

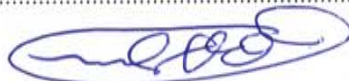
Ref:	NR/L2/SIG/11129
Issue:	6
Date:	03/09/2011
Compliance date:	30/09/2014

Level 2

Life Management of Signalling Relays and Electro-mechanical searchlight and banner signals

Endorsement and Authorisation

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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
2	October 2001	2nd issue
3	Aug 2004	Update and Review of Processes and included RT/E/C/10048
4	Dec 2004	Definition of Track Relay and 7.1.8 Para 8 have been clarified
5	August 2008	Total revision - RT/E/C/10049, RT/E/C/10050 & RT/E/C/10051 withdrawn
6	September 2011	Maintenance of document, no change to requirements (CCMS document number 61377515)

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from the dates below.

Compliance for this standard shall be a staged as follows:-

- By 30/09/2009 the responsible Signal Engineer shall have an approved action plan in place so that implementation can take place no later than 30/09/2010.
- The action plan shall be reviewed on an annual basis until full compliance is achieved. This shall be endorsed by the Route Asset Manager [S&T] and Signal & Telecom Maintenance Engineer.
- Full compliance shall be achieved by 30/09/2014.

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.

Reference documentation

[NR/L2/SIG/11201](#) Signalling Design Handbook

[NR/GN/SIG/19265](#) Labelling of Signalling Equipment

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1 Purpose

This standard details the requirement to control the risks presented by failures of signalling relays and electro-mechanical searchlight and banner signal mechanisms.

The aim of life management, as it relates to signalling relays, searchlight and banner signals performing safety critical or safety related functions, is to check that equipment continues to operate within its specified parameters.

Relay replacement/servicing shall be considered as part of the renewals programme as it is a life extension activity. However, some applications will require periodic maintenance servicing of particular relays to demonstrate safety.

2 Scope

The requirements of this standard apply to electro-mechanical relays and electro-mechanical searchlight and banner signal mechanisms that perform safety critical or safety related functions and that form part of the infrastructure-based railway signalling control system.

Relays internal to electronic systems (e.g. pcb mounted reed relays) are excluded from the scope as these are covered by system maintenance and associated tests. Relays within signalling equipment (e.g. token or block instruments) are included and may require the entire unit to be *replaced*.

Searchlight and banner signals with only optical components and no significant moving parts, e.g. LED, fibre-optic, are excluded.

NOTE New relays shall be used on all new schemes.

3 Process

The requirement for managing signalling safety relays shall be determined by consideration of the type of relay and whether it is used in a low or high risk function.

All electro-mechanical searchlight signals and banner signals shall be considered as high risk functions.

3.1 Type

For the purposes of relay management signalling safety relays have been categorised into two types:

Simple relays include plug-in relays with no special features. This category forms the majority of the national population. They have a proven record of long life and almost invariably fail right-side.

Complex relays have some form of additional functionality e.g. thermal timer relays, track relays, magnetic latch relays, vane relays. Complex relays are those with features that have known time- or usage- related deterioration mechanisms which affect vital performance requirements.

Appendix B "Relay Service Requirements" identifies relays as Simple or Complex and details any special conditions that shall apply.

3.2 Function

The function in which relays are used will determine whether it is a low or high risk.

Low Risk functions do not have primary safety implications e.g. a point timer.

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High Risk functions include most signalling systems in which ‘signalling’ relays are used. The default position shall be that all signalling functions are High risk.

For the purposes of relay management and servicing, all relays associated with the control of automatic level crossings (i.e. AHBC, AOCL, ABCL, AOCL, MWL & MSL) are deemed to be **Complex relays** used in **High Risk** functions.

3.2.1 Track Relays

These fall into a special category because slow changes in their characteristics can be masked by other changes in the track circuits and technicians’ adjustments, resulting in overall change to the track circuit properties. Therefore they shall be subject to regular servicing at standard frequency, as a ‘Complex, High Risk’ category.

Where a ‘TR’ relay is used as the circuit interface for a track circuit receiver and does not affect the basic track circuit characteristics (e.g. TI21), the relay shall be considered as similar to any other line relay and treated as ‘simple’.

3.3 Relay Management/service requirement

	Low Risk	High Risk
“Simple”	Run to failure	Run to failure, but apply any special conditions.
“Complex”	Run to failure, but apply any special conditions.	Regular servicing. See 3.3.1

Relays changed on failure shall be replaced with new relays or serviced relays.

3.3.1 Servicing Complex relays used in High Risk functions

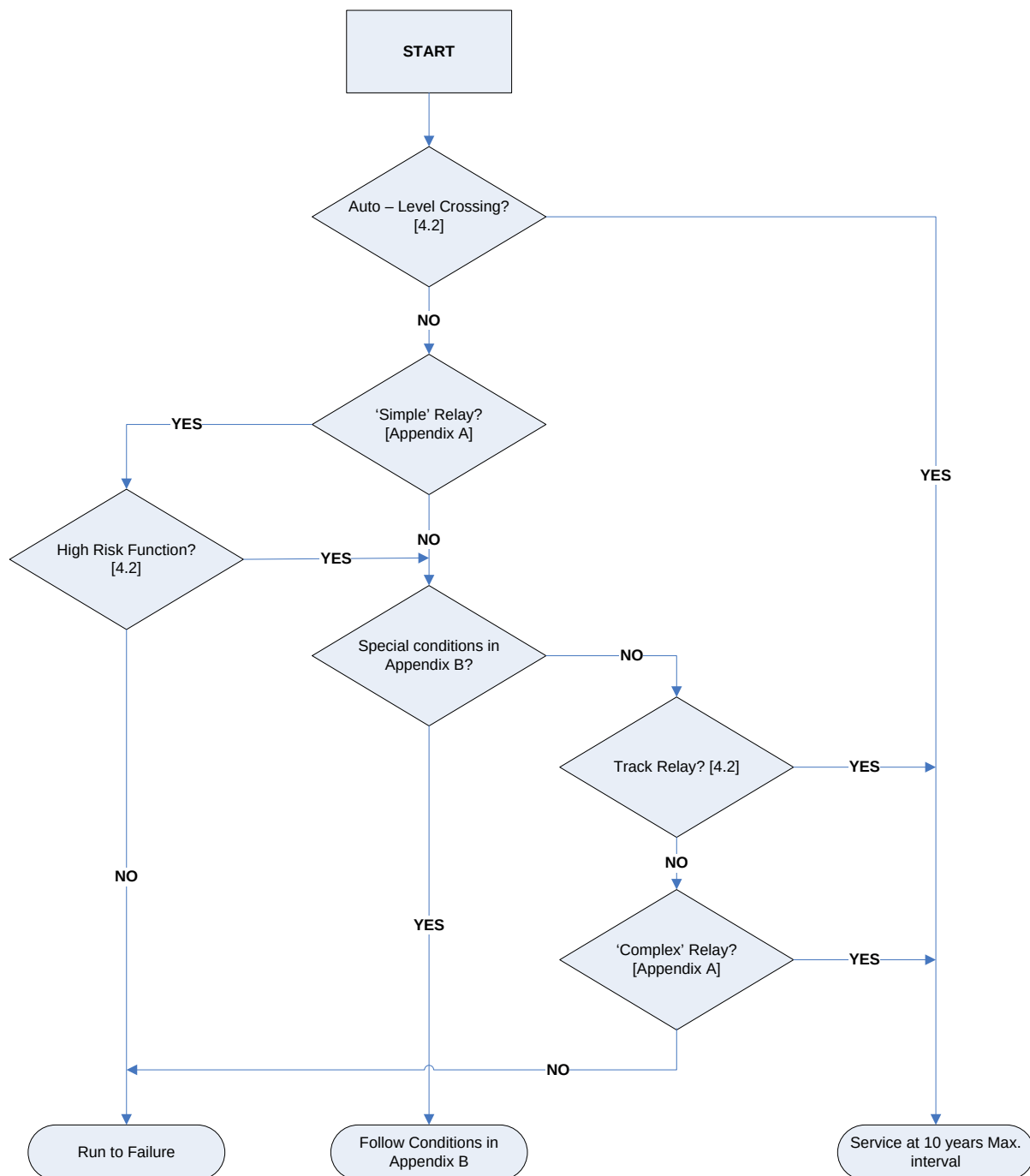
All Complex Relays used in High Risk functions shall be serviced at regular intervals. The standard maximum period for regular servicing is 10 years. Where Appendix B shows a service requirement, this takes precedence. More frequent servicing may be adopted at the discretion of the local manager, e.g. where operating frequency is particularly high.

Where a twin relay is encountered the more onerous of the two duties shall be adopted and both halves of the relay shall be shown as exempt from servicing for the entire relay to be exempt.

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3.4 Process Flow Chart



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4 Labelling

Labels shall not be removed or replaced other than by authorised Service Agent staff. Incorrectly labelled or unlabelled relays shall be removed from service. Full details of labelling requirements are detailed in [NR/GN/SIG/19265](#), Labelling of Signalling Equipment.

5 Records

The Maintainer shall keep a database of the relays within their area. The database is required for two reasons:

- To permit fast identification of relays if a high risk failure mode is identified and re-call via the SIN process is required.
- To assist the maintainer in managing a robust routine *replacement* regime.

The database shall include the following information as a minimum:

- Interlocking type.
- Signalling control function.
- Relay type.
- Relay specification (where existing).
- Relay voltage.
- Relay pin code (where applicable) and contact arrangement.
- Serial number.
- Manufacturer.
- Location.
- Date of manufacture.
- Date of next replacement / *servicing* or test.
- Subject to routine *replacement* or not.
- The *replacement* frequency or date of next *replacement* (if applicable).
- Any other action required (e.g. regular checks / tests or *replacement* by a specified date to eliminate a known deficiency).
- Date installed
- Date of last service (if applicable)

All records of *replacement* and inspection (including readings and notes) shall be held for the life of the installation and kept up to date following failure.

6 Approved Replacements

Banner, searchlight signals and relays can only be regarded as a suitable *replacement* for the purposes of fulfilling this Specification, if they are either:

- newly built units of a design accepted by Network Rail, and manufactured by an approved organisation.