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Level 3 Module

Signalling Installation – Signal Boxes and Ground Frames: Electrical Equipment

Endorsement and Authorisation

For endorsement and authorisation, please refer to NR/L3/SIG/11303.

This module is a reformatted version of the previous Signalling Installation Handbook with no change to the content other than correction of terminology.

It represents historic best practice which may no longer be relevant.

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Issue record

Issue	Date	Comments
2	September 2010	Reformatted version of previous document incorporating the text of the installation handbook.
1	August 2000	First issue.

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 4 December 2010.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 4 to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Stage 4 was reached and not to comply with requirements contained herein, unless the designated Standard Owner has stipulated otherwise in the accompanying Briefing Note.

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1 Introduction

This module applies to traditional electro-mechanical signal boxes. Ground Frames should be considered as the equivalent of the locking frame area of a signal box and so the relevant parts of this instruction also apply to them.

When working near levers and locking frames, beware of being struck or trapped by moving parts. Wear head protection and agree with the signaller that you are to be warned before levers are moved. Care should be taken to avoid working in a position in which the unexpected movement of a lever may cause injury. Positions in the line of travel of backweights, tappets and other moving parts of a lever frame should especially be avoided unless the lever has first been secured.

2 General

Before any work is carried out, check that adequate lighting is available in areas such as the underfloor and relay and battery rooms.

If wander lamps are used, these are to be of 110 volt type (or lower) and fully enclosed in insulating material. Lamps may not be fed from a signalling supply. In some rooms, a special 50 volt supply socket is provided.

Disturbing the wiring in some older installations may damage brittle insulation and make it unsafe. Where this danger is known, you will have been told to install in such a way that either:

- a complete renewal takes place; or
- the new wiring is to be in different runs so that the old wiring is not disturbed.

When working on an existing installation, if ever your work appears to have a bad effect on old wiring or equipment, stop immediately. Report the problem to your supervisor.

Refer also to Module 1D20 when working at existing installations.

Figure 1 shows a typical signal box wiring arrangement. A neat block shelf and frame is shown in Figure 7.

3 Trunking For Cables And Wires

Use trunking of sufficient size to allow future alterations and additions to be made safely and easily.

Plastic trunking shall be used for all cable and wire routes within the signal box. Allow adequate capacity in the trunking. Install it as near as possible to the equipment to be wired.

Except for termination, internal wiring should not come into contact with any metal surface. Nylon nuts and bolts or rivets shall be used for securing trunking to racking,

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frames, etc. When trunking has to be fixed to timber surfaces, a special nylon cup washer and cap should be used to cover the head of the appropriate wood screw.

Exceptionally, when making alterations to an installation where metal trays or trunking already exist and it is impracticable to run additional plastic trunking, wiring may be run in the existing routes if specially sanctioned by the infrastructure controller. See Modules 1D05 and 1D20.

If oil or rubbish is likely to come into contact with cables and wires, use plain (non-perforated) trunking to protect them.

Wiring between trunking and equipment should be protected by flexible conduit where practicable. (See Figures 2 and 4.) This conduit is also available in split lengths where feeding wires through would be difficult. If conduit cannot be used, plastic cable wrap "Spiroband" offers reasonable protection.

There is a special grade of flame retardant trunking and conduit (known as "halogen free") which does not emit hazardous gases when burning. This is fitted wherever halogen gases could be a danger to staff or public. Where this type of material needs to be installed, its use will be specified on the installation drawings or other installation document.

4 Wires And Cables

The type and size of wire or cable will normally be specified on the installation drawings. In general, for all internal wiring, internal multicore cable to specification GS/ES0872 Type A3, 0.75mm², should be used as far as practicable. Multicore cable is available in 2, 4, 6, 10, 14, 18, 27, 36, and 48 core sizes. Not all these sizes are in common use.

If multicore cable is not suitable, then a single core wire to GS/ES0872 Type A2 (Type A1 if protected within all plastic trunking or conduit) should be used in quantity as required. See also Module 1D05 under CIRCUIT DIAGRAMS - WIRE AND CABLE SIZE AND TYPE.

Stranded wire should always have a crimp connector fitted before termination. Use:

- The correct make of relay spade for plug-in relays.
- Ring tongue connectors for all stud terminals, e.g. cable terminations, shelf relays.
- Crimped blade connectors for screw type terminations, e.g. Klippon terminal strips.
- Hook type connectors for use with RS32 and 63 fuses and track circuit fuse/links.

Check cables and wires are fixed so that they cannot be damaged by moving apparatus or contaminated by oil.

Use proper cable ties to secure wiring. (See Module 1D15).