

**SPOORNET**  
A division of Transnet Limited

**INFRASTRUCTURE (SIGNALS)**

**STANDARD SPECIFICATION  
FOR  
DOCUMENTATION FOR SIGNALS EQUIPMENT**

**NOTE:** This specification replaces CSE-52 of February 1993.

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## 1 SCOPE

### 1.1 Identification.

The subject of this specification is documentation which must be supplied with electrical, electronic or power equipment supplied to Infrastructure (Signals), excluding equipment of which the design is fully owned by Spoornet.

### 1.2 Item overview.

All electrical, electronic and power equipment and systems delivered in assembled form must be accompanied by a full set of documentation to facilitate installation, commissioning, operation and maintenance. This documentation includes operating manuals, maintenance manuals, installation instructions and complete technical descriptions.

Components of the equipment and systems (such as printed circuit cards and sub-assemblies) which may be ordered and delivered separately are not subject to this specification, provided that their details are contained in the documentation for their host equipment or system.

Proprietary equipment, such as personal computers and non-specific test equipment, are not subject to this specification.

### 1.3 Document overview.

This specification serves to establish the minimum requirements for documentation which must accompany all relevant equipment delivered. This specification replaces Spoornet specification no. CSE-52 of February 1993.

## 2 APPLICABLE DOCUMENTS

### 2.1 Integrated documents.

Spoornet (Infrastructure) (Signals) specification CSE-1152-001, category D48, latest issue: "Preparation of Signalling Plans and Diagrams".

### 2.2 References.

Spoornet (Infrastructure) (Signals) specification CSE-52, February 1993: replaced by this specification.

## 3 TYPES OF DOCUMENTATION

### 3.1 Technical description.

A detailed technical description of the equipment and all its modules shall be supplied. It shall be written on a level which a technician-trained (T3) technician with limited experience can comprehend. It shall include:

- (1) A brief overview of the equipment and a description of the requirements which it fulfils.
- (2) A data sheet containing detail on all critical parameters of the equipment, e.g. inputs, outputs, power consumption, dimensions, etc..
- (3) Detailed description of the equipment and all its modules, including block diagrams.
- (4) Detailed description of how the equipment works.
- (5) A complete set of drawings, as specified below (section 0).
- (6) A complete set of component lists, as specified below (section 0).

3.2 **Installation manual.**

Where appropriate, a manual containing all detail required for installation, set-up and commissioning of the equipment shall be supplied.

3.3 **Operating manual.**

If the equipment is manually operated, a manual describing in detail the method of operation shall be supplied. It shall be written on a level which the intended operator can comprehend.

3.4 **Maintenance manual.**

A manual describing routine maintenance, fault-finding detail and workshop repairs shall be supplied. It shall be concise and well indexed. It shall include:

- (1) **Maintenance:** Full detail on procedures and required tools for routine maintenance. This section shall be written on a level which the lowest skilled person who can be expected to maintain the equipment can comprehend. A schedule of recommended regularity of maintenance shall be included.
- (2) **Fault-finding:** Procedures and flowcharts to guide first-line fault-finding. The objective shall be to get the equipment back in working order in minimum time, typically on a card or module replacement basis. This section shall be written on a level which an engineering technician with limited experience can comprehend.
- (3) **Workshop repairs:** Procedures for tracing faults down to component level. Set-up and adjustment routines after component or module replacement. Operation and description of special test rigs, if applicable. Safety precautions, if applicable. Special attention must be given to providing all the necessary reference voltage levels, waveforms, timing diagrams, etc.. The objective of this section shall be to repair and test the system or module in such a way that it is guaranteed to work once installed in the equipment. This section shall be written on a level which an experienced technician-trained (T3) technician can comprehend.

It is recommended that each of the three sections should be separately bound and indexed.

3.5 **Software manual.**

Where applicable, a manual containing comprehensive detail on all software used in the equipment shall be provided. It shall include detail on software architecture, comprehensive flowcharts, complete detail on all software modules and items, timing diagrams, detail on resource utilisation, compiler detail and a complete source code listing.

4 **IDENTIFICATION AND CONFIGURATION CONTROL**

4.1 **Identification of documents.**

Every manual shall have with a document number, which shall appear on the front page. The issue number and issue date shall also appear on the front page.

4.2 **Configuration control.**

- (1) Whenever the document is altered in any way whatsoever, the issue number shall likewise be updated.
- (2) The range of serial numbers of the equipment to which the document is applicable shall be clearly documented in the document, preferably on the front page or second

page.

- (3) All units of the equipment supplied shall be exactly in accordance with the documentation, as approved. No alterations to the design, layout or any component shall be made without written approval from the duly authorised person in Spooronet.

## 5 DOCUMENT FORMAT

### 5.1 Front page.

The following shall appear on the front page of every document:

- (1) Name of the manufacturer of the equipment.
- (2) Document number, issue number and date of issue.
- (3) Type of equipment.
- (4) Type of document, e.g. "technical description" or "maintenance manual".
- (5) The number of the relevant Spooronet specification.

### 5.2 List of contents.

A comprehensive list of contents of the document shall appear either on the front page or on one of the subsequent pages, but before the start of the text. The number of levels listed depends on the type and subject of the document, but shall be adequate for speedy tracing of the required topic.

### 5.3 List of figures.

It is recommended that a list of figures be provided immediately after the list of contents.

### 5.4 Data to appear on every page.

The document number, issue number and page number shall appear on every page of the document, preferably as headers and/or footers.

## 6 DRAWINGS

### 6.1 Compliance with specification.

Where applicable, drawings shall comply with Spooronet (Infrastructure) (Signals) specification no. CSE-1152-001, category D48, latest issue.

### 6.2 Types of drawings.

The following drawings shall be supplied, if applicable:

- (1) Physical layouts on which all cabinet dimensions, as well as the positioning of all main components such as transformers, inductors, capacitors, diodes, contactors, switches, fuses, printed circuit boards, plug-in modules, etc. are shown to scale.
- (2) A block diagram by means of which the overall operation of the equipment is explained.
- (3) The circuit diagram of each printed circuit board or module, on which each component is clearly labelled, together with value, type number, etc..
- (4) Physical layout drawings (to scale) of each printed circuit board or module, on which each component is clearly labelled in agreement with the circuit diagram.
- (5) A detailed overall circuit diagram on which each of the modules is clearly shown and labelled, as well as any other components such as transformers, contactors, etc., together with the details of all interconnections.

### 6.3 Title blocks.

The title blocks of all drawings shall be positioned on the bottom right-hand side of the sheet, with provision for sheet number, issue number, and date and number of amendment.

6.4 **Reference grid.**

It is recommended that a reference grid should be used on drawings, especially for circuit diagrams and layout drawings, in order to easily locate and cross-reference components, or refer to them in the description.

6.5 **Standards.**

All components, especially digital integrated circuits, shall be drawn according to current American standard practice. The naming of parts and components, e.g. signal lines, shall be consistent throughout the documentation.

6.6 **Unused sections.**

Unused outputs and sections of integrated circuits shall be clearly marked as such.

6.7 **Reference data.**

Reference voltages and waveforms, where applicable, shall be clearly indicated and labelled on diagrams.

6.8 **Paper size.**

Drawings shall preferably be printed on A3 or A4 size paper.

6.9 **Position in document.**

Drawings not in text shall be positioned at the back of the document as appendices.

## 7 **COMPONENT LISTS**

7.1 **List requirements.**

Component lists covering every component used in the equipment shall be supplied. Components in each list shall be grouped together (e.g. resistors, capacitors, transistors). The following lists are required:

- (1) An overall list of all major components, e.g. transformers and contactors. In this list printed circuit boards or modules shall be regarded as major components, and shall be listed as such.
- (2) A separate list for every printed circuit board or module, covering all the components on the board or module.

7.2 **Component detail.**

The following detail per component shall be provided in tabular form:

- (1) Component number, as used in the circuit diagrams and descriptions.
- (2) Type of component (description), e.g. resistor, capacitor or transistor.
- (3) Component's value and rating. Manufacturer's reference number in the case of semi-conductors.
- (4) Tolerances, where applicable.
- (5) Manufacturer's name, if single sourced.
- (6) Names of at least two suppliers in RSA.

## 8 **QUANTITY AND PRESENTATION**

8.1 **Quantity.**

- (1) One complete set of documentation shall be supplied to the office of the Chief Engineer (Infrastructure) (Signals).
- (2) One complete set of documentation shall be supplied to the office of the Regional Signal Manager in every region where the equipment is installed.
- (3) One complete set of documentation shall be supplied to every site where the equipment is installed.

#### 8.2 **Presentation medium.**

- (1) All documentation delivered as specified in section 0 shall be paper copies.
- (2) For equipment which appears on an approved list of Infrastructure (Signals), a complete set of documentation in reproducible form shall be supplied in addition to the above-mentioned hard copy. Magnetic media in the form of 5,25" floppy disks (360kB or 1,2MB) or 3,5" stiffy disks (720kB or 1,44MB), in files fully compatible with software packages approved by the office of the Chief Engineer (Infrastructure) (Signals), are preferable. Transparent sepias are also acceptable.

#### 8.3 **Delivery.**

- (1) The Chief Engineer's set of documentation shall be posted or handed to the contract engineer in head office, if applicable, before final payment; alternatively to the Chief Engineer (Infrastructure) (Signals).
- (2) The Regional Signal Manager's set of documentation shall be handed to the Regional Signal Manager or his representative before completion of installation.
- (3) The site copy of the set of documentation shall be delivered with the equipment.
- (4) Relevant documentation shall be supplied to Signals' electronic repair workshop.

#### 8.4 **Format of hard copy.**

- (1) The text shall be printed on A4 size paper.
- (2) Drawings shall be bound as appendices with the text.
- (3) Separate documents of the same equipment shall either be bound separately, or shall be compiled in a suitable file (3 or 4 rings), with documents separated by suitable dividers. Should the documents be compiled in a file, a title page and list of documents shall be provided.

### 9 **COPYRIGHT**

Spoornet assumes the right, despite copyright restrictions mentioned in the documentation, to reproduce or copy as it sees fit, any part or the whole of the documentation, solely for the purpose of training and/or operational efficiency. This right shall be deemed to be in force, unless written advice to the contrary is received at the time of tendering.

### 10 **PROPRIETARY SOFTWARE PACKAGES**

Where a licence fee is paid by the supplier on behalf of Spoornet for the supply of proprietary software packages necessary for the operation of the system or equipment, the supplier shall provide all original documentation including source magnetic media to the Regional Signal Manager.