

Ref:	NR/L2/SIG/11201 – Mod B17
Issue:	4
Date:	04/06/2011
Compliance date:	03/09/2011

Level 2

Signalling Design: Module B17 -

Signals - General

Endorsement and Authorisation

For endorsement and authorisation, please refer to
NR/L2/SIG/11201

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Published and Issued by Network Rail, Kings Place, 90 York Way, London. N1 9AG.



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Issue record

Issue	Date	Comments
4	June 2011	Modularisation of handbook and guidance notes, contains content of former NR/GN/SIG/11600, Part S.

Compliance

This Module is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03/09/2011.

When this standard 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 standard.

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1 SIGNALS - INTRODUCTION

1.1

This Company Standard applies, in support of [GK/RT0045](#), to all technologies of trackside equipment used to give, or restrict, visual movement authorities to train drivers and any associated train warning or protection system.

1.2

This is a temporary issue to allow the early cancellation of former BRB documentation. Only the necessary sections are included in this issue.

1.3

Not yet included.

1.4

The following guidelines and specifications should satisfy the principles encompassed within the Company Standard:

- a) the standard drawings for signal structures listed in [NR/LS/CAT003](#) and [NR/LS/CAT004](#);
- b) supplementary mechanical information on semaphore signals in [NR/L2/SIG/11201, Module B18](#);
- c) the typical circuits for signal operation and proving listed in [NR/GN/SIG/CAT005](#), which are described in [NR/L2/SIG/11201/Mod B19](#);
- d) guidelines for SSI installations in [NR/L2/SIG/11201/Mod B20](#); and
- e) specific equipment specifications listed in [NR/LS/CAT006](#).

2 DESIGN PRINCIPLES

These principles are mandated in [NR/L2/SIG/11201](#).

2.1

The appearance, meaning and performance of signals and indicators should conform to [GK/RT0045](#).

2.2

Signals and indicators should be positioned in accordance with [GK/RT0045](#). The actual position, profile and alignment should be subject to the confirmation of a Signal Sighting Committee, as described in [GK/RT8037](#).

2.3

Signals should not clear unless the next signal ahead is displaying a valid aspect, in accordance with [GK/RT0045](#).

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2.4

The remaining design principles are not yet included.

3 MAIN SIGNALS

Not yet included.

(CLS = colour light signal)

4 PERMISSIVE OR SHUNTING SIGNALS

Not yet included.

(PLS = position light signal)

5 JUNCTION SIGNALS AND ROUTE INDICATORS

Not yet included.

(PLJI = position light junction indicator; RI = route indicator)

6 MISCELLANEOUS INDICATORS

Not yet included.

7 ELECTRICAL REQUIREMENTS

7.1 GENERAL

De-energisation of the control circuits, or shut down of an electronic control device, should result in the most restrictive aspect being displayed.

Further details for relay circuits are given in [NR/L2/SIG/11201/Mod B19](#) and for Solid State Interlocking (SSI) installations in [NR/L2/SIG/11201/Mod B20](#).

7.2 SIGNAL LAMPS AND OPTICAL SYSTEMS

All lights of all aspects and indications displayed at any one signal should appear to be of similar intensity. Range and angular view for each type of signal and indicator is specified in [GK/RT0045](#). Wide angle readability at short range is generally addressed by the provision of close-up lens sectors aligned towards the track. The standard arrangement is for long range optical units and signals positioned to the left of the track. Any requirement for short range optical units (or spreadlight lenses) or signals positioned to the right of the track should be specified by the Signal Sighting Committee.

Signal lighting should be provided by one of the following means:

- a) direct optical system using signal lamps (SL) to [BS 469](#) or [NR/L2/SIG/10127](#);

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- b) direct optical system using lamps to [BS EN 60064](#);
- c) direct optical system using tungsten halogen lamps;
- d) fibre optic (FO) system using tungsten halogen lamps;
- e) light emitting diode (LED) array of suitable colour and intensity;
- f) other approved arrangement that fulfils the requirements of this Module.

The observed colour of light emitted should conform to [GK/RT0045](#). This may be achieved by means of:

- i. a self-coloured light source, such as an LED array;
- ii. fixed colour filters or lenses; or
- iii. a searchlight mechanism capable of changing the aspect displayed by a single lamp.

The lens should provide adequate security for the environment in which the signal is situated.

The types of lamp generally available are shown in Figure 1.

Standard	Code	Rated Voltage	Rated Wattage	Type	Cap	Typical Application
BS 469	SL 1	4V	0.5W	single filament	MBC	semaphore signal (low wattage) #
	SL 5	12V	4W	single filament	2 pin BC	semaphore signal (low wattage)
	SL 13	6V	12W	single filament	BA15s	searchlight signal #
	SL 17	12/16V	16/12W	double-pole	3 pin BC	multiple aspect CLS #
	SL 18	12V	24W	single filament	3 pin BC	multiple aspect CLS #, PLJI
	SL 21	12/16V	24/12W	double-pole	3 pin BC	multiple aspect CLS #
	SL 22	12/16V	10/6W	double-pole	3 pin BC	PLJI #
	SL 25	6V	6/9W	triple-pole	2 pin BC	searchlight signal
	SL 29	12V	2.4W	single filament	2 pin BC	repeater
	SL 32	12V	12/16W	triple-pole	2 pin BC	searchlight signal
	SL 33	110V	25W	single filament	3 pin BC	PLJI, loading/unloading indicator
	SL 34	12V	16/24W	triple-pole	3 pin BC	multiple aspect CLS #
RT/E/S/10127	SL 35	12V	24/24W	triple-pole	3 pin BC	semaphore signal (intensified lighting), multiple aspect CLS, PLJI, banner
BS EN 60064	general service	110V	15W (pygmy)	single filament	2 pin BC or SBC	standard RI (multi-lamp)
		110V	60W	single filament	2 pin BC	miniature RI (stencil), banner
	rough service	110V	40W	single filament	2 pin BC	PLS, loading/unloading indicator, banner
BRS-SE163	service	110V	35W	single filament	2/3 pin BC	PLS, loading/unloading indicator, banner
ECE Reg. 37	H3	12V	55W	tungsten halogen		FO RI, FO banner, FO points indicator
	H3	10V	50W	tungsten halogen		fibre optic PLS, FO RI
GY6.35-13	M89	24V	50W	tungsten halogen		FO level crossing indicator

Note: # = not generally appropriate for new work

Figure 1 – Lamps for Signalling Purposes

7.3 FILAMENT FAILURE PROTECTION

The main filaments of lamps should have a manufacturer's design life that is commensurate with Network Rail policy for lamp changing. Typically this should be at least 1000 hours, and for newly specified equipment should be 8000 hour lamps.

Signal lamps with a high degree of reliability are required, because an extinguished signal presents a hazardous situation. The lamps of the red, first yellow and green