

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 Z20 2-6-4 Tank Locomotive

E208 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 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.

Modellers are advised to check photographs of the particular locomotive they have chosen to model, also keeping in mind the era they are modelling. For assistance in general detailing, modellers are referred to R.G. Preston's "Tender into Tank" and other Australian railway books and journals.

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, "dry fit" parts first to ensure a good fit.

Electrical pickup

The electrical system used for this kit utilizes the usual live wheels on the right-hand side of the locomotive, and the front pony truck, when looking from the top facing forward to the locomotive chassis. The current from the left-hand rail is collected by wipers contacting the insulated left-hand drivers, and the insulated rear bogie.

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: 0.5mm, 0.6mm, 0.7mm, 0.8mm, 1.0mm, 1.2mm, 1.6mm and 2.0mm.

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.

Some parts in the parts list have an asterisk (*) next to the part number. This indicates that the fitting of this part (s) is optional. Check prototype and photographs.

Sometimes parts join to others which are shown on a different drawing. This is indicated by showing the linked drawing number in a circle. For example, in Drawing 1 the screws (61x2) attaching the chassis with the body at the base of the bunker (67) in Drawing 2: and the screw (60) attaching the chassis to the body at the base of the smoke box (62); this is indicated by the 2 in Drawing 1, and the 1 in Drawing 2.

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

The Motor/Gearbox Unit (Part 16)

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 bell 102, Peco Electrolube or Faller 489. Do not use "household " or "sewing machine" oils.

Test the gearbox by temporarily adding the axle gear (17) and axle (11). Check that axle (11) runs freely in the horn blocks (14x2) before securing the axle gear (17) with the grub screw (18). **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 (11) and the axle gear (17) to allow later fitting of the gearbox to the chassis - be careful not to lose the grub screw ! !

Locomotive Drawing 1 (Parts 1 - 61)

Remove the R/H chassis frame (1) and L/H chassis frame (7) from the etch and fold the rear tabs, pick-up wiper mount, and front guard irons as shown on the drawing. Secure the two frames together using the spacers (3x2) and spacer screws (2x2) and (8x2) tightening these screws only enough to allow fitting of the etched spacers. Remove the etched spacer plates (4, 5 and 6) and turn down the pickup eye on the rear spacer (4). Fit the spacer plates to the chassis. Align the spacers (3x2) so that the threaded cross holes are vertical and tighten the spacer screws. Solder the plates (6, 5 and 4) to the frames.

Fit the horn blocks (15x4) and centre horn blocks (14x2) to the chassis. Note that the thin flange of the horn block goes to the inside of the chassis and the centre horn blocks (14x2) have thinner outside flanges. The horn blocks are a "snap" fit into the chassis, and should not be soldered.

Before fitting the driving wheels (9x3 and 100) note that the insulated wheels (9) are on the L/H side as viewed from the top facing forward. Note, the insulated driving wheels can be identified by the thin insulation strip between the tyre and the wheel. Fit the driving axles (11x3) and axle washers (13x6) to the chassis with the axle nuts (12x6), quartering the wheels so that the

crank pin 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. Axle covers (26x6) should be fitted after the final assembly and painting.

Fit the coupling rods (24x2) to the wheels using the crankpin screws (25x6). Check that the chassis runs freely.

Motor Pickup Part 1: Check that the pins on plastic pickup pin (27) will pass through the holes in the keeper plate (19), and that the plastic washer (29) will fit on the pins - enlarge holes if necessary. Cut off the unwanted part of the pickup strip (28) as per the drawing and solder an 80mm length of pickup wire to the pickup strip. Following the drawing, place pickup strip (28) on the plastic rivet (27) followed by plastic washer (29). Then pass the pin through the keeper plate. Hold the assembly firmly together with tweezers. Use a soldering iron to melt over the excess plastic pin to retain the assembly. Feed the pick-up wire through the keeper plate as per the drawing and fix the keeper plate to the chassis using screws (22).

Adjust the pick-up strip to bear lightly on the inside of the tyre of the front driving wheel and trim off excess. Check that the pickup is not also bearing on the wheel centre.

Pass three 20mm lengths of 0.7mm wire through the keeper plate. Solder the brake shoes (21x6) to the brake hangers (20x3pair), and clean out the mounting holes with a 0.8mm drill. Fix the brakes to the 0.7mm wires as per the drawing ensuring a little clearance from the wheels to avoid shorts and to allow later removal of the keeper plate/brake assembly. Remove the brake hanger wire between the mounting holes on the front brakes to clear the pony truck.

Fit a 20mm length of 0.7mm wire through the holes in the chassis frames at the rear of the rear drivers to carry the brake actuating levers. Fit the brake cylinder (39) to the L/H side, then fit the crank and piston rod (40) in line with the cylinder. Fit the hand brake crank (41) to the R/H side just inside the line of the brake hangers. Fit the brake pull rod levers (42xpair) on each side flush with the other brake levers.

Drill the sand pipe indents of the rear sand boxes (43x2) 0.5mm and fit to the chassis. Fit sand pipes from 0.5mm wire.

Motor Pickup Part 2: Check that the pins on the plastic rivet (30) will pass through the bracket in the chassis frame, and that the plastic washers (32x2) will fit on the pins - enlarge holes if necessary. Cut off the unwanted part of the pickup strips (31) as per the drawing and solder an 30mm length of pickup wire to one of the pickup strips. Following the drawing, place pickup strips (31x2) on plastic pickup pin (30) followed by plastic washer (32). Then pass the pin through the frame bracket followed by another plastic washer (32). 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 wheel tyres.

Make up the front pony truck fitting the wheel set axle (54) into the axle slot of part (53) and capturing with radial arm (55) and screw (56) noting that the insulated wheel is on the L/H side. Fix the pony truck to the spacer (through the keeper plate) using the front pony mounting bush (59), washer (58) noting that this washer does not fit over the top-hat spacer, and retaining screw (57). The pony truck should move freely.

Make up the rear bogie (44), fitting the wheels (45x2) to the bogie - note that the insulated wheels are on the R/H side of the bogie. Retain the wheels using the keeper plates (46x2) and screws (47x2). Solder a 40mm length of pickup wire to power tag (37). Cut the countersunk M2 screw (34) to a length of 12mm and assemble it to the rear etched spacer with plastic insulated bush (35) above, plastic insulating (36) below, followed by the power tag (37) and M2 nut (38). Thread the pickup wire through the eye on the keeper plate. Fit the brass sleeve (48) and spring (cut down to 5mm), washer (50), bogie with the insulated wheels on the R/H side, washer (51) and M2 nut (52). Again check that the chassis runs 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 unit (16) between the frames and locate axle gear (17), then replace axle (11) followed by centre driving wheel and coupling rod. Align the axle gear before tightening the grub screw (18). Fix the motor mounting block (23) between the frames then use a small dab of silicon glue to retain the motor to the block.

Locomotive Drawing 2 (Parts 62 - 114)

As mentioned previously all holes shown on the drawings should be drilled prior to assembly. Clean out the two holes in the smoke box supports (just behind the front buffer beam) with a 0.7mm drill.

Clean up the footplate (63) and remove any feed sprues from the centre cutout under the boiler and on the left hand edge taking care not to spoil the valance. Fix the smoke box door (92) and the front spectacle plate (70) to the firebox/boiler/smoke box unit (62). Fix the coal bunker front (68) to the coal bunker base (67), and the rear spectacle plate (72) to the bunker top (75). Fix these two components together. Fit lubricator recess base (66) to the L/H side tank (65) as per the inset diagram.

Fit the side tanks (65x2) to the footplate taking care to ensure they are vertical. Fit the boiler unit to the footplate fixing under the smoke box and at the spectacle plate. Fit the coal bunker assembly to the footplate. Fit the cab sides (71x2) to the spectacle plates. Fit the cab floor (69) into the cab, and then fix the back head (73) to the cab front.

Fit the front (77) and rear (76) buffer beams to the footplate. Assemble the steps (105x4) and (106x4) and fit to the footplate - this may be done later as they are vulnerable to damage. Fit the rear steps before fitting the water pipes (108).

Commence detailing, fitting the chimney (79), dome (78), safety valve (82), steam generator (84 - add 0.5mm wire), whistle (83), smoke box door handle (94), steam turret (81), and electrical junction box (80).

Fix the LF and R/H marker lamps (91x2) to the smoke box sides, the Westinghouse pump (90) to the front of the L/H side tank and clack valves (85x2) to the boiler. Fix the tank fillers (87x2) and lift brackets (86x2) to both tank tops, and tank air vent pipes on both tank tops at the rear from 0.7mm wire protruding 2.5mm). Fix the steps (104x2) to the front of the R/H tank, and the handrail supports (88x2) to both tank fronts.

Fit the front driving axle springs (64x2) to the splashers, one or two re-railing jacks (99x2), toolbox (100), and the access panel (95) to the base of the smoke box front, followed by the sandbox lever (98xpair) to the smoke box. Fix the front sand box detail plates (97x2) to the sand boxes (96x2), drill 0.6mm for the operating rod (0.5mm wire), and then fit these to the footplate.

The drawing also shows detailing of the front buffer beam using the brake hose (102), buffers (101x2), and dummy coupling (103); and the rear buffer beam with buffers (109x2) and brake hose (110). Ensure that the spigots of these parts do not protrude through the buffer beams as this will inhibit fitting the chassis to the body. It is recommended that these parts be fitted later as they are vulnerable and subject to damage at this stage of assembly.

Fit the side tank detail plates (107x2) to both tanks, aligning with the last row of rivets. Fit the rear tank tool boxes (11 lx2), the rear tank fillers (112x2), the rear headlamp (114) and the rear marker lamps (1 13x2). The side water pipes (108x2) can also be fitted now or later if worried about damage, but ensure that the rear steps are fitted first.

Locomotive Drawing 3 (Parts 115 – 117

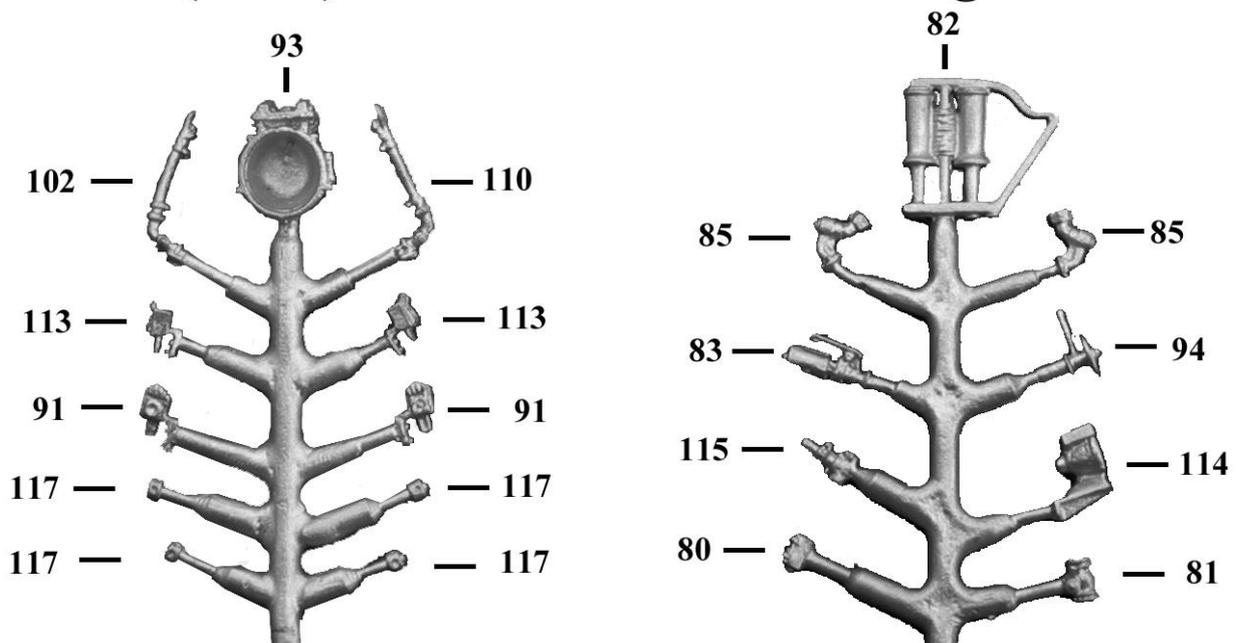
This drawing shows the wire and pipe layout to complete detailing the locomotive body. Fit the junction boxes (117x4) to the body. Drill through the pump governor (115) 0.5mm for the 0.4mm wire pipe. Feed the governor onto a piece of 0.4mm wire and shape the wire to fit to the Westinghouse pump and back to the cab just behind and below the top of the LH tank. Fit the pump filter (116) to a piece of 0.5mm wire and fit to the Westinghouse pump as indicated. After fitting all the pipe work and other handrails, fit the handrail around the smoke box. Fit the front headlight (93) at the same time; thread the wire through the headlight bracket, as you would do with a smoke box door handrail knob before fitting the handrails (89x2) and headlight to the body.

On completion of the piping fit the buffer beam fittings, steps and water pipes if not already fitted.

Fit the locomotive body to the chassis using spacer screws (60) at the front and (61x2) at the rear. 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.

1 April 2009

(E208) - Z20 - Lost Wax Castings



(E208) - Z20 - PARTS LIST

Chassis Drawing 1

1.	R/H Chassis Frame	E
2.	M2 Spacer Screws x 2	T
3.	Spacer x 2	T
4.	Rear Spacer Plate	E
5.	Centre Spacer Plate	E
6.	Front Spacer Plate	E
7.	L/H Chassis Frame	E
8.	M2 Spacer Screw x 2	T
9.	Insulated Driving Wheels x 3	T
10.	Non Insulated Driving Wheels x 3	T
11.	Axles x 3	T
12.	Axle Nut x 6	T
13.	Axle Washer x 6	E
14.	Hornblock (Thin Flange) x 2	T
15.	Hornblocks x 2	T
16.	Motor/Gearbox Unit	E/T
17.	Axle Gear	T
18.	Grub Screw	T
19.	Keeper Plate	W/M
20.	Brake Hangers x 3 Pair	E
21.	Brake Shoes x 3 Pair	E
22.	M2 Spacer Screw x 2	T
23.	Motor Mounting Block	W/M
24.	Coupling Rods x Pair	E
25.	Crankpin Screws x 6	T
26.	Axle Nut Covers x 6	E
27.	Plastic Rivet	P
28.	Pick-up Strip	E
29.	Plastic Washer	P
30.	Plastic Rivet	P
31.	Pick-up Strips x 2	E
32.	Plastic Washer x 2	P
33.	Insulated Wire	
34.	M2 x 12mm C/S Screw	T
35.	Insulated Bush	P
36.	Insulated Washer	P
37.	Power Tag	E
38.	M2 Nut	T
39.	Brake Cylinder	W/M
40.	Brake Cylinder Lever	E
41.	Brake Crank	E
42.	Brake Pull Rod Levers x Pair	E
43.	Sandbox x 2	W/M
44.	Bogie Body	W/M
45.	Wheel Set x 2	T
46.	Bogie Keeper Plate x 2	W/M
47.	12BA x 3/16 C/S Screw x 2	T
48.	Brass Sleeve	T
49.	Spring	T
50.	Washer (2.5mm Dia. hole)	E
51.	Washer (2mm Dia. Hole)	E
52.	M2 Nut	T
53.	Front Pony Block	W/M
54.	Wheel Set	T
55.	Radial Arm	E
56.	12BA x 3/16 CH Screw	T
57.	M2 Spacer Screw	T
58.	½ Etched Washer	E
59.	Front Pony Mounting Bush	T
60.	M2 x 8mm CH Screw	T
61.	M2 Spacer Screw x 2	T

0.7mm Dia. Wire
Insulated Wire

Body Drawing 2

62.	Firebox/Boiler/Smokebox	W/M
63.	Footplate	W/M
64.	Spring x 2	T
65.	Tank Sides x pair	W/M
66.	Lubricator Recess Base	W/M
67.	Coal Bunker Base	W/M
68.	Coal Bunker Front	W/M
69.	Cab Floor	W/M
70.	Front Spectacle Plate	W/M
71.	Cab Sides x Pair	W/M
72.	Rear Spectacle Plate	W/M
73.	Cab Backhead	W/M
74.	Cab Roof	W/M
75.	Coal Bunker Top	W/M
76.	Rear Buffer Beam	E
77.	Front Buffer Beam	E
78.	Dome	W/M
79.	Chimney	W/M
80.	Electrical Junction Box	L/W
81.	Steam Turret	L/W
82.	Safety Valve	L/W
83.	Whistle	L/W
84.	Steam Generator	W/M
85.	Clackvalve x 2	L/W
86.	Lift Bracket x 2	E
87.	Water Filler x 2	W/M
88.	Tank Handrail Brackets x 2	E
89.	Short Handrail Knobs x 2	T
90.	Pump	W/M
91.	Smokebox Marker Lamp x Pair	L/W
92.	Smokebox Door	W/M
93.	Headlight	L/W
94.	Smokebox Door Handle	L/W
95.	Access panel	W/M
96.	Sandbox x Pair	W/M
97.*	Sandbox Detail Plate	E
98.	Sandbox Lever x Pair	E
99.*	Jacks x 2	W/M
100.*	Toolbox	W/M
101.	Buffers x 2	W/M
102.	Brake Hose	L/W
103.	Dummy Coupling	W/M
104.	Tank Steps x 2	E
105.	Steps x 4	E
106.	Step Treads x 4	E
107.	Tank Detail Plate x 2	E
108.	Water Pipes x 2	W/M
109.	Buffers x 2	W/M
110.	Brake Hose	L/W
111.*	Rear Tank Toolbox x 2	W/M
112.	Water Filler x 2	W/M
113.	Rear Tank Marker Lamps x 2	L/W
114.	Rear Lamp	L/W

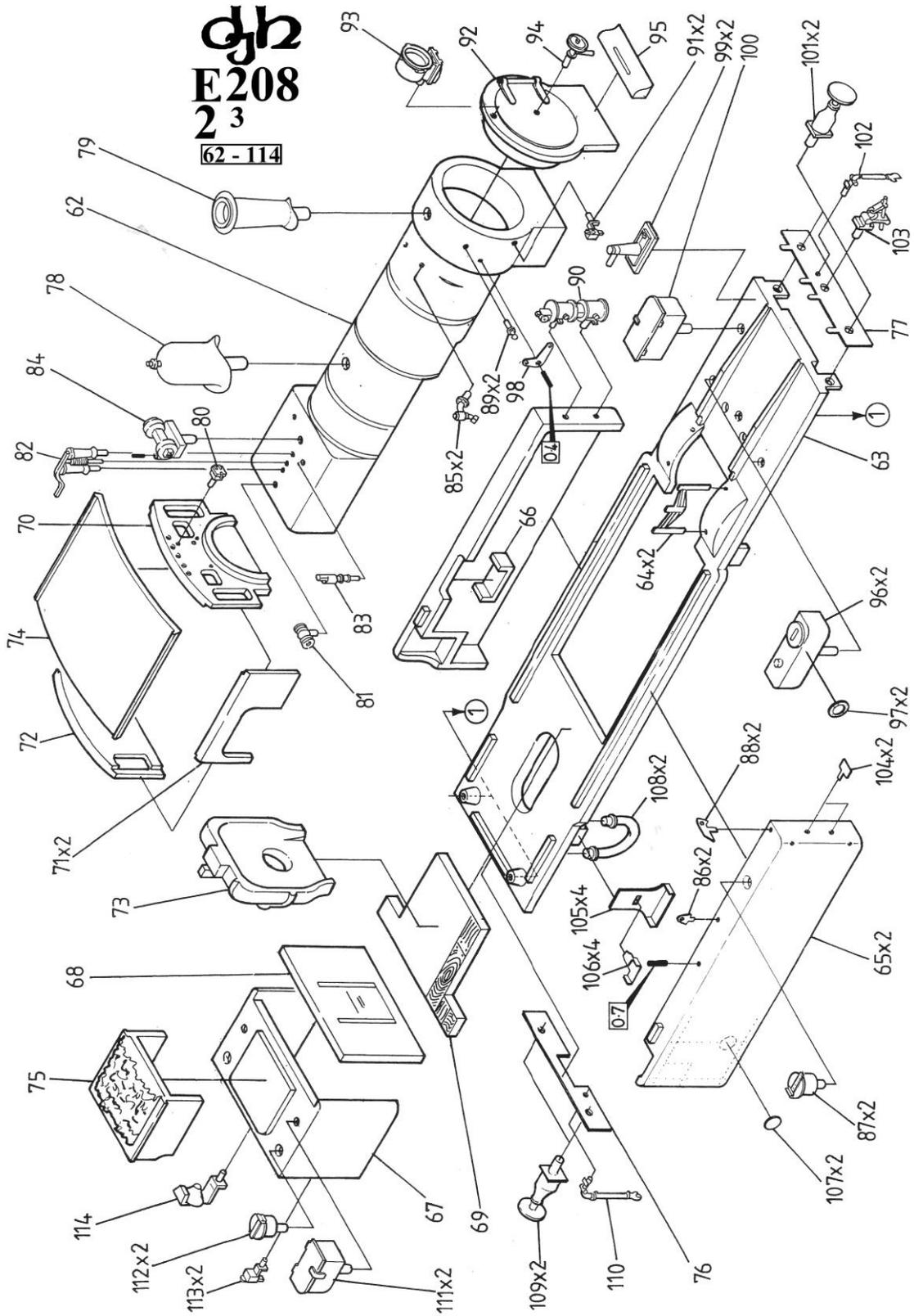
0.4mm Dia. Wire 0.7mm Dia. Wire
0.5mm Dia. Wire

Body Drawing 3

115.	Pump Governor	L/W
116.	Pump Filter	W/M
117.	Junction Box x 4	L/W

0.4mm Dia. Wire 0.7mm Dia. Wire
0.5mm Dia. Wire

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