

SER-Kits

Centre Birdcage 25ft Passenger Brake Van

Revised April 2019



Before starting construction, I recommend reading through the instructions to understand the approach. If you don't, you may find yourself undoing something and giving yourself trouble!

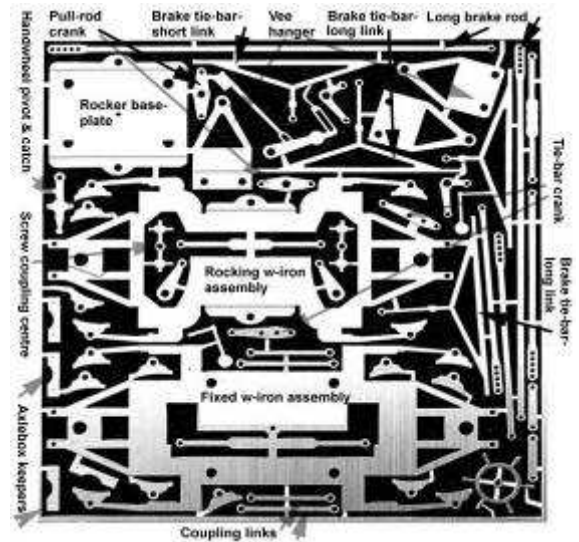
'Glue' in the instructions refers to either thin cyano-acrylate (super-glue) or 5 minute epoxy resin such as Araldite or Devcon.

You may wish to consider doing the various soldering jobs all at once to save getting out and putting away tools and acids: end steps, running board hangers, wheel units, birdcage. Then rinse in weak bicarb solution, water, and spray with etch primer ready (Halfords or your choice).

If you're not used to drilling LMA castings, use a slow speed and remove the drill frequently to clear swarf. This is particularly important when using drills less than 1mm.

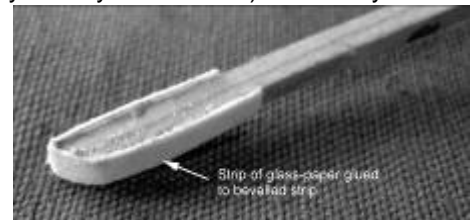
Castings have enough give to be gently bent straight (solebars), straightened a bit (the springs, usually), or joggled more or less (the end lamp-irons)

Comp. brake u'frame etch	Carriage steps/handles etch	Centre birdcage etch
10" 26 SWG soft brass wire	175mm 26 SWG p-b wire	2 solebars
1.5mm styrene sheet – floor 171.5 x 46.5mm	1mm b'cage roof min. 46.5x41	1mm styrene 46.5 x 41 – partitions x 2
4x1mm microstrip lower running boards	2x1mm microstrip lower running board edges	6x1mm microstrip upper running boards
150mm ¼ round microstrip		
BAG 1		
4 1880s a'boxes: cosmetic drilled	4 6ft springs [36x6, 5]	8 type B T-spring-hangers
4 short 3-rib buffer stocks	4 metal head buffers & 2 coupling hooks	2 small door handles, 2 handles
2 Lamp pots	2 Torpedo vents	End lamp
	2 long louvres	
BAG 2		
Auto or Smiths Vacuum cylinder	2 x Auto or Smiths end vacuum pipes	
BAG 3		
2 ½ " of 3/64 rod	40 x pins	50mm 0.5mm round microstrip
Scale drawing	Transfers x2 if ordered	



The Body

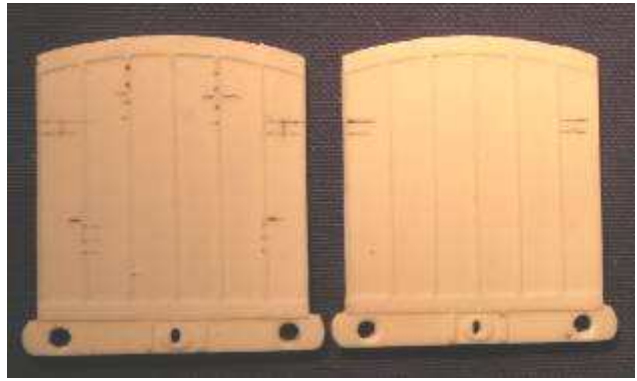
1. The sides and ends form a box around the floor. The roof can be made removable – see later.
2. Before gluing anything together, prepare the sides as follows.
3. Hold up to the light and check if there are any air bubble holes. I check this and fill larger ones, but I may have missed one. They're best filled from the rear. Small ones don't matter unless they've broken through. Use the tip of a craft knife or small screwdriver to press in a model filler such as Humbrol's or Squadron Putty.
4. Run a file or glass-paper along the top and bottom edges, noting that the top is bevelled to fit the roof. A useful long-sander tool can be made by glueing medium glass paper to flat ply approximately 250mm x 50mm - you're less like to overdo the ends. Remove any flash on the ends of the sides. Note that there are mouldings to represent the ends of handrail fixings to be left in place at this stage.
5. With a light touch, remove any remaining 'flash' from around window apertures, cutting or scraping or filing with fine needle file or emery board. Note that the luggage compartment doors have narrow toplights (windows), not vents as in some vans. The forward- and rear- facing ducket windows have thin resin fillers which should be removed (casting these as holes is beyond my skill level...) Later on you have to fit glazing, so quite possibly you could leave them in and paint them shiny black.
6. Next, check the surfaces for flaws.
7. I find the homemade end-sander tool in the photo very useful for cleaning up inside panelled areas where normal tools would remove detail. The strip wood is 3 or 4mm square. Time taken at this stage will be repaid when painting.
8. There is a known flaw in the moulding, as in the illustration, circled. It's become slightly raised, and should be gently filed flat
9. Check the tiny detail of cosmetic bolts. If any have failed to cast, remedy this as follows: drill 0.55mm and superglue tiny protruding lengths of the supplied 0.5mm plastic rod into the holes. Similarly, the rod can be used to replace missing hinges (rare).
10. When the van is completed, the temptation is to pick it up by the duckets. It's worth gluing thin card or styrene sheet behind the panelling for extra strength.
11. The dog box door vents are metal castings. They are used in several of my kits, and should be modified as in the photo. The 'fins' are cut to fit the dog box holes, and the overall width of the casting reduced to a flange so it can be glued in place. For a snug fit, bevel the end flanges. Glue in place now – it's a bit tricky when the body is put together.
12. Next, check the resin end castings in a similar way to the sides. Being simpler castings they need less work. Clear any resin from the buffer and drawhook holes with a craft knife. A 1.4mm drill can be used in the latter. If you plan to fit safety chains (SER and into early SECR) drill 1mm holes 7mm out from the centre of the drawhook holes.
13. Using the long flat sanding tool described above, smooth off the roof edges. The length is correct, with little overhang, so don't take off more than necessary. The sides are slightly over scale width, because one side may have the remains of casting sprues. Later, when you fix the roof, you can see if want scale width. Or not to bother.



Drilling for fittings

14. There is no rule that says you must fit all the detail. How much you do depends on your skill. However, it may be best to the drilling described below as it's not easy to get right on the finished body. You can always fill the holes with paint.
15. Note the various handrails on each side, some horizontal and longish, others short and vertical on the doors and ducket front and rear. Pip and drill 0.55mm to take 0.5mm wire later on – 4 holes for the horizontal rails and 4 for luggage doors. It's a bit awkward to get a drill in for the ducket rails, and I use a pin vice rotating it between the fingers, but make sure to pip with a sharp point before starting. Then drill for guard's and dog box door handles with a 0.9mm drill.

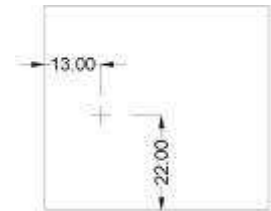
16. The ends have different fittings and so different holes. The photo shows what you're aiming for, but I recommend making up the step fittings beforehand, so that the holes match. With the lower fittings, leave on as much of the fixing tag as you can (it would be top in the photo but I've cut the tag off... Note that it's bottom on the etch. You'll need it to solder on the top step.



17. Check the step positions against the drawing and photographs, then pip and drill the top hole 0.6mm. Use one of the pins to hold the fitting in place while you pip and drill the others.
18. Open out for the buffers and coupling hooks on the headstocks. Then drill 3mm or a bit over for buffer stocks and 1.4mm for coupling hooks using the drill to ream the slot to suit the hook. If fitting safety chains, drill ~ 0.6 mm 7mm (1 scale foot) either side of the coupling hook.

Body assembly

19. Offer one end to the floor which sits on the headstock, and check whether the floor is too wide and might need sanding narrower. Glue the floor to the end.
20. Offer up the sides (which fit outside the ends) and if necessary, reduce the length of the floor – better a bit less than too long, because you want the ends to be a nice snug fit so that there's no gap in the prototype moulding. Glue the sides, then the end, sitting the result on a very flat surface while the glue goes off.
21. Cut the 40thou/1mm styrene to make partitions which are to be glued to the inner sides of the locating strips. Before glueing, check that they are low enough not to obstruct the central roof strengtheners which are meant to appear as one with the partitions. One partition should be drilled to take a pin (~ 0.6 mm) as in the diagram for the brake handwheel. This partition should be nearer the end that has no footsteps, only lamp-irons.

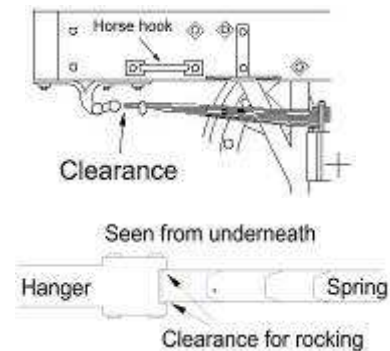
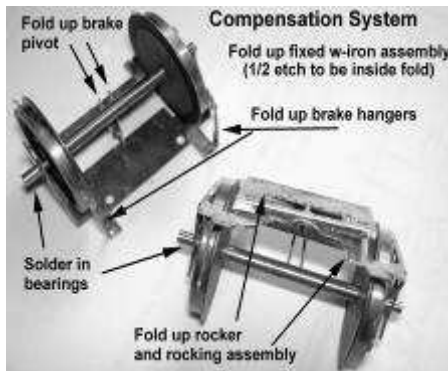


The underframe

22. At this stage I recommend making a simple cradle to support the vehicle upside door. Three pieces of strip wood and a soft duster. The photo shows what you're aiming for with the wheel units and brakes, but is also relevant for the running boards, later on but not yet.



23. Drill 0.9mm or thereabouts into the indentations under the solebars for the 8 spring T-hanger castings but fit these and other running gear later. (The 'large' diameter allows room to move the hangers a little.) Identify the 5 pairs of holes for the running board hangers and drill 0.7mm through into the rear holes.
24. Basic order of underframe assembly:
- Solder folds of wheel assembly
 - Loose fit bearings and wheels
 - Fit assemblies
 - Fit solebars
 - Fit Vee-hangers, vacuum cylinder, crossrod and cranks
 - Fit the brake linkage, tying the brakes
 - Fit vacuum linkage
 - Fit running boards,
 - Fit T-hangers, axleboxes and springs



25. The photo and diagrams should make clear what you're aiming for, but the comp units have brake hangers in the etch supplied (see photo on p.2).
26. Reinforce folds with solder or 2-part quick-set epoxy resin such as Araldite. As you cut out the small parts, make sure not to lose them. Remove the A shaped brake ties. Spring them into the brake hangers, letting them hang down (towards the floor at this stage). The A-frames with the short extension go nearest the PBV ends. Confirm with brake arrangement on the main drawing further on. Solder a spare brake block onto the projecting spigot. Choose appropriate keeper plates, punch rivets and solder to bottom of W-irons. (For better appearance, drill out keeper plates, and fix with lill pins after squaring the heads.) Use 3/64" brass rod to pivot the rocking W-iron.
27. Before making the wheel assemblies, fixed and rocking, I prefer to side-track and paint the wheels. This is best if you're going for the full Mansell patent: wooden segments teak and outer steel tyre white. Use 3ft 6in Mansell Wheels (GWR type) from e.g. Slaters. If you're using Slaters wheels, then the centre can be black and also the inner rim. This paint scheme is difficult to apply in situ, surrounded by running gear.
28. There's not much clearance for the wheel treads so offer them up. You may need to burr out small rectangles in the floor. Also, file the corners of the rocking assembly. The wheels must run freely.
29. To control the rocking, solder lengths of 0.5mm PB wire as in the photo opposite. Bend towards floor a little.
30. Rinse off any acid, (dilute bicarb solution, then water.) Spray with an etch primer and then black.
31. Loose fit bearings and wheels. Solder the bearings with the iron, pushing in so that there is virtually no sideways play and making sure wheels are centred.
32. Mark the centre line of each coach side, put the body in the cradle and trial the solebars, so that the centre holes line up with side centre. Ends may need to be trimmed. Offer up the wheel units and check that the rocker can rock, no more than 1/2-1mm.
33. Glue the solebars, but not the wheel units. Fit the buffer guides, checking the fin orientation, and lining up with a length of 1.6mm (1/16") rod along the length.

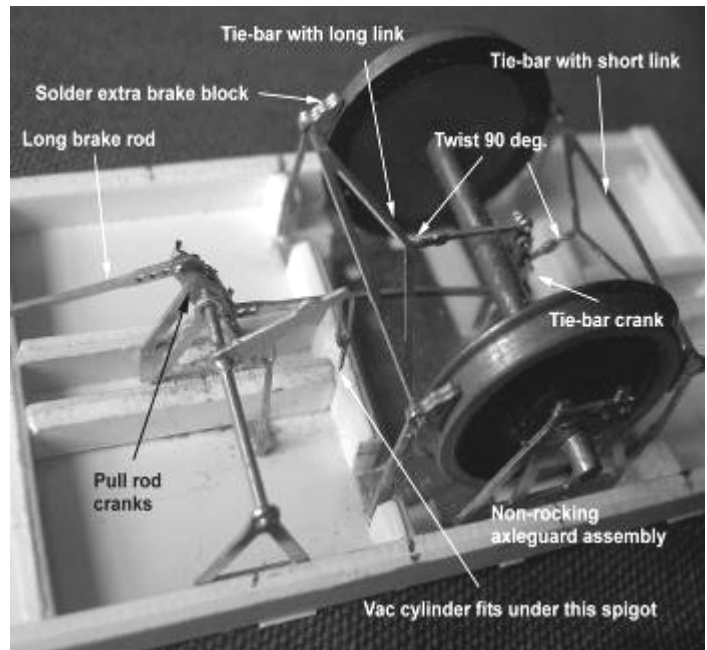
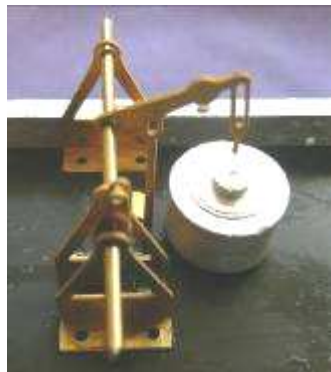


34. Glue the fixed wheel assembly in place, lining up the W-irons with the bolt heads cast on the solebars. Holding the rocking assembly, place the vehicle on a level surface, and measure the height of the buffer-guides at each end. Depending on the sharpness of the folds, you may need to insert a little card packing when glueing.
35. The four axlebox castings are to be glued to the bearings and W-irons, but first you may wish to drill 0.55mm (litte pips in the castings) to take wire representing the L-shaped cap handles. The springs need slightly straightening. They and the T-hangers should be fitted next. Gain practice with the fixed wheel unit first. The T-hangers are glued to the underside of the solebar, locating with the three holes drilled for each. Manoeuvre the spring in place. Mark and trim to fit between the hangers. On my build, I found that a tiny rectangle of 0.5mm styrene packing needed glueing behind the spring so that it sat far enough outwards.

Brake Gear

36. Make pivots for the brake linkage from the fine pins supplied. It's usually best to cut them down to make manoeuvring easier. It's also best to leave cranks loose and then solder groups of links.
37. Identify the tie-bar cranks with reference to the brake diagram and by their 4 holes. Pivot them in the brake pivots sticking up from each of the assemblies. Glue or solder, leaving the crank loose.
38. With a hot iron, loosen the A-shape tie rods and point their extensions towards the crank. Twist the A- extensions by 90° and pin to tie-bar cranks.

39. Follow the same procedure for the rocking unit, except allowing clearance for the spring to rock up and down between the hangers. The RH drawing is for a different vehicle but on the same principle.



40. Bend the three Vee hangers and glue them as in the drawing and near photo. (The far photo shows a vehicle with framing.) They must be close to the non-rocking wheel unit. Thread the vacuum cylinder crank and the two pull-rod cranks on to 3/64" (1.2mm) rod, but don't fix yet
41. The auto vacuum cylinder should be offered up and marked around. Drill a clearance hole for the fixing screw. Some metal must be filed off to clear the wheel unit. Smith's vacuum cylinder has a lug and sits on framing. This can be made of 3x6mm styrene.
42. Assemble remaining brake linkage. 2 lengths of brake pull-rod are provided. If neither suitable, cut, overlap & solder for shorter version, or overlap half of each & solder for much longer version.

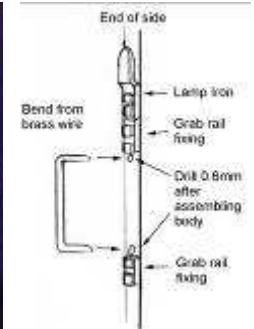
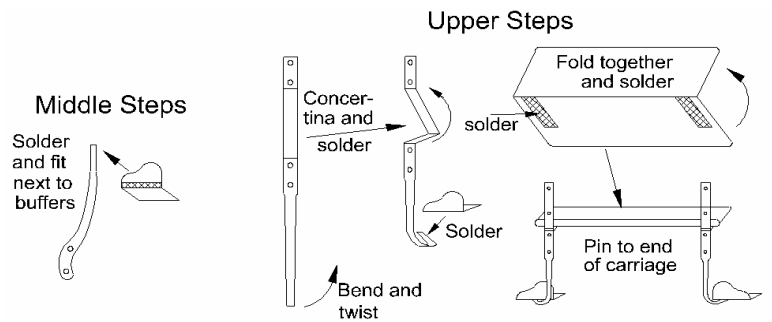
43. Solder pin into handwheel centre, and into handwheel pivot etch. Glue inside vehicle body.
44. Cut small lengths of 26SWG N/S wire, bend into an L shape and adjust to fit around the axleboxes as in the diagram.



End detail

45. Remove the appropriate end steps from the etch, bend and solder as in diagram which shows other vehicles' steps as well.

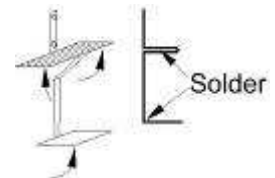
46. Refer back to the photos of the end used for drilling and fix in place with pins and superglue. End steps were at the non-guard's end as built, and were transferred to the guard's end some time after c1888. Note the use of the three hole curved step supports, with the curves folded over and closer to the middle. The etched board is too narrow for the PBV and should be replaced by 1mm card or styrene, cut to the width of the vertical frames. (see Drawing) Grab rails should be fitted, bent from 0.5mm wire and fitted into drilled holes in the outside frames. For super-detailing tiny rectangles of brass can be pipped for bolt heads and glued against the grab rails. Above them, lamp irons are fitted, either castings or joggled from the underframe etch. Also etched eyes have been fitted either side of the draw hook hole.



47. When the fittings were moved to the guard's end, the short grab rails were placed with sweep rails up to the roof. These can be seen in several later photos, but can only be fitted when the birdcage and roof are in place. Note that in a number of SECR period photos, all the end steps have been replaced with much simpler steps each on its own angle bracket.

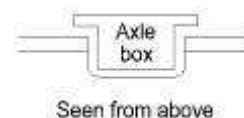
Detailing: steps and hangers

48. Remove all the combined steps and hangers, fold as shown and solder. Also remove 4 hangers and fold. As the lower hanger rod is rounded on the prototype, run the solder down to give thickness. Also solder the join at the rear for strength.



49. The hangers and steps are located with two cut down pins fitting into the solebar holes drilled earlier. The combined steps go at the ends and the middle. The hangers are fitted in between. They need to be trimmed to clear the axleboxes. Four steps are fitted under the guard's and luggage doors.

50. Cut the upper running boards from 6x1mm styrene, noting that they're longer than the body and tapered at the ends. Glue them to the top steps (this may well have been Ashford practice when new safety rules came in). For strength, form a fillet of glue at the back of every hanger onto the solebar.



51. Make up lower running boards from pieces of 2x1mm styrene strip cut to suit the drawing and glued behind 4x1mm styrene strip. A piece of metal angle makes a useful jig as in the photo below. (If the styrene sticks to the metal, you're applying too much solvent – use a smaller brush.)

52. Offer the running boards to the carriage and file to fit around the axleboxes as in the diagram.

53. Check that all the hangers are vertical, and the steps and hanger toes horizontal. Glue the running boards to the hangers. 2-part epoxy resin glue is forgiving because it has 'thickness'. The photo shows the PLV. Cut the upper running boards from 6mm styrene, noting that they overlap the ends and are tapered. Glue to the steps.

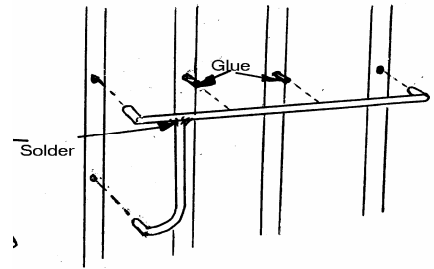
Handrails etc

54. The photo shows the fittings to be attached next.

55. Bend square-U shaped pieces of 26 SWG brass wire to make grab-handles for the double doors and insert in the holes drilled previously. Do the same for ductet grab-rail next to the guard's door.

56. Making and fitting the side grab-rails is ticklish. If you're manipulatively challenged (clumsy? – perish the thought!), I'd suggest it's better to leave them off than to have badly-made ones that are not square and parallel with the framing.

57. The diagram is generic and there are no drop rails on this model. Cut 4 pieces of brass wire about 4mm long and tin the ends. Push them into the middle holes of the horizontal rails to protrude about 1mm. Cut more brass wire for the horizontals and bend the ends at right angles to fit the drilled holes. Tin them where they'll touch the middle pins. Insert and touch each join with a hot iron. Alternatively, you could replace the solder with resin glue but the model will need gentler handling.



58. Fit larger cast handles into the guard's doors and smaller ones into the end dog-boxes.

59. Solder the etched safety chain eyes into the square washers and glue into the headstocks, either side of the drawhook. They were often left on, even after the chains were removed

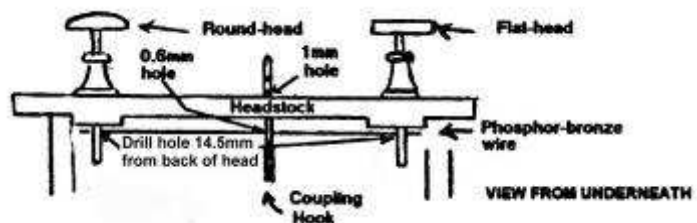
60. At this stage, I recommend painting all the brass-work with etch primer and then painting the whole vehicle appropriately. (See later notes)

Buffers and draw-gear

61. The kits have an etched screw coupling which is strong and easy to assemble, as well as etched safety chain hooks and eyes. If looks are more important than strength, I can supply castings for hooks, coupling screws and bob weights plus wire to form the loops. Formed this way, the couplings are to scale and quite tiny, but stronger than they appear. They work well for me in period trains of to 12 or 15 vehicles. Of course, sudden 'snatching' can break them – as with the prototype.

62. Clean up the buffers. (Note that two are flat-heads and two are round-heads. Check with the drawing to get them the right way round!) Some modellers have been worried about the fragility of these buffers, but the metal is pliable, and can be bent straight again after an accident! I've been using them for more than 20 years now. (The alloy is prone to pitting, so you may need to use filler)

63. The buffers should need little adjustment in order to slide easily in the stocks. If necessary, gently run a 1.7mm drill through the holes in the buffer stocks, and scrape the buffer shanks along the length with a craft knife, rotating the buffer between each scrape. Don't file the shanks across the width – the roughness will stop the buffers sliding smoothly. The buffers should slide easily in and out. If not, your derailment rate will rise!



64. Measure 14.5mm along the shanks from the back of the buffer head. Drill a hole 0.6 mm (No 73) right through each shank to take the spring wire. If you're squeamish about drilling through a narrow rod, make a simple jig from a couple of inches of 1/16" I.D. brass tube. Drill the hole through the brass tube at the correct distance from the end. It's then a simple matter to feed each buffer into the tube for drilling. This jig is also useful for protecting the shank if you paint the buffer heads before assembly (rear – black, front and edge – teak colour).

65. The kit has both etched and cast drawhooks (coupling hooks). The latter look better. If you choose to use them with the etched screw couplings, you'll need to make a saw-cut into the front hole in order to slide the top link in, and close it with glue or 70° solder.
66. There are two ways to carry out the next step. One uses solder and needs a temperature controlled soldering iron (a standard lighting dimmer in a plastic box with plug and socket is fine and cheap if you know your electrical safety). The other is to use 2-part epoxy glue,
67. Cut off two pieces of phosphor-bronze wire 41.5 mm long. For soldering: tin the centre. For gluing, roughen the centre to give the glue something to grip. Slide the wire through the hole in the coupling hook just behind the headstock, into the hole drilled in one of the buffer shanks, and overshoot into the recess in the solebar. Now pull it back into the hole in the other buffer shank. (It's easier to do than explain).
68. Solder the wire to the hook with 700deg solder, or use a blob of resin glue. The glue must be allowed to fully set overnight. When set, the ends of the wire can be bent to touch the headstock so that the buffer heads protrude fully and the draw-hook is held back by the spring.
69. Solder or glue bob weights into the holes in the coupling centres. Fold coupling links around the coupling centres, insert long link into the slot in the coupling hook, and fold lip down to hold.
70. If modelling vehicles pre-1890, hang safety chain hooks from eyes with short lengths of chain. The safety chains were often looped up out of the way by threading the hook through the eye.

The Roof

71. Solder the corners of the birdcage and spray with etch primer. Superglue the ¼ round microstrip around the join. (The photo shows a 18ft van.)
72. Trim the 1mm rolled styrene to fit. (Try 44mm long x 37.5mm across)
73. After painting the interior, add the roof to the body. The roof is white when it leaves the works.
74. The roof may be made removable. Glue several pieces of scrap 60 thou styrene into the corners, and drill to take wire or rod which is epoxy resin glued in. The four rods are arranged to project through floor holes where they can be bent over to hold the roof, or have washers soldered to them. (Use low-melt so as not to melt the styrene.) Alternatively use 4 or 6BA studding instead of rod and hold with washers and nuts.
75. Otherwise, glue roof to body with Evostik. Glue in the lamp-pots – be warned that the catches sticking up are fragile. At some later stage, torpedo vents were fitted.



76. Sight along all the steps and straighten them up where necessary.
77. The rear lamp casting will need a slot drilled out to fit the lamp-iron, or else file the rear collar away and replace with a square U-shaped piece of thin metal (shim). Drill either side of the lamp chimney 0.55mm and make a tall U-shaped handle with wire. I believe the lamp body was painted red. The 'glass' can be painted shiny dark red. The lamp should be on the right-hand side of the carriage, looking towards the locomotive.

Painting and lettering

EXTERIORS PRE-1885

Before c1883, there was a two-tone livery. The upper panels were 'a pale yellowy flesh colour' (definitely not the pale pink often used by modellers on LSWR stock). As an innovation, the lower panels were crimson lake, rather than brown. Ends were brown. From c1883 the vans were in overall crimson lake livery.

The single overall colour is recorded as dark crimson lake which could look like chocolate in some lights. I use a purple-brown undercoat (SR goods brown with a little extra red, or Humbrol Wine 73 + black) and cover this with varnish into which is added a tiny amount of Precision Paints SECR crimson lake or Humbrol 73. This allows the undercoat to show through, but tinted by the crimson. Practise on scrap styrene first.

Using this approach, vehicles look dark crimson lake or chocolate, depending on the light they're viewed in. To my mind, this is how it should be.

Headstocks and solebars and ironwork were painted black (unlike wagons) and varnished. Roofs were originally white, so I use white with dashes of black and yellow for a bit of weathering – all different!

The wheels were to Mansell's patent, with varnished teak segments between hub and tyre, so I paint the hub black, the segments 'teak' and the tyres (weathered) white, according to patent and photos. For crimson lake vans, the segments should match. The axles were supposed by patent to be painted blue. This was an expensive pigment and was presumably intended to show that these were classy wheels.

Fit SERKits transfers according to the scale drawing. You will need two sets for enough 'Luggage compts'.

INTERIORS:

The three compartments compartment were probably white or comb-grained to represent oak.

25ft Passenger Van numbering	Date of manufacture	Date of withdrawal
229-238	1887	Withdrawn 1913-6. Some go to France and lose their birdcages in WW1
241-279	1881	Roughly ditto but some last until 1920 in original form
Note that these took numbers of earlier vans being withdrawn – this was common SER practice. Later similar looking versions are 27ft and have elliptical roof and a chalk destination panel at the bottom of the top end panels. 6-whl versions are introduced in the 1890s and last into Southern days and later.		

Finally:

I hope you've enjoyed assembling this kit. If you've had any problems, let me know, and I'll try to find a solution for later kits. I'm hoping at some stage to detail the SER's fairly complicated lettering and numbering arrangement which no-one has yet chronicled. In the meantime, modellers will need to rely on photos.

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