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Level 2

Signalling Power Distribution Diagrams

Module A Requirements for Technical Content of Each
Type of Schematic

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Reference documentation

BS 7671	Requirements for electrical installations
NR/L2/ELP/27311	Engineering Assurance Requirements for Design and Implementation of Electrical Power Engineering Infrastructure Projects
NR/L2/SIG/11201	Signalling Design Handbook
NR/L2/SIG/30050	Signalling Power Circuit Principles
NR/L3/ELP/27406	Engineering Deliverable Requirements for Electrical Power Asset Design
NR/L2/SIGELP/27410	Specification for Class II Based Signalling Power Distribution Systems
NR/L2/SIGELP/27418	Design, Installation and Testing of Earthing in Signalling Power Systems
NR/SP/ELP/27243	Specification for Signalling Power Supplies

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1 Scope

This module sets out the technical content for each type of signalling power supply network drawings and associated documentation.

NOTE 1: Abridged requirements from NR/L2/SIG/11201 are replicated in this module, so that both sides of the functional interface, and the interface itself, can be managed seamlessly.

For signalling power supply network drawings, engineering design should include:

- Signalling power network map to describe the network topology;
NOTE 2: This standard does not cover detailed or comprehensive requirements for the database-driven map of network topology, which includes a signalling power distribution layer. This will be covered in a future update of the standard.
- Signalling power facilities block diagram, showing principal relationships and key facilities;
- Signalling power distribution schematic (SPDS), a single line diagram for each power source to enable safe isolation.

Additional signalling documentation, not covered in this standard, may be required to interface to the signalling power distribution network documentation, including:

- Cable route plans and buried cable charts;
- Cable schematic plans and cable core plans;
- Location area plans;
- A set of wiring diagrams for each functional supply point (FSP), including cubicle and/or rack layouts;
- Mechanical drawings and ground layout plans, as necessary.

NOTE 3: At the next opportunity (e.g. the next project), any signalling power distribution cables should be removed from the signalling cable schematic plan and all their details incorporated into the signalling power distribution schematic instead. A typical drawing is given in Module B.

NOTE 4: FSP diagrams including where auto reconfigurations systems are applied should generally follow signalling practice to facilitate incorporation into signal location documentation.

NOTE 5: Further details of such signalling documentation are given in NR/L2/SIG/11201-Mod A2.

Additional electrical power documentation, not covered in this standard, may be required to interface to the signalling power distribution network documentation, including:

- Site layout plans (general arrangement drawings);
- Cable schematic plans and cable route plans;
- A set of wiring diagrams for each principal supply point (PSP), including cubicle and/or profile layouts;
- Earthing and bonding details;
- Details of alarms and remote condition monitoring;
- Reports and strategies, including protection, earthing and bonding, electrical calculations and staging.

NOTE 6: PSP diagrams will generally follow electrical power practice, except when incorporated into signalbox or interlocking documentation when they should follow signalling practice.

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NOTE 7: Further details of such electrical power documentation are given in NR/L3/ELP/27406.

NOTE 8: The examples shown in figures 1 to 4 are typical and should not be taken to imply any particular technical requirement.

2 Grouping of engineering design

2.1 Geographical division

Engineering details shall be geographically grouped to the controlling signal box, interlocking, substation or PSP, with separate index sheet(s) for each group.

NOTE 1: See Figures 2a and 4a for examples of index sheets.

A single approval and issues record (AIR) sheet shall be provided for each geographical group of engineering design associated with a single alteration.

NOTE 2: See Figure 1 for an example of an AIR sheet for a project alteration. AIR sheet procedures are given in Module F.

Where applicable, engineering details shall be allocated to a particular equipment housing (or suite of apparatus cases identified as a single lineside location), together with the lineside equipment directly fed.

Longitudinal details, such as signalling power schematics, location area plans and cable plans, shall be subdivided at interlocking boundaries.

Where a substation or PSP supplies more than one signalbox area:

- One signalbox, ideally the one in whose area the substation or PSP is located, shall display the primary alarms and indications for the power network;
- The signalling power schematic and associated documentation shall be split at the boundary, where practicable;
- Each part shall bear the identity of the signalbox and interlocking in whose area it is located;
- Each part shall be cross-referenced, but not duplicated, on the adjacent part;
- Site records shall be held at the interlocking, substation or PSP to which they are assigned, but, where necessary to enable safe isolations, copies of the relevant records shall be provided at both interlockings.

NOTE 3: In such cases, a note should be added to the records stating where duplicate site copies are held.

NOTE 4: This will enable engineering records to be readily identified and retrieved from the National Records Group. It will also allow the version control to be aligned between disciplines.

NOTE 5: See Module F for obtaining signalbox identities.

NOTE 6: For production purposes only, proposal schematics and associated engineering design may be combined with those for adjacent signal boxes, provided that the engineering records are arranged to be divided at the appropriate boundaries.

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2.2 Grouping by hierarchy of drawing types

The hierarchy of documentation covered by this standard is divided into consecutive groups, each of which is required to be produced before proceeding to the next group.

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Figure 1 – Typical AIR sheet

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2.2.1 Signalling input

Signalling load and location information shall be obtained as an input to the design of the signalling power supply distribution network.

NOTE 1: It is preferable for a controlled copy of the location area plan to be used to obtain this information, instead of providing a separate signalling power facilities diagram, so as to be aware of any subsequent signalling changes. See Appendix A for details.

NOTE 2: Requirements for location area plans are given in NR/L2/SIG/11201-Mod A2.

NOTE 3: Requirements for signalling power facilities diagrams are given in section 3.2 of this module.

2.2.2 Signalling power distribution schematic (and other proposal drawings)

A power schematic (or signalling power facilities diagram) shall be produced from the signalling input, as a proposal drawing for the design of the signalling power supply distribution network. The level of detail shall be increased as the project progresses, from a proposal drawing to a detailed signalling power distribution schematic.

After commissioning, the schematic shall be updated and maintained for record purposes.

NOTE 1: Requirements for signalling power distribution schematics are given in section 3.3 of this module.

NOTE 2: At the next opportunity (e.g. the next project), any signalling power distribution cables should be removed from the signalling cable schematic plan and all their details incorporated into the signalling power distribution schematic instead. A typical drawing is given in Module B.

2.2.3 Detailed design (both electrical power and signalling)

Using the detailed schematic, the detailed design of the signalling power supply distribution network shall be produced with an appropriate level of detail for construction purposes.

A set of wiring diagrams shall be produced for each equipment housing.

After commissioning, the engineering design shall be updated and maintained for record purposes.

NOTE 1: PSP diagrams will generally follow electrical power practice, except when incorporated into signalbox / interlocking documentation when they should follow signalling practice.

NOTE 2: Further details of electrical power documentation are given in NR/L3/ELP/27406/MOD E.

NOTE 3: FSP diagrams should generally follow signalling practice to facilitate incorporation into signal location documentation.

NOTE 4: Further details of signalling documentation are given in NR/L2/SIG/11201-Mod A2.