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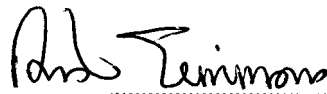
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Company Work Instructions

Points General – Supplementary Drives - Mechanical

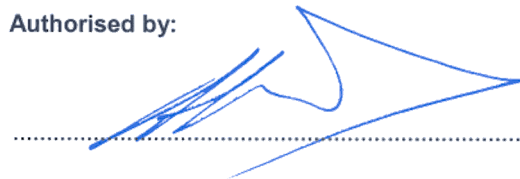
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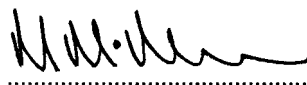
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1 Purpose

The purpose of this standard is to give additional information to supplement and support the information given in NR/GN/SIG/11772, regarding best practice for the installation and adjustment of mechanically operated supplementary (back) drives.

2 Scope

This standard is applicable to all crank operated supplementary drives installed on full depth switches and shallow depth UIC 54B switches. Sketches are included for guidance only. The principles are applicable to crank operated supplementary drives installed on RT60 switch systems.

For all RT60 layouts, manufacturers' drawings must be used. Each set of points must be treated as bespoke with the potential for differing arrangements for the same type of switch layout, including, sleeve setting distances, crank and drive rod arrangements.

3 Reference documentation

3.1 Company Standards

NR/GN/SIG/11772	Supplementary Point Drives and Detection
NR/WI/SIG/10179	The Installation & Maintenance of S&C with 35mm square section adjustable stretcher

3.2 Signalling Maintenance Specification NR/SMS

NR/SMS/ PA00	Point Equipment General
NR/SMS/PA01	Mechanical Points
NR/SMS/PA11	Point Inspection
NR/SMS/PB11	Rail Clamp Point Lock
NR/SMS/PF01	Point Fittings
NR/SMS/PF02	Mechanical Supplementary Drives
NR/SMS/Test/001	FPL Test (Machine)
NR/SMS/Test/002	FPL Test (Mechanical)
NR/SMS/Test/003	FPL Test (Clamp Lock)
NR/SMS/Test/016	Supplementary Detection Test

3.3 Standard Drawings BRS Series

These diagrams show the layout of fittings for various mountings on timber and concrete bearers. Those listed below are the relevant series for current drive positions.

Drawing Number	Switch Type	Bearer Type	Drive Position	Parts list	Comments
BRS-SM 350	Vertical, Inclined, B.H.	Timber	6 foot		
BRS-SM 2330	UIC 54B	Timber	4 foot	BRS-SM 52330	
BRS-SM 2335	UIC 54B	Timber	6 foot	BRS-SM 52335	
BRS-SM 2370	UIC 54B	Concrete or Timber	6 foot	BRS-SM 52370	
BRS-SM 2371	UIC 54B	Concrete or Timber	4 foot	BRS-SM 52371	
BRS-SM 2530- 2539	113A full depth	Concrete or Timber	6 foot	BRS-SM 52530	Clamp Lock
BRS-SM 2550- 2561	113A full depth	Concrete or Timber	4 foot	BRS-SM 52550	Point Machine
BRS-SM 2570- 2578	113A full depth	Concrete or Timber	4 foot	BRS-SM 52570	Clamp Lock
BRS-SM 2590- 2600	113A full depth	Concrete or Timber	6 foot	BRS-SM 52590	Point Machine

4 Definitions

Auger	Hole forming tool used in preference to a drill bit when making holes in coarse timber.
CV, DV, EV, etc.	Letter code used to identify the switch type. The first letter refers to the switch length. A vertical switch is shown by the V suffix.
Lost Motion	Is the difference between the motion of the driving and the driven elements of a machine due to clearance between parts. In the case of mechanical supplementary drives this is the gap between the drive lug and the adjusting nuts or sleeved nuts. The reason for using lost motion in points drive systems is: 1/ To enable the drive in the point machine to move before the points move. 2/ To convert the distance the Throw Bar of the point machine moves into the required switch rail movement (point opening).

3/ Allows the switch rails to flex outwards during the passage of a train without stressing the rest of the supplementary drive system.

4/ Permits a small amount of movement of the rail and supplementary drive components owing to temperature expansion and contraction.

Fang bolts Plain, square-headed bolt fitted with a large shoe, rather than a nut. The shoe is used to bite into coarse timber.

Free Wheel Clearance The minimum gap between the switch and stock rail, which will allow the flange of a train wheel to pass through. A reduction in this gap may result in flange trapping.

Mechanical Advantage The ratio of the output force of a mechanism to the applied input force

Switch Planing The machined part of the head of the switch rail.

Reamer Precision cutting tool used for dressing holes after drilling to remove burrs. When lubricated, are ideal for cleaning surface rust and debris from the hardened steel bushes in cranks and rod eyes.

Springing of the toe The toe of the closed switch rail springs away from the stock rail when the actuator holding force is removed (most readily observed when hand cranking a switch). Springing is caused when incorrect system adjustment prevents the switch rail from holding up against the stock rail along the planed length.

5 Supplementary Drives - Mechanical

This standard shows the method to be followed when installing supplementary drives for the first time or carrying out complete renewals.

The settings and adjustments given in this document can also be followed for carrying out faulting and maintenance tasks.

Installations on timber or concrete use common components. The process for setting up and adjustment is the same, as is the procedure for different rail types.

6 Operation of Supplementary (Back) Drives - Mechanical

All supplementary drives, when correctly fitted, will reduce the risk of premature wear and failure on long switches. Supplementary drives achieve this by holding the planed length of the switch rail up against the stock rail, and by assisting the point motor/clamp-lock in moving the switch rails across to their correct position.

Positioning of the drive will be as specified by the layout design. Drives will be fitted in one of three places for clamp-lock installations, in the 4-foot or external to the 4-foot, either LH or RH side of switch rails. For point machines, drives are fitted in either the 4-foot, or the side opposite the point machine.

6.1 Operating Requirements

For supplementary mechanical drives to operate with maximum efficiency and minimum wear, the following criteria need to be met:

1. Drive connection rods must run parallel to the stretcher bars at mid stroke.
2. The front connection rod must be secured to its drive lug or stretcher bar bracket with no lost motion clearance.
3. Crank arms must be square to the stock rail when the points are in the mid position.
4. The stroke of the crank arms must give a reduction in movement from the front of the switch to the rear.
5. There must be a gap (lost motion) typically 5 - 15 mm at the rear and intermediate lug connection in order to allow reduced point opening at the rear and to increase mechanical advantage.

Note: Too large a gap will fail to maximise the mechanical advantage in the supplementary drive system.

No gap may introduce unwanted forces in the drive mechanism and resist the closing of the switch rail at the toe (under travel).

6. There should be a gap of 1.5mm between the closed switch and stock rail at each rear and intermediate drive position to ensure the drive has not been over-tightened.

7 Pre-Installation

7.1 Preparation

Ensure all nuts and sleeve nuts are clean and made to run free on the connection rods.

Holes in crank arms and connecting rods should be cleaned and lubricated to ensure a push fit of the headed pins.

Crank-arm adjusting sleeve securing bolts lubricated and running free.

7.2 Pre-checks

1. All stretcher bar lengths need to be checked to ensure correct fit of the switch rail to the stock rail and achievement of the Free Wheel Clearance.
 - Bows in the rail may indicate a stretcher bar of incorrect length.
 - Point openings at each stretcher bar position shall comply with NR/GN/SIG/11772.
2. For all backdrives fitted to Rail Clamp Point Lock (4ft & 6ft mounted) and for 6ft mounted backdrives for point machines, all fixed stretcher bar insulations must be in line with the soleplate insulation.
3. For point machine operated 4-ft mounted backdrives, ensure that the 2nd and subsequent fixed stretcher bars are fitted with the insulations on the opposite side of the 1st fixed stretcher bar and soleplate. This avoids the risk of track circuit failure should the channel rod sag and come into contact with the stretcher bars.
4. Check that the points pass the FPL gauge test and there is no springing of the toe.