

GWR WOODEN POST SIGNAL KIT

The kit represents the type of signal used by the Great Western Railway for new installations and renewals from the late 1880s until the advent of tubular steel posts in 1930. Many were still in existence in BR days, but the type is probably now extinct on Network Rail. Some still exist on the various preserved lines.

The kit may be built with either a 4' home or distant arm, or the 3' goods line arm. The goods line ring and shunting arm symbols are included.

Parts supplied:

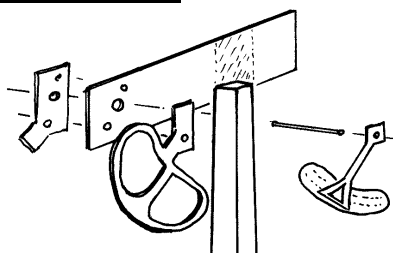
G1/14 arm etc fret
 G1/14/1 symbols fret
 G1/17 wooden post
 G1/09 ladder fret
 SC104 lamp casting
 SC105 finial casting
 SC141 balance lever casting & 2 weights
 SC151 arm bearing casting
 Baseplate
 30mm x 1/16" brass rod (arm spindle)
 10mm x 5/64" brass tube (spindle spacers)
 300 x 0.7mm brass wire (pull rod & guides)
 30 x 0.9mm brass rod (balance lever axle)
 50 x 1.2mm brass rod (two post pegs)
 60cm x 22swg nickel silver wire (rungs)
 8 pins
 Red, yellow, green and blue-green glazing

ASSEMBLY INSTRUCTIONS

The test kit was built using 50W and 25W (low temperature) soldering irons, 188°, 145° and 70° solders and liquid flux, impact adhesive, minidrill and slitting disc, piercing saw, various files, pliers, drills etc, and tinsnips and small scissors for cutting out the frets. A selection of prototype photographs will help assembly; these should be easy to find, as this was a common type of signal.

Burnish both sides of the frets before removing any parts, and tin the smaller parts before removal. Grip the etched parts in smooth pliers when filing off tags to avoid bending them. Left- and right-hand mean as viewed from the front of the signal.

The Signal Arms:



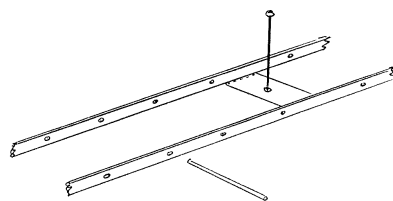
Identify the correct arm and motion plate for the signal you are building. The top plate on the fret is for the 4' home or distant arms,

whilst the lower plate is for the 3' goods arm. Scribe painting lines on the chosen arm using the half-etched marks as a guide. Open out the large holes in the plate and arm to 1/16", and the smaller ones to no.69. Tin (188°) both sides of the arm around the three holes. Place the arm face up on the workbench, lay the plate on top and align the spindle holes as shown above. Solder (188°) the plate and arm together. Lay the arm assembly face down, and place the spectacle plate on top, with the half-etched portion on this component being face down, and with the smaller aperture to the bottom. Solder (188°) the two together.

Drill a 1/16" hole in a wooden block. Insert the spindle in the hole, ensuring it is perpendicular. Drop the arm face down onto the spindle, and solder it (145°). Do not tilt the arm when making this joint. Remove the excess front spindle using the minidrill and slitting disc. For the 3' arm, add the goods line ring or shunt ahead "S" if required, centred about the stripe markings.

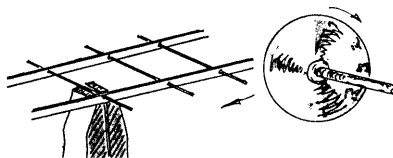
The Ladder:

To avoid mistakes, build the ladder to its full length, and cut it to size at the fitting stage. The jig incorporated in the ladder fret helps to keep the ladder aligned whilst the rungs are being soldered in place. Before removing the ladder and jig from the fret, clear the rung holes to suit the 22swg nickel silver wire supplied. A no.74 drill will suffice, or preferably a five-sided cutting broach. The holes are deliberately etched undersize to prevent failure in production and to give a fine fit to the wire.



Fold up the two side stiles with the half-etched lines on the inside, and pin the whole assembly to a balsa block, using the holes in the five jig spacers.

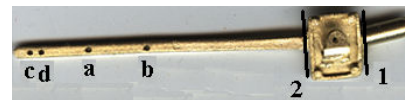
Lightly tin the outer edges of the ladder. Straighten some nickel silver wire between finger and thumb, tin it, then cut pieces to length, just over the width of the ladder. Thread them through the holes, two or three at a time, and solder them in place from the outside. Repeat the process at the other end of the assembly, and so on until the middle is reached. It is most important to work from alternate ends as work proceeds, so that the heat from the soldering iron is dissipated along the ladder's length, eliminating any tendency to twist.



Remove the ladder and jig from the balsa block, and tidy up the rung ends using a minidrill and slitting disc. Hold the rungs in pliers as shown to avoid damage. The vibration from the drill is most useful, as it will shake apart any poorly soldered joints!

Finally, cut the jig free using a piercing saw or a craft knife on a firm hardwood surface. The slitting disc may also be used, but take great care not to damage any rungs. Do not discard the strips in the middle of the jig, as these are used later.

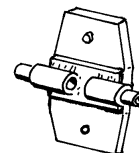
The Balance Lever:



Remove the casting sprue by making two cuts with a piercing saw or slitting disc as shown. Tidy up the cuts and any mould lines with files, and file flat the rear face of the bracket. Open out axle hole (a) and the corresponding holes on the bracket with a no.65 drill, then use broaches to make them a good clearance fit on the 0.9mm brass rod. Open out pull rod hole (b) and signal box wire hole (c) to no.69. Fill in hole (d) with solder - this is for another application of this casting.

Solder or glue the weights to the lever, and file off or fill in the decorative circles. Check which side of the signal post the bracket was fitted (left, right and front have all been seen), and which side the weight hangs, and push the lever appropriately into the bracket jaw from the side (jaw mouth uppermost). Ensure it moves freely without any slop. Insert the 0.9mm brass rod through the bracket and hole (a) in the lever, leaving it overlong at the rear, so it will provide a secure fixing into the post. Oil hole (a), and solder the rod to both bracket faces.

The Arm Bearing:

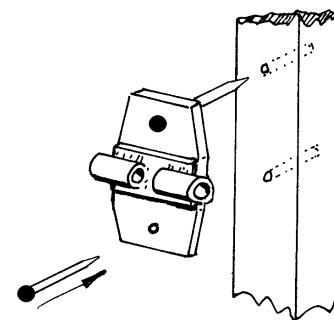


Remove the casting sprue and the smaller diameter bearing tube from each side of the casting. Open out the spindle hole with a 1/16" drill, then use broaches until the arm spindle is a loose fit in the hole. Open out the two fixing holes to no.74.

Assembling the Post and its Fittings:

Warning: being made from wood, the post is easily charred by a soldering iron, or bruised by pliers. Also, beware of splinters.

The post as supplied will build into a signal 20ft high. If you require a shorter post, remove the excess from the top end of the post.



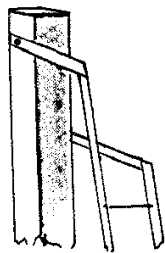
Offer up the arm bearing to a post face (which now becomes the left-hand side), so that the bearing centreline is 6mm below the post top. Drill no.74 through the fixing holes and through the post. Glue the casting to the post, and strengthen the joint with two pins. Once

set, trim the pins to length, and file the casting to match the width of the post.

If you intend to use the large rectangular baseplate to mount the signal on the layout, first scribe a longitudinal centre line along it. Drill a no.56 hole on this line, 30mm from one end. Drill a similar hole in the centre of the post base, and then glue in a 1.2mm brass rod strengthening peg. Orient the post with the bearing on the left, then glue and solder the post to the baseplate, so its longer portion is to the rear. Ensure squareness in all three planes.

Having decided above which face of the post the balance lever is to sit on, drill a no.65 hole from this face through the post on its longitudinal centreline. The height of the balance lever axle varies from just above ground to 3' high; 2' (20mm) seems the commonest. Glue the balance lever bracket to the post, passing the axle through the hole. When set, trim the axle to length.

Use the minidrill and slitting disc to form a two short channels in the baseplate, parallel to the centre line, 4.5mm either side of it, and centred 30mm from the post rear face. (If the post has been cut to a shorter height, the channels should be positioned to give a ladder slope around 1 in 7.) If not using the baseplate, fasten pieces of scrap wire either side of the post, long enough to reach the ladder end.



Take one of the holed ladder jig strips. Cut it in to two equal halves, and tin (188°) one face of each. Glue and pin the struts to the post sides as shown, with the tinned sides facing inwards. That on the left-hand side of the post

(right-hand in drawing above) should be placed 5mm below the arm bearing casting, while the right-hand one should be 5mm below the post top.

Place the ladder foot in the baseplate channels (or between the two wires), and joggle out the two fixing struts so the ladder fits between them. If either strut coincides with a rung joint, remove a small amount of material from the ladder foot to prevent this. Solder the ladder top (145°) and bottom (188°), inclining the ladder so the joint with the topmost strut is 5mm from the rear of the post. Remove the left-hand side of the ladder above its fixing strut and all other surplus material, and tidy the joints.



Form the safety hoop from one of the holeless ladder jig strips. Wrap it round a 15mm diameter former; the natural spring of the brass will open it to the correct 17.5mm diameter. Bend the end tags to the ladder width and solder (145°) them to the outside of the ladder stiles as shown above,

4mm below the right-hand fixing strut (but slightly above or below this to avoid being level with a rung).

Ladder bracing struts do not appear to have been common on GWR signals. If required, make them from the holed ladder jig strips. Glue and pin them to the post sides, and solder (145°) to the outside of the ladder stiles, and not exactly level with a rung. Cut the pins to less than half the post width, otherwise they will foul each other.

Remove any flash and mould lines from the lamp casting, but not the casting sprue, unless a working lamp is to be fitted. If so, drill out the body and lenses to suit your light source, then glue it into the casting. Make one connection to the lamp via an enamelled wire fixed to back of the post, and the other via a wire soldered to the ladder. Ensure that the first wire is insulated from the baseplate.

The lamp bracket is made from one of the unused arms. Drill out the spindle hole to 9/64", and then file it out until the lamp sprue drops in. Make a right-angle bend across the arm 5mm from the hole's centreline. Solder (70°) the lamp to the bracket, and remove the excess sprue. Trim the bracket's outer corners to match the curve of the lamp body. Cut the vertical leg of the bracket to be 6mm long. Use the slitting disc or piercing saw to remove material from the back edge of the vertical leg until it is 4mm wide. Drill two no.74 fixing holes at diagonal corners, and then bend the bracket until the angle is slightly less than 90° to allow for the post taper. Offer up the bracket to the right-hand side of the post, so the top of the lamp catch (the small, square vertical piece) is level with the post top. Drill no.74 through the fixing holes and through the post. Glue the bracket to the post, and strengthen the joint with two pins. Once set, trim the pins to length.

Remove any flash and mould lines from the finial. File back each side of the square finial base, so it is in line with the circular plinth on top of the base. Drill the centre top of the post 2.8mm (do not drill down too far, otherwise you will hit fixing pins), shorten the base peg to give a good fit, and glue the finial to the post top.

Painting:

Degrease the post and arm assemblies by washing in detergent water and leaving to dry. Put a drop of oil on the balance lever axle, then spray overall with white car primer.

Detail paint as follows (but check with photographs as there is a lot of prototype variation):

Black: – bottom 40mm of the post including the balance weight assembly; ladder above the level of black on the post; ladder fixing and bracing struts; safety hoop; lamp; arm bearing; arm spectacle and motion plates; arm rear band/chevron; front chevron on a distant arm; square finial base.

Red or Yellow: front and edges of the arm except the home's white band or distant's black chevron (note - no white band on a ringed or S arm); finial ball.

Silver: lamp lenses front and rear.

Glaze the spectacles; use red (home) or yellow

(distant) in the top aperture. In the bottom aperture, use blue-green for an unlit signal or a yellow light source; use green for a white light source. The easiest method is to cut a rectangle approximately to size so the whole of the aperture is covered, fix it in place on the rear of the spectacle plate using MSE's *GSA* adhesive or gloss varnish, and then trim the edges when set. Coat the front of the glazing with gloss varnish to give a better glass effect.

Final Assembly:

Remove any paint from the spindle and arm bearing holes. Open out the hole in the back blinder arm to 1/16", and solder (188°) it to the smooth side of the back blinder as shown above. Cut a spacer (1mm long in the test build) from the 5/64" tube, and place it on the spindle. Insert the spindle in the bearing and check that the spectacle plate clears the lamp lens in its travel - you may need to adjust the spacer length to allow for any assembly variation. Take the 0.7mm brass pull rod, and bend it to 90° 5mm from one end. Insert this into the lower hole in the arm, from the rear. Bend it further to trap the wire in the hole, and remove any excess.

Cut another 5/64" tube spacer (5mm long in the test build) and place it on the rear of the spindle, followed by the back blinder, with the corrugations facing the front. Push the arm fully into the bearing, and the back blinder against its spacer, and check that the back blinder swings free between the rear of the lamp and the right-hand ladder stile, without hitting either. If not, adjust the spacer length. When satisfactory, oil the bearing, and solder (145°) the back blinder to the spindle, adjusting its position so it just clears the lamp rear lens when the arm is horizontal, and acts as an arm stop against the top ladder fixing strut when the arm is off. Wash off any surplus flux, then prime and paint black.

With the pull rod hanging loosely down the post, make a second 90° bend so that the rod fits through hole (b) in the balance lever. When doing this, ensure that the lever is at the bottom of its travel, and the arm is horizontal. Again, bend the wire further to trap it in the hole, and remove the excess. Any bending in the pull rod when operated can be removed by adding guides. Bend up one or more narrow U-shaped guides from the surplus 0.7mm brass rod, and glue them in to pairs of holes drilled in the post's front and side faces, with the operating rod in the bend. These will prevent the rod from flexing excessively when the signal is operated. Small loco handrail knobs may be used instead, but remember to thread them onto the operating rod before making the lower bend. Prime the pull rod and guides and paint black.

The signal may now be installed on the layout and connected to your chosen means of operation.

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