SECTION – 2.26

Scope of work 145 kV, Centre Rotating Double Brake Isolators

1.0.0 INTRODUCTION

The servicing , revival and replacement of Motor Operated Drive Mechanism Boxes of the existing, 145 kV isolators are envisaged under this project. The broad scope outlined herein is conceptual in nature and intended to provide an overall understanding of the work involved.

The Bidder shall review the available data, site conditions, and existing system configuration, and shall accordingly carry out the required work. All activities shall be aligned with applicable standards, OEM recommendations, and best industry practices, ensuring safe, reliability, and efficient operation of the system integration with the proposed BESS.

2.0.0 SCOPE OF WORK

2.1.1 The Contractor's scope shall include complete Revival of existing 145 kV, center rotating double breaker isolators, including but not limited to inspection, servicing, refurbishment, dismantling and replacement of drive mechanism box (DMB), testing, and recommissioning.

2.1.2 The Contractor shall design (if required), supply, install, test, and commission a new Drive Mechanism Box fully compatible with isolator.

2.1.3 The scope shall be deemed to be comprehensive and inclusive of all items, materials, consumables, accessories, and activities required for safe, reliable, and continuous operation, whether or not explicitly specified in this document.

2.1.4 No additional claims shall be entertained on account of omission of any minor items essential for completeness of work.

2.1.5 Details of existing isolators

The following drawings, details, and documents are included in the tender for general reference only. These may not necessarily represent the latest "as-built" or updated status.
The Bidder shall be solely responsible for verifying the actual site conditions, type, and quantum of work prior to submission of the bid.
No additional cost or claim shall be admissible on account of any discrepancies, deviations, or inaccuracies in the drawings, documents, or information provided herein.
All available details and documents have been provided in this tender. For any additional information, the bidder shall carry out necessary site assessment.

The Bidder is advised to visit the site to familiarize themselves with the site conditions. Site visits may be arranged with prior intimation and on a mutually convenient date and time.

1. Details of supports for MOM Box
2. Details of Operating pipe support for isolators.
3. Schematic diagram of isolators.

2.1.6 List of 145 kV Isolators Revival in Scope of Bidder.

Sr	Bay	ANSI Code	Unit	Quantity	Elevation (Approx)	Amp Rating
1	Line-3	89-A	No	1	5 meter	1250 A
2		89-B	No	1	13 Meter	1250 A
3		89-C	No	1	5 Meter	1250 A
4	Line-4	89-A	No	1	5 meter	1250 A
5		89-B	No	1	13 Meter	1250 A
6		89-C	No	1	5 Meter	1250 A
7	STG-2 UT (70 MVA)	89-A	No	1	5 meter	1250 A
8		89-B	No	1	13 Meter	1250 A
9		89-C	No	1	5 Meter	1250 A
10	Bus coupler	89-A	No	1	5 meter	2000 A
11		89-B	No	1	13 Meter	2000 A
12	Bus-A + Bus-B - PT Bay	89-A	No	1	5 meter	1250 A
13		89-B	No	1	13 Meter	1250 A
Total Number of Isolators				**13**		

3.0.0 CODES AND STANDARDS

3.1. The retrofit (DM Box), refurbishment, testing and recommissioning of the existing 145 kV isolators shall comply with the latest editions of the following IS / IEC standards, as applicable to maintenance, life extension and revival works. Some of the applicable standards are listed below.

IEC 62271-102	High-voltage switchgear and control gear - Part 102: Alternating current disconnectors and earthing switches
IEC 62271-1	High-voltage switchgear and control gear - Part 1: Common specifications
IS 9921 (Part 1 & Part 2)	Alternating Current Disconnectors (Isolators) and Earthing Switches
IEC 60529 / IS 2147	Degrees of Protection (IP Code)

IEC 60947 / IS 13947	Low-voltage switchgear and control gear
IS 325	Three-phase induction motors
IS 3043	Code of practice of earthing
IS 2629	Recommended practice for hot-dip galvanizing

4.0.0 DETAILED SCOPE OF WORK

4.1.1 Operating Mechanism and Control

a) The mechanism box shall house the operating mechanism, electrical, controls, monitoring devices and all other accessories.

b) The box shall be IP55 with gasketed weather-The operating mechanism of the disconnect switch and earth switch shall be motor operated type, with electrical control from remote as well as local position.

c) The mechanism shall also have provision for manual operation with detachable handle. The arrangement shall be such that one operator may be able to operate without undue efforts.(Handle shall be supplied for each Drive Mechanism Box and Two numbers spare)

d) Interlock shall be provided such that electrical power to the motor is cut off on insertion of manual operating handle.

e) The mechanism of disconnect switch shall be so designed that its blade(s) are in positive continuous control throughout the cycle of operation.

f) Visible indication of switch position and means to prevent false indication if the mechanism fails to complete the operation shall be provided.

g) Starters, relays, limit switches shall be provided as required for operation, indication and interlocks. Electromagnetic brakes and adjustable mechanical stop shall be provided to limit over-travel.

h) The bidder shall offer, motor operated switches having padlock arrangement on both ON' and 'OFF' positions.

i) Control cabinet/operating mech. box shall conform to requirements stipulated elsewhere in the specification and IS:5039/IS 8623/IEC 439 as applicable.

j) Spare terminals equal in number of 20% active terminals shall be furnished.

4.1.2 Wiring , Terminal Block, Glands and Lugs.

a) Wiring shall be complete in all respects to ensure proper functioning of the control, protection, monitoring and interlocking schemes.

b) Wiring shall be done with flexible 1100V grade, class-5, PVC insulated switchboard wires with Braided stranded copper conductor of 2.5 mm2.

c) Each wire shall be identified at both ends with permanent markers bearing wire numbers as per Bidder's wiring diagram.

d) Wire terminations shall be done with crimping type connectors with insulating sleeves. Wires shall not be spliced between terminals.

e) All spare contacts of relays, push buttons, auxiliary switches etc. shall be wired up to the terminal blocks in the mechanism box.

f) Terminal Blocks shall be stud type only (Screw Driver Operated)

g) Cables and wiring shall be terminated with ring type lugs only. For power circuit long barrel heavy duty.

h) Gland shall be of brass , double compression, heavy duty and nickel plated.

4.1.3 Dismantling, Inspection and Assessment

a. Detailed inspection and recording of:
   i. Main contacts (fixed and moving), including **silver plating condition.**
   ii. Arcing horns and contact fingers
   iii. Rotating columns, bearings, bushes, shafts
   iv. Operating pipes, couplers, and universal joints
   v. Insulator stacks (cracks, puncture, contamination)

b. Measurement and documentation of:
   i. Contact wear
   ii. Misalignment
   iii. Mechanical play/backlash

   A **joint inspection report** (Contractor + Owner + Consultant) shall be prepared before proceeding.

4.1.4 Servicing, Repair and Replacement

a) Thorough cleaning using approved & non-damaging methods.
b) Removal of carbon deposits, oxidation, and hardened grease.
c) Application of **OEM-approved contact grease for silver-plated contacts**

The following shall be **replaced mandatorily**:

d) Damaged/worn:
   i. Bearings, bushes, pins
   ii. Arcing horns

e) Contacts shall be replaced if:
   i. Silver plating is worn beyond acceptable limits
   ii. Contact resistance exceeds specified limits

4.1.5 Insulator Works

a) Cleaning using approved methods ensuring no damage to glaze.
b) Replacement of defective insulators (Scope of Supply: Owner)
c) Torque tightening as per OEM recommendations

4.1.6 Alignment, Setting and Synchronization

a) Precise alignment of all three phases
b) Adjustment of:
   i. Contact pressure
   ii. Contact wipe and travel
   iii. End stops and limits
c) Acceptance Criteria:
   i. Simultaneous operation of all phases
   ii. No undue vibration, jerk, or misalignment

4.1.7 Lubrication

a) Complete removal of old grease
b) Application of **OEM-recommended lubricant suitable for EHV outdoor conditions**
c) Lubrication points shall be clearly identified and documented.

4.1.8 Testing and Acceptance Criteria

The following tests shall be carried out and recorded:

a. Mechanical Operation
   i. Minimum **10 complete open-close cycles**
   ii. Smooth, uniform, and synchronous operation

b. Contact Resistance Test
   i. Using micro-ohm meter (100 Amp)
   ii. All three phases shall have comparable values
   iii. Deviation between phases shall not exceed ±20%

c. Functional Checks

i. Limit switches (repeatability check)
ii. Torque Switches
iii. Auxiliary contacts
iv. Mechanical interlocks
v. Position indication (local & remote, if applicable)

d. Visual & Functional Inspection

i. No abnormal noise, looseness, or heating tendency

4.1.9 Earthing and Safety

a) All earthing connections shall be checked, cleaned, and tightened.
b) Continuity of earthing shall be ensured.
c) Earthing switch (for both Line Feeders) shall be checked for proper operation and interlocking

4.1.10 Final Commissioning

a) Final tightening and inspection
b) Trial operation under no-load condition
c) Readiness certification prior to energization

5.0.0 REPLACEMENT OF DRIVE MECHANISM BOX (DMB)

The Contractor shall **design, supply, install, test, and commission** a new **Drive Mechanism Box fully compatible with isolator**.

5.1.1 Dismantling of followings

i. Drive mechanism Box
ii. Existing mounting structure of DMB. The same may be reused if found suitable; otherwise, a new mounting structure shall be provided, and the existing structure shall be dismantled and removed.
iii. All existing cables to be removed up to the remote terminal end.

5.1.2 Minimum Technical Requirements:

i. Outdoor, dustproof and weatherproof enclosure (IP-55 or better)
ii. Robust mechanical drive suitable for frequent operations
iii. Anti-backlash gear mechanism ensuring precise positioning
iv. Adjustable limit switches (Open/Close) with repeatability
v. Auxiliary contact as per project requirement and 2NOC+2NC Spares for future use by owner (wired up to terminal block)

vi. Local mechanical position indicator (clearly visible)
vii. Padlocking arrangement in both OPEN and CLOSE positions
viii. Mechanical interlocks to prevent maloperation
ix. Motorized and Manual Operation with required mechanical and electrical interlocks during mechanical operation.
x. Power Socket and LED illumination (minimum 12W) shall be provided.

5.1.3 Compatibility Requirements:

i. Shall match existing operating pipe arrangement without major modification
ii. Shall ensure perfect 3-phase gang operation and synchronization

Any modification required for fitment shall be in Contractor's scope.

- All components , devices, equipment shall be of approved make only. Bidder shall refer relevant section in the tender document.

5.1.4 Power and Control Supply

Power supply (3-Phase 415 V) and control supply (110 VDC) for overhauling, testing, commissioning , illumination and any other activity required for successful completion of the job is in scope of bidder.

Power supply system shall have proper distribution, cables / wires without joints, ELCB and other protections.

6.0.0 MATERIALS AND WORKMANSHIP

- Only OEM-approved or equivalent high-quality materials shall be used.
- All fasteners exposed to atmosphere shall be hot-dip galvanized or stainless steel.
- Workmanship shall be of high standard ensuring long-term reliability.

7.0.0 GUARANTEE / DEFECT LIABILITY

- Minimum 12 months guarantee from date of commissioning
- Any defect arising during this period shall be rectified free of cost

8.0.0 TIME SCHEDULE AND COMPLETION

Contractor shall deploy adequate manpower and resources to meet timelines of BESS Project.

9.0.0 SAFETY AND COMPLIANCE

- All statutory safety procedures, PTW system, and PPE requirements shall be strictly followed.
- Any damage to equipment during execution shall be rectified at Contractor's cost.

10.0.0 DOCUMENTATION AND DELIVERABLES

The contractor shall submit:

- As-found and as-left condition report and schematic drawings.
- Measurement and test reports
- Details of replaced components
- DMB drawings, datasheets, and wiring diagrams
- Final completion report with recommendations