

NewTrack P4 turnout kit B7

The P4Track Company

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These instructions may look a little intimidating but we have chosen to try to be comprehensive rather than keep them simple. You do not need to read everything to build this turnout but it is recommended that you go through the General Guidance section before starting and familiarise yourself with the components and method of construction. Aim to relate what you read to what is shown on the turnout drawing. You should then follow the Basic Assembly Sequence section.

**IMPORTANT: Do not remove any chair from its sprue until you are about to use it.
Do not alter rail lengths if you wish to build the turnout as designed.**

General Guidance

Terminology: A turnout is made up of a switch assembly, a crossing assembly and connecting ‘closure’ rails, with supporting timbers. The switch assembly consists of a straight stock rail with a curved switch rail on one side and a curved stock rail with a straight switch rail on the other. The crossing assembly consists of a point rail and a splice rail forming the vee with immediately adjacent wing rails. Connecting the wing rails to the switch rails are the straight and curved intermediate closure rails. On the outer edges of the turnout, connected to the stock rails, are the straight and curved outer closure rails. The check rails are opposite the vee and adjacent to the outer closure rails.

It is recommended that the turnout be assembled with provision for laying it in two sections, with a break between timbers 13 and 14. With rail joints here and between timbers 12 and 13, it is difficult to make the turnout strong and it is convenient to be able to separate it into two parts.

It is also recommended that the turnout drawing (‘template’) included in the kit is **not** used as a template but rather kept as a constructional guide. The turnout should be assembled on a flat, hard surface (e.g. an MDF offcut). All that is needed is a straight line drawn on the surface to help in aligning the plastic timber bases. Small pieces of blutack are helpful to keep the bases in place.

With one unavoidable exception, the rails have been cut to the correct lengths and all sharp bends (e.g. to check rail ends) have been made already. You will need to shape the curved closure rails and the end of the crossing assembly that connects to the curved intermediate closure rail (see below). The bullhead rail used in these turnouts must always be the correct way up with the thinner section as the base.

If you find that any rails are not the correct length or any of the rails in the switch or crossing assemblies are not the correct way up, please write to Exactoscale (see above) describing the problem and enclosing the defective parts. Replacements will be provided promptly.

The curved closure rails (each slightly longer than their straight equivalents) should be gently manipulated between thumb and finger until the curve matches the curve on the drawing. Try to get the curve running smoothly right to both ends of the intermediate closure rail and right to the end of the outer closure rail that connects to the switch assembly. Use tools as little as possible when curving the rail - you may damage the surface finish.

The crossing assembly as supplied should be straight throughout on both roads. Check it, and correct any misalignment by careful bending at the knuckle (where the etch finishes). The wing rail that connects to the curved intermediate closure rail then needs to be curved from its end to where it attaches to the etched brass base. This needs to be done carefully as it is important to curve the rail, not to unbend it at the point of attachment to the etch. To give some idea of the amount of curvature needed, the total required deflection of the end from its original straight position is about 1/3mm. Check the crossing against the drawing to see the curvature required.

The wing rail lengths in the crossing assembly as supplied are the same on both routes. For the rail joints to be correctly positioned midway between the timbers, the straight route needs approx. 0.4mm removed from the end of its wing rail. The length of the straight intermediate closure rail is sufficient to allow for this 0.4mm having been removed.

It is assumed that contraction and expansion of rails will be accommodated by movement of the rails through the chairs. With this approach, rails should not be rigidly attached to chairs at more than one location in any length of rail and rail gaps should be set to allow for some limited rail expansion.

All rail ends will be easier to slide into the chairs if the sharp edges of the rail are softened slightly with a needle file (the edge of a 'knife' shaped file works well). Do not force sharp rail ends into chairs.

The special crossing and switch chairs are all supplied on their moulding sprues with identification on the sprue. The items you will need for this turnout are shown in the key on the turnout drawing (because the mouldings cover a wide range of turnout types, many items will not be used). The S1, L1 and check chairs are also supplied on sprues (before use, the S1 and check chairs must be scored with a scalpel where the chair connects to the sprue). You are likely to find it best to feed these functional chairs onto the rail while still attached to their sprue, breaking them off in turn by folding the sprue back against the base of the rail and then twisting each one free.

The turnout has been designed to have chair keys pointing in the direction switch -> crossing. Certain keys cannot be placed in this direction and all keys at rail joints point away from the joint.

The chairs are bonded to the plastic timber base using an appropriate solvent (e.g. butanone). Full penetration of solvent is important - chairs attached only at the edges will soon break free. When fitted to the rail, the base of each functional chair becomes slightly bowed and solvent should enter this gap (normally by capillary action) before the chair is pressed flat.

There is a small conflict between the adjacent chairs on timbers 14 and 15 and in the centre of timber 33. Shaving 0.1mm off the appropriate end of each S1 chair involved removes the conflict. Do this with a scalpel once the chair is on the rail.

The 'P' chairs under the moving parts of the switch rails do not have pips to locate them and only locate against the outside of the stock rails. It is not essential that the stock rails are bonded to these chairs though it is important to achieve a good fit. It is suggested that a small drop of Loctite 601 (or equivalent) applied in the outer web of the stock rail adjacent to each chair after the chairs have been bonded to the timbers will help strengthen the switch assembly.

The fishplates are best removed from their sprue with a scalpel, taking care not to twist the fishplate while doing so. Position the sprue over the edge of a scrap of MDF and press the scalpel down so that the cut is made squarely and symmetrically just outside the end bolt, then trim the other end of the fishplate in the same way. Do not leave the fishplates too long or they will clash with the chairs.

It is best to try to position the rails to give correct rail gaps (0.3-0.5mm) when they are initially fixed. It is possible (but not always easy) to slide the rails through the chairs to make final adjustments.

Tags for electrical connections are provided on the switch and crossing etches. Other rails need to have direct connections attached by soldering wire 'droppers' to the underside of the rail. This requires care as it is important not to overheat the plastic chairs. The use of heat sinks (metal clips, or scrap

aluminium pressed against the rail head) can reduce the risk and it is probably better to use a hot soldering iron applied briefly than a cooler iron for longer. Planning ahead and leaving selected chairs unbonded so that they can be slid further away from the heat may also help.

Track can be laid on a variety of materials, using several alternative glues. The trackbed needs to be flat (though canted and graded if required) and the track stuck down with an adhesive that does not become too brittle as it ages. A cork underlay and Evostick flooring adhesive seem to work well.

Basic Assembly Sequence

1. Place the plastic timber bases for the crossing and closure section on the flat surface with the protruding plastic webs under the rails butting together and with the straight road accurately aligned. Hold the bases in position with small pieces of blutack. Leave the switch section on one side for now.
2. Take the crossing assembly, check that the straight road is straight and that the curved road is only curved over the section from timber 25 to timber 28. Make scratch marks on the straight road 0.4mm from both ends and file each rail end with a needle file until you reach the scratch mark. Make sure the rails ends are square and remove any sharp edges or burrs. Select and fit the chairs for timbers 25, 26, 33 and 34. Shave 0.1mm off the inner edges of the S1 chairs on timber 33 to avoid a conflict between them. Place the crossing assembly in position on the timbers - the tip of the V should be 1/3mm from the edge of timber 29. Adjust the position of the chairs on timbers 25, 26, 33 and 34 until they are all seated on their pips and cement them in position. Now, piece by piece, add the crossing chair components to timbers 27 - 32 inclusive, cementing them in position. The components should fit snugly but take care not to push the crossing assembly out of alignment.
3. Take the straight intermediate closure rail (it runs from timber 13 to timber 24 inclusive), check that it is straight and 'load' it with the appropriate number and type of chairs. Leave the chair on timber 13 till later and note that the keys of all these chairs point towards the V except for the one on timber 24. Remember to shave a little off the outside of the chair bases on timbers 14 and 15. Adjust the chair positions so that they will lie over the appropriate timbers, add a fishplate to the crossing end of the rail (nuts outwards) and place the rail in position on the base unit, threading the fishplate onto the crossing assembly (the rail gap should be no more than 0.5mm). Adjust the chair positions so that they positively locate on the pips and cement them in position.
4. Repeat the steps in 3. for the curved closure rail, but only trim the chair on sleeper 15 and do not cement the chairs on to timbers 14 - 19 at this stage.

Now turn to the switch assembly...

5. Check that the switch rail assembly with the straight stock rail does have a straight stock rail and carefully adjust if necessary. Select the appropriate 1P chair and slide it from the 'timber 1' end of the switch assembly past the switch rail (holding it open as it passes the switch toe) until it is in approximately the right position. Add the appropriate chairs for timbers 1, 2 and 13. Place the assembly on the switch timber base unit and position it so that the tip of the switch blade is 0.85mm from the edge of timber 3. Adjust the position of the chairs on timbers 1, 2 and 13 until they engage with the pips on the timbers, brush a little butanone solvent around the base of the chairs and press the rails down until set. Check that the stock rail is still straight, centre the 1P chair on its timber and cement it in place.
6. Repeat the procedure in 5 for the switch assembly with the curved stock rail. In this case use a NewTrack track gauge to position it in relation to the straight stock rail when pressing the chairs into their final positions. It is important the gauge is nowhere less than 18.83mm.
7. Now add the P chairs to the switch assembly, on the straight stock rail side first. Do not apply any pressure that could push the stock rail out of its straight alignment. Use a track gauge between the straight stock rail and the straight switch rail when cementing the P chairs for the curved stock rail in

position. Add the switch chair components to timbers 10, 11 and 12.

8. Fit fishplates to the four rail ends at the crossing end of the switch assembly (nuts outwards) and slide L1 chairs for timber 13 onto the intermediate closure rails. Place the switch assembly on the flat surface and slide the assembly so that the inner two fishplates engage with the intermediate closure rails and the L1 chairs fit onto the pips on timber 13. Check that the straight rail is accurately aligned right through the turnout and tack the switch unit base in place with small pieces of blutack. Check that the rail joint gaps are not too large (the gap between rail ends should not be greater than 0.5mm). Cement the remainder of the chairs on the intermediate closure rails in place.

9. Load each check rail with check rail chairs. Note that the keys on the CC chairs should all point in the direction switch -> crossing whilst the CCR and CCL chairs have their keys pointing towards the middle of each check rail. Space the chairs on each check rail to fit correctly on timbers 26 - 30.

10. Slide the straight outer closure rail through the check chairs of its check rail (check the key direction!). Now load the closure rail with chairs, not forgetting to shave a little off the insides of the chairs for timbers 14 and 15, and with the key on timber 34 facing away from the rail joint. Position the chairs to lie approximately over the appropriate timbers, feed the rail end into the fishplate between timbers 13 and 14 and, with the rail gap set correctly, adjust each chair - including each check rail chair - so it locates positively on its pip. Cement the straight stock rail and check rail in position, using a track gauge for reassurance if desired.

11. Repeat 10. above with the curved outer closure rail, but only trim the chair on timber 15.

12. Remove the blutack and - if felt helpful - slide the switch assembly out of engagement with the rest of the turnout (keep the fishplates on the switch assembly's rail ends). Turn the assemblies over to make electrical connections.

13. Prepare the site for the turnout. Holes for the electrical feeds need to be drilled and holes (or slots) made for the operating mechanism.

14. With electrical connections in place, the turnout is ready for laying. Lay the whole turnout in one session, placing the two sub-assemblies (if separated) in position in turn (engaging the four fishplates as the second subassembly is placed in position). The alignment of the whole turnout can then be checked and adjusted, including checking that the rail end clearances are between 0.3 and 0.5mm. Weight the turnout evenly while the adhesive sets - old timetables can be quite effective.

15. Connect the electrical feeds to the layout wiring, install the point operating mechanism and test the turnout.

16. Finally, ballast and weather the turnout to give the desired final appearance.

Fine Tuning (for perfectionists!)

This kit makes up into a very realistic 4mm scale representation of the real thing. Nevertheless, there are some 'tweaks' and additions that can make for even greater realism.

Chamfering Etches - While the etches that hold together the switch assemblies and the crossing unit have been made as unobtrusive as possible, they can be seen when the track is viewed at low angles. Careful filing of the edges of the etch before assembling the turnout can reduce this effect.

Height of vee - for the smoothest running, the tip of the vee needs to be approx. 0.1mm below the level of the adjacent wing rails whereas the production method keeps it level. A little careful scraping/filing to produce a slight fall over the last 5mm of the vee can correct this.

Rail cant - the crossing assembly as supplied has its rails upright whereas they should have the same

1/20 cant as the adjacent rails. This lack of cant can be noticeable when reflections are seen from the running surface and also slightly affects the rail head alignment at rail joints. Cant can be added by careful inward twisting of the rails at the switch end of the crossing and outward twisting of the point and splice rails. You have to clamp the soldered section very firmly to avoid damaging the assembly and this work is at your own risk!

P chair length - the P chairs were designed to accommodate the switch throw required for EM and 00 and are 0.5mm longer than they should be. The moulding can be cut to produce two pieces with a join under the centre of the stock rail giving the correct overall length.

Small gaps - it was decided that there is a minimum size of moulding that is worth producing. This means pieces to go between the rails have not been included for the X and 2P chairs. You may wish to add small offcuts to fill the gaps.

Operating the Turnout

There is a variety of ways of operating turnouts and this is not the place for a comprehensive review.

As part of the NewTrack project, an adaptor plate enabling a Tortoise motor to be readily (and nearly invisibly) connected to the switch rails has been designed and is now available. If this method is used, cosmetic stretcher bars are required which need to be insulated, be easily attached to the switch rails without restricting their movement in any way, be close to scale size and not be too fragile. Possible solutions are under development.

Special Configurations

The prototype uses turnouts in an almost infinite variety of configurations. NewTrack turnouts come with standard left or right hand geometry only. Obviously it is up to the individual modeller how far to go in customising these turnouts to meet the requirements of a particular location. Certain points are worth making:

It is possible to curve the turnouts relatively easily except for those sections where the etches hold the rails. Removing the web under three of the four rails enables the moulded base to be curved and the rails can then be curved before assembly. Rails where the timber spacing has increased as a result of the curving will have to be replaced with longer rails.

If more comprehensive curving is required, the first option is to cut back the etch under the crossing to the bare minimum, covering just the A and B chairs. This has been tried with good results. Beyond that, the soldered assemblies would have to be unsoldered, the rails curved as required and the assemblies re-soldered to the required shape - not a trivial task. If curving involves a radius of under about 1500mm, additional gauge widening is advised and it will be necessary to remove the pips for the relevant section of one outer closure rail, then use a +0.2 or +0.3mm NewTrack track gauge when bonding the chairs to the timber base. If the gauge is widened to this extent at the crossing, you will need to use wider flangeway check chairs (0.8mm ones are available).

If more complex formations, e.g. tandem turnouts, are required, then many components from the standard kits will be useable but some longer timbers and rail cut to different lengths will be required as well. The NewTrack range includes sets of longer timbers for this purpose.

When building crossovers, it is important to plan carefully to ensure that the timbers supporting the crossing chairs are at their standard spacing. Usually, there are two options - either to interlace the timbers of the two turnouts or to use a number of through timbers. The turnout drawing gives centre lines for these alternatives.

Track Gauge Issues

The turnout has been designed to be assembled with little or no use of gauges. Satisfactory results should be obtained simply by careful assembly, ensuring that all chairs are fully located on their pips and that the straight rails in the switch area are accurately aligned. Use of a track gauge to ensure no gauge narrowing occurs in the switch area is however recommended.

Against this background, it may seem unnecessary to say more - but nonetheless modellers working to exact scale dimensions or those wishing to achieve some gauge widening in the turnout may find more details useful.

Location pips vary slightly in diameter. The closest fit is where the crossing locates and at the crossing end of the intermediate closure rails. Generally, the pips are designed to allow up to +0.1mm on the nominal gauge of 18.83mm. Remember that setting the track gauge (TG) will, with a fixed check rail flangeway, set the Check Gauge (CG) dimension too.

Setting TG at the crossing to 18.83mm will give a CG that complies with the published P4 standards. Setting TG to +0.1mm will give a CG of 18.25mm.

If you wish to use S4 (exact scale) dimensions, it is best to replace the 0.68mm flangeway check chairs with 0.58mm ones (when available). The crossing flangeway though is difficult to alter and complies with P4 standards.

You are advised to use track gauges in the switch area. Here, there is scope to set TG at 18.83mm or to increase it by up to 0.1mm right through the switch area.

After Sales Service

We hope you will be able to build this turnout without encountering any difficulties. If all does not go smoothly, we will do our best to correct problems and provide assistance - but please make full use of these instructions before looking for further assistance.

If there seem to be deficiencies in the kit as supplied, please write to Exactoscale (see address at top of these instructions) describing the problem and enclosing the defective component(s) (if appropriate).

If you have difficulties assembling the kit, contact us at info@p4track.co.uk or on 01780 720076 (please use e-mail if you can).

If components become damaged during assembly or if vital mouldings are lost, we will replace them. Please write to Exactoscale (see address at top of instructions), including stamps for return postage and including the damaged component (or sprue in the case of a lost moulding). Components will not be replaced except on this basis.

[Note: for lost switch or crossing mouldings, a close equivalent can often be used from elsewhere on the sprue with little loss of accuracy, e.g. some 1:8 components would be acceptable on a 1:7 crossing.]

Feedback

This turnout kit is part of a new range and feedback on your experience in assembling it may help us improve this or later kits in the range. In particular, if you have found a better way of assembling it than that described here, please let us know. Contact info@p4track.co.uk or phone 01780 720076 (please use e-mail if you can).

Note: Exactoscale Ltd and/or Andrew Jukes (the Suppliers) have taken great care in designing and producing this product. The Suppliers however do not and cannot guarantee accuracy or performance. Anyone using this product does so at their own risk and shall be deemed to indemnify the Suppliers against any and all injury or damage arising from its use.