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Level 3

Hy-Drive Supplementary Point Drive System

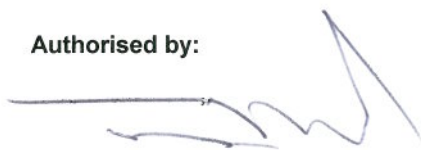
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User information

This Network Rail standard contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – *No variations, could stop the railway*

- **Red requirements shall** always be complied with and achieved.
- Red requirements shall be presented in a red box **with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of red requirements lies with the Professional Head/Standard Owner.
- Red requirements are monitored for compliance.
- Corrective actions shall be enforced if variations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Amber requirements – *Controlled variations, approved risk analysis and mitigation*

- **Amber requirements shall** be complied with unless variation has been approved in advance.
- Amber requirements shall be presented with an amber sidebar **and with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner, or their nominated Delegated Authority.
- Amber requirements are monitored for compliance.
- Variations **may** be permitted. Variations are approved by the Standard Owner or through existing Delegated Authority arrangements.
- Corrective actions shall be enforced if **non-approved** variations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Green – *Guidance*

- Guidance is based on good practice. Guidance represents supporting information to help achieve **Red** and **Amber** requirements.
- Guidance shall be presented with a dotted green sidebar **and with the word “should” (usually in notes) or as a direct instruction**.
- Guidance is **not mandatory** and is not monitored for compliance.
- Alternative solutions may be used. Alternative solutions do not need to be formally approved.
- Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence or documentation.

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Issue record

Issue	Date	Comments
1	12/02/2007	New document for the Installation & Set-Up of Alstom SO Hydraulic Supplementary Point Drive System
2	03/09/2011	Maintenance of document, no change to requirements
3	30/09/2014	Document changed from a Guidance Note to a Level 3 standard as it now includes mandatory requirements. It has also been updated to include the design changes introduced as Hy-drive MkII

Compliance

This Network Rail Work Instruction is mandatory and shall be complied with by Network Rail and its contractors if applicable from 30th September 2014.

When this Work Instruction is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this Work Instruction.

Reference documentation

NR/L2/SIG/30014/D120	Hy-Drive Supplementary Point Drive System – Signal Work Test Specification & Handover Certificate
NR/SIG/11231	Signalling Maintenance Testing
NR/SIG/10663	Signalling Maintenance Specifications
NR/L3/SIG/11303	Signalling Installation Handbook
NR/L2/SIG/11774	Clamp Lock Handbook
BRS-SM 3002	Hy-Drive Point Layout – NR60C Layout (MkI design)
BRS-SM 3003	Hy-Drive Point Layout – NR60D Layout (MkI design)
BRS-SM 3004	Hy-Drive Point Layout – NR60E Layout (MkI design)
BRS-SM 3005	Hy-Drive Point Layout – NR60F Layout (MkI design)
BRS-SM 3006	Hy-Drive Point Layout – NR60SG Layout (MkI design)
BRS-SM 3007	Hy-Drive Point Layout – NR60G Layout (MkI design)
BRS-SM 3008	Hy-Drive Point Layout – NR60H Layout (MkI design)
TWI 3S107	Track Work Information Sheet – Roller Baseplate Installation
BRS-SM 3302	Hy-Drive Point Layout – NR60C Layout (MkII design)

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BRS-SM 3303	Hy-Drive Point Layout – NR60D Layout (MkII design)
BRS-SM 3304	Hy-Drive Point Layout – NR60E Layout (MkII design)
BRS-SM 3305	Hy-Drive Point Layout – NR60F Layout (MkII design)
BRS-SM 3306	Hy-Drive Point Layout – NR60SG Layout (MkII design)
BRS-SM 3307	Hy-Drive Point Layout – NR60G Layout (MkII design)
BRS-SM 3308	Hy-Drive Point Layout – NR60H Layout (MkII design)
BRS-SM 53302	Hy-Drive Parts Schedule – NR60C Layout (MkII design)
BRS-SM 53303	Hy-Drive Parts Schedule – NR60D Layout (MkII design)
BRS-SM 53304	Hy-Drive Parts Schedule – NR60E Layout (MkII design)
BRS-SM 53305	Hy-Drive Parts Schedule – NR60F Layout (MkII design)
BRS-SM 53306	Hy-Drive Parts Schedule – NR60SG Layout (MkII design)
BRS-SM 53307	Hy-Drive Parts Schedule – NR60G Layout (MkII design)
BRS-SM 53308	Hy-Drive Parts Schedule – NR60H Layout (MkII design)

Disclaimer

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1 Purpose

The contents of this standard provide information on how to install and set-up Hy-Drive Supplementary Point Drive System when used on Network Rail controlled Infrastructure.

This standard will produce the relevant guidance and mandatory information to supports the installation and maintenance of the Hy-Drive Supplementary Point Drive System. Information published within NR/SIN/118 to mitigate the risk of flange contact with the Break-Out Device is contained within this document.

The Hy-drive Supplementary Point Drive System now has two designs known as Mkl and MkII. This Work Instruction explains the key changes that were introduced in 2014 as part of the MkII design.

2 Scope

This Network Rail standard specifies requirements and guidance on the Hy-drive Supplementary Point Drive System which is used in conjunction with an In-bearer Clamp lock to create the Hy-drive Points System. This applies to systems that are used to operate NR60 Rail from C switch to H switch length.

This standard specifies installation information and set-up advice as well as key differences between the Mkl and MkII designs. This standard applies to staff that are deemed competent to install and maintain the Hy-Drive Points system.

3 Definitions

For the purpose of this standard, the following terms and definitions apply.

Hy-Drive	When the Alstom SO Hydraulic Supplementary Point Drive System is fitted with In-Bearer Rail Clamp Point Rail Lock and a Hi-Flow Power Pack the complete system is referred to as "Hy-Drive".
RT60	Point layouts using CEN60 rail section to Railtrack specification
NR60	Network Rail design of S&C using CEN60 rail sections (60kg/m rail) <u>Note</u> It is based around the family of CEN60 rail sections, the design is documented on the RE/PW/2000 series drawings.
BoD	Break-out Device
IBCL	In-bearer Clamp Lock
SO units	Sistema Oleodinamico is the Italian translation for Hydraulic System. The Alstom SO units are used to operate the switch rails

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4 Hy-drive Supplementary Point Drive System

4.1 Introduction

The Point Drive System is made up of a number of SO Units (depending on the switch length) to be used in conjunction with an In-Bearer Clamp Lock (IBCL) and a Hi-Flow Power Pack in order to operate NR60 layouts. The three sub-systems together fitted to a point layout is also known as "Hy-Drive"

The system has a single adjustable stretcher bar fitted over the second bearer.

In conjunction with the SO Units, the IBCL system has been designed to provide tampable S&C.

4.2 System Overview

The SO Units perform the driving, holding and detecting functions of the points, and includes a "Break-out Device" (BoD). the original Italian design does not used BoDs as this is component only used in the UK in order to comply with UK Railway Group Standards.



Figure 1 – Hy-Drive System

MkI Design

In 2004 there were a number of pilot installations and by 2007 the Hy-Drive Supplementary Point Drive System was fully approved for switch lengths C – H on CEN60 Rail. In 2010 a review of the systems reliability was carried out because of an increase in the number failures associated with SO unit actuation. The initial solution was to apply lubrication to the slide baseplates.

MkII Design

In 2012 a trial installation of the MkII design was carried out which included a change to some of the SO unit stroke lengths. The MkII design is now supplied for all new installations and as well as new SO unit stroke lengths, roller baseplates have been introduced. Section 9.2 provides information on upgrading the design.

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4.3 Roller Baseplates

Track Work Information Sheet TWI 3S107 provides guidance on how to retro fit roller base plates.

MkII systems shall be installed with roller plates fitted at the positions shown in Table 1.

Switch Length	Bearer Numbers		Total No of plates required
	Double roller baseplates	Single roller baseplates	
C	3 & 6	12	6
D	3 & 7	11,	6
E	3 & 6	12 & 17	8
F	3 & 7	12, 17 & 20	10
SG	3 & 7	12, 17 & 22	10
G	3 & 8,	14, 20 & 25	10
H	3 & 9	15, 20, 26, 32 & 39	14

Table 1 – Roller Baseplate Positions

NOTE

Single Roller Baseplate Cat No 057/009909.

Double Roller Baseplate Cat No 057/009008.

The In Bearer Clamp lock is located at bearer one.

5 System Components in Detail

This section covers the main components that are used within the hy-drive system which comprise of:

- SO Units – also referred to as actuators and supplied by Alstom
- Hi-Flow Power Pack – supplied by SPX Rail Systems
- Adjustable Stretcher Bar – supplied by Vossloh Cogifer
- By-Pass Valve – supplied by Alstom
- Break-Out Device – (BoD) supplied by Alstom
- Roller Baseplates - supplied by Schwihag

The In-Bearer Clamp lock (IBCL) is the Point Operating Equipment used to Drive and Detect the switch toe of the Hy-drive system. For more information on the installation and maintenance of the IBCL see NR/L2/SIG/11774.

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5.1 SO Units

In 2014 two new actuator stroke lengths (106mm and 103mm) were introduced to F, SG and G switches as illustrated in figures 2 and 3. The SO units for other switch lengths are not affected. The bearer positioning for the SO Units remain the same for MkII.

	ACTUATOR POSITION FROM TOE MKI					
Turnout	1	2	3	4	5	6
C	80 mm					
D	94 mm	66mm				
E	94 mm	66mm				
F	94 mm	80 mm	66 mm			
SG	94 mm	80 mm	76 mm	66 mm		
G	94 mm	80 mm	76 mm	66 mm		
H	94 mm	88 mm	80 mm	76 mm	66 mm	36 mm

Figure 2 – Mki Design

	ACTUATOR POSITION FROM TOE MKII					
Turnout	1	2	3	4	5	6
C	80 mm					
D	94 mm	66mm				
E	94 mm	66mm				
F	106 mm	94 mm	66 mm			
SG	106 mm	103 mm	94 mm	66 mm		
G	106 mm	106 mm	94 mm	66 mm		
H	94 mm	88 mm	80 mm	76 mm	66 mm	36 mm

Figure 3 – MkII Design

The SO Unit provides the drive via hydraulic actuators within the casting. In addition, the unit also provides holding and detection via an internal slide, gear system and rotary electrical switch.

The SO Unit provides switch rail movement via drive rods, with a factory set drive stroke available in a number of versions, as illustrated in figures 2 and 3 which is clearly displayed on a label on the top of the unit.