AUSTRALIAN RAIL TRACK CORPORATION LTD

Engineering (Track & Civil) Manual

50Kg Dual Gauge Turnouts and Gauge Separations – Construction and Maintenance Manual

ETN-03-01

Applicability

ARTC Network Wide	✓	**Western Jurisdiction**		**New South Wales**		**Victoria**	

Document Status

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Version	Date Reviewed	Clause	Description of Amendment
1.0	19 Jun 08		First issue for use throughout ARTC where dual gauge track exists

Purpose

The purpose of this manual is to set out construction and maintenance requirements, including component inspections, for ARTC 50kg Dual Gauge and Gauge Separation turnouts and associated trackwork units.

References

This note/manual should be read in conjunction with the following ARTC Standards:

ETF-00-01 Mixed Gauge Track

ARTC Code of Practice Track and Civil Infrastructure Guidelines – Section 3 Points and Crossings

ARTC Code of Practice Track and Civil Infrastructure Guidelines – Section 4 Ballast

Contents

1 Purpose

The purpose of this Manual is to set out construction and maintenance requirements, including component inspections, for 50kg ARTC Dual Gauge and Gauge Separation turnouts and associated trackwork units.

Refer to drawings of the Dual Gauge and Gauge Separation turnouts as listed in the drawing register in Appendix A.

This Manual does not specifically cover construction and maintenance requirements for switch machines, interlocking and detection equipment, switch operation adjustment or materials which are common with open track (eg sleepers, concrete bearers, thermite rail welds, insulated joints, fishplated joints, standard rail base plates and fastenings), which are detailed in other specifications and guidelines.

This Manual does not cover manufacturing or installation requirements except where stated.

2 Scope

The requirements of this Manual apply to all 50kg ARTC Dual Gauge and Gauge Separation turnout assemblies installed and maintained in the Australian Rail Track Corporation rail network.

3 Design Information

The 50kg Dual Gauge and Gauge Separation Turnouts incorporate head hardened rail. The bearers may either be concrete or timber. The design speeds are 115km/h on the main line with a diverge speed of 35km/h both for standard and broad gauge. The normal recommended maximum axle load is 23 tonnes both for locomotives and rollingstock. Axleloads of up to 25 tonnes are allowable, however higher axleloads lead to increased inspection and maintenance requirements.

4 Construction

4.1 General Description of Turnouts

The ARTC Dual Gauge turnouts, Assembly Types 29, 30, 39 and 40 permit both standard gauge and broad gauge trains to proceed on the straight or diverge and consist of an assembly of the following trackwork units:

- RH & LH switch assemblies – identified from the toe end of switch and by the Type of turnout. These units consist of a dual bladed switch assembly for the dual rail and a single blade switch assembly for the common rail.
- K crossing assembly that is located behind the heel of dual bladed switch assembly and identified by the Type of turnout.
- Double nose V monoblock crossing which is manufactured from cast austenitic manganese steel and identified by turnout Type.
- Checkrails and closure rails to suit these trackwork units.

The ARTC Dual Gauge Separation turnouts, Assembly Types 24, 27, 28, 34, 82 and 82A were designed to permit a variety of single gauge or a combination of standard gauge and broad gauge trains to proceed on the straight or diverge and consists of an assembly of the following trackwork units:

- RH & LH switch assemblies – identified from the toe end of switch and by the Type of turnout. These units consist of a single or dual bladed switch assembly for the dual rail and a single blade switch assembly for the common rail.
- For Type 82 and 82A turnouts straight and curved running rails are utilised for the switch assembly on the dual rail only and are identified by the Type of turnout.
- For Type 27 and 28 turnouts a K crossing assembly is located behind the heel of the single bladed switch assembly on the dual rail only and is identified by the Type of turnout.
- Rail Bound Manganese V crossing and identified by turnout Type.
- Checkrails and closure rails to suit these trackwork units.

All ARTC Dual Gauge and Gauge Separation turnouts are manufactured from 50kg HH rail and resiliently fastened to concrete bearers or, if specified timber, bearers may also be utilised.

4.2 Trackwork Assembly Details

The following is a description of each trackwork assembly utilised in these turnouts. Full details are given on relevant manufacturing, set-out and layout drawings.

4.2.1 Dual Rail Switch Assembly

A Dual Rail (LH or RH) Switch Assembly consists of:

- An outside switch blade and stockrail, the operation of which controls broad gauge wheels either on the straight or the turnout.
- An inside switch blade and stockrail, which controls standard gauge wheels either on the straight or the turnout.
- Fitted distance blocks support both inside and outside switch blades during broad and standard gauge wheel moves and an 4125mm UIC 33 check rail on the opposite common rail side assists the control of wheels for the standard gauge straight.
- The switch assembly utilises a standard pivot heel design consisting of double rail joint heel blocks, heel fishplates, heel bolts, ferrules, washers and nuts holding the stockrails and switch blades together. The heel spreads (measured at the end of switch blade rails) are 95mm and 130mm.

- The toe of switch blades are designed with a V nose which results in the toe profile fitting under the machined head of the stock rail for protection.
- A long baseplate which extends the length of the switch blades give support to the both stockrails and allow the switch blades to slide during operation.

4.2.2 Single Blade Switch Assembly

On the common rail (LH or RH) Switch Assembly with single heel block consists of:

- An assembly of switch blade and stockrail, the operation of which controls wheels either on the straight or turnout.
- Fitted distance blocks support the switch blade during wheel traverses.
- The switch assembly utilises a standard pivot heel design consisting of single rail joint heel block, heel fishplates, heel bolts, ferrules, washers and nuts holding the stockrail and switch blades together. The heel spread (measured at the end of the blade rail) is 130mm.
- The toe of switch blade is designed with a V nose which results in the toe profile fitting under the machined head of the stock rail for protection.
- For the common rail side slideplates are installed on each bearer and provide support to the stockrail and allow the switch blade to slide during operation.

4.2.3 Switch Operation

Operation of the switch blades are controlled by stretcher bars which are connected to the blades as follows:

- Two half rods separated by insulation connected to the two inner switch blades via two centre brackets and web drive brackets, with the outside (BG) switch blade connected via end brackets and drive rods which are attached to the outer (BG) switch blade rail web. Slotted holes are machined in the web of the outer stockrail to allow the drive rods to be connected to the outer (BG) switch blade.
- The toe of the switch blades are adjusted to give a minimum throw of 95mm. Adjustments can be made using the centre and end brackets and the drive rods.
- Drive, lock and detector rods complete the connection of the switch operating assembly to the motorised switch machine. In front of the switch blade toe a connecting rod connects the outside and inside switch blades through a hole machined in the inside stockrail. The type of operating assembly layout installed depends on the Type of turnout and the side the point machine is required to be installed.

Adjustments to the operation are to ensure that the back of outer (BG) switch blade, when in open position, is within 2mm of contacting the inner (SG) stockrail for the full length to 1200mm from flared end of the inside stockrail.

All slideplates must be lubricated using approved lubricants. It is essential that the whole of each slide surface is fully lubricated which will necessitate each switch blade being thrown over to permit lubrication of the “closed side” to be undertaken. The lubrication process shall be in accordance with approved procedures and all debris is to be removed from the vicinity of the switch during this process.

Under no circumstances should hands or feet be placed between the open switch blade and stock rail unless precautions are made to prevent the moveable rails from closing.

4.2.4 Gauging of Switches

Switches are laid to exact gauge in accordance with design drawings. The set of switches shall be gauged for standard and broad gauge at three locations: - ahead of the end of stockrail, ahead of and within 1 metre of the set in the stockrail and at the heel.

4.2.5 K Crossing

The K crossing is a fabricated unit and is constructed of 50kg nose and wing rails assembled together with spacer blocks and swage lock fasteners. The geometry of the unit is in accordance with design drawings and is fitted to the heel end of the inner and outer switch blades of the dual rail switch assembly.

The K crossing is positioned behind the dual rail switch assembly and allows the broad gauge line to pass through the standard gauge line.

The wheels traversing the unguarded gaps are controlled as follows:

- For the standard gauge move the opposite running rail is manufactured 6.5mm tight to gauge and a UIC 33 checkrail 4125 long with a 45mm flangeway is positioned adjacent to this tightened gauge.
- For the broad gauge move the 3440mm splice check rail is manufactured with a 42mm flangeway located on the opposite common rail and provides wheel guidance.

The K crossing is clipped on heel baseplates, placed on HDPE pads and screwspiked to the concrete bearers.

4.2.6 V Crossing for Dual Gauge Turnouts

For dual gauge turnouts the 1 in 8 (BG) double nose V crossing has a splay angle of 7˚9’10” with partially curved wings and configured in accordance with the turnout Type. The crossing design includes:

- Two wheel transfer areas consisting of two noses 16mm thick and 1 in 20 slope cast on the crown of the transfer wings.
- Manufactured in cast austenitic manganese steel in one piece with wings and noses of the transfer areas explosively hardened.

The V crossing is clipped on crossing baseplates, placed on HDPE pads and screwspiked to the concrete bearers.

As an alternative to the cast crossing, a fabricated crossing is available. This is constructed of 50kg rail assembled together with spacer blocks and swage lock fasteners. Dimensionally the fabricated crossings are very similar to the cast crossings and are clipped to the same crossing baseplates as the cast crossing.

4.2.7 V Crossing for Gauge Separation Turnouts

The dual gauge separation turnouts, Assembly Types 24, 27, 28, 34, 82 and 82A utilise a 1 in 8 Rail Bound Manganese V crossing with a splay angle of 7˚9’10”, partially curved wings and configured in accordance with the turnout Type. The crossing design includes:

- The wheel transfer area is manufactured in cast austenitic manganese steel and swage lock fastened between two 50kg HH rails with the nose and wings explosively hardened.
- Wheel transfer area consisting of a 13mm thick nose and level crown cast transfer wings.

The V crossing is clipped on crossing baseplates, placed on HDPE pads and screwspiked to the concrete bearers.

4.2.8 Gauging V Crossings

Double V and V crossings are laid to exact gauge in accordance with design drawings. The V crossings shall be gauged at both the V end and the wing ends. A check of gauge may also be taken at the nose where the nose is the same height with the wing rails.

4.2.9 Checkrails

Double and single checkrails are fixed to the running rail directly opposite double V, single V and K crossings. The function of checkrails is to prevent a wheel taking a wrong path at the nose by restricting lateral movement of the inside face of the wheel on the other end of an axle.

The checkrails utilised are machined from UIC 33 rolled section to AS1085.1. The UIC 33 section is bolted to checkrail plates and the flangeway gaps are adjusted with shims. In the case of the K crossing for the broad gauge an additional checkrail is installed which is a 3440mm splice check rail manufactured with the single switch on the common rail side and is not readily adjustable in the field.

4.2.10 Checkrail Gauging

Checkrails shall be gauged from the running edge of the wings and nose area of the V and K crossing to the service side of the checkrail. The setup checkrail flangeway and checkrail gauges for V crossings are 42mm and 1393mm (SG) & for the two checkrails on the K crossing 45mm and 1390mm (SG) and 42mm and 1393mm (SG).

4.2.11 Closure Rails

Closure rails are installed on baseplates and fastened with e2003 Pandrol clips. The rail assembly with HDPE pads are fastened with screwspikes to the concrete bearers.

For mechanical joints Pandrol e1627 clips are used to fasten the rails.

For dual rails the centre of the two gauge rails are fastened with Pandrol e1829TC clips and two adaptors 12548.

Closure rails are thermite welded in track where clearance permits between rails.

The closure rails and trackwork assemblies are laid vertically on the bearers and the turnout is laid with zero cross level.

4.2.12 Insulated Joints

Insulated joints manufactured to AS1085.12 are installed as shown on relevant drawings. In some dual rail locations a modified double rail insulated blockjoint is used.

4.2.13 Bearers

Two sets of concrete bearers have been designed which cover all turnout Types.

The bearers are manufactured to meet the required service loadings and are supplied to ARTC Engineering Specification *ETD-03-02* and AS1085.14. HDPE dowel inserts are cast in the correct locations in the bearers so that the rail baseplates can be fitted.

The locations of bearers are laid to conform to the relevant design drawings.

Timber bearers, if specified, are supplied to ARTC Engineering Specification *ETA-02-01* and are laid heart-side down.

4.2.14 Plating

Fabricated plating is used throughout the assemblies except that cast plates designated CSR129 may be used under a single rail.

4.2.15 Turnout Construction Tolerances

There are a number of trackwork parameters that require to be controlled during construction and maintenance of the dual and gauge separation turnouts to ensure improved operational integrity and to increase service life.

Further, excluding the initial design and traffic considerations, the principal factors which affect the ride qualities of the turnouts and which most affect the operational service, either individually or together, are:

- Trackwork unit condition (new material installed for initial construction);
- Track gauge;
- Track geometry including horizontal and vertical alignments, twist and superelevation;

- Ballast condition.

The dual gauge and gauge separation turnouts should be constructed to specified tolerance limits. The principal track gauge dimensions with allowable tolerances are shown on the drawing in Appendix B and in the following Table.

Table 1 Turnout Construction Tolerances

Trackwork Unit	Location	Construction Track Gauge & Tolerance
Switch Assembly	1. Ahead of the end of stockrail	SG 1435 +2, -2mm & BG 1600 +2, -2mm
	2. Ahead of the toe	SG 1435 +2, -2mm & BG 1600 +2, -2mm
	3. Heel of Switch	SG 1435 +2, -2mm & BG 1600 +2, -2mm
	4. Toe Throw Opening	95 mm Minimum
K crossing Assembly	1. SG Move	SG 1428 +2, -2mm & BG 1593 +2, -2mm
	2. BG Move	SG 1435 +2, -2mm & BG 1600 +2, -2mm
	3. Crossing Flangeway	42 +1, -1mm
Splice Checkrail 3440 long UIC 33 Checkrail 4125 long	1. Flangeway gap	42 +1, -1mm
	2. Checkrail Gauge	SG 1393 +2,-2mm or BG 1558 +2, -2mm
	1. Flangeway gap	45 +1, -1mm
	2. Checkrail Gauge	SG 1390 +2, - 2mm & BG 1555+2, - 2mm
Closure Rails	1. Measure at 2 locations for both Straight & Curve	SG 1435 +2, -2mm & BG 1600 +2, -2mm
V crossing Assembly	1. Straight Move both ends of crossing	SG 1435 +2, -2mm & BG 1600 +2, -2mm
	2. Turnout Move both ends of crossing	SG 1435 +2, -2mm & BG 1600 +2, -2mm
	3. Crossing Flangeway	42 +1, -1mm
	4. Nose (Nose same height. as wings)	SG 1435 +2, -2mm & BG 1600 +2, -2mm
Single UIC 33 Checkrail 4125 long	1. Flangeway	42 +1, -1mm
	2. Checkrail Gauge	SG 1393 +2,-2 mm or BG 1558 +2,-2mm
Double Checkrail 4125 long	1. Flangeway	42 +1, -1mm
	2. Checkrail Gauge	SG 1393 +2,-2mm or BG 1558 +2,-2mm

Note: Refer to drawing in Appendix B for layout variations of dual gauge and gauge separation turnout Types.

Final turnout track geometry construction parameters shall be better than those defined in Clause 5.4 of ARTC Code of Practice Track & Civil Infrastructure Guidelines – *Section 5 Track Geometry*.

Turnout ballast construction shall comply with ARTC Code of Practice Track & Civil Infrastructure Guidelines – *Section 4 Ballast*, and shall ensure that there is sufficient depth of ballast under the bearers and that the ballast has been adequately surfaced, tamped and constructed to the required profile.

5 Maintenance

5.1 General

Regular and carefully performed maintenance of turnout assemblies is most important to ensure safety under traffic. Periodic maintenance must be made in order to prolong the lifetime of the components in service.

Track maintenance plans should include routine and detailed inspection of the turnouts to verify the fitness for service and smooth riding of trains.

- Inspections are to be carried out in accordance with the maintenance plans especially in regard to the level of inspection and the frequency of inspection required.
- Discrepancies from standards in this manual shall be reported.
- Other conditions which there is no simple “go/no go” limit shall be assessed according to the Inspector’s own experience and judgement and reported if necessary.
- Where the Inspection reveals any reservations about the safety or durability of any trackwork assembly, sub-assembly or component, the feature of concern shall be marked in the field and the relevant details shall be reported for assessment by a Track Supervisor or higher.
- Protection for trains must be provided wherever a condition is detected which renders the track unsafe for movements at normal speed.

Each turnout together with the adjacent plain track should, as a matter of course, be regularly inspected by a number of persons responsible for the permanent way each of who has a number of obligations to the maintenance of track.

Effective maintenance for the least cost/effort/interruption to traffic can be achieved only if thorough investigation of each site is undertaken before any attempt is made to resource and plan the remedial work. Physical work then undertaken must be carefully carried out (including any follow up work) and monitored to ensure that some previously unknown deficiency has not detracted from the work done.

Before any attempt is made to lift and/or line the turnouts it is essential that a visual check is made of the condition and suitability of the several components which make up the layout to establish that:

- The required numbers of components are present;
- The components are of a suitable condition to fulfil their designed function;
- The components are of a condition that will withstand the additional stresses imposed by disturbance during the proposed work;
- Replacement of defective items is undertaken before the final lifting and lining proceeds.

It is probable that the visual examination will need to be supplemented by measurements taken on site and the person(s) undertaking this element of the work must be conversant with (or have access to details of) the principal dimensions of the turnout components being examined.

At the time of the preliminary investigation the nature of the work decided upon will determine whether or not possession and/or electrical isolation of one or more lines of way is/are required.

Once the exact nature of the work to be undertaken is decided upon it is necessary to ensure that all tools, equipment, warning devices and measuring apparatus necessary for the safe and complete execution of the work are readily available. It should be ensured that any necessary replacement components are ordered in sufficient time and that all such items are available either at, or very close to, the site of work.

5.2 Inspections

The inspection frequencies of dual gauge turnouts and gauge separations shall follow those specified in *Section 3* of the ARTC Code of Practice ie:

- Weekly patrol inspection
- 3 monthly general inspection
- Yearly detailed inspection

The above are the minimum inspection frequencies for main line turnouts, for those on low speed loops and sidings the frequency may be varied to suit specific operating conditions.

5.2.1 Patrol Inspections

Track patrol inspections should keep a lookout for points and crossing defects and conditions (ie indicators of a defect) that may affect the integrity of the track structure or which may indicate a risk of failure to guide rollingstock correctly, including the following:

a) Broken crossings, switch blades, or rails

b) Missing components

c) Damage to any component that does not allow it to perform its intended function including switch operating equipment

d) Obstructions in flangeways and between the dual rails particularly in the switch and K crossing areas

e) Track geometry defects

f) Wheel marks which indicate incorrect wheel/rail interaction, particularly in the K crossing area

g) Rail creep which may for example lead to displacement of components and rail alignment problems

h) Rail pulling including at the point and splice rails of fabricated crossings

i) Other obvious defects that may affect continuity of support and direction to rollingstock

Patrol inspection of dual gauge points and crossing structures should be carried out by walking.

5.2.2 General and Detailed Inspections

The frequency of general and detailed inspections must be reviewed and assessed by experience and according to the particular location and traffic carried.

Inspection intervals are to be reviewed on a yearly basis. Where special trackwork at a specific location carries high volume traffic (greater than 2 Mgt per month) or heavy axle load traffic (greater than 25t) or where switches undertake a high number of operations (greater than 200 operations a day) the frequency of general inspections should be increased to at least one monthly intervals and the frequency of detailed inspections should be increased following an assessment of the rate of deterioration.

The general and detailed inspections of the turnouts involve examination of all track assemblies, to determine condition and include the items listed in Section 5.3 below.

5.3 Items to be Inspected

5.3.1 Rails

Rails, welds and rail ends, including rail wear, weld defects, fishplates and fastenings, for condition including alignment, breaks, damage, corrosion, fastening adjustment, expansion gap and flogging.

5.3.2 Turnout Assemblies

- Check layout for missing or broken components;
- Line – horizontal alignment of rails through the turnout and displacement of components due to rail creep;
- Top – vertical alignment of rails through the turnout including deflection under traffic;
- Cross level of the turnout assembly for zero cant;
- Twist of the turnout assembly over a specified distance;
- Track Gauge at defined positions;
- Track centre dimensions at fouling points.

5.3.3 Switches

- Gauge at defined positions;
- Switch and stockrails for alignment, wear, damage, breaks, obstructions, metal flow, mating and seating on slide and base plates;
- Heel block, set fishplate, ferrule and fastenings for condition, breaks, damage, wear, adjustment, alignment and heel spread dimension;
- Switch distance blocks for attachment, wear, damage and mating;
- Switch slideplates for condition, cracks, wear, attachment to stock rails and lubrication;
- Switch blade toe throw dimension for operating clearance requirements;
- Flangeway gap between open switch blades and stockrail for clearance requirements;
- Blade gap between switch blade toe and stockrail in closed position;
- Gap between back of Outer (BG) switch blade and Inner (SG) stockrail;
- Rails for horizontal and vertical movement;
- Baseplates for correct location, condition and fastening to rails and bearers;
- Heel and toe squareness for evidence of rail creep.

5.3.4 Switch Operation

- Hand operated lever operation for obstructions, correct clearances of movable components, lubrication, condition and visibility requirements;
- Operating rods and connecting rods for operation and adjustment, condition (distortion, breaks) and pins for condition and lubrication;
- Stretcher bars for condition, straightness, correct adjustment and clearance under rails;
- Web drive brackets for condition and attachment to switch blades and pin or bolt connection to bars for condition and lubrication;
- Stretcher bar insulations and plates for condition and attachment.

5.3.5 V & K Crossings

- Gauge at defined positions;
- Rail wear, damage, breaks or metal flow especially at nose and wings;
- Relative movement of rails and blocks;
- Flangeway gaps for obstructions;
- Flangeway blocks for breaks/fractures condition and fit;
- Fastenings, including washers, if fitted, for condition, fit, straightness and adjustment;

- Rail pulling especially heel rails of RBM crossings;
- Fractures, crushing, damage, metal flow, cracks, chips or shelling of monoblock castings and RBM inserts especially at nose and wings;
- Running rails for alignment;
- Platework for condition and fastening.
- Resilient fastenings for correct number and condition.

5.3.6 Check Rails

- Flangeway gap and gauge rail gauge to crossing;
- Rail wear or damage;
- Relative movement of rails and blocks;
- Blocks for condition, fit and any flangeway obstructions;
- Fastenings, including washers if applicable, for condition, straightness and adjustment;
- Resilient fastenings for correct number and condition;
- Platework for condition and fastening.

5.3.7 Closure Rails

- Track Gauge;
- Rail for curve alignment;
- Rail wear and damage;
- Rails for horizontal and vertical movement;
- Rail fastenings, including special clips and spacers, for correct number, fitting and condition;
- Platework for condition and fastening to bearers.

5.3.8 Platework

- Special plates such as graduated cant for correct placement orientation and installation;
- Worn, cracked, damaged or cut plates.

5.3.9 Fastenings

- Missing, inadequate number or incorrect type of fastenings;
- Damaged fastenings from incorrect installation or derailment, etc;
- Resilient fastenings for correct number, installation and condition;
- Worn and corroded fastenings;
- Inadequately attached to bearers (loose).

5.3.10 Bearers

- Conformance to specified dimensions, angle to rail, overhang and spacing;
- Condition including cracking, breakage, dishing/hogging, cutting by baseplates and fastenings grip;
- Clearance between bearers and operating mechanisms.

5.3.11 Ballast

- Condition and drainage.
- Correct level below top of bearers and operating mechanisms at switch.
- Correct shoulder profile.
- Tamping or support under complete length of bearer particularly at the toes of switch and transfer areas of crossings.

6 Maintenance Standards

6.1 General

These maintenance standards, limits and tolerances and other requirements detailed in this manual shall apply to all mainline 50kg Dual and Gauge Separation turnouts.

6.2 Gauge and Wear

6.2.1 Relationship between Track Gauge and Rail Side Wear

a) For inspection and general maintenance purposes, track gauge shall be taken as the sum of "measured gauge" (which may include any initial construction tolerance + any side wear + some proportion of any 'working' in the track) and "any measured 'working' of the track beyond that accounted for in the gauge measurement".

b) Traditionally, limits for track gauge may be exceeded when there is no evidence of 'working track' and the widening of track gauge is due to rail side wear alone. This shall remain the case, but no guidance will be given in this manual as to the limits of this 'extra allowance'. Responsible track personnel shall use their own experience and judgement and the relevant rail wear limits to assess the situation and arrive at any decision. Track Inspectors shall report all exceedences of the stated limits, and the decision to allow 'safe' exceedences to remain in track shall be approved by the relevant Track Supervisor or higher.

6.2.2 Angle of Side Wear

a) A maximum angle of rail side wear of 26º from the vertical axis of the rail is the standard allowable limit for side wear of any rail in the turnout assembly.

6.2.3 Gauging of Double V & V Crossings and Checkrails

a) In service the guarding face of the checkrail is likely to become worn and the checkrail would require to be shimmed or changed when the specified flangeway gap is exceeded.

When a crossing is replaced it is likely the checkrail would be worn and therefore should be either adjusted or replaced at the same time.

b) There are 3 different gauge-type characteristics requiring measurement in the area of a V crossing:

A. Track Gauge: from running edge (RE) of nose & wings of V-crossing to RE on opposite rail.

➡ Acceptable range when considered alone = 1435mm (+8, -2) = 1433 – 1443mm.

B. Checkrail Gauge: from RE of nose & wings of V-crossing to service side of checkrail.

This dimensional check is to protect the nose from wheel impact and the worst realistic case is with new wheelsets. For a 42mm flangeway gap Checkrail gauge should be adjusted or replaced to maintain Checkrail Gauge in the range 1393mm (+4, -4).

➡ Acceptable range when considered alone = 1393mm (+4, -4) = 1389 – 1397mm.

C. Checkrail Flangeway: the gap between running rail and its attached checkrail.

➡ Acceptable range when considered alone = 42mm (+4, -2) = 40 – 46mm.

c) However these three parameters are not independent (as A = B + C) and the extremes of their tolerances are not simultaneously achievable. When considered together, a reduced range of tolerances results, as per the following table:

Table 2 Checkrail Adjustment Guidelines

A = Track Gauge Acceptable Range (usually 1433-1443mm)	B = Checkrail Gauge Acceptable Range (usually 1389-1397mm)	C = Checkrail Flangeway Acceptable Range (usually 40-46mm)
1433	1393	40
	1389	44
1435	1395	40
	1389	46
1437	1396	41
	1391	46
1439	1397	42
	1393	46
1441	1397	44
	1395	46
1443	1397 Only	46 Only

d) This table "Table 2 - Checkrail Adjustment Guidelines" shall be used in the following manner:

- The figures in the table result from generalisations used to develop a standard approach to all situations. After engineering assessment of specific conditions, exceptions to the standard approach may be authorised by the Track Supervisor or Maintenance Manager.
- Track Gauge (A) takes priority and shall be measured first.
- Checkrail Gauge (B) & Checkrail Flangeway (C) are then measured and checked whether they are all into the acceptable ranges in the table.
- If not, field adjustment of A &/or C may be needed until A+B+C line up.
- If this is not readily achievable, engineering assessment may allow a widening of the acceptable ranges after considering the following:
    1. The nose is still protected.
    2. Any impact & expected wear on the checkrail is acceptable.
    3. Any impact & expected wear on the wing at the nose is acceptable.

6.2.4 Table of Gauge and Wear Guidelines

The dual and gauge separation turnouts should be maintained to specified tolerance limits. The principal track gauge dimensions with allowable tolerances and allowable rail wear are shown on the drawing in Appendix C and the in Table 3 below.

Table 3 Gauge and Wear Guidelines

Track Gauge	Detailed Tolerances
Turnout Assemblies:	
At all required gauging positions except for K crossing SG track:	1435mm (+8, -2) 1600mm (+8, -2)
Ahead (on toe side) of set in stockrail.	For locations refer to Appendix C - Drawing 50kg Dual & Gauge Separation Turnouts – Track Gauging & Tolerances - Maintenance
Heel of switch (straight & diverge).	Include measurement at Nose where Nose same height. as wings.
On closure rails (straight & diverge).	
On V crossing.	1428mm (+4, -2) Refer to Appendix C Drawing for locations.
At K crossing for SG track	1435mm (+8, -2) 1600mm (+8, -2)
At toe of Switch: - This is not usually gauged unless there is a problem needing deeper analysis. It is best done to the top of the switch blade when it is closed against the stockrail – if it is sitting under the stockrail, measure to the stockrail.	
Wear	
Switches:	
From toe of switch to 'Intersection of Heads':	Switch shall be measured at 500mm from toe and if switch blade tip width is less than 7mm and/or it is chipped or broken in excess of 200mm in length the switch assembly shall be replaced. In addition to this criteria assessment of other conditions of the switch blade tip will have to be considered as detailed in the Note below which would indicate whether replacement is required.
On switch blade with full section (ie. from 'Intersection of Heads' to heel):	'Gauge + wear + working' shall result in Track Gauge not exceeding 1443mm (SG) & 1608mm (BG) (ie. side wear limit = 8mm when other factors = zero, with 4mm max top wear): ➡ Side Wear: 8mm (with 4mm max top wear). ➡ Top Wear: 8mm (with 4mm max side wear). ➡ Max. Angle of Side Wear = 26º (from rail vertical axis).
Closure Rails: On straight & curved leads:	'Gauge + wear + working' shall result in Track Gauge not exceeding 1443mm (SG) & 1608mm (BG) for straight & curved leads. Limits of wear for side, top & max. angle as per switches-'from intersection of heads' to heel A top wear limit of 4mm shall be used for inspection & general maintenance purposes. Top wear exceeding 4mm may be permitted depending on engineering assessment.
Crossings:	
Nose side wear:	4mm & max angle of 26˚.
Nose top wear:	10mm (ie. 16mm below new wing level)
Wing Rail side wear in wheel transfer area:	4mm & max angle of 26˚.
Wing Rail top wear in wheel transfer area:	10mm
Wing Rail side & top wear not in transfer area:	As for closure rails.
Flangeway width:	42mm (+4, -2)

Track Gauge	Detailed Tolerances
Checkrails: Checkrails guarding rubbing face wear.	Any amount of wear that leaves the Checkrail Flangeway in the range 40-46mm is acceptable. (see checkrail gauging below for V crossings)
Checkrail Gauging	
Double V & V Crossings: Checkrail Gauge (from running edge of crossing to guarding face between the flared areas of a checkrail) is one of 3 No. related characteristics: A. Track Gauge B. Checkrail Gauge C. Checkrail Flangeway	<u>Limits when considered alone:</u> 1435mm (+8, -2) = 1433 – 1443mm. 1393mm (+4, -4) = 1389 – 1397mm. 42mm (+4, -2) = 40 – 46mm <u>Limits when considered together:</u> Refer to "Table 2 Checkrail Adjustment Guidelines" and associated notes.
K Crossing: UIC 33 Checkrail 4125 long Splice Checkrail 3440 long	<u>Limits for Checkrail Positions:</u> Flangeway gap: 45 (+1, -3) mm. Checkrail Gauge: 1390 (+3, -3) mm. Flangeway gap: 42 (+4, -2) mm. Checkrail Gauge: 1393 (+4, -4) mm.

Note for Switch Blade Replacement due to Wear:

Close monitoring of the switch blade/stockrail wheel transfer area should be carried out and this assessment should consider to following factors:

- the thinness or sharpness of the top of the switch;
- the extent of any chipping out from the top of the switch;
- how well the switch is mated with the stockrail from the tip to the intersection of heads;
- how well the switch is seated on its plates from the tip to the intersection of heads;
- the extent of any wear in the stockrail and the angle of such wear;
- previous grinding of the tip and potential for further grinding to the maximum tip loss (ie 200mm for dual gauge switches).

6.3 Turnout Assemblies

For turnout track gauge and rail wear refer to "Table 3 - Gauge and Wear Guidelines" above.

Note: Running edge wear, including that on switches and noses of crossings, must conform to 26° maximum angle from vertical axis of rail.

The track geometry maintenance limits of the turnout (other than track gauge) should be maintained in accordance with the ARTC Code of Practice Track & Civil Infrastructure Guidelines – *Section 5 Track Geometry*, Clause 5.4.

6.4 Rails for Switches, Crossings, Checkrails & Closure Rails

Rail damage and rail flaws shall be treated as for open track.

It should be noted that some parts of the turnout assemblies may not be subjected to examination by a Rail Flaw Detector Car.

6.5 Switch Assemblies

6.5.1 Gauge and Wear Limits

See "Table 3 Gauge and Wear Guidelines" above.

Wear limits are subject to the toe of switch blade complying with the following conditions:

- The alignment and wear tolerances do not allow any protrusion of the toe that might allow the wheel to strike the switch or to split the switch at the toe.
- The toe section does not become weakened to such an extent that it might allow the switch to break or be crippled during operation.

6.5.2 Switch Blade Fit

a) Maximum gap between fitting surfaces of switch blade and stockrail at the toe when closed (to prevent damage to tip or splitting of points; and to enable proper detection): 1mm.

b) Maximum gap between mating surfaces of switch blade and stockrail when closed from beyond toe to 'Intersection of Heads' to minimise wear on switch and switch operation and detection components: 4mm.

c) Flangeway between back of open switch blade and running edge of stockrail at 'Intersection of Heads' on pivot heel switches: 50mm minimum.

d) Gap at the back of outer (BG) switch blade, when in open position, and inner (SG) stockrail for the full length to 1200mm from flared end of the inside stockrail: 2mm maximum

e) Switch blade distance blocks fit (with no gap at 'Intersection of Heads'): +0, -2mm (i.e. no gaps between distance blocks and stockrail larger than 2mm).

f) Switch blade rail support on slideplates: There shall be a maximum gap between the base of the switch blade and the slideplate surface of 0-1.5mm:

- At the first three slideplates.
- At the bearer under the heel.
- At a minimum of 1 in 4 of the chairs between these.

g) Squareness: Toe of switches shall not lead or trail each other by more than 12mm (i.e. +/- 6mm from design position) when measured square to centreline of the mainline.

6.5.3 Switch Assembly Heel

a) Heel spread tolerance: +2, -2mm (design heel spread is 130 & 95mm).

b) Cracked heel blocks: nil

c) Cracked or damaged heel fishplates: nil

d) Maximum gap of heel block and upper inside fishing face of heel end of switch rail (with switch in closed position): 2mm.

e) Clearance between the fishing faces of the set fishplate and the outside fishing faces of the heel end of switch blade (with switch blade in open position) for pivot heel: Check for some clearance.

f) M22 heel bolts should be tightened to the correct torque.

g) Maximum vertical step in joint at pivot heel: 2mm in either direction.

h) Rail end batter at pivot heel: maximum depth: 2mm.

6.5.4 Metal Flow on Switch Assemblies

a) On running edge of switch blade: maximum metal flow is 3mm (to ensure that shelling is minimised and that the flow is not susceptible to wheel strike).

b) In the mating area of switch blade & stockrail -between toe and "Intersection of heads":

- Stockrail metal flow where the switch blade is required to fit up against stockrail face: 3mm maximum to ensure the fit is not compromised and that shelling is minimised.
- Switch blade metal flow against the stockrail: 3mm maximum.
- Combined metal flow of switch blade and stockrail: Any combination which does not infringe the limit of 1mm maximum gap at toe and the 4mm maximum gap elsewhere is permitted.

c) On the field side of the switch and on the running edge of the stockrail outside their mating area maximum metal flow: 3mm.

6.6 Switch Operation

a) Condition of components and connections shall permit switch operating rods to operate freely without binding and shall ensure that the switch is held firmly against the stockrail. Any looseness in points operation shall be rectified.

b) Toe Throw tolerance on open switch blade: 95mm minimum.

c) Stretcher bars shall have adequate clearance under rails: not less than 2-3mm.

d) The sides and ends of stretcher bars and operating rods shall have adequate clearance to ballast throughout their movement (especially at the ends of stretcher bars).

e) Adequate ballast support under bearers to support switch operation equipment.

f) Condition of paint on levers shall prevent rusting and ensure good visibility for operations personnel.

6.7 Crossings

Gauge and Wear: See "Table 3 Gauge and Wear Guidelines" above.

Flangeway Width: A width and tolerance of 42mm (+4, -2). When measured outside this range tightening/replacement of loose crossing fasteners and/or checking of checkrail effectiveness may be required.

Rail alignment i.e. deviation from stringline between ends of wing rails: ±3mm (This is especially important for the nose, which must not be exposed more than 3mm beyond the stringline, and result in wheel strikes).

Metal flow on nose and wings: 3mm maximum (to ensure that shelling is minimised).

Metal flow on Cast Manganese Crossings and Inserts of crossings: In order to achieve the optimum life from these crossings, the following preventative maintenance is essential.

6 weeks after installation	Light grinding of nose to remove any metal flow.
3 months after installation	Light grinding of nose to remove any metal flow.
6 months after installation	Light grinding of nose to remove any metal flow.

After 6 months the cast manganese crossings should be inspected at regular intervals to determine future grinding plans for each crossing.

6.8 Checkrails

Standard Checkrail Gauge is SG-1393mm (+4, -4) and BG-1558mm (+4, -4) when considered alone.

Standard Checkrail Flangeway: is 42mm (+4, -2) when considered alone.

However there is a relationship between both of these and the track gauge and all three shall be considered together as per “Table 2 Checkrail Adjustment Guidelines” and “Table 3 Gauge and Wear Guidelines” above.

Irrespective of measured Checkrail Gauge, close monitoring of wheel impact marks on the nose of a crossing shall be carried out as a guide to determine whether track regauging or checkrail adjustment are required.

6.9 Closure Rails

Gauge and Wear - see “Table 3 Gauge and Wear Guidelines” above.

Metal flow on running edges and field edges shall not exceed 14mm.

Closure rails shall be supported on clip fastened baseplates and fastened to the bearers with screwspikes and double helical spring washers fitted in every hole in the plate.

6.10 Platework

6.10.1 General

a) Any condition of damage, wear or corrosion shall not be permitted to deteriorate to the extent that the intended function of any platework is compromised.

b) Maximum wear on plates (ie rail-cutting of plates): 3mm.

c) Maximum spike hole wear: 3mm.

d) Items in poor condition shall be replaced.

6.10.2 Slideplates

a) For cast slideplates: No cracked plates shall be permitted to remain in track.

b) Cracked fabricated slideplates are permitted to remain in track provided they are monitored and they meet the following limits:

- Cracks in Horn: No adjacent slideplates shall have cracks exceeding 50% of horn width, and no single slideplate shall have a crack exceeding 75% of horn width.
- Cracks in Base: No adjacent slideplates shall have cracks with an aggregate length exceeding 75mm, and no single slideplate shall have cracks with aggregate length exceeding 100mm.

c) Wear on sliding surface where switch blades have vertical foot machining: 2 mm maximum.

d) Wear on sliding surface of switch blades that have foot machining which overlaps the stockrail: Plates that show the sliding surface has worn to the extent that the underside of the closed switch rubs on the top of the foot of the stockrail shall be replaced.

e) Lubrication of sliding surface: All slideplates are to be lubricated using the approved lubricants and shall cover the complete sliding surface to allow the switch blades to operate freely. Switch blade lubrication is to be applied at a maximum of 6 weeks however this may need to be adjusted according to traffic volumes, frequency of switch movements and local conditions.

6.11 Fastenings

Any condition of damage, wear or corrosion shall not be permitted to deteriorate to the extent that the intended function of a fastening is compromised.

a) At each maintenance period screwspikes must be checked (including observing under traffic) and tightened to the correct tension where necessary. Before tightening screwspikes ensure bearer and baseplate are tight to the underside of the foot of the rail. Replacement screwspikes and double helical spring washers used shall be as specified on design drawings.

b) Screwspikes must be entered vertically into the holes and care should be taken to ensure that the screwspike remains vertical during fitting. Screwspikes which are bent, have damaged threads or where the head is damaged should not be used.

c) The type of clips and location used shall be as specified on design drawings. Whenever clips are being installed it is essential that the baseplates are tightly held to the rail before and during the fitting of the clip, failure to carry out this procedure could result in damaging the clip housing.

d) Pandrol clip toe spacers (where fitted) and rail pads shall not be reused unless they are in a good condition and a check should be made to ensure that new pads and spacers are installed correctly.

6.12 Bearers

a) Bearer spacing tolerances shall be ±10mm generally, but ±5mm at fixed positions.

b) Bearers shall be examined for the concrete cracking, especially at the side and top around the holding down screws and if cracking has occurred remedial action shall be taken as soon as possible. All bearers shall be capable of holding gauge.

c) Check bearer baseplate screw holes and integrity of HDPE dowel inserts by observing passing traffic. Where screwspike holes have became worn and the bearer is no longer capable of gripping the screwspike then the worn dowel insert should be repaired or replaced.

d) Hogging or dishing of bearers is limited by appearance of concrete cracking and conformance with track geometry limits.

e) Check for any severe or uneven indentation on the surface of the bearer at the baseplate seating area.

6.13 Ballast

Ballast profile and depth in turnouts shall be maintained to the constructed profile.

Maintain regular ballast tamping to ensure adequate support to all bearers in the turnout particularly at the toes of switches and at noses of crossings. Observe switch bearers under traffic and if voids measured by a void metre exceed 7mm the bearers are to be packed.

No ballast shall be permitted to remain above the level of the top face of the bearers in general, and in areas with stretcher bars and operating rods, there shall be adequate clearance between the ballast and such equipment throughout their movement (especially at the ends of stretcher bars).

Bearers shall be packed or tamped over the entire length of the bearers.

Ballast under bearers shall provide adequate support for switch operation equipment.

6.14 Exceedence of Specified Tolerances

Table 4 specifies action to be taken where wear exceeds tolerances specified. For the other components/elements not included in the table, the action should be to repair within a period dependent on the rate of observed deterioration of the particular component.

Table 4

Clause	Component / Element	Limit (s)	Action to be taken when limit exceeded
6.2.2	**Side Wear Angle**	26° from vertical	Replace or repair component
6.2.4	**Track Gauge**		
Table 3	500mm ahead of toe of points	-2, -6mm +8, +15mm	Impose speed restriction of 30km/h
	At heel of switch	-2, +8mm	Repair or replace component(s)
	On closure rails (straight & diverge)	+8, +24mm -2, -8mm	Impose speed restriction of 20km/h on diverge
6.2.4	**Wear**		
Table 3	Switch blades	Those in table 3	Repair or replace components
	Crossings	Those in table 3	Repair or replace components
	Checkrail gauging		
	Double V & V crossings	Those in table 3	Manage according to Table 2
	K crossing	Those in table 3	Repair or replace component(s)
6.5.3	**Switch Heel**		
	(a) Heel Spread	+2, -2mm	Impose speed restriction of 15km/h until repaired
	(g & h) Vertical step and balter at pivot heel joint	2mm	Impose speed restriction of 30km/h until repaired

7 Maintenance Replacement

7.1 General

a) Serviceable material or components may be utilised if deemed fit for service or are used in a new assembly.

b) Damaged or unserviceable material shall be suitably marked and returned to the Depot for repair, for use as spare parts or for scrapping in accordance with the directions of the Maintenance Manager.

c) Turnout components shall not be manufactured from rails containing welds.

d) Minimum closure rail lengths within and adjacent to trackwork assemblies shall conform to the appropriate standards.

e) Build up or repair welding of rails or components is not permitted except as detailed in these specifications.

7.2 Switch Assemblies

7.2.1 General

No modifications to rails (including length) or components are permitted without written approval of the Infrastructure Owner.

7.2.2 Switch and Stockrail Replacement

All Mainline or loop points shall be replaced in complete Single Switch or Double Switch Assemblies.

7.2.3 Switch Blade Toe

a) A damaged or worn switch toe tip may be blended by grinding to a suitable profile within 200mm of the end providing it conforms to the original new toe profile.

b) No rail welding is permitted at the toe.

7.2.4 Switch Heel

a) Worn or damaged heel blocks, ferrules washer plates and set fishplates may be replaced in the field subject to adequate fit.

b) Heel openings shall be maintained within specifications.

c) The switch must be capable of pivoting freely to permit normal operation of switch blades without undue force.

d) Heel bolts shall be tight. If tightening of bolts reduces freedom of switch movement, the heel shall be dismantled and the ferrule shall be inspected for wear or damage and replaced if required.

7.2.5 Distance Blocks and Web Drive Brackets

Distance blocks and web drive brackets are fixed with swage lock fastenings, which do not permit ready replacement. Damaged or loosened distance blocks and web drive brackets may only be replaced with the approval of and under the conditions specified by the Maintenance Manager.

7.2.6 Slideplates, Heel, Crossing and Other Plates

Damaged or worn platework may be replaced subject to adequate fit, re-fastening to rails and bearers and proper seating of the rails.

7.2.7 Welding and Grinding of Switch Assemblies

a) Building up of worn rail surfaces or repairs by welding on switches may be permitted upon submission of an approved procedure and proof of appropriately qualified staff. The process shall be approved in writing by the Infrastructure Manager.

b) Grinding of metal flow from the running edge of the stockrail, from the stockrail side of the switch and the running edge of the switch blade shall be carried out before metal flow reaches the specified limits.

c) Grinding shall be carried out with an approved procedure detailing type of grinder, gauging method and final inspection processes. The process shall be approved in writing by the Infrastructure Manager.

7.3 Crossings

7.3.1 General

Mainline and loop crossings shall be replaced as complete units. Component replacement, except for fastenings, is not permitted in the field without approval of the Infrastructure Manager.

When K crossings are replaced the checkrails opposite shall be checked for wear and condition.

Where signs of rail creep are evident and heel rail of a crossing or other joints have pulled apart, appropriate methods to alleviate the rail creep should be taken when the crossing or rail is repaired or replaced.

No modifications to rails, including length, or components are permitted without approval of ARTC.

7.3.2 Grinding of Crossings

a) Grinding of metal flow from the running edge of the nose and wing rails shall be carried out before it reaches the specified limits.

b) Grinding shall be carried out with an approved procedure detailing type of grinder, gauging method and final inspection processes. The process shall be approved in writing by the Infrastructure Manager.

7.3.3 Repairs and Building Up Crossings by Welding

a) Building up of worn rail surfaces or repairs by welding of cast monoblock and rail bound manganese V crossings and fabricated K crossing may be permitted upon submission of an approved procedure and proof of appropriately qualified staff. The process shall be approved in writing by the Infrastructure Manager.

b) The maximum depth of wear for effective build up welding shall be 10 mm.

c) Any crossing exhibiting more than 10 mm of wear shall be replaced.

d) Rail exhibiting cracks to a depth of 15 mm below the running surface may be approved for repair welding.

e) Prior to any welding, it is essential that the following is carried out:

- The crossing and components shall be thoroughly inspected for serviceability.
- Consideration shall be given to replacement of loose/broken swage lock fastenings.
- Damaged and suspect components shall be replaced.

- Metal flow on the crossing shall be ground back.
- The crossing shall be properly packed.

f) Reconditioning of crossings, which have been removed from track, may be undertaken by the manufacturer subject to the repairs conforming to approved specifications.

7.4 Check Rails

a) If threaded fasteners are used loose fastenings shall be tightened to specification. If swage lock fasteners are used any loose (eg stretched) fasteners shall be replaced.

b) Worn or damaged fastenings shall be replaced.

c) Worn or broken checkrail plates shall be replaced.

d) Checkrails shall be adjusted to the required checkrail gauge and tolerance.

e) If the extent of wear does not permit gauging to tolerance specifications, the checkrail shall be replaced.

7.5 Closure Rails, Rail Ends, Joints & Fishplates

a) Building up of rail surfaces or repairs by welding of worn or battered rail ends and closure rails may be permitted upon submission of an approved procedure and proof of appropriately qualified staff. The process and welder shall be approved in writing by the Infrastructure Owner;

b) If cracks are discovered in bolt holes, the affected switch assembly, crossing or closure rail shall be repaired/replaced as soon as possible;

c) Insulated joints shall be maintained in accordance with the relevant specification;

d) Broken, cracked or damaged fishplates shall be replaced.

7.6 Fastenings

a) All bolts, spring washers, nuts, screwspikes and resilient fastenings and spacers shall be properly installed in accordance with relevant plans and standards, shall be in good condition and shall perform the intended function. Loose fastenings shall be tightened to specification. Worn or damaged fastenings shall be replaced;

b) Any swage lock fastenings that have become loose or stretched shall be replaced.

8 Documentation

The following documentation forms part of this Manual:

Appendix A Drawing Register 50kg Dual Gauge & Gauge Separation Turnouts

Appendix B 50kg Dual Gauge and Gauge Separation Turnouts – Construction Track Gauging and Tolerances

Appendix C 50kg Dual Gauge and Gauge Separation Turnouts – Maintenance Track Gauging and Tolerances

9 Appendix A - Drawing Register for 50Kg Dual Gauge and Gauge Separation Turnouts

Drawing No.	Title	Description
ARTCS1060001000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29	Type 29 Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060002000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29	1 In 8 Dual Gauge Lh Switch Assembly Type 29
ARTCS1060007000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout – Type 30	Type 30 Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060009000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout – Type 30	1 In 8 Dual Gauge Rh Switch Assembly Type 30
ARTCS1060013000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout – Type 39	Type 39 Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060015000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout – Type 39	AS50kg Rh Switch Assembly
ARTCS1060019000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout – Type 40	Type 40 Diagram/Assembly - Concrete Or Timber Bearers - Timber Bearers Only
ARTCS1060020000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout – Type 40	1 In 8 Dual Gauge LH Switch Assembly Type 40
ARTCS1060025000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge 'K' Crossing Assembly for turnout type 29 & TYPE 30	'K' Crossing Assembly For Turnout Type 29 & Type 30
ARTCS1060026000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout – Type 29	Right Hand Uic33 Check Rail For Left Hand Turnout 4125 Long
ARTCS1060027000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29 Type 34, Type 82, Type 82A,	Right Hand Splice Check Rail For L/Hand Turnout 3440 Long
ARTCS1060028000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 29 & Type 30 Type 34, Type 82, Type 82A,	Single Rail Check Panel For Type 29 & Type 30 Turnouts
ARTCS1060029000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 29 & Type 30 Type34,	Double Rail Check Panel For Types 29 & 30 Turnouts
ARTCS1060030000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 34, Type 39 Type 82, Type 82A,	Concrete Bearer Details For Turnout Type 29 - Type 30 Opposite Hand
ARTCS1060031000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 29 & Type 30	Baseplate For Plate Support Assembly For Types 29 & Type 30 Turnouts
ARTCS1060032000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29	Baseplate For Turnout Type 29 & Type 30
ARTCS1060033000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge 'K' Crossing Assembly For Turnout Type 39 & Type 40	K' Crossing Assembly For Turnout Type 39 & Type 40
ARTCS1060034000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 39	AS50kg /Uic33 Guard Rail Assembly 11758mm Long
ARTCS1060035000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 39	AS50kg /Uic33 Double Guard Rail Unit 11728mm Long
ARTCS1060036000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 27, Type 28, Type 39 & Type 40	Uic33 Check Rail Detail For Turnout Assembly Type 39 & Type 40
ARTCS1060037000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - TYPE 24, Type 27, Type 28, Type 39 & Type 40	AS50 Kg Splice Check Rail & ISC3 Closure Rail Detail For Switch Assembly Type 39 & Type 40
ARTCS1060038000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 39 & Type 40	Parsail Set Of Concrete Bearers For Turnouts With Concrete Bearers Only
ARTCS1060039000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 39 & Type 40	Set Of Concrete Bearers For Turnouts With Concrete Bearers Only
ARTCS1060040000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 39 & Type 40	Baseplate For Plate Support Assembly For Type 39 & Type 40 Turnouts
ARTCS1060041000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 39 & Type 40	Plate Support Assembly For Types 39 & 40 Turnouts
ARTCS1060043000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Right Hand Switch Blade For Left Hand Turnout 5390 Long
ARTCS1060044000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29, Type 30, Type 39 & Type 40	Stock Rail Detail For Single Switch Assembly
ARTCS1060045000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29, Type 30, Type 39 & Type 40	Left Hand Outside Switch Blade For Left Hand T/O 5390 Long
ARTCS1060046000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 29, Type 30, Type 34, Type 39 & Type 40	Left Hand Inside Switch Blade For Left Hand T/O 5390 Long
ARTCS1060047000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29, Type 30, Type 39 & Type 40	Left Hand Inside Stock Rail For Left Hand T/O 5185 Long
ARTCS1060048000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29, Type 30, Type 39 & Type 40	Left Hand Outside Stock Rail For Left Hand T/O 9945 Long
ARTCS1060055000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	HDPE Pads For Turnout Type 29, Type 30, Type 39 And Type 40
ARTCS1060065000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82A,	Centre Bracket For Stretcher Bar
ARTCS1060069000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29, Type 30, Type 39 & Type 40	End Bracket For Stretcher Bars
ARTCS1060070000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29, Type 30, Type39 & Type 40	Outer Switch Drive Rod
ARTCS1060071000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 29, Type 30, Type 39 & Type40	1 IN 8 Dual Gauge Switch Sections 1600mm & 1435mm Gauge
ARTCS1060075000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Turnout - Type 30 And Type 40	Operating Assembly- Mounted On Left Hand Side For Turnout Type 30 And Type 40

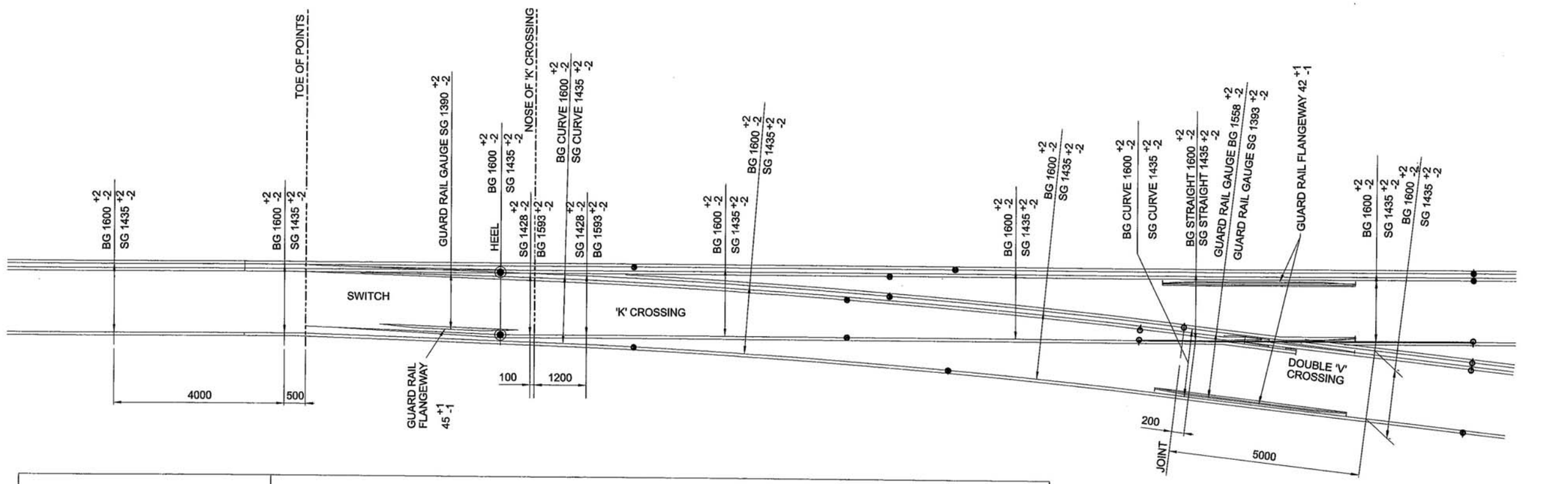
Drawing No.	Title	Description
ARTCS1060076000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Turnout - Type 30 And Type 40	Operating Assembly- Mounted On Right Hand Side For Turnout Type 30 And Type 40
ARTCS1060077000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Turnout - Type 29 And Type 39	Operating Assembly- Mounted On Right Hand Side For Turnout Type 29 And Type 39
ARTCS1060078000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Turnout - Type 29 And Type 39	Operating Assembly- Mounted On Left Hand Side For Turnout Type 29 And Type 39
ARTCS1060079000	Standard 50 Kg - Operating Rod And Pin For Operating Assembly 1 In 8 50kg Dual Gauge Turnouts - Type 24, Type 27, Type 29, Type 30, Type 39 & Type 40, Type 82, Type 82A,	Operating Rod And Pin For Operating Assembly 1 In 8 50kg Dual Gauge Turnouts
ARTCS1060080000	Standard 50 Kg - Lock Bar Assembly 1 In 8 50kg Dual Gauge Turnouts – Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Lock Bar Assembly 1 In 8 50kg Dual Gauge Turnouts
ARTCS1060081000	Standard 50 Kg - Lock Bar Assembly 1 In 8 50kg Dual Gauge Turnouts – Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Lock Bar Connector 1 In 8 50kg Dual Gauge Turnouts
ARTCS1060082000	Standard 50 Kg - Motor Detector Tods And U5a Detector Rods 1 In 8 50kg Dual Gauge Turnouts - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Motor Detector Tods And U5A Detector Rods 1 In 8 50kg Dual Gauge Turnouts
ARTCS1060083000	Standard 50 Kg - Nylon Bushes And Pin For Operating Assembly 1 In 8 Dual Gauge Turnouts - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Nylon Bushes And Pin For Operating Assembly 1 In 8 Dual Gauge Turnouts
ARTCS1060084000	Standard 50 Kg - Baseplate Fr Motor Detector 1 In 8 50kg Dual Gauge Turnouts - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Baseplate Fr Motor Detector 1 In 8 50kg Dual Gauge Turnouts
ARTCS1060085000	Standard 50 Kg - Switch Lug For Operating Assembly 1 In 8 50kg Dual Gauge Turnouts - Type 29, Type 30, Type 39 & Type 40	Switch Lug For Operating Assembly 1 In 8 50kg Dual Gauge Turnouts
ARTCS1060090000	Standard 50 Kg - 1 In 8 - Type 39 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 39 - Crossing Arrangement
ARTCS1060091000	Standard 50 Kg - 1 In 8 - Type 39 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 39 - Rail Details
ARTCS1060092000	Standard 50 Kg - 1 In 8 - TYPE 39 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 39 - Rail Details
ARTCS1060093000	Standard 50 Kg - 1 In 8 - TYPE 39 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 39 - Rail Details
ARTCS1060094000	Standard 50 Kg - 1 In 8 - Type 40 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 39 - Block Details
ARTCS1060095000	Standard 50 Kg - 1 In 8 - Type 40 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 40 - Crossing Arrangement
ARTCS1060096000	Standard 50 Kg - 1 In 8 - Type 40 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 40 - Rail Details
ARTCS1060097000	Standard 50 Kg - 1 In 8 - Type 40 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 40 - Rail Details
ARTCS1060098000	Standard 50 Kg - 1 In 8 - Type 40 - 50 Kg Dual Gauge Fabricated V Crossing - 1435 And 1600	Type 40 - Rail Details
ARTCS1060099000	Standard 50 Kg - 1 In 8 - Type 40 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 40 - Block Details
ARTCS1060100000	Standard 50 Kg - 1 In 8 - Type 29 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 29 - Crossing Arrangement
ARTCS1060101000	Standard 50 Kg - 1 In 8 - Type 29 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 29 - Rail Details
ARTCS1060102000	Standard 50 Kg - 1 In 8 - Type 29 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 29 - Rail Details
ARTCS1060103000	Standard 50 Kg - 1 In 8 - Type 29 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 29 - Rail Details
ARTCS1060104000	Standard 50 Kg - 1 In 8 - Type 29 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 29 - Block Details
ARTCS1060105000	Standard 50 Kg - 1 In 8 – Type 30 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 30 - Crossing Arrangement
ARTCS1060106000	Standard 50 Kg - 1 In 8 - Type 30 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 30 - Rail Details
ARTCS1060107000	Standard 50 Kg - 1 In 8 - Type 30 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 30 - Rail Details
ARTCS1060108000	Standard 50 Kg - 1 In 8 - Type 30 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 30 - Rail Details
ARTCS1060109000	Standard 50 Kg - 1 In 8 - Type 30 - 50 Kg Dual Gauge Fabricated Double V Crossing - 1435 And 1600	Type 30 - Block Details
ARTCS1060154000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout – Type 24	Type 24 Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060156000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24	1 In 8 Dual Gauge LH Switch Assembly Type 24
ARTCS1060159000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 27 Type 28,	Type 27 Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060161000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout – Type 27	1 In 8 Dual Gauge Rh Switch Assembly Type 27
ARTCS1060164000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 28	Type 28 Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060166000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - TYPE 28	1 In 8 Dual Gauge LH Switch Assembly Type 28

Drawing No.	Title	Description
ARTCS1060169000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout – Type 34	Type 34 Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060171000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - TYPE 34	1 In 8 Dual Gauge Rh Switch Assembly Type 34
ARTCS1060174000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout – Type 82	Type 82 Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060176000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout – Type 82	1 In 8 Dual Gauge LH Switch Assembly Type 82
ARTCS1060179000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout – Type 82A	Type 82A Diagram/Assembly - Concrete Or Timber Bearers
ARTCS1060180000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82A	1 In 8 Dual Gauge LH Switch Assembly Type 82A
ARTCS1060183000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge 'K' Crossing Assembly For Turnout Type 27 & Type 28	K' Crossing Assembly For Turnout Type 27 & Type 28
ARTCS1060184000	Standard 50 Kg - Lock Bar Assembly 1 In 8 50kg Dual Gauge Turnouts - Type 27 & Type 28	Lock Bar Assembly 1 In 8 50kg Dual Gauge Turnouts - Type 27 & Type 28
ARTCS1060185000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - RBM (Rail Bound Manganese) Crossing – Type 27 & Type28	RHM (Rail Bound Manganese) Crossing - Straight To Suit - Type 27 & Type 28
ARTCS1060187000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - RBM (Rail Bound Manganese) Crossing - Type 24, Type 34, Type 82 & TYPE 82A	RHM (Rail Bound Manganese) Crossing - Curved To Suit - Type 24, Type 34, Type 82 & Type 82A
ARTCS1060188000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge – Operating Assembly – Type 27	Operating Assembly - Mounted On Right Hand Side For Turnout Type 27
ARTCS1060189000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge – Operating Assembly – Type 27	Operating Assembly - Mounted On Left Hand Side For Turnout Type 27
ARTCS1060190000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27 & Type 28	Plate Support Assembly For Type 27 & Type 28
ARTCS1060191000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24	Plate Support Assembly For Type 24
ARTCS1060192000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - Type 24	Stock Rail & Closure Rail Details For Switch Assembly Type 24
ARTCS1060194000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge – Operating Assembly – Type 24	Operating Assembly - Mounted On Left Hand Side For Turnout Type 24
ARTCS1060195000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge - Operating Assembly – Type 24	Operating Assembly - Mounted On Right Hand Side For Turnout Type 24
ARTCS1060201000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82 & Type 82A	Single Rail Check Panel For Type 82 & Type 82A
ARTCS1060203000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82	Operating Assembly - Mounted On Left Hand Side For Turnout Type 82
ARTCS1060204000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82	Operating Assembly - Mounted On Right Hand Side For Turnout Type 82
ARTCS1060205000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 34	Operating Assembly - Mounted On Left Hand Side For Turnout Type 34
ARTCS1060206000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 34	Operating Assembly - Mounted On Right Hand Side For Turnout Type 34
ARTCS1060208000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 34	Plate Support Assembly For Type 34 Turnout
ARTCS1060209000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout - TYPE 34	Stock Rail & Closure Rail Details For Switch Assembly Type 34
ARTCS1060211000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge – Operating Assembly – Type 82A	Operating Assembly - Mounted On Left Hand Side For Turnout Type 82A
ARTCS1060212000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge - Operating Assembly – Type 82A	Operating Assembly - Mounted On Right Hand Side For Turnout Type 82A
ARTCS1060213000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82, Type 82A,	Front Lock Bar - Type C & Type D
ARTCS1060216000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 – Dual Gauge Lead/Turnout – Type 82	Lock Bar Assembly For Type 82 Turnouts Motor Mounted Turnout Side
ARTCS1060217000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - TYPE 82A	Lock Bar Assembly For Type 82A Turnouts Motor Mounted Turnout Side
ARTCS1060218000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 28	Operating Assembly - Mounted On Left Hand Side For Turnout Type 28
ARTCS1060219000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 28	Operating Assembly - Mounted On Right Hand Side For Turnout Type 28
ARTCS1080002000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, 34, 82 & 82A	Stock Rail Detail For Single Switch Assembly. - Type 24, 34, 82 & 82A
ARTCS2060003000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29	Crossing Panel 'Fl' Type 29 Turnout
ARTCS2060004000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29	Crossing Plates Type 29 Turnout
ARTCS2060005000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29	Heelplate Type T29
ARTCS2060006000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29 Type 34,	Heelplate CSHP
ARTCS2060008000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 30	Crossing Panel 'Fr' For Type 30 Turnout
ARTCS2060010000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 30	Crossing Plates Type 30 Turnout
ARTCS2060011000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 30	Heelplate Type T30
ARTCS2060012000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 30, Type 34, Type 82,	Heelplate CSHP
ARTCS2060014000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 39	As50kg Monoblock Crossing

Drawing No.	Title	Description
ARTCS2060016000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 39	Type 39 Timbering Diagram/Assembly - Concrete Or Timber Bearers
ARTCS2060017000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 39	Rh & LH Heel Plates Var. X 200 X 20
ARTCS2060018000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29 & Type 39	Cast Steel Heel Plates For Turnout Type 27 & Type 39
ARTCS2060021000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 40	Crossing Panel 'El' For Type 40 Turnout
ARTCS2060022000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 40	Crossing Plates Type 40 Turnout
ARTCS2060023000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 40	Heel Plates For Type 40
ARTCS2060024000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24,	Cast Steel Heel Plates For Turnout Type 24, Type 28 & Type 40
ARTCS2060042000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout	Typical Coring Detail
ARTCS2060049000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29, Type 30, Type 39 & Type 40	Double Rail Heel Joint Assembly
ARTCS2060053000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Sleeper Plates Double Rail Cdr294
ARTCS2060056000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Check/Closure Blocks
ARTCS2060057000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Cant Reducing Plate Double Rail
ARTCS2060059000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Single Rail Heel Joint Assembly
ARTCS2060060000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Double Rail Joint Assembly
ARTCS2060063000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 29, Type 30, Type 39 & Type 40	2nd Stretcher Bar Assembly (Complete With Brackets)
ARTCS2060064000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29, Type 30, Type 39 & Type 40	Details Of Cast Web Washer
ARTCS2060067000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82A,	Stretcher Basket Details
ARTCS2060072000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout	Crossing Check & Standard Plate Sections
ARTCS2060073000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Double Rail Joint Plates CDRJ294
ARTCS2060155000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24	Crossing Panel - Type 24
ARTCS2060157000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24	Crossing Plates For Type 24
ARTCS2060158000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24	Heel Plates For Type 24
ARTCS2060160000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27	Crossing Panel - Type 27
ARTCS2060162000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27	Crossing Plates For Type 27
ARTCS2060163000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27	Heel Plates For Type 27
ARTCS2060165000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 28	Crossing Panel - Type 28
ARTCS2060167000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 28	Crossing Plates For Type 28
ARTCS2060168000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 28	Heel Plates For Type 28
ARTCS2060170000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82	Crossing Panel - Type 82
ARTCS2060172000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 34	Crossing Plates For Type 34
ARTCS2060173000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 34	Heel Plates For Type 34
ARTCS2060175000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82A	Crossing Panel - Type 82A
ARTCS2060177000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82	Crossing Plates For Type 82
ARTCS2060178000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82	Heel Plates For Type 82
ARTCS2060181000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82A	Crossing Plates For Type 82A
ARTCS206018200B	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82A	Heel Plates For Type 82A
ARTCS2060193000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 34, Type 82, Type 82A,	Single Rail Turnout Plate Type FRS 129a & FRS 129c
ARTCS2060196000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24 & Type 34	Arrangement Of Streatcher Bars

Drawing No.	Title	Description
ARTCS2060197000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27 & Type 28	Arrangement Of Streatcher Bars
ARTCS2060198000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82 & Type 82A	Stockrail Drilling Details
ARTCS2060199000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82 & Type 82A	Support Plates
ARTCS2060202000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82 & Type 82A	Arrangement Of Streatcher Bars
ARTCS2060207000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 34	Crossing Panel - Type 34
ARTCS2060210000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 82, Type 82A,	Support Bracket For Front Stretcher Bar
ARTCS2070012000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout	Dual Rail Cant Reducing Transition Plates, 431d-H, 432d-H & 433d-H.
ARTCS3060050000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Sleeper Plates Single Rail CSR129
ARTCS3060051000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29, Type 30, Type 39 & Type 40	Single Rail Cast Guard Plate CSG129
ARTCS3060052000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 29, Type 30, Type 34, Type 39 & Type 40	Double Rail Cast Guard Plate CSG129
ARTCS3060054000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Cant Reducing Plate Single Rail
ARTCS3060058000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Slideplate Type SPC
ARTCS3060061000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 30, Type 34, Type 39 & Type 40, Type 82, Type 82A,	Slideplate Type SPS
ARTCS3060062000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout	Double Rail And Centre Block Details
ARTCS3060066000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 34, Type 82A	Rod Detail For Stretcher Bar
ARTCS3060068000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 34, Type 82A,	Web Driver Bracket
ARTCS3060074000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 24, Type 27, Type 28, Type 29, Type 34, Type 82, Type 82A,	Distance Blocks
ARTCS3060200000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 82A,	Elevated Guard Rail Plate
ARTCS3060215000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout - Type 27, Type 28, Type 29, Type 30, Type 39 & Type 40	Wedge Clip For 50kg Rail
ARTCS3070026000	Standard 50 Kg - 1600 & 1435mm Gauge - 1 In 8 - Dual Gauge Lead/Turnout	Modified Double Rail Joint Assembly.

10 Appendix B - 50Kg Dual Gauge & Gauge Separation Turnouts – Construction Track Gauging & Tolerances

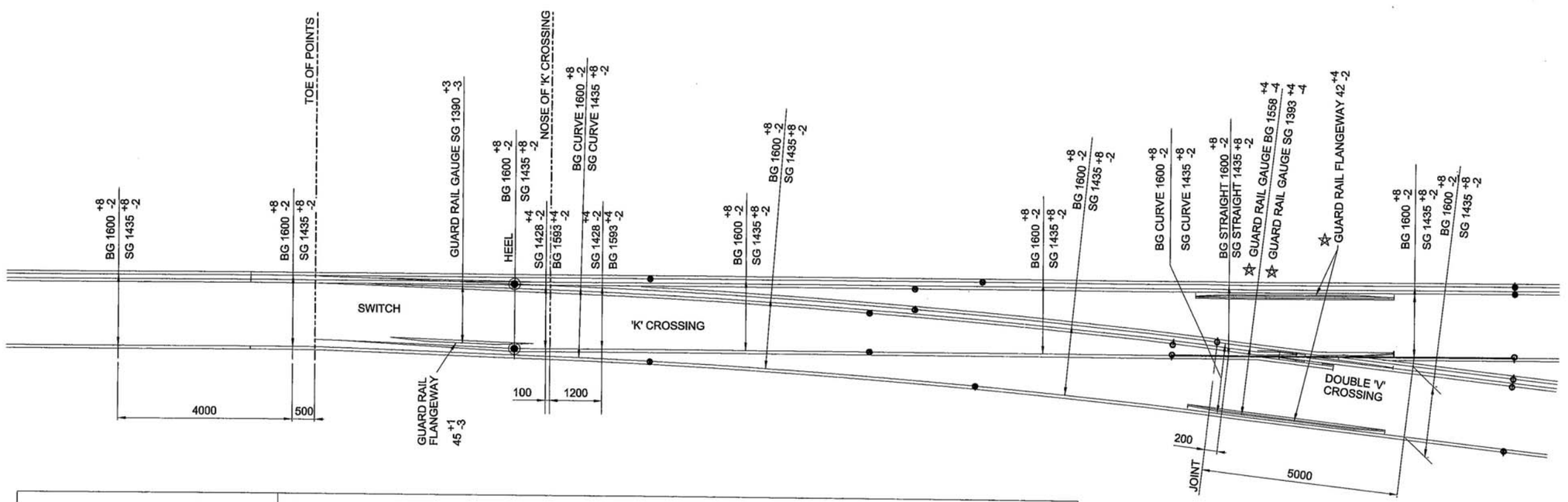


DESIGNATION OF TURNOUT LAYOUT	VARIATIONS TO TRACK GAUGING & TOLERANCES
TYPE 39 DUAL GAUGE	AS SHOWN
TYPE 40 DUAL GAUGE	AS SHOWN, EXCEPT L.H.
TYPE 30 & 29 DUAL GAUGE	R.H. & L.H. EXCEPT GAUGE TIGHTENING ON SG & BG TURNOUT LEGS.
TYPE 24 GAUGE SEPARATOR	1. BG TURNOUT LEG NOT APPLICABLE. 2. GUARD RAIL AT SWITCH NOT APPLICABLE. 3. K CROSSING NOT APPLICABLE - TIGHT GAUGE NOT REQUIRED. GAUGE ON STRAIGHT 1435 +2, -2 & 1600 +2, -2. 4. DOUBLE V CROSSING REPLACED WITH STD. V CROSSING - GAUGE BOTH V & WING ENDS 1435 +2, -2 ON STRAIGHT & CURVE.
TYPE 27 & 28 GAUGE SEPARATOR	1. SG TURNOUT LEG NOT APPLICABLE. 2. DOUBLE V CROSSING REPLACED WITH STD. V CROSSING - GAUGE BOTH V & WING ENDS 1600 +2, -2 ON STRAIGHT & CURVE.
TYPE 34 GAUGE SEPARATOR	1. BG TURNOUT LEG NOT APPLICABLE. 2. GUARD RAIL AT SWITCH NOT APPLICABLE. 3. K CROSSING NOT APPLICABLE - TIGHT GAUGE NOT REQUIRED. GAUGE ON STRAIGHT 1435 +2, -2 4. DOUBLE V CROSSING REPLACED WITH STD. V CROSSING - GAUGE BOTH V & WING ENDS 1435 +2, -2 ON STRAIGHT & CURVE.
TYPE 82 & 82A GAUGE SEPARATOR	1. SG TURNOUT & BG STRAIGHT LEGS NOT APPLICABLE. 2. GUARD RAIL AT SWITCH NOT APPLICABLE. 3. K CROSSING NOT APPLICABLE - TIGHT GAUGE NOT REQUIRED. GAUGE ON STRAIGHT 1435 +2, -2 4. DOUBLE V CROSSING REPLACED WITH STD. V CROSSING - GAUGE BOTH V & WING ENDS 1435 +2, -2 ON STRAIGHT & 1600 +2, -2 ON CURVE.

APPENDIX B

AUSTRALIAN RAIL TRACK CORPORATION
50kg DUAL GAUGE & GAUGE SEPARATION TURNOUTS
CONSTRUCTION TRACK GAUGING & TOLERANCES

11 Appendix C - 50kg Dual Gauge & Gauge Separation Turnouts – Maintenance Track Gauging & Tolerances



DESIGNATION OF TURNOUT LAYOUT	VARIATIONS TO TRACK GAUGING & TOLERANCES
TYPE 39 DUAL GAUGE	AS SHOWN
TYPE 40 DUAL GAUGE	AS SHOWN, EXCEPT L.H.
TYPE 30 & 29 DUAL GAUGE	R.H. & L.H. EXCEPT GAUGE TIGHTENING ON SG & BG TURNOUT LEGS.
TYPE 24 GAUGE SEPARATOR	1. BG TURNOUT LEG NOT APPLICABLE. 2. GUARD RAIL AT SWITCH NOT APPLICABLE. 3. K CROSSING NOT APPLICABLE - TIGHT GAUGE NOT REQUIRED. GAUGE ON STRAIGHT 1435 +8, -2 & 1600 +8, -2. 4. DOUBLE V CROSSING REPLACED WITH STD. V CROSSING - GAUGE BOTH V & WING ENDS 1435 +8, -2 ON STRAIGHT & CURVE.
TYPE 27 & 28 GAUGE SEPARATOR	1. SG TURNOUT LEG NOT APPLICABLE. 2. DOUBLE V CROSSING REPLACED WITH STD. V CROSSING - GAUGE BOTH V & WING ENDS 1600 +8, -2 ON STRAIGHT & CURVE.
TYPE 34 GAUGE SEPARATOR	1. BG TURNOUT LEG NOT APPLICABLE. 2. GUARD RAIL AT SWITCH NOT APPLICABLE. 3. K CROSSING NOT APPLICABLE - TIGHT GAUGE NOT REQUIRED. GAUGE ON STRAIGHT 1435 +8, -2 4. DOUBLE V CROSSING REPLACED WITH STD. V CROSSING - GAUGE BOTH V & WING ENDS 1435 +8, -2 ON STRAIGHT & CURVE.
TYPE 82 & 82A GAUGE SEPARATOR	1. SG TURNOUT & BG STRAIGHT LEGS NOT APPLICABLE. 2. GUARD RAIL AT SWITCH NOT APPLICABLE. 3. K CROSSING NOT APPLICABLE - TIGHT GAUGE NOT REQUIRED. GAUGE ON STRAIGHT 1435 +8, -2 4. DOUBLE V CROSSING REPLACED WITH STD. V CROSSING - GAUGE BOTH V & WING ENDS 1435 +8, -2 ON STRAIGHT & 1600 +8, -2 ON CURVE.

☆ THESE VALUE ARE BASED ON EXACT VALUES OF TRACK GAUGE 1435 & 1600. FOR OTHER VALUES OF TRACK GAUGE WITHIN ACCEPATABLE LIMITS REFER TO "TABLE FOR GUARDRAIL ADJUSTMENT GUIDELINES" IN DOCUMENT "50kg DUAL GAUGE TURNOUTS AND GAUGE SEPARATIONS CONSTRUCTION AND MAINTENANCE MANUAL".

APPENDIX C

AUSTRALIAN RAIL TRACK CORPORATION
50kg DUAL GAUGE & GAUGE SEPARATION TURNOUTS
MAINTENANCE TRACK GAUGING & TOLERANCES