

Ref	NR/PS/ELP/27219
Issue	2
Date	April 2006

Business Process Document

750 V d.c. track voltage relays

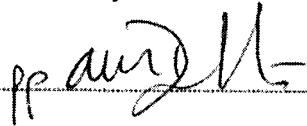
Endorsement & Authorisation

Endorsed by:



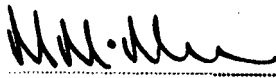
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Published & Issued by: Network Rail 40 Melton Street. London NW1 2EE



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Issue record

Issue	Date	Comments
2	April 2006	Re-issued as a SAF3 Business Process Document (<i>formerly RT/E/S/27219</i>)

Implementation

1 April 2006

Compliance

This Network Rail product specification is mandatory and must be complied with by Network Rail and its contractors from 1 April 2006

When this product specification is implemented, it is permissible for all projects, which have formally completed GRIP Level 4 to continue to comply with the Issue of any relevant Network Rail standards current when GRIP Level 4 was reached and not to comply with requirements contained herein unless the head of electrification and plant has stipulated otherwise in the accompanying briefing note.

Where the head of electrification and plant has specified that all projects will comply with the requirements, specific authority not to comply can be sought in the usual manner using the appropriate non-compliance authority processes described in Network Rail standard, [NR/SP/STP/045](#) *Managing the process for non-compliance authority* (formerly RT/LS/P/045).

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I Purpose

Not used

2 Scope

This general specification covers the design and manufacture of Track Voltage Relay (TVR) systems, based on solid state technology, for use on 750V DC third rail electrification systems. The system specified in this document are to be used for indicating the state of energisation of a track section and to trip the associated DC circuit breakers in the event of a fault that creates low voltage conditions.

Detailed information regarding the number, disposition, specific installation details and other relevant information covering the requirements of the relays, is included in the associated procurement specification.

The term TVR used in this specification shall be taken to mean a Process Logic Controller (PLC) based system that measures the track voltage and depending on the measurement, operating various outputs according to the program contained within the system.

3 Reference documentation

EN 60529	Specification for degrees of protection provided by enclosures (IP code)
EN 60721	Clasification of environmental conditions
EN 60439	Low voltage switchgear and controlgear assemblies

4 Definitions

Not used

5 General requirements

5.1 Interchangeability

All like plant and apparatus shall be interchangeable as a whole and as regards its parts.

5.2 Environmental conditions

Special service conditions in accordance with EN 60439 Section 7.2.2 shall apply in that the equipment will be installed adjacent to the railway track and will be subject to:

- a) Vibrations from passing rail traffic and heavy plant operating within substations.
- b) High magnetic fields associated with DC fault levels to 200kA, arcing noise associated with both AC and DC circuit breaker operations. Magnetic fields associated with nearby rectifier plant and transformers.

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In addition nearby Radio Frequency transmissions are made by handheld and mobile radios used by maintenance staff and trains.

In respect of ambient air temperatures, relative humidity and altitude, the levels given in EN 60721 for normal service shall apply.

5.3 Enclosures

All enclosures shall offer ingress protection to EN 60529, category IP40 or better with the door and all cable entries in place.

Enclosures shall be suitable for wall mounting. Access for the purposes of maintenance and testing shall be by means of a front mounted door. Enclosures shall afford the best possible access for maintenance and testing purposes.

An M8 brass stud shall be affixed to the outside of the enclosures for the purposes of making an earth connection. All doors and removable plates etc shall be bonded to the main structure by means of earth wires or straps.

5.4 Wiring terminal blocks and wiring

Terminals for transducer inputs, outgoing indication and trip wiring shall be of the Klippon Weidmuller SAKR type, or equivalent to the approval of the Engineer. Terminals for power supply inputs to the system and to any other peripheral device shall be of the Klippon Weidmuller RSF3 type, or equivalent to the approval of the Engineer.

Insulating barriers of the type relevant for the terminals concerned shall be provided between terminals serving different functions.

5.5 Nuts, bolts, washers etc.

All nuts, bolts washers and other metallic fixings shall be adequately protected against corrosion by a method approved by the Engineer.

6 Drawings

6.1 Drawings

3 copies of all design drawings, data sheets, software listings etc. showing the general and detailed arrangements of the equipment shall be provided.

Layout drawings shall show the disposition of all components within the system.

After the equipment has been successfully commissioned, all drawings are to be brought up to date as necessary, to provide a permanent "as fitted" record of the equipment.