

GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS



सत्यमेव जयते

TI/STR/001(Revision-3)

(Issued :-----)

Schedule of Technical Requirements

For

Approval of Vendors

For supply of protective Relays for 25 kV/ 2x25 kV AC Traction  
System of Indian Railways.

	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURES			
DATE			
DESIGNATION	SSE/PR	DTI-3	PED/TI

ISSUED BY

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1. SCOPE

This schedule covers the technical requirement to assess the manufacturing capability of vendor of static/ numerical/ Electro Mechanical Protection Relays for use in 25 kV/ 2x25 kV single phase AC Traction System on Indian Railways.

The Schedule of technical requirement shall be read in conjunction with RDSO's latest specifications pertaining to Relays.

2. GENERAL, INFRASTRUCTURE AND MANUFACTURING FAILITIES

2.1. The relays should be indigenous i.e. all the manufacturing activities including designing shall be done in India to fulfil the concept of 'Make in India' if the applying firm is established in India.

2.2. The firm should have adequate covered accommodation for the purpose of effective storage of inward raw material, and the finished product awaiting dispatch and prototype/ routine inspection and testing. The firm should have an effective quality control system to monitor quality control of the

2.2.1. Inward raw material

2.2.2. Stage inspection at various assembly stages.

2.2.3. Inspection of the final assembled product to conform adherence to the requirements of the specification.

2.3. The firm should have a proper drawing office to support the design/ development of product. The company should have a clean and pollution free environment, should be taking adequate safety precautions during the production. The company must have items like fire extinguishers, safety warning board, shock treatment charts and medical first aid kit in their premises.

2.4. The relations with the workers should be harmonious and regular employee training programs should be scheduled by the management for regular upgradation of the knowledge and skills of the employees.

3. MACHNINERY AND PLANT REQUIREMENT

The following machinery and plant of suitable capacity should be available at the firm's premises for the manufacturing of the protective relays:

SN	Name of M&P	Required for activity
i.	a. Wave soldering machine or automatic/ programmable soldering machine. b. Lead tinning bath.	For components assembly on PCB
ii.	a. Diesel generating set. b. Air-conditioned area for assembly and testing.	Basic requirements for relay manufacturing and testing
iii.	a. Temperature controlled soldering machines. b. Temperature controlled oven c. Crimping tool for lugs etc. d. PCB stuffing stands e. Electronic equipment assembly tools such as nose pliers, cutters, wire strippers. f. Mechanical working tools such as screw driver, spanners set etc.	

	<ul style="list-style-type: none"> <li>g. Antistatic (ESD) wrist straps.</li> <li>h. Bench drilling machines and portable drilling machines.</li> <li>i. Static free soldering environment</li> <li>j. Solder Fume extractor</li> </ul>	
iv.	<ul style="list-style-type: none"> <li>a. PC for software program execution and</li> <li>b. AutoCAD software</li> <li>c. Solid works software</li> <li>d. Coloured Printer</li> </ul>	Relay programming and preparation of relay drawing.

The activity at para 3.0(i) above may be outsourced in India in case the applying firm is established in India, subject to stringent quality control by manufacturer. The manufacturer has to provide information regarding this in the Quality Assurance Plan (to be approved by RDSO) covering full details of activity being outsourced indicating control over quality of inward, in process and finished material as outcome of the said process.

#### 4. QUALITY CONTROL REQUIREMENTS

- 4.1. The firm should have acquired ISO-9000-2015 or latest certification for the product broadly for which approval is being sought.
- 4.2. The system of easy traceability of the product from the raw-material stage to the finished product stage should be available.
- 4.3. Quality Assurance Plan (QAP) for the product in accordance with RDSO's guideline should be available. QAP shall be approved by RDSO.
- 4.4. The firm should have a system of monitoring customer complaints in the format similar to the format given in RDSO's Guideline for preparing QAP.
- 4.5. Head of the inspection / testing / quality control section must possess at least Diploma in Engineering with 5 years' experience in the relevant field.
- 4.6. System should exist for documentation of the following.
  - 4.6.1. Incoming raw material with the reference of suppliers as well as internal test.
  - 4.6.2. Details regarding stage inspection and test results.
  - 4.6.3. Details regarding the final testing and dispatch to the customer in proper packed condition.
  - 4.6.4. System for calibration of testing and measuring instruments.

#### 5. INSPECTION AND TESTING FACILITIES

The firm should have the following testing and measuring instruments/ equipment. These instruments should be calibrated with standard master instruments accountable to national physical laboratory or a similar reputed international agency. Each instrument should have a valid calibration certificate.

- i. Secondary Injection Relay testing kit with following minimum facilities:
  - a. At least 6 numbers fundamental 50 Hz sinusoidal wave current source. The capacity of each current source shall be at least 15 A. the current shall be variable in the steps of 001 A.
  - b. At least 3 numbers voltage source, the voltage shall be variable from 0 to 300 V in steps of 0.01 V.
  - c. DC output source, the voltage shall be variable from 0 to 300 in steps of 0.1V.
  - d. Capable to generate odd and even harmonics up to 13<sup>th</sup>.
  - e. Facility to mix each fundamental current source with different harmonics.
  - f. The current and voltage source shall be usable alone or simultaneously.

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- g. Manual as well as automatic testing of relays. The automatic test result shall be saved in the memory and printable.
- h. Facility to measure operating and resetting time of relays.
- i. Error of relay testing kit shall not be more than 0.2%.
- j. Phase shifting 0 to 360<sup>0</sup> in steps of 0.1<sup>0</sup> in leading and lagging phase.
- ii. Digital type Ammeter, Voltmeter, Phase Angle measurement meter, timer and frequency meter and continuity tester.
- iii. High Voltage testing equipment minimum 2 kV.
- iv. Insulation Resistance tester minimum 1000 V.
- v. Stabilized DC power supply 0 to 150 Vdc.
- vi. Digital Multi-meter.
- vii. Inductor & Rheostat of different rating used for contact breaking capacity test.
- viii. Oscilloscopes.
- ix. Digital LCR meter.
- x. Programmable IC tester.
- xi. Magnifying Lenses.
- xii. Variable AC current injection source upto 250 A.
- xiii. Digital Vernier Callipers, screw gauge, meter scale and digital thermometer.
- xiv. **Power quality Analyzer up to 200A analysing capability.**