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Level 3 Module

Signalling Installation – Electrical Wiring: Alterations: Alterations to an existing installation

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

Any work carried out on an existing installation should not affect the safe and reliable working of that installation. In addition to the installation practices described elsewhere in this Handbook, the following procedures should be undertaken.

2 Preparation

Before any alteration work is started in Relay Rooms, Locations and Signalboxes, the person in charge of the installers shall arrange for the following checks to take place on the parts of the installation affected by the work:

- a) Check that a current record of the installation exists on site. This is so that it can be referred to if there is any doubt as to which circuits are in work.
- b) Check that all equipment labels refer to the current installation. If any labels are missing on the existing installation, place temporary labels at the front and back of the equipment.
- c) Examine the existing wiring to determine if all the insulation is in good condition, and will not be stripped or broken by the work which is to be carried out. Insulation deterioration may be either: the “wet” type where the inner layer goes sticky, and the thin outer layer may split. the “dry” type where the insulation goes brittle and may crack or crumble if bent. These types of deterioration are particularly found in the inner insulation of some wires and cables to NR/L2/SIG/00005 manufactured before 1987.
- d) Examine the existing wire runs for any sharp edges which may strip new wires being run or cut into existing wires. Should any sharp edges be found, these should be dealt with before installation starts. Protect wires to be run in, and check that the existing wiring has not been damaged. If the wiring is run in trees, examine them to determine if it is safe to break into them to add or remove wires. (Special authority is required to break into trees - see instruction on WIRING TREES in Module 1D15.)
- e) Note any wires or cables which are not terminated. These should have been made safe on the completion of the previous works. However, they should be re-checked, and if they can be physically identified throughout their length they should be removed from the installation. If tightness of wiring makes this impossible, they should be cut back and insulated in an approved manner. See the later sections in this appendix on “Removal of Redundant Wiring” and “Redundant Wires that Cannot be Removed”.
- f) Become thoroughly familiar with the installation, noting any features or defects which may represent a hazard or result in personal danger. Areas which are hazardous or are not to be disturbed shall be clearly marked off as such.
- g) Carry out an earth test on all busbars that are not fitted with Earth Leakage Detectors (ELDs).

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- h) Examine all terminations to check that no conductive debris (washers, small pieces of wire, etc.) has fallen or is trapped between the terminals. With shelf type relays and lever circuit controllers take special care to check that nothing has fallen on the top of the terminals or is lodged between the detachable top and the relay itself. It may be necessary to arrange a disconnection and to remove detachable tops in order to carry out this check.
- i) If not already so fitted, all open vertical terminals should be shrouded with the correct plastic covers before installation work starts. The shrouds are available in two lengths. Make "cut-outs" in the shrouds to accommodate connecting wires.
- j) Past practice allowed 0 or 2BA terminal blocks to be wired so that some or all of the terminals acted as individual binding posts (not as linked pairs). If you find such an arrangement, mark all unlinked terminals to act as a warning that a link should not be fitted. If sufficient threaded terminal remains above the nuts, marking can be by fitting a red plastic domed nut to each terminal top. These nuts are only available in metric sizes, but the M5 size fits 2BA terminals and the M6 fits 0BA. The catalogue short description for these nuts is: NUT DOME PLASTIC M5 2BA (or M6 0BA) TERMA. As an alternative, or if the domed nuts cannot be fitted, a red plastic angle strip is available in several different lengths for fixing under the terminal nuts. If the nuts and strips are not suitable or not available, fix wooden or plastic battens between terminal pairs or mark individual terminals with red insulation tape.

The above checks apply to any item of equipment which has safety signalling circuits applied to it. This includes all types of relays, circuit controllers and terminal panels. In the event of any difficulty, reference should be made to the Supervisor.

3 Faulty Insulation And Sharp Edges

If checks (c) or (d) above reveal faults, it may be that the situation is serious enough to prevent the new wiring being accommodated in the existing wire runs. The state of the existing wiring may be such that the insulation could become unsafe if wires are run adjacent to them. In these cases it will be necessary to construct supplementary wiring trays. These should be constructed entirely of an insulating material. All bolts which are exposed in the wiring trays shall be of nylon. (Steel wiring trays are no longer considered suitable).

If running single wires in an existing steel tray is unavoidable, then the wire shall be Type A2, which has much more substantial insulation.

4 Earth Faults

If an earth potential is found when testing as in (g) above, and it cannot readily be traced, then the supervisor should be notified. The supervisor should make the necessary arrangements with the local maintenance supervisor to have the earth traced and removed. If the installation is a relay room, a record of the earth test shall be entered in the earth test or occurrence book. If the installation is a location, a note of the test figures should be made in the installer's own log book.

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5 Earth Tests

If permanent continuous earth leakage detectors are not fitted, carry out a further earth test towards the end of each shift's work. Its purpose is to check that the work done on that shift has not resulted in the application of an earth fault. If an earth fault is found, then it should be relatively easy to isolate and rectify. The results of this test should also be recorded.

A description of how to carry out an earth test is given in NR/L3/SIG//11171, Maintenance of Signalling Circuit Insulation.

6 Information To Others

Before work commences the Maintenance Supervisor and Fault Control should be informed of the extent and programme of the work.

At the start of each shift's work, the installer in charge shall inform the signaller at the controlling signalbox, or fault control (where it exists), that the work is in progress, its likely duration, and how the installer may be contacted.

When you leave the site unattended during alteration work (e.g. overnight or at weekends), the installation drawings shall be left in a position where the maintenance staff can refer to them if necessary.

You shall at all times leave the work place tidy, and not block the maintenance technician's access to equipment in operational use.

7 Identification And Labelling Of New Equipment

The positions of any new equipment should be clearly labelled (both front and rear if appropriate) before the equipment is actually fixed.

Label both front and rear of the racks of plug-in relays with relay names. Once labelled, a relay should always be referred to by its name rather than rack position. This avoids confusion as to which side of the rack is being viewed.

8 Labelling Of Equipment And Wiring To Be Removed

Equipment due to be removed during an alteration is to be marked with a green paper label, or green paint or green or green/yellow tape - preferably in the form of a cross.

Wiring due to be removed during an alteration is to be marked with a green paper label, or green or green/yellow tape in the form of a flag marker.

If equipment or wiring is to be removed or recovered in stages, each stage will be allocated a colour which will be indicated on the installation diagrams. In addition to the green or green/yellow marking, the equipment or wiring should be marked with the stage colour in tape or paint.