



A Division of Transnet SOC Limited

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# **RAIL NETWORK**

## **ELECTRICAL DEPARTMENT**

### **SPECIFICATION**

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## **LOOP IMPEDANCE/ PROSPECTIVE SHORT CIRCUIT (PSC) CURRENT/LOAD TESTER**

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**CONTENTS**

1. GENERAL REQUIREMENTS .....3

2. OPERATING CONDITIONS.....3

3. PERFORMANCE REQUIREMENTS .....3

4. TECHNICAL REQUIREMENTS .....3

4.1. General Description .....3

4.2. Operational requirements.....4

4.3. Power supply requirements.....4

4.4. Measuring Capability .....4

4.5. Preferred mass and housing .....5

4.6. Additional requirements .....5

4.7. Data Plate.....5

5. COMPLIANCE AND CERTIFICATION .....5

6. TECHNICAL EVALUATION .....6

## **1. GENERAL REQUIREMENTS**

- 1.1. This specification outlines the requirements for the supply and delivery of a single and 3 phase Loop Tester (Loop/PSC/Load) which is designed to measure earth fault loop impedance and determine prospective fault currents.
- 1.2. The Loop Tester (Loop/PSC/Load) shall be ergonomically designed for maximum operator productivity and safety.
- 1.3. These instruments shall be of robust nature and designed to withstand the rough conditions of the railway environment. Proper casing or carry bag shall be supplied with each instrument.

## **2. OPERATING CONDITIONS**

- 2.1. Loop Tester must be capable of operating under the following environmental conditions:

Altitudes: From sea level to 2000m above sea level.

Relative humidity: 10% to 95%

Atmospheric conditions: Must operate in environments ranging from dry and dusty to humid and saline.

Ambient air temperatures: -20° C to 50° C. (daily average +30 °C)

## **3. PERFORMANCE REQUIREMENTS**

- 3.1. The actual design and service life of a single and 3 phase Loop Tester (Loop/PSC/Load) is to be stated.
- 3.2. The Loop Tester (Loop/PSC/Load) should provide high-performance, accurate testing of earth fault loop impedance and prospective fault currents in both single-phase and three-phase systems. It features a 400 A capability, a durable design, and a long-lasting battery.

## **4. TECHNICAL REQUIREMENTS**

### **4.1. General Description**

- 4.1.1. A heavy duty, portable and digital display single phase and 3 phase Loop Tester (Loop/PSC/Load) Capable of testing low voltage installations.
- 4.1.2. The Loop Tester should include high-quality, insulated test leads for both single-phase and three-phase measurements, with the latter featuring color-coded connectors for easy identification.

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- 4.1.3. A robust earth lead is required for connection to the earth point during testing.
  - 4.1.4. The test probes should be durable, with sharp tips to ensure reliable contact with test points, and the kit must also include large, insulated crocodile clips for secure attachment to conductors or terminals during testing.
  - 4.1.5. The design of a single and 3 phase Loop Tester (Loop/PSC/Load) is to be that of the manufacturer but must be of robust construction in order to meet sustained heavy duty demands, yet it must be light and easy handled by one operator.
  - 4.1.6. The device will be acceptable in standard factory production finish and colour. Details to be furnished.

#### **4.2. Operational requirements**

- 4.2.1. The device should include a built-in, rechargeable battery pack designed for long-lasting performance, capable of powering the tester for extended periods. Additionally, a compatible AC charger, suitable for local voltage (230-240V AC), should be provided for recharging the battery.
- 4.2.2. It should be capable of testing circuit breakers rated up to 400 A (20 kA and more) for both single-phase and three-phase systems.
- 4.2.3. It must be equipped a large digital LCD that shows detailed measurement data.
- 4.2.4. It must be supplied with all power cables and required test leads.
- 4.2.5. It should have a robust enclosure and all components shall be housed within one unit.
- 4.2.6. The device should feature an intuitive interface with easy-to-understand controls, allowing users to perform tests quickly and efficiently.

#### **4.3. Power supply requirements**

- 4.3.1. Voltage: 230VAC – 240VAC
- 4.3.2. Voltage variation:  $\pm 10\%$
- 4.3.3. Frequency: 50Hz
- 4.3.4. Frequency variation:  $\pm 3\%$

#### **4.4. Measuring Capability**

##### **4.4.1. Earth Fault Loop Impedance**

- 4.4.1.1. Single-Phase Range: 0.01  $\Omega$  to 2000  $\Omega$
- 4.4.1.2. Three-Phase Range: 0.01  $\Omega$  to 2000  $\Omega$
- 4.4.1.3. Resolution: 0.01  $\Omega$  for precise measurements
- 4.4.1.4. Accuracy:  $\pm 2\%$  or better

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**4.4.2. Prospective Short Circuit (PSC) Current**

- 4.4.2.1. Single-Phase Range: 0.1 A to 20 kA
- 4.4.2.2. Three-Phase Range: 0.1 A to 50 kA
- 4.4.2.3. Resolution: 0.1 A for accurate readings
- 4.4.2.4. Accuracy:  $\pm 5\%$  or better

**4.4.3. Voltage Measurements**

- 4.4.3.1. Single-Phase Range: (Phase to earth) 0-240 V AC
- 4.4.3.2. Three-Phase Range: 0 to 400 V AC (Line-to-Line)
- 4.4.3.3. Accuracy:  $\pm 2\% \pm 3$  V or better

**4.5. Preferred mass and housing**

- 4.5.1. The mass of the unit shall not exceed 10 kg.
- 4.5.2. The housing for the units making up this device shall be of robust construction to sustain heavy duty demands under the service conditions as stated in clause 2 of this specification.

**4.6. Additional requirements**

- 4.6.1. An operators' handbook, calibration chart and spare parts list must be supplied with each device in order to ensure that the device is operated in accordance with the manufacturer's instructions.
- 4.6.2. All devices and equipment must be supplied complete with essential tools and consumable items as necessary. Details to be furnished for any tools required.

**4.7. Data Plate**

- 4.7.1. The Loop Tester (Loop/PSC/Load) must come with a data plate.
- 4.7.2. The brand and model number of the insulation tester must be clearly shown.
- 4.7.3. The actual weight in kilograms (kg) of the insulation tester must be shown on the machine.
- 4.7.4. The actual dimensions of the insulation tester must be indicated in millimetres (mm).

**5. COMPLIANCE AND CERTIFICATION**

- 5.1. The Loop Tester (Loop/PSC/Load) must comply with relevant international and local standards.
- 5.2. It must be supplied with calibration certificates traceable to national standards.

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- 5.3. The instrument is to be guaranteed for a minimum period of 12 months (1 year) against faulty material and workmanship-fair wear and tear excluded. Full details of guarantee are to be submitted.

**6. TECHNICAL EVALUATION**

- 6.1. The Loop Tester (Loop/PSC/Load) will be subject to a technical evaluation. The final decision will, amongst other factors, be based on these findings of this evaluation.
- 6.2. The information as requested by the various clauses in this specification must be supplied in the form of technical data, pamphlets and/or drawings. Failure to comply with this requirement may result in the offer being overlooked.
- 6.3. All bidders must submit data sheets with clear images of the instruments and their accessories.
- 6.4. Data sheets must detail the relevant technical, operational, functional, and other specifications as indicated in this document. Failure to provide detailed data sheets will result in disqualification.