

TERMS OF REFERENCE (TOR)

Supply, Installation, Testing and Commissioning of One (01) 1000 kVA Distribution Transformer with 11 kV Industrial Protection Panel

1. Background

The Common Management Unit (CMU) intends to procure, install, test, commission, and energize one (01) 1000 kVA oil-immersed distribution 3 phase pole mounted transformer along with an 11 kV industrial protection panel to ensure reliable and uninterrupted electrical power supply for warehouse operations. The contractor shall complete the work in accordance with applicable IESCO standards.

2. Objective

The objective of this assignment is to supply, transport, install, test, commission, energize, and hand over one (01) 1000 kVA oil-immersed distribution transformer complete with all accessories, civil works, cable terminations, earthing system, industrial protection panel, and associated equipment in accordance with IESCO requirements and approved engineering standards.

3. Scope of Work

The contractor shall be fully responsible for providing all labor, materials, tools, equipment, transportation, supervision, testing instruments, and technical expertise necessary for successful completion of the project.

The scope shall include, but not be limited to, the following:

3.1 Supply

The contractor shall supply:

- One (01) 1000 kVA, 11KV/415, 3-phase, oil-immersed distribution transformer.
- One (01) 11 kV Industrial Protection Panel equipped with 630 Amp Vacuum Circuit Breaker (VCB).
- All transformer accessories including:
 - Conservator tank
 - Buchholz relay
 - Silica gel breather
 - Oil level indicator
 - Winding temperature indicator
 - Pressure relief device
 - Marshalling box
 - Cable boxes
 - Rating and warning plates

- HT and LT cable termination kits.
- Earthing materials.
- Copper earth electrodes and earth pits.
- Transformer oil.
- All hardware, nuts, bolts, clamps, supports, and accessories required for complete installation.

3.2 Civil Works

The contractor shall:

- Construct RCC foundation for the transformer as per size.
- Earthing pits with 30 feet depth.
- Debary clearance installation at the site.

3.3 Installation

The contractor shall carry out:

- Installation of transformer.
- Installation of protection panel.
- Installation of all accessories.

3.4 Electrical Works

The contractor shall perform:

- HV cable termination.
- LV cable termination.
- Neutral connections.
- Earthing of transformer body.
- Earthing of protection panel.
- Neutral earthing.
- Copper strip earthing.
- Interconnection between transformer and protection panel.
- Installation of danger signs and safety labels.

3.5 Testing and Commissioning

The contractor shall perform all pre-commissioning and commissioning tests including:

- Insulation Resistance (IR) Test
- Transformer Turns Ratio (TTR) Test
- Winding Resistance Test
- Oil BDV Test.
- Functional testing of protection relays
- VCB operation test

- Earth resistance test
- High Voltage testing.
- Phase sequence verification
- Protection coordination checks
- Complete functional testing prior to energization

4. Deliverables

The contractor shall submit:

- Factory Test Certificates (FAT)
- Type Test Certificates
- Routine Test Certificates
- Material Inspection Reports
- Installation Drawings
- As-Built Drawings
- Operation & Maintenance Manuals
- Warranty Certificates
- Commissioning Report
- Test Reports
- Earthing Test Report (proper boring ,copper plate earthing or copper rod earthing for transformer and protection panel.

5. Training

The contractor shall provide on-site operational and maintenance training to CMU technical staff covering:

- Safe operation
- Routine inspection
- Preventive maintenance
- Protection panel operation
- Emergency shutdown procedures

6. Warranty

The contractor shall provide a minimum **12-month warranty** from the date of successful commissioning and handover.

During the warranty period, the contractor shall replace or repair any defective equipment without any additional cost to the employer.

7. Technical Requirements

The supplied transformer shall meet the following minimum specifications:

Item	Specification
Capacity	1000 kVA
Voltage	11/0.415 kV
Frequency	50 Hz
Phase	Three Phase
Cooling	ONAN
Vector Group	Dyn11
Insulation Class	As per IEC Standards
Mounting	Outdoor
Standard	IEC / IESCO / WAPDA Standards

8. Protection Panel

The protection panel shall include:

- 11 kV, 630 Amp Vacuum Circuit Breaker (VCB)
- Over Current Protection
- Earth Fault Protection
- Digital Protection Relay
- CTs and PTs
- Trip Circuit Supervision
- Indication Lamps
- Metering Instruments
- Interlocking Arrangement
- Control Switches
- Emergency Trip

9. Standards

All equipment and workmanship shall comply with:

- IEC Standards
- IESCO Specifications
- NEPRA Regulations
- Pakistan Electrical Rules
- WAPDA Standards
- PEC Engineering Practices

10. Completion Period

The contractor shall complete the entire assignment, including supply, installation, testing, commissioning, energization, and handover, within **30 calendar days** from the date of issuance of the Purchase Order or Notice to Proceed.

11. Inspection and Acceptance

The work shall be inspected by the Employer's Representative. Final acceptance shall be subject to:

- Successful installation.
- Completion of all tests.
- Submission of all documents.
- Successful energization.
- Issuance of Completion Certificate.

12. Payment Terms

Payment shall be made upon:

- Successful completion of the work.
- Submission of all required documents.
- Successful testing and commissioning.
- Final acceptance by the CMU.

No advance payment shall be made unless specifically agreed in the contract.

13. Contractor's Responsibilities

The contractor shall:

- Ensure compliance with all applicable safety regulations.
- Arrange all tools, lifting equipment, and manpower.
- Coordinate with IESCO for approvals and energization.
- Obtain all necessary permits if required.
- Protect existing utilities and infrastructure.
- Rectify any defects during the warranty period.
- Maintain proper housekeeping at the project site.