Australian Railway Kits
ABN: 27 416 246 418

Incorporating Main West Models
Manufacturers, Wholesalers and Retailers of Quality Australian Model Railways
PO Box 252 Warwick, Queensland, 4370 Australia
Phone/Fax: 617 4667 1351 Website: www.arkits.com Email: info@arkits.com

NSWGR Z13 4-4-2 TANK LOCOMOTIVE KIT

E183 Manufactured Exclusively for AR Kits by DJH Engineering from Patterns owned by AR Kits

PLEASE READ INSTRUCTIONS THOROUGHLY BEFORE COMMENCING ASSEMBLY

CONSTRUCTION

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 hard timber (e.g. Masonite) 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.

This kit contains sufficient parts to make either the original or altered version of the Z13. Both versions are shown on the drawings, therefore during assembly refer to photographs of your chosen prototype. As with all classes of NSWGR locomotives, individual Z13s varied in minor details from time to time in their life. Modellers are therefore advised to check photographs of the particular locomotive they have chosen to model.

A detailed history of the Z13 locomotive is covered in Ron Preston's book "Tender Into Tank", and an excellent Data Sheet is also available.

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 T2000). These irons have temperature control, as low melt solder only requires around 200 degrees centigrade. You must use special low melting point solder, such as that available from AR Kits.

IT IS NOT ADVISABLE 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 method you choose but dry fitting parts will ensure a good fit

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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, as shown as LS (live side) on the drawings. The tender is insulated from the locomotive chassis by a plastic bush and current is collected from the wheels on the left hand side of the tender.

For good electrical pickup, we recommend the use of track cleaners such as Peco Electro lube or Wahl oil. Regular maintenance should also include cleaning of the pickup wires on the driving wheels.

Clean up and 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 available from Dick Smith stores. Then wash thoroughly in warm soapy water. Rinse with clean water drying 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 motor please do not attempt to repair it yourself - return the motor to us. We cannot exchange 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 you. 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, 0.7mm, 0.8mm, 1.Omm, 1.1mm, 1.2mm, 1.3mm, 1.6mm, 1.7mm.

During construction refer to the drawings at all times. A number of parts are quite similar, so double check if in doubt. In the general instructions the part numbers are shown in brackets. Note that attached to the instructions is a photocopy of the lost wax brass castings sprues with each part numbered for easy identification.

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.

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 - 63)

Remove the L/H frame (1) and the R/H frame (2) from the etch. Note that R/H frame (2) incorporates the motor mounting bracket. Using jewellers files, clean up any tab remnants. Take the axle bushes (3x4) and fit them to the axle holes in the frames, flanges to the outside. Make sure the bushes are fully pushed home before soldering them from inside the frames. Take a Romford axle (14) and check that it turns freely in all the axle bushes.

Fold the motor mounting bracket on top of the R/H frame (2) inwards (fold lines are etched) as shown on the drawing - note that the bracket folds twice. Take the L/H frame (1) and fold the top of the pickup tab outwards and down 90 deg as shown. At the rear of both frames fold the guard irons as shown on the drawing. Use a little solder to reinforce the fold lines.

Take the turned brass frame spacers (4x2). Using the spacer screws (5x4) secure the frame spacers to the inside of the R/H frame, then use the remaining two screws to secure the L/H frame. Note that the top of the L/H frame fits inside the return of the motor mount bracket - see inset drawing. Cut the brass screw (18) (the same type of screw as used in the frame spacers) to a length of 2.Omm and fit to the motor mounting bracket with power tag (17).

Remove the two small screws from the front of the motor (15). Fit the motor and worm to the chassis as shown using the two small screws to secure in place.

Use Loctite or Superglue to fix the long gear bush (9) onto the gear shaft (12), 1.0mm in from the end of the shaft. Remove any excess Loctite or Superglue before fitting the reduction gear (10) (large gear first) followed by the short gear bush (9) note, the gear and the short bush are not glued to the shaft. Loosen the brass spacer screws (5x4) to allow fitting of the assembled reduction gear/shaft and the Romford axle and gear. At this point, also fit the spacer and spring plate (6) checking that it is around the right way - see drawing, spacer front fixing plate (7) and spacer bogie pivot plate (8). Retighten spacer screws and solder the three plates 6,7 and 8 in place. Solder two 20mm lengths of 0.4mm wire into spacer and spring plate (6) as shown. These provide springing for the rear pony axle.

Cut two pieces of 0.4mm wire to a length of 30mm and use these to fit the brake gear pull rods (26x2) against the inside of the frames as shown.

Fix balance weights small (24x2) and balance weights large (25x2) to the driving wheels (21x2) and (22x2) -see inset drawing. Using a Romford axle nut screwdriver, fit the crankpins (31x4) to the driving wheels. Now fit the driving wheels to the chassis adding etched O.5mm washers (19x2) and (20x2), ensuring the insulated wheels are on the L/H side. Note that the insulated wheels can be identified by a fine insulating washer between the nickel silver tyre and the wheel. Quarter the wheels so that the crankpin on the right-hand wheel leads that of the left-hand wheel by 90 deg when the axle rotates forward, and secure in place with the Romford axle nuts (23x4).

Cut another two pieces of 0.4mm wire to a length of 30mm and pass through the holes in the top of the frames to secure the brake shoes (29x2) and (30x2). Drill each brake shoe (top and bottom) 0.5mm. Fit each brake shoe to the top and bottom wire, flush with the outside of the wheel. Fix in place and trim off excess wire.

Take the rear pony axle (27) and "short out" one wheel by pushing a length of l.Omm brass between the axle and wheel as shown - note one wheel has been pre-drilled for this. Trim off excess wire flush with the wheel. Check that the bearings on the rear pony axles slide easily in the slots in the frame before fitting the axle, "shorted" wheel on the R/H side. Retain wheel with rear pony keeper plate (28); spot solder the keeper plate in position.

Using a 1.0mm drill, drill the cylinder covers rear (40x2), and the two dimples under each cylinder body (42x2). Make up the cylinders using cylinder body (42x2), cylinder covers front (41x2) and cylinder covers rear (40x2). Put aside for later fitting. Fix the motion bracket (39) to the frames, ensuring that it is level with the top of the frames. Fold the slide bars (35x2) as shown. Trim the crosshead rods (34x2) to a length of 10mm as shown and clean out the hole in the crosshead with an l.Omm drill bit. Tests fit the crossheads into the slide bars and check that they slide freely. With crossheads fitted to the slide bars, fit the connecting rods (36x2) using 14BA screws (37x2) and 14BA nuts (38x2). Take care when tightening these screws - do not squeeze the crossheads against the connecting rod. Trim excess thread from screw and use a drop of Superglue to retain the nut. Pass the connecting rods through the motion bracket (39) and fit the crossheads into the cylinders. Fix the completed cylinders to the chassis ensuring that they are aligned with the top of the chassis, at the same time locating the rear crosshead guide tabs into motion bracket - see inset drawing. Fit the connecting rods (36x2) to the crankpins- (31x2) of the leading driving wheels. Fit the spacing washers (33x2) to the crankpins of the rear driving wheels then fit the coupling rods (32x2). Fit crankpin fixers (44x4). **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.

Take the drain cocks (43x2) and file a point on the end to fit into the hole in the bottom of the motion bracket. Place the end into the motion bracket and glue the two vertical tabs into the two holes previously drilled in the bottom of the cylinders.

Motor Pickup

Check that the pins on plastic pickup pin (59) will pass through the bracket in the chassis frame, and that the plastic washers (60x2) will fit on the pins - enlarge holes if necessary. Following the drawing, place pickup strip (58) on plastic pickup pin (59) followed by plastic washer (60). Then pass the pin through the frame bracket followed by another plastic washer (60). Hold the assembly firmly together with tweezers, and use a soldering iron to melt over the excess plastic pin to retain the assembly. Trim off excess from each end of the pickup strip, and adjust to bear lightly on the wheels.

Front bogie. Take the two front bogie axles (46x2) and "short out" one wheel on each using 0.7mm wire -note one wheel on each axle has been pre drilled. Make up the front bogie using bogie body (45), bogie axles (46x2) and keeper plates (47x2), ensuring that the "shorted" wheels are on the L/H side of the bogie. Before assembly, it is recommended that the keeper plates (47x2) be drilled in the centre (1.Omm) to enable lubrication.

Make up the front bogie mounting assembly using M2 screw (48) cut to a length of 16mm, power tag (49), insulated washer (51), insulator (50) and M2 nut (52). Then add bogie sleeve (53), spring (54), washer (55) and assembled bogie, followed by washer (56) and M2 nut (57). Inset drawing clarifies assembly.

Body Drawing 2 (Parts 64 - 120)

Take the footplate (64) and use a 0.7mm drill to clean out the hole for the brake handle (73); use a 1.2mm drill to clean out the holes for the sandbox fillers (89x2). On the underneath of the footplate, use a 1.3mm drill to countersink the holes for the fitting of the water pipes (94x2) - DO NOT drill these right through!

Note that underneath the right-hand side there are a number of feed sprues used in the casting process. Use a file to remove these but be careful not to file into the plate itself. Now remove the feed sprues across the centre of the footplate - use a razor saw for this as side cutters will distort the casting. Place the footplate on top of the chassis and check that the angle at the front matches that of the chassis. Fix M2 nut (117) into the slot in the footplate. Take the front pilot deck (66) and drill all holes as shown on the drawing. Check that the front pilot deck locates properly on the front of the footplate before fixing in place.

Take the boiler/firebox (67) and drill all holes as shown on the drawing. Trim M2 screw (68) to a length of 8mm before fixing into the boiler as shown. Fix the front spectacle plate (75) to the firebox ensuring that the lug on the spectacle plate fits into the firebox. Fit the boiler/firebox/spectacle plate assembly to the footplate, gluing at the front and securing under the boiler with M2 nut (69).

Take the R/H tank side (74) and L/H tank side (76) and drill all holes as shown on the drawing. Note that the lifting hooks (110x4) were not fitted to all locos. Fix both tank sides to the footplate/boiler. Fix tank back (79) in place. Select either original cab back (78) or later version (77) and fix in place - note that later version cab back (77) must be fitted with the riveted band facing the inside of the cab if you wish to fit the extended coal bunker. Fix bunker (80) in place, and if desired, bunker extension (81), before fitting coal (82).

Fit brake handle (73) to cab. Drill back head (84) 0.6mm and fit regulator handle (83), before fitting back head in place. Before detailing the boiler/firebox, carefully check Drawing 3 which shows the original style Z13 at the bottom of the page and the altered version at the top of the page. Following these drawings continue detailing the boiler/firebox. In both versions the clack valve piping on the boiler is held in place with split pins (120x2). Before fitting, reduce the size of the eye in the split pin to a more acceptable size by placing it on a length of 0.7mm wire and squeezing with a pair of flat nose pliers. It is recommended that the split pins and piping are fitted before smoke box door (90), so that the split pins can be bent over from inside the boiler. Fit smoke box valves (114x2) to the smoke box door (90) and trim/file off flush with the rear of the smoke box door before fitting the smoke box door to the smoke box.

Continue to detail the remainder of the locomotive referring to Drawing 3 and photographs - note that the rear water fillers were taller on some locomotives and are supplied as an option. Some modellers may prefer to leave the fixing of the cab roof (85) until the locomotive has been painted.

With the body seated on the chassis, fix footplate detail part (65x2) to the edge of the footplate directly above the cylinders. Remove rear steps (95x2) from the fret and fold the bottom and top as shown. Remove rear step treads (96x2) and fix to the rear steps. Fix the steps over the spigot under the footplate. Trim water piper (94x2) just above the collar and fix to the underside of the footplate (into the previously countersunk holes) behind the rear steps. Make up the front steps (97x2) with front step treads (98x2) as per the rear steps, and fix to the underside of the footplate as shown. Remove guard irons (118) from the fret, fold as per the drawing and reinforce the folds with solder before fitting behind the buffer beam.

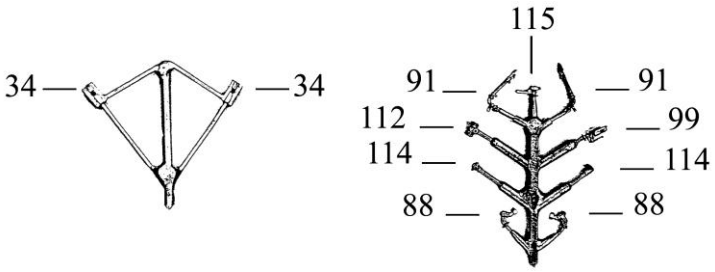
Drawing 3 - Detailing

As mentioned previously, Drawing 3 shows detailing for both early and late versions. Both versions are fitted with handrails using handrail knobs short (116x2). Locating dimples are present for all handrail holes. If fitting the inspection cover (113x2), (not fitted to some locomotives) a suggestion is to hold the cover using a small piece of Blue-tac on the end of a toothpick, apply a very small amount of superglue to rear of the cover and fix in place.

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.

24 Feb 2009

(E183) - Z13 - LOST WAX BRASS CASTINGS



(E183) - Z13 - PARTS LIST

Chassis Drawing 1.

1.	L/H Frame	E
2.	R/H Frame	E
3.	Axle Bushes x 4	T
4.	Spacers x 2	T
5.	Spacer Screws x 4	T
6.	Spacer and Spring Plate	E
7.	Spacer Front Fixing Plate	E
8.	Spacer Bogie Pivot Plate	E
9.	Long Gear Bush	T
10.	Reduction Gear	P
11.	Short Gear Bush	T
12.	Gear Shaft	T
13.	Gear and Romford Axle	T
14.	Romford Axle	T
15.	Motor and Worm	T
16.	Motor Screws x 2	T
17.	Power Tag	E
18.	Spacer Screw	T
19.	Etched 0.5mm Washers x 2	E
20.	Etched 0.5mm Washers x 2	E
21.	Insulated Driving Wheels 20mm x 2	T
22.	Non-Insulated Driving Wheels 20mm x 2	T
23.	Romford Axle Nuts x 4	T
24.	Balance Weights Small x 2	E
25	Balance Weights Large x 2	E
26.	Brake Gear Pull Rods x 2	E
27.	Rear Pony Axle 13.5mm	T
28.	Rear Pony Keeper Place	E
29.	L/H Brake Shoes x 2	W/M
30.	R/H Brake Shoes x 2	W/M
31.	Crankpins x 4	T
32.	Coupling Rods x 2	E
33.	Spacing Washer 0.25mm x 2	E
34.	Crossheads x 2	L/W
35.	Slidebars x 2	E
36.	Connecting Rods x 2	E
37.	14BA C/H Screw 1/4" x 2	T
38.	14BA Nuts x 2	T
39.	Motion Bracket	E
40.	Cylinder Covers Rear x 2	W/M
41.	Cylinder Covers Front x 2	W/M
42.	Cylinder Body x 2	W/M
43.	Draincocks x 2	E
44.	Crankpin Fixers x 4	T
45.	Bogie Body	W/M
46.	Bogie Axles 10.5mm x 2	T
47.	Keeper Plates x 2	W/M
48.	M2 x 16 C/H Screw	T
49.	Power Tag	E
50.	Insulator	P
51.	Insulator Washer	P
53.	Bogie Sleeve	T
54.	Spring	T
55.	Washer	E
56.	Washer	E
57.	M2 Nut	T
58.	Pickup Strip	E
59.	Plastic Pickup Pin	P
60.	Plastic Washers x 2	P
61.	Axle Covers x 4	E
62.	M2 x 8mm C/H Screw	T
63.	M2 Nut	T
65.	M2 Nut	T

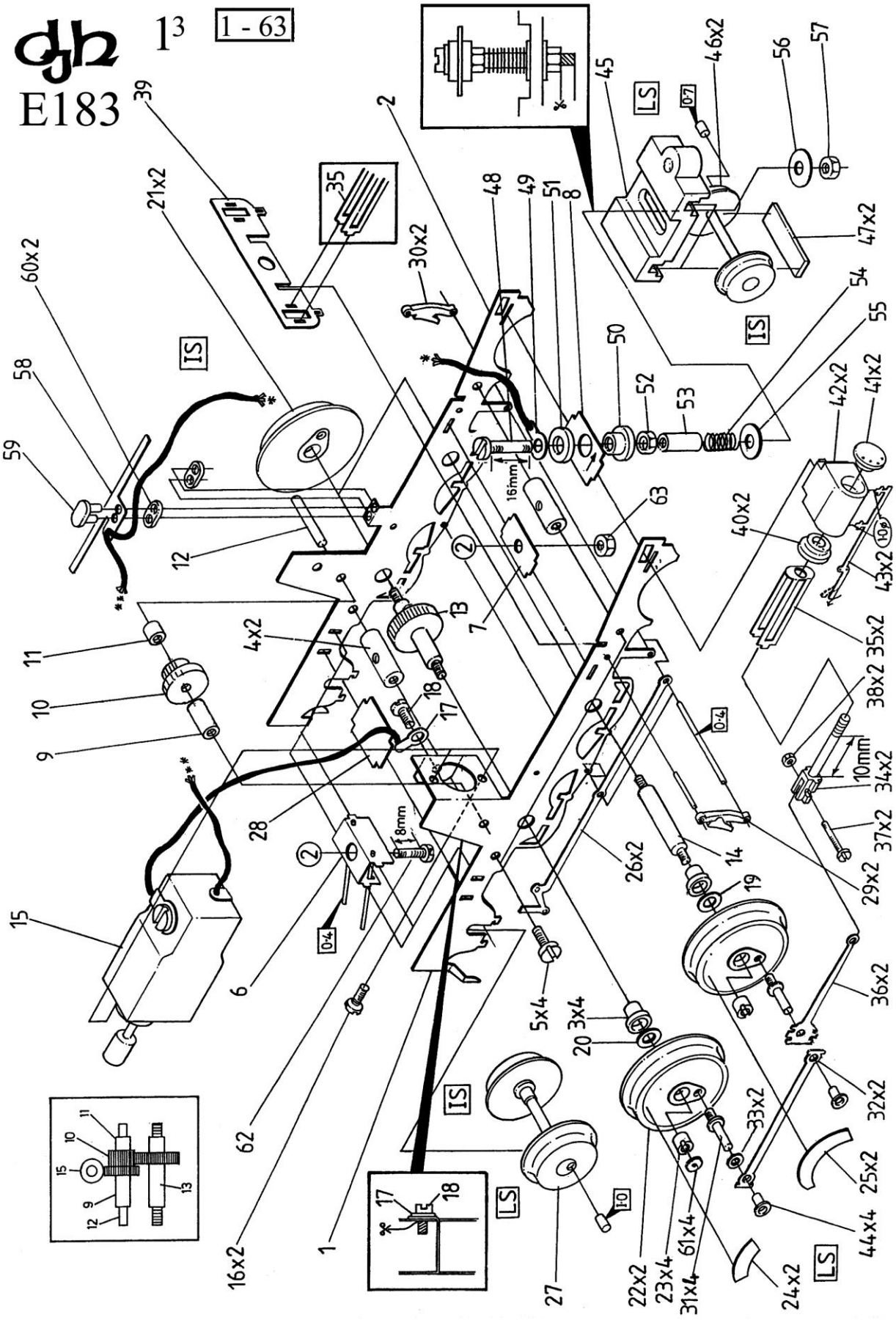
0.4mm dia. Wire
0.7mm dia. Wire
1.0mm dia. Wire
Insulated Wire

Body Drawing 2.

64.	Footplate	W/M
65.	Footplate Detailing Part x 2	E
66.	Front Pilot Deck	W/M
67.	Boiler/Firebox	W/M
68.	M2 x 16mm C/H Screw	T
69.	M2 Nut	T
70.	Water Fillers x 4	W/M
71.	Water Fillers Tall x 2	W/M
72.	Toolboxes x 2	W/M
73.	Brake Handles	W/M
74.	R/H Tank Side	W/M
75.	Front Spectacle Plate	W/M
76.	L/H Tank Side	W/M
77.	Cab Back	W/M
78.	Cab Back - Original	W/M
79.	Tank back	W/M
80.	Bunker	W/M
81.	Bunker Extension	W/M
82.	Coal	W/M
83.	Regulator Handle	W/M
84.	Backhead	W/M
85.	Cab Roof	W/M
86.	Dome	W/M
87.	Chimney	W/M
88.	Clack Valves x 2	L/M
89.	Sandbox Fillers x 2	W/M
90.	Smokebox Door	W/M
91.	Vacuum Pipes x 2	L/W
92.	Buffers x 4	W/M
93.	Dummy Coupling x 2	W/M
94.	Water Pipes x 2	W/M
95.	Rear Steps x 2	E
96.	Rear Steptreads x 2	E
97.	Front Steps x 2	E
98.	Front Steptreads x 2	E
99.	Whistle	L/W
100.	Whistle	W/M
101.	Generator	W/M
102.	Safety Valve	W/M
103.	Pump Large	W/M
104.	Pump Small	W/M
105.	Jacks x 2	W/M
106.	Front Marker Lights x 2	W/M
107.	Rear Marker Lights x 2	W/M
108.	Rear Lamp	W/M
109.	Front Lamp	W/M
110.	Lifting Hooks x 4	E
111.	Tank Steps x 2	E
112.	Pipe Junction	L/W
113.	Inspection Cover x 2	E
114.	Smokebox Valves x 2	L/W
115.	Smokebox Handle	L/W
116.	Handrail Knobs Short x 2	T
117.	M2 Nut	T
118.	Guard Irons	E
119.	Fire irons	E
120.	Splitpins x 2	-

Drawing 3.

0.4mm dia. Wire
0.5mm dia. Wire
0.7mm dia. Wire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E183
1³
1 - 63
IS
LS
0-4
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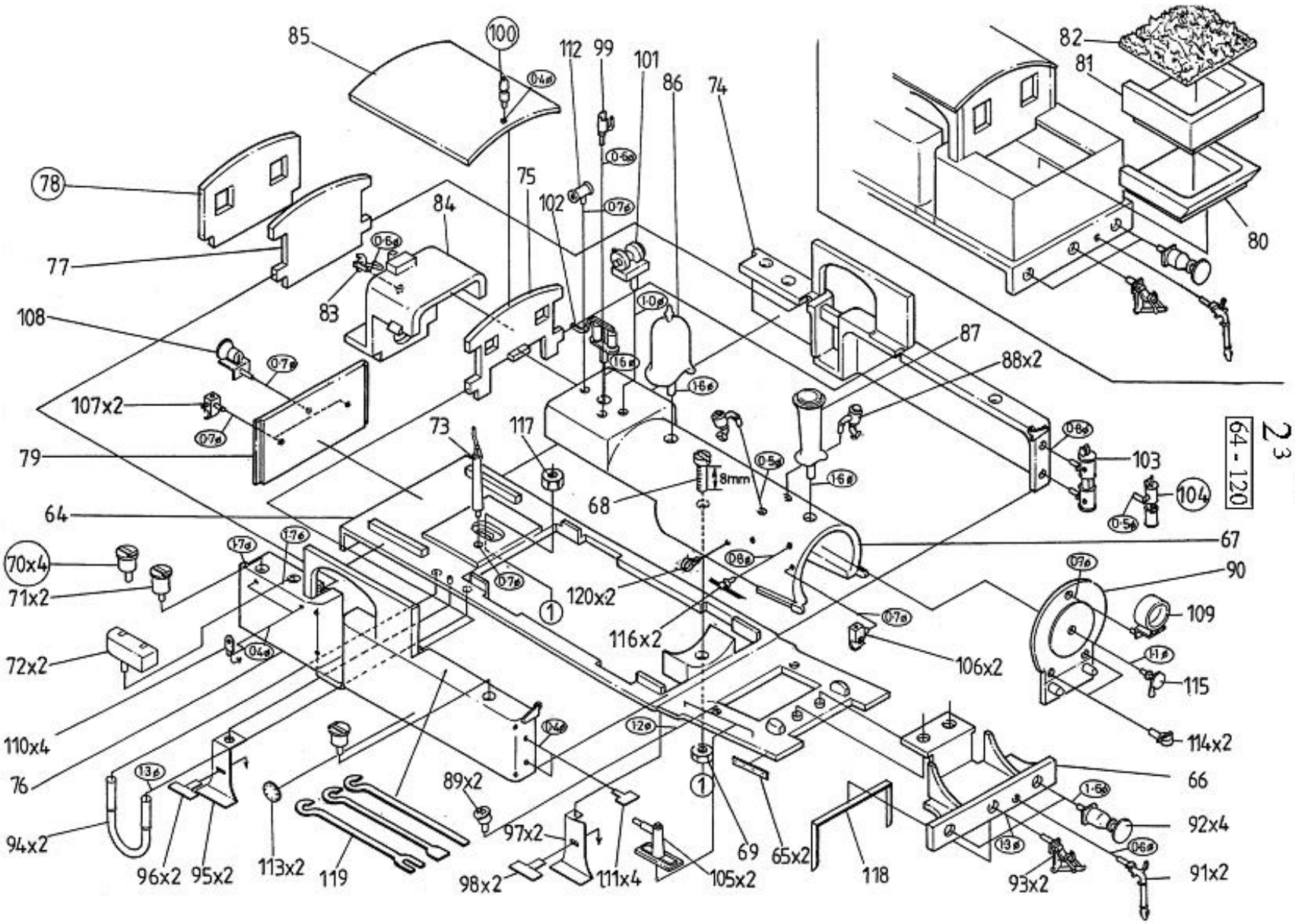
16mm
8mm
10mm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108
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1-6ø
87
88x2
107x2
0-7ø
73
117
0-5ø
8mm
68
0-8ø
103
104
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64
67
70x4
71x2
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120x2
116x2
106x2
90
109
1-1ø
115
72x2
0-4ø
114x2
110x4
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12ø
89x2
1-6ø
92x4
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94x2
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119
98x2
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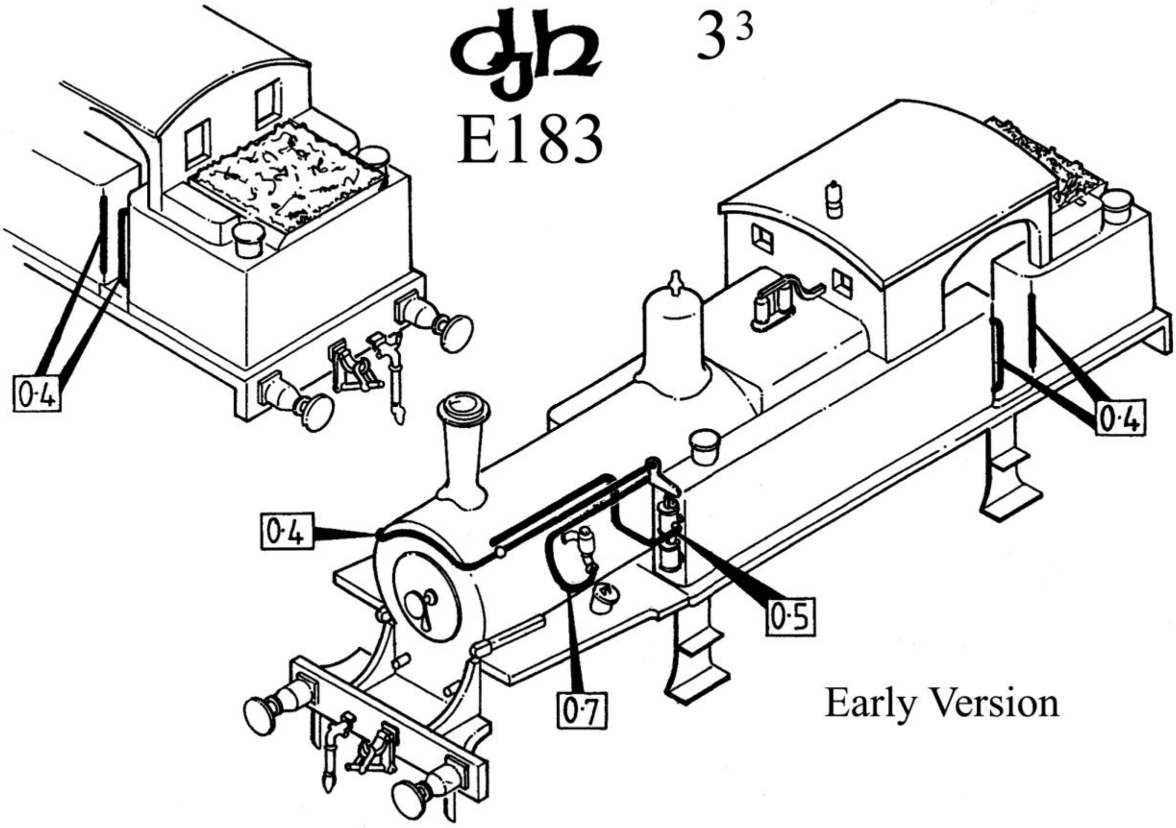
93x2

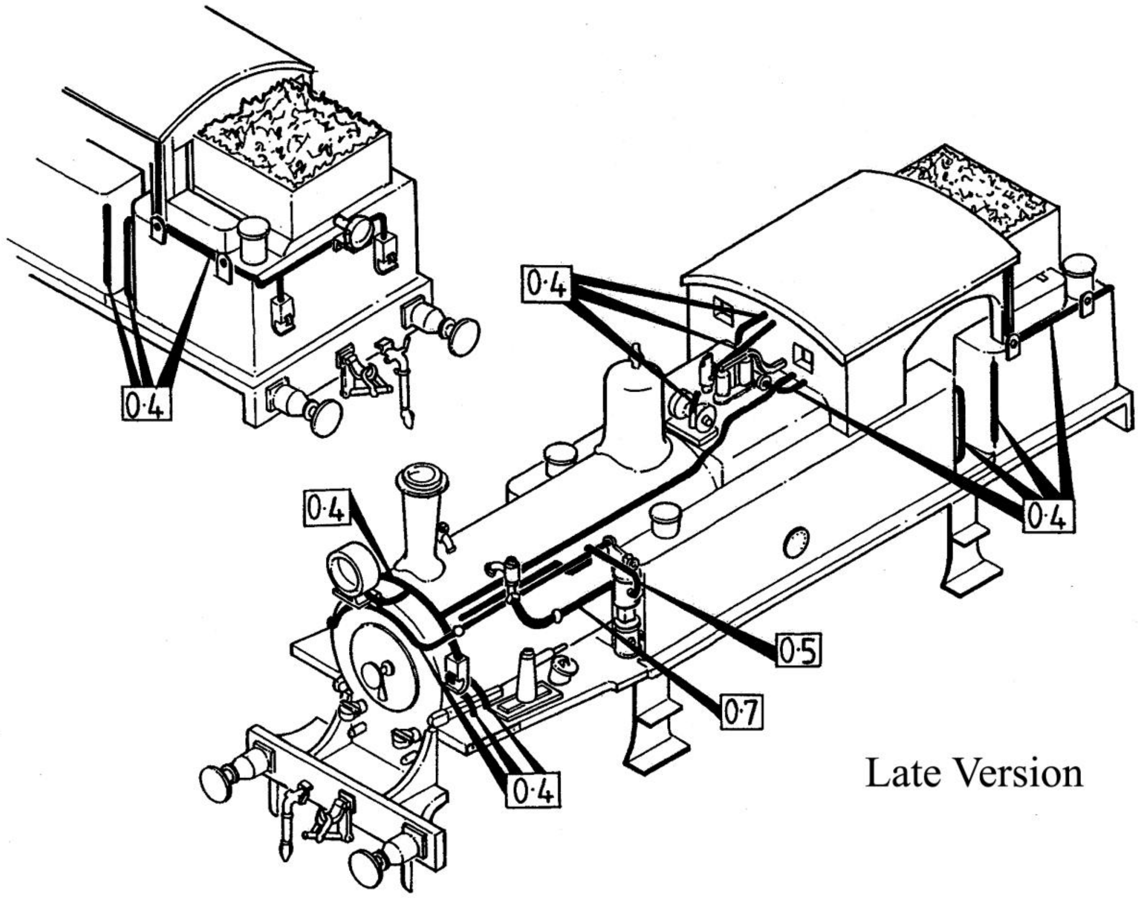
djb

3[3]

E183



Early Version



Late Version