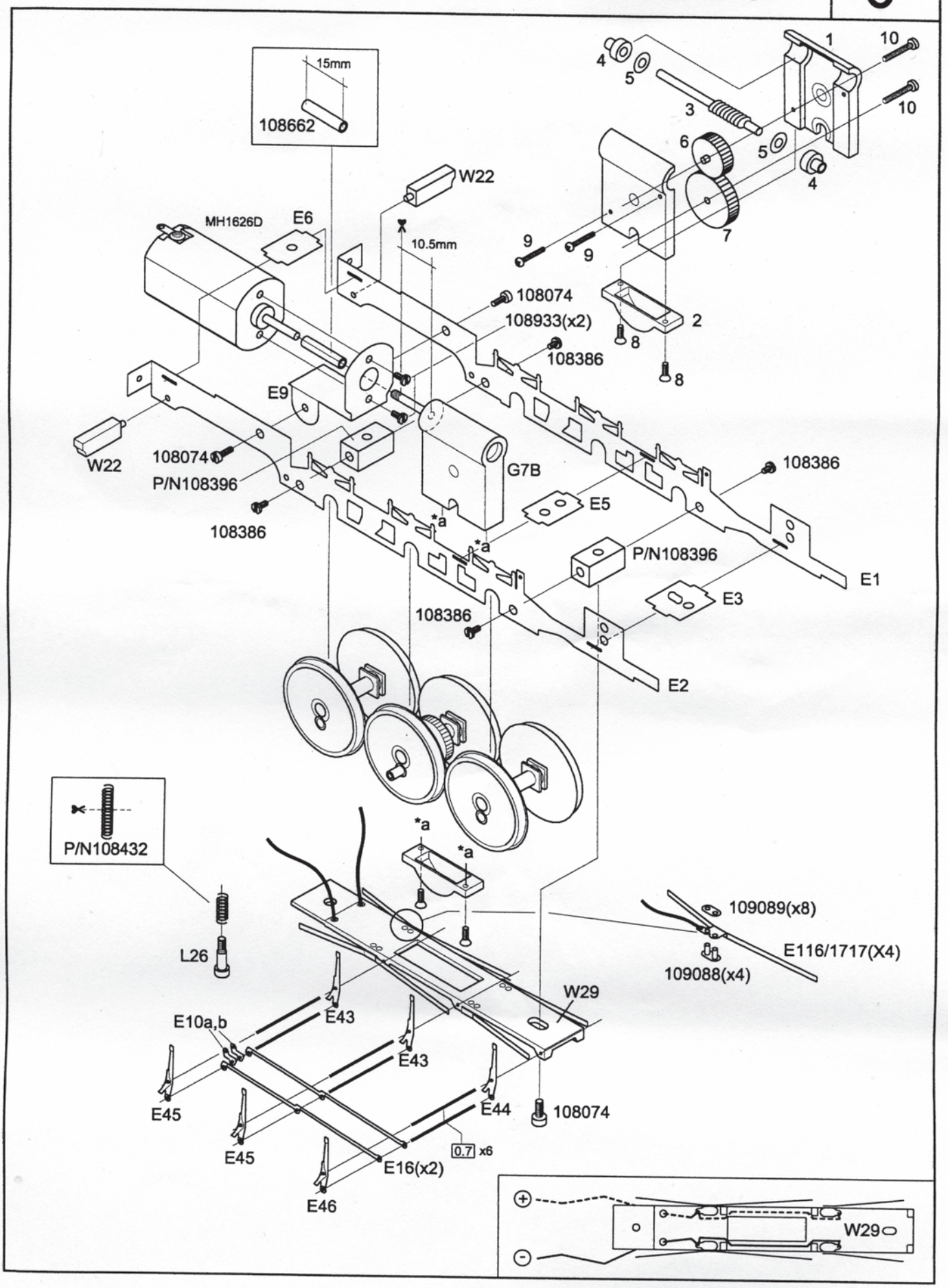

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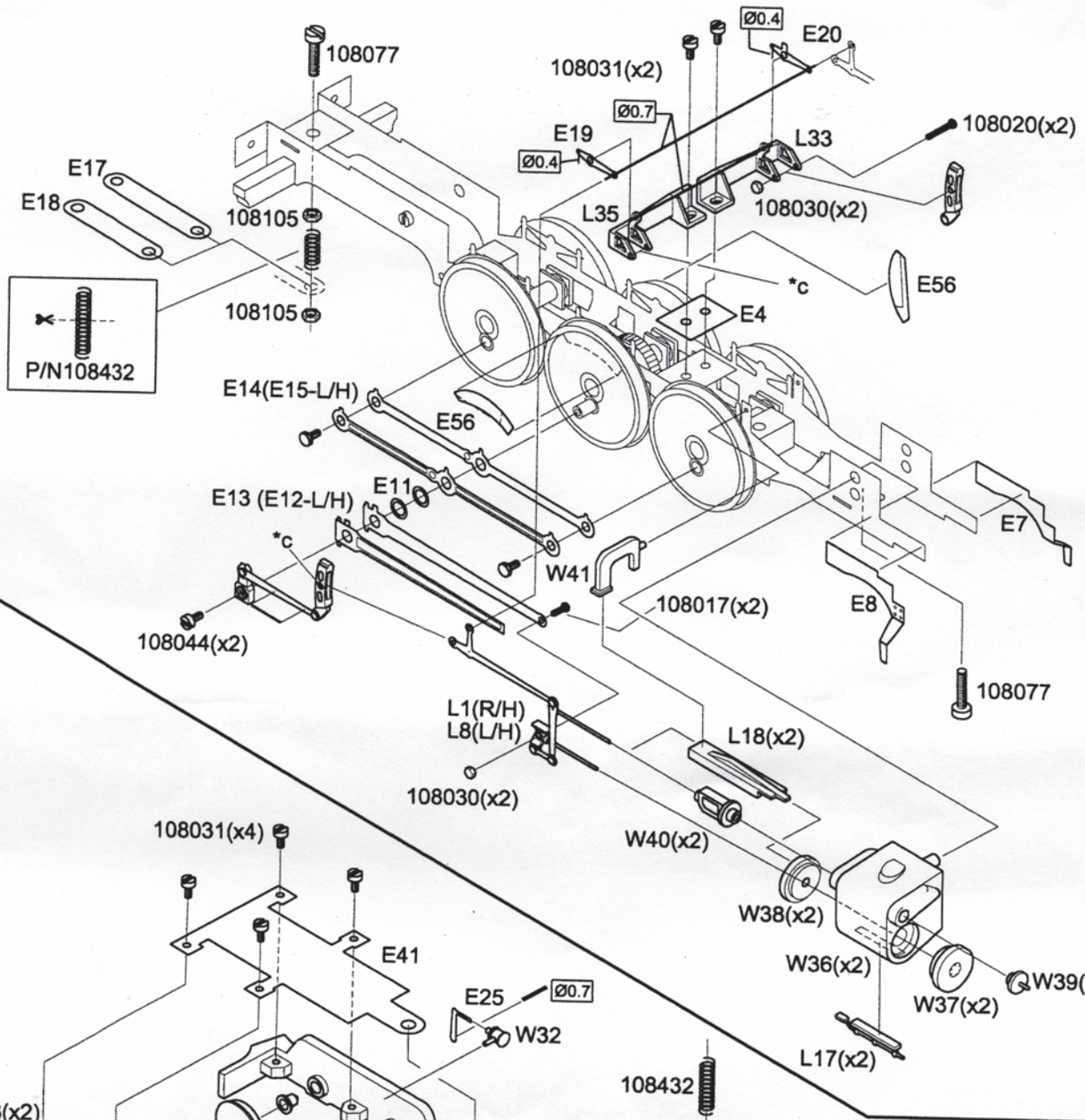

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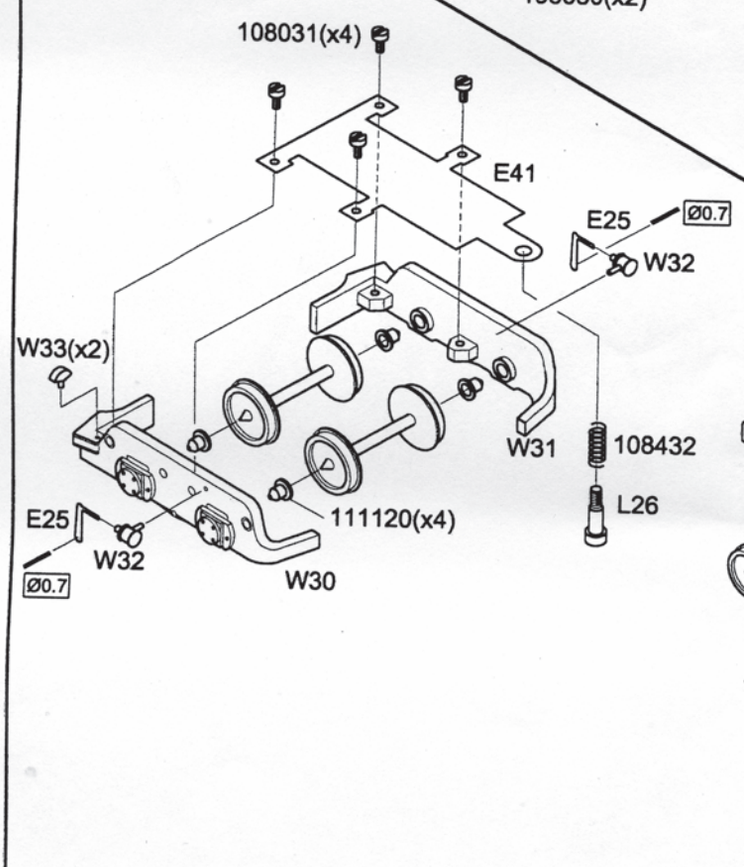

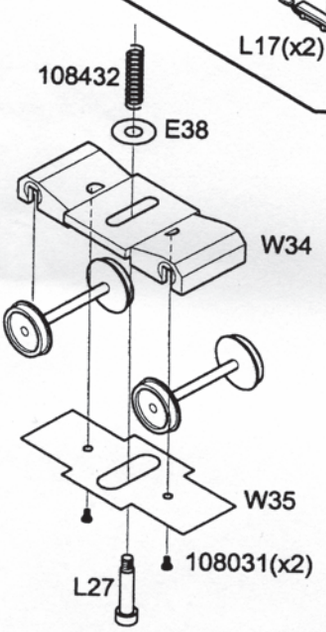

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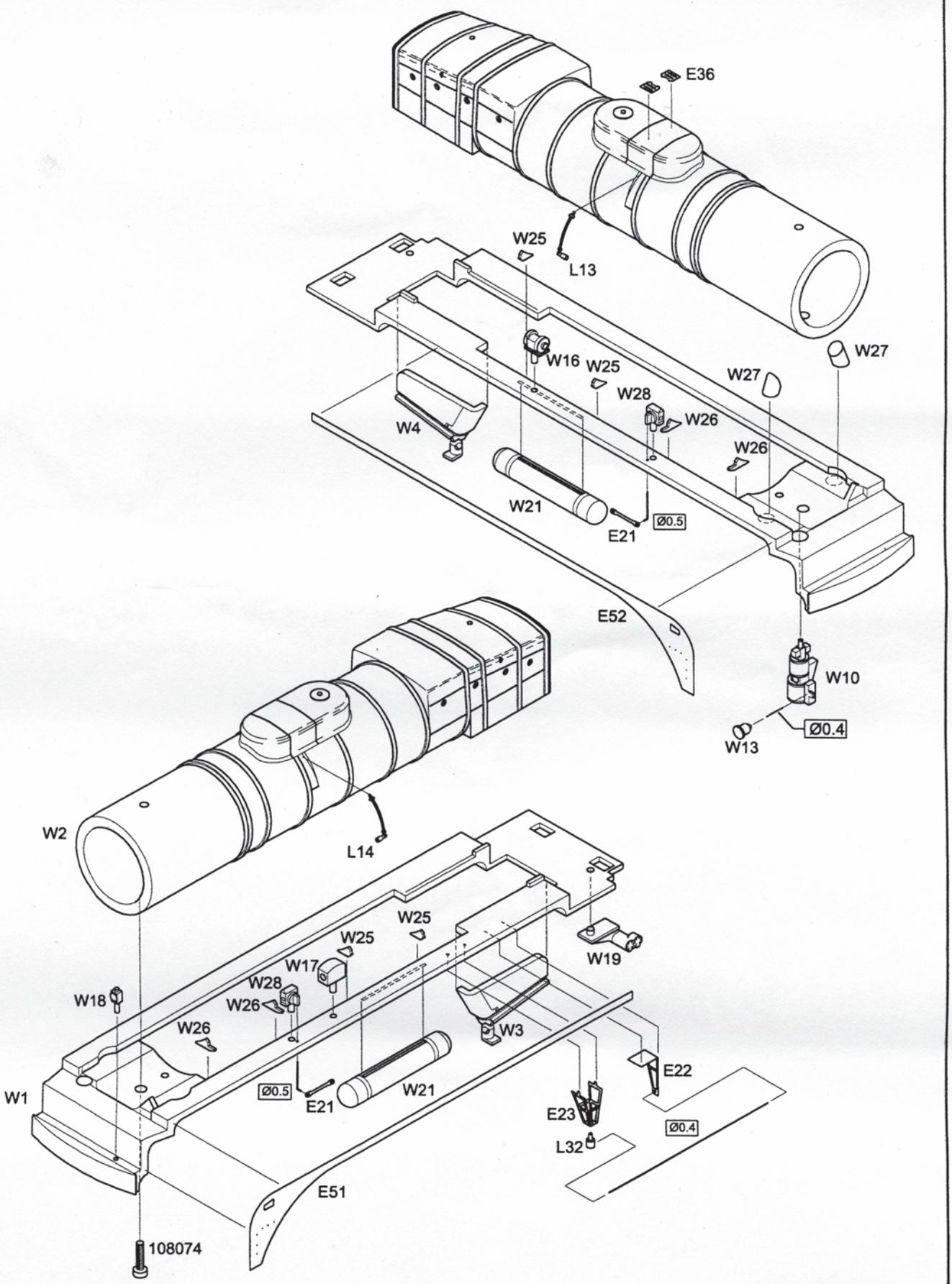

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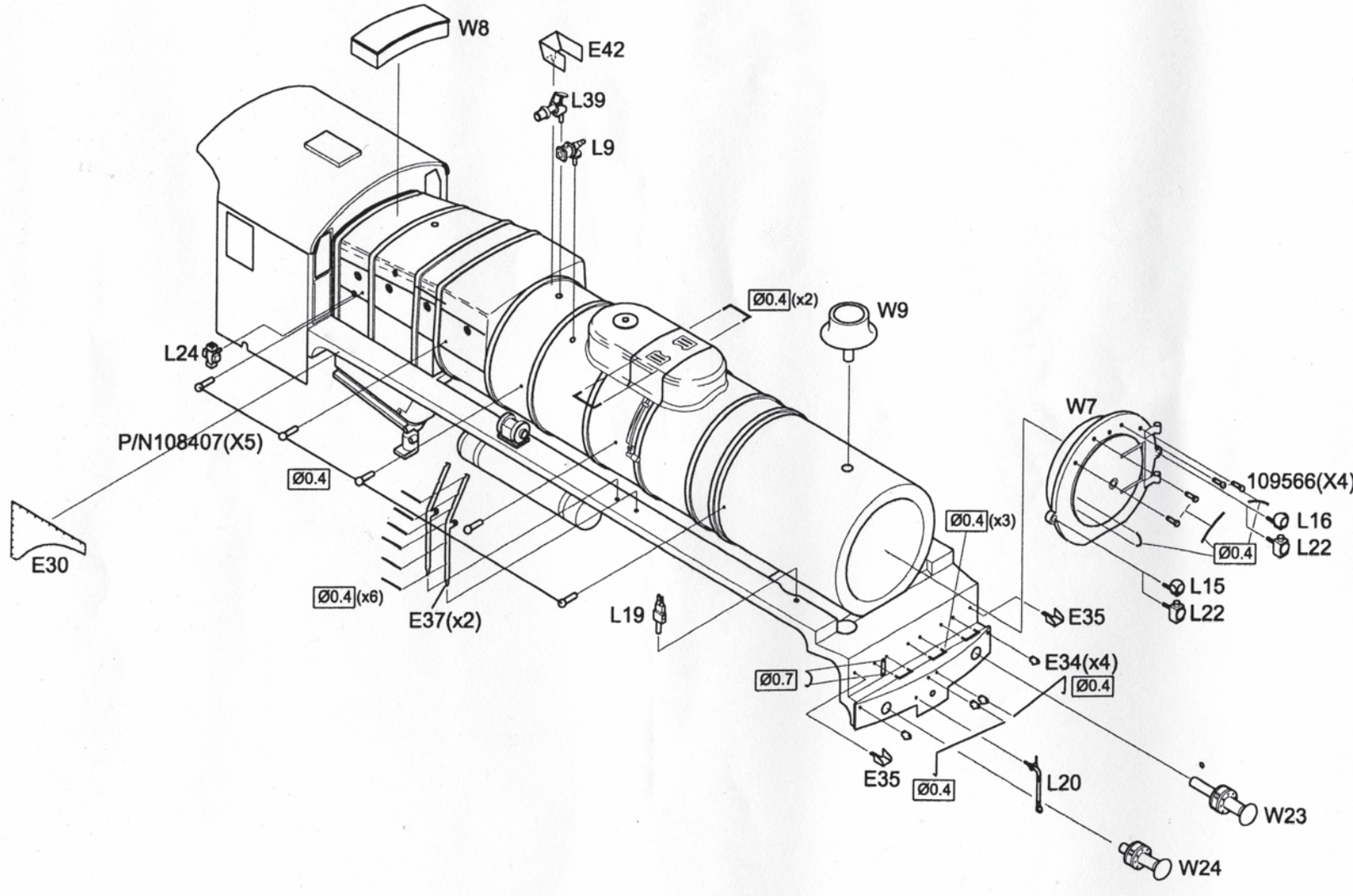

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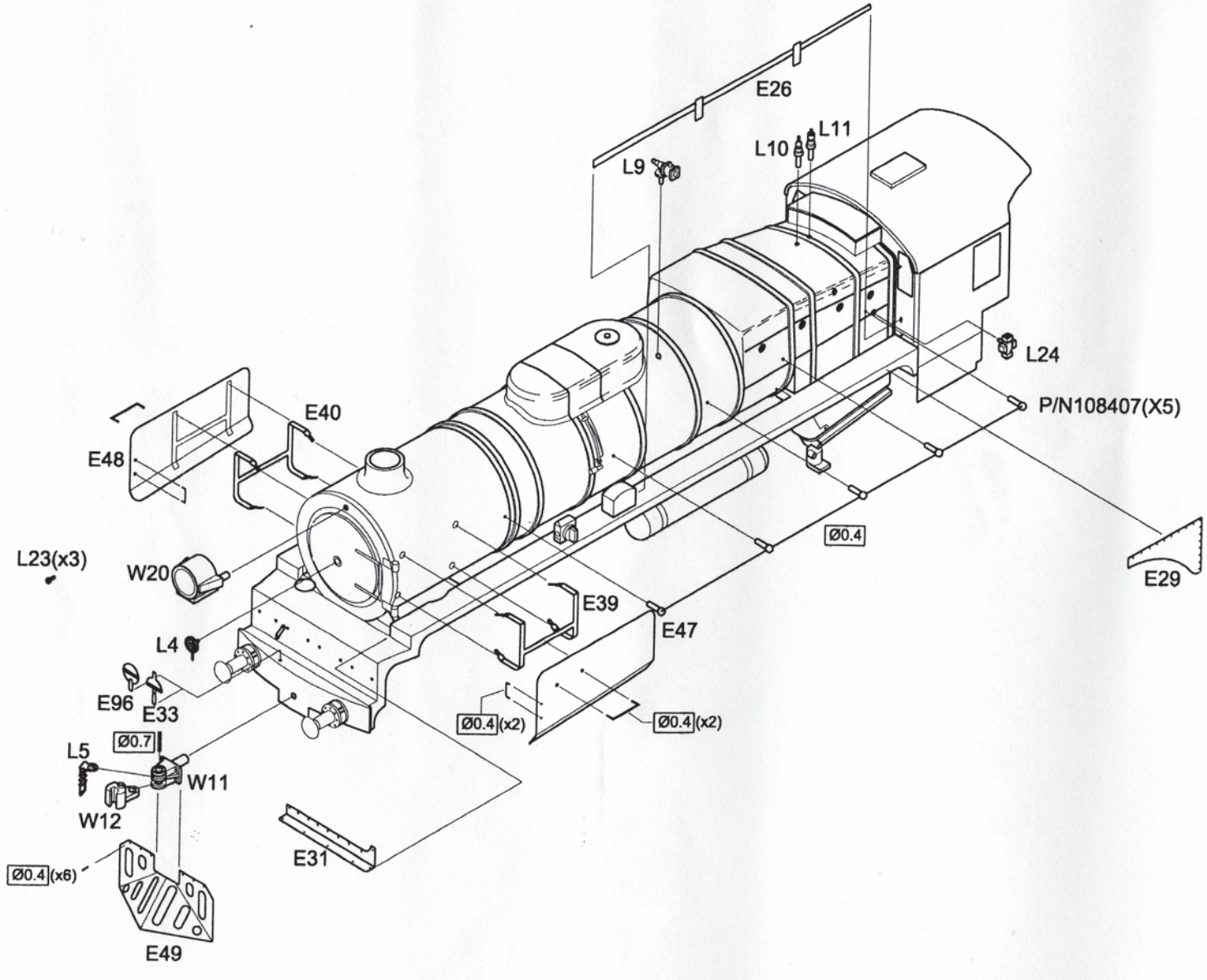

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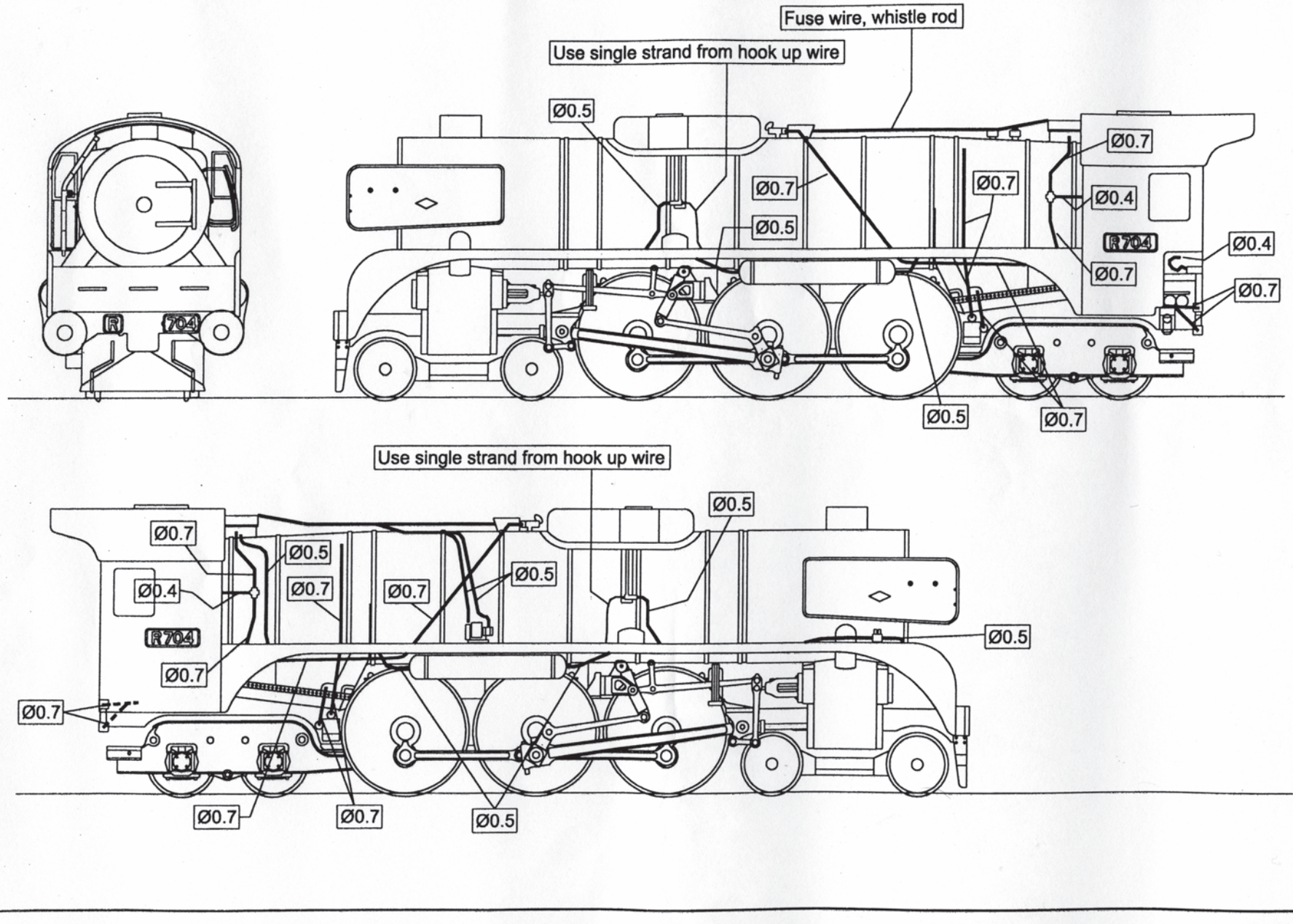

Layout of screws and other hardware in packaging.

Frame spacers (2) **P/N 108396**	**Tender bogie pivots (2)** **P/N 111636**
M2 x 8 Pan head screws (2) **P/N 108077**	**M2 x 5 Pan head screws (5)** **P/N 108074**
M2 Hex nuts (2) **P/N 108105**	**M2 x 4 Cheese head screws (6)** **P/N 108386**
12BA x 5 cheese head screws (2) **P/N 108044**	**14BA x 3 cheese head screws (2)** **P/N 108017**
14BA hex nuts (4) **P/N 108030**	**14BA x 6 cheese head screws (2)** **P/N 108020**
Long handrail knobs (10) **P/N 108407**	**Short handrail knobs (4)** **P/N 109566**
Brass 'top hat' bearings (12) **P/N 111120**	**Coil springs (3)** **P/N 108432**
Plastic fixings for pickups (4) **P/N 109088**	**Plastic fixings for pickups (8)** **P/N 109089**
M2 x 2 pan head screws (2) **P/N 108933**	
12BA x 3 cheese head screws (16) **P/N 108031**	