

GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS



सत्यमेव जयते

TI/STR/002(Revision-3)

(Issued:-----)

Schedule of Technical Requirements

For

Approval of Vendors

For supply of Control & Relay Panels incorporating with 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 Control & Relay Panels incorporating with protective Relays for 25 kV/ 2x25 kV AC Traction System of Indian Railways.

- 1.1. This Schedule of technical requirement shall be read in conjunction with RDSO's latest Specifications for control & relay panels incorporated with relays No. ~~TI/SPC/PSI/PROCT/6071, TI/SPC/PSI/PROCTC/4050, TI/SPC/PSI/PROTCT/7100~~ with latest revision.

## 2. GENERAL REQUIREMNT, INFRASTRUCTURE AND MANUFACTURING FAILITIES

- 2.1. The "Make in India" Policy of Government of India shall be applicable.

2.2. The firm should have adequate covered accommodation for the purpose of effective storage of inward raw material, and the finished panels 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. MACHINERY AND PLANT REQUIREMENT

The following machinery and plant of suitable capacity should be available at the firm's premises for the manufacturing of Control & Relay Panels incorporating with protective Relays for 25 kV/ 2x25 kV AC Traction System of Indian Railways

SN	Name of M&P	Required for activity
i.	a. Power Shearing Machine b. Sheet folding machine c. High speed cutting saw d. Hydraulic press e. Bench drilling machines f. Suitable welding machine	For manufacturing of panel box
ii.	a. Stove oven. b. Powder coating facilities.	For dry powder coating on panels
iii.	a. Portable drilling machines b. Diesel generating set c. Bench Grinder d. Hand riveting machine e. Crimping tool for lugs etc.	For assembly and panel wiring

	f. Hand tools such as nose pliers, cutters, wire strippers, screwdrivers, spanners set and mallets.	
iv.	a. PC installed with <b>latest genuine licensed</b> AutoCAD software. b. Colour Printer	Preparation of drawings & <b>printing.</b>

The activity at para 3.0(i) & (ii) 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 series series of 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. 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.
  - i. Incoming raw material with the reference of suppliers as well as internal test.
  - ii. Details regarding stage inspection and test results.
  - iii. Details regarding the final testing and dispatch to the customer in proper packed condition.
  - iv. 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 2 numbers fundamental 50 Hz sinusoidal wave current source. The capacity of each current source shall be at least 30 A. the current shall be variable in the steps of 0.01 A.
  - b. At least 1 number **ac** voltage source, the voltage shall be variable from 0 to ~~250~~ **280** V in steps of 0.01 V.
  - c. DC output source, the voltage shall be variable from 0 to 250 in steps of 0.1 V.
  - 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.
  - g. Facility to measure operating and resetting time test of relays
  - h. Error of relay testing kit shall not be more than 0.2%.
  - i. Phase shifting 0 to 360<sup>o</sup> in steps of 0.1<sup>o</sup> in leading and lagging phase.

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- ii. Digital type Ammeter, Voltmeter, Phase Angle measurement meter or power factor measurement meter, timer, frequency meter and continuity tester.
- iii. High Voltage testing equipment minimum 2 kV.
- iv. Insulation Resistance tester minimum 1000 V.
- v. Stabilised DC power supply 0 to 150 Vdc.
- vi. Digital Multi-meter.
- vii. Magnifying Lenses.
- viii. High rating variable AC current injection source upto 250A
- ix. Digital thermometer
- x. Digital Vernier Callipers, screw gauge, meter scale.
- xi. KVA & KW meter

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