

TECHNICAL INSTRUCTION

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NETWORK RAIL - SIGNAL ENGINEERING HPSS Assembly and Installation

Relevant Standard: NR/GN/SIG/11400

Purpose

This Technical Instruction is being issued to spread best practice in the assembly and installation of HPSS Points Operating Equipment.

Scope

The new practices shall be applied to all new installations of HPSS across the network.

Background

The instructions have been developed following a study on the reliability of HPSS points. One of the workstreams is to spread best practice to reduce the potential for damage and errors to occur during assembly and construction. This TI is intended to perform that task.

Compliance Requirements

These requirements shall be complied with from publication of this instruction.

Action Required

- 1 Self-Locking (Prevailing Torque) Nuts and Bolts**
 - 1.1 There are various HPSS parts that are retained using self-locking (prevailing torque) nuts and bolts. The manufacturers of these components only guarantee security of connection if they are tightened up once to the correct torque using a torque wrench. Examples are Binx, Aerotite, Philidas nuts and Durlok bolts.
 - 1.2 There have been various instances of these nuts and bolts coming loose after commissioning and this is often due to the fact that they have been assembled and disassembled several times before the final commissioning.
 - 1.3 It is therefore important that nuts and bolts used for the preassembly stages prior to final commissioning shall be plain nuts and bolts that are used for set up purposes only. These can either be plain nuts and bolts or the specified self-locking components that are only ever used for set up purposes. For Durlok bolts the use of plain bolts is recommended due to the cutting action of the Durlok bolt head.

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- 1.4 At the final commissioning stage the self-locking (prevailing torque) components shall be removed from their protective packaging and immediately installed using a torque wrench. It is permissible for the torque setting to be then checked again with a torque wrench providing this activity does not turn the component in the loosening direction and is done within 6 hours of the initial tightening action. An indelible tell-tale (witness mark) shall then be applied to the component to allow subsequent visual inspections. This can be done by the use of correction liquid (Tippex) or similar. This practice will identify any rotation in relation to other components thus indicating loosening. SMS PC51 requires maintenance teams not to check torque settings of these components using torque wrenches - they are expected to use the witness marks. Any apparent loosening will result in complete replacement of the self-locking (prevailing torque) components.

2 Pre-assembly

- 2.1 The practice of preassembling the HPSS operated points in the S&C manufacturer's premises has led to damage of various components of the HPSS system. This includes cables, plug couplers as well as mechanical components like self-locking nuts and bolts. It is also likely that the kit of parts issued from IAD for a particular set of points is not reliably retained intact when the points are delivered to the stillage on site with components from various point ends being swapped.
- 2.2 For this reason, and to reinforce the requirement for single use of self-locking (prevailing torque) components, it is required that if preassembly is carried out it must involve the use of set up HPSS components that never get sent to site.

3 Installation

- 3.1 There have been occasions when damage has been done due to lifting S&C into place using slings from single point lifting positions. This can have the effect of squeezing the rails tight to gauge and damaging the gauge blocks and HPSS fittings. It is essential, therefore, to ensure that all lifting operations involve the use of spreader beams with vertical lifting slings. Such lifting beams and slings are in use in some parts of the country and the version used by Jarvis is typical of these. The photos below show the Jarvis lifting frame. Whatever beam arrangement is used it is important that the slings lift vertically and are all set to hold the panel horizontally to minimise twisting.



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- 3.2 There is potential for damage to occur to the PowerLink Backdrive system during tamping operations if the intended movement of the S&C is substantial (greater than 30mm). It is therefore recommended that the first tamp after installation is undertaken with the PowerLink Backdrive bearing block top caps loosened by removing the M12 through bolts and self-locking Binx nuts (Note: The M12 Binx nuts must be replaced once the top caps retaining bolts are refitted following tamping).
- 3.3 The torque tube must be positioned, by adjustment of the bearing blocks, parallel to the straight stock rail or least curved rail – which is usually on the main through route. For correct setting of the PowerLink backdrive refer to IAD Rail Systems document ER/R/1/0137 (Installation Manual IAD 'PowerLink' Backdrive (Plain Switches RT60C to SG)). It is important to complete the installation with the torque tube straight and as close to being perpendicular to the front bearer as possible.
- 3.4 It is apparent that there are varying practices in setting the Switch Rail Toe travel dimension (sometimes confusingly referred to as the toe opening) and the free wheel clearance (FWC). Until an appropriate tool is developed the recommended best method of measuring the toe dimension is with a steel rule placed flat across the top of the switch rail with the end of the rule touching the stock rail at the position where the switch rail touches the stock rail when the switch is closed. The rule should then be parallel to the baseplate and therefore measuring the gap up to the part of the stock rail where the top of the switch rail makes contact when the switch rail is closed. The free wheel clearance at the end of switch planing, and at any other position on the switch, must be measured with a track gauge placed parallel to the slide chair which will measure switch movement 14mm down from the stock rail head. Required Toe travel is 113mm +/- 1 and FWC is 60-66mm for RT60/NR60 rail.

