

ANNEXURE-1

EARTHING SWITCH CUBICLE

Complete Earthing Switch cubicle of protection class IP52 is to be supplied which shall house 12kV, 3-Phase, 6300A Grounding switch as well as shorting bar of the same rating. Grounding switch housed in the cubicle shall be of knife blade type, air insulated, gang operated, motor driven with optional manual drive & shall be integrated with isolated phase busduct, in the busduct run of OD 780mm. The operation of switch shall be electrically interlocked with suitable rating of circuit breaker/isolator as well as start command of the unit. The detailed drawing to illustrate the operational features of the cubicle shall also be supplied. The earth switch & shorting bar assembly shall be used for generator drying out and testing purpose. The short time rating of earthing switch shall be 110kA (rms) for 1 sec./275 kA peak.

Quantity : 06 Nos.

Technical Specification

1.	Type of grounding switch	:	3-Phase motorized earth switch, knife blade type, air insulated, gang operated, and motor driven with optional manual drive.
2.	Rated voltage	:	12KV
3.	Rated normal current (Amps)	:	6300 Amps.
4.	Class: Indoor or Outdoor	:	Indoor
5.	Basic Insulation Level (BIL)	:	28 kV (rms) / 75 kV (Peak)
6.	Rated frequency	:	50 HZ
7.	Max temperature rise for Enclosure over ambient temperature of 40°C	:	30°C for accessible surface 50°C for inaccessible surface
8.	Max Temp Rise For Conductor Over ambient temp 40°C	:	30°C for bolted joints (plain or tinned) 65°C for bolted joints (silver plated) 65°C for Al welded joints
9.	Material of Conductor	:	Electrolytic Copper
10.	Material of cubicle	:	Minimum 4 mm thick Al ALLOY Gr 31000 (IS-737)
11.	Rated short time withstand current	:	110kA rms for 1 sec /275 kA Peak
12.	Phase spacing	:	1000 mm

13.	Phase to Earth Clearance	:	150mm (minimum)
14.	Packing withstanding duration/ material	:	Min. 2 year/with Vacuum Corrosion Inhibiter
15.	Connection between Busduct Conductor and Earthing cubicle Conductor	:	Flexible Type (BHEL Scope)
16.	Connection between Busduct Enclosure and Earthing Cubicle	:	Through bolted flange connection
17.	Type of operating mechanism	:	Gang operated with electromechanical Interlocking.
18.	Over all dimensions	:	Max. 2800 (L) x 2500 (D) x 2700 (HT)
19.	No. of Operation (Life in cycle)	:	should be provided by Supplier
20.	Outer Dia. Of busduct Enclosure to be bolted on the body of the cubicle	:	780 mm (Dia)

Operating Mechanism (type, voltage)

Disconnector with Earthing Switch : Detail to be furnished by Vendor

STANDARDS The switch shall conform to IEC-60129 and IS-9921.

IMPORTANT FEATURES

- Operating reliability of the earthing switch assembly shall be very high.
- Cubicle shall facilitate easy maintenance and Inspection.
- Driving mechanism shall be reliable.
- Operable by both Motor and Manual.
- Operation of the switch shall be smooth.
- Tested in accordance with the IEC and IS.
- Operation of all three phases shall be simultaneous.
- Cubicle shall be self standing type. Design shall be such that no reinforcement required for support during normal and dynamic operation.
- There shall be provision of window to see through to check status (ON/OFF) of the switch.
- Cubicle shall have seal off bushings on incoming side. (This is BHEL scope.)
- Provision of necessary contacts and/or ports for integration with plant SCADA system,

CONSTRUCTION

The cubicle shall be made out of rigid Al alloy frame work, with provision for manual operation through operating drive handle. The same shall be equipped with Uni-directional Bevel geared motor for motor operation associated with control circuit and shall also have arrangement for manual operation.

The cubicle shall consist of following:

1. Door for access
2. Junction Box with Limit switch
3. Illuminating Lamp and Space Heater
4. Manual overdrive
5. Feedback and control logic
6. Suitable Spares
7. Special tools required, if any

BRIEF SPECIFICATION OF COMPONENTS

1.	Fixed contacts	:	Shall be made out of silver surfaced high conductivity copper castings mounted on insulators.
2.	Moving Contact blades	:	Shall be made out of silver surfaced high conductivity copper castings. These blades shall be spring loaded to exert the required contact pressure.
3.	Operating Lever	:	Shall be made out of insulating material meeting the normal and Short Circuit forces.
4.	Operating Shaft	:	Shall be made out of Bright Steel equipped with Swivel mechanism, Limit switch operating mechanism, Auxiliary switch operating mechanism, CLOSE/OPEN position indicators and shall be supported by Bearings on both ends for smooth operation.
5.	Support Insulators	:	Porcelain insulators of at least 12kV Class, for supporting the fixed contacts.
6.	Motor	:	Bevel Geared motor for electrical operation of Switch, through operating levels.
7.	Control circuit accessories	:	Shall be provided with MCB, Contactors etc. to operate the switch
8.	Manual Operating Handle	:	Shall be made of Hard-chrome plated rod attached with Ratchet mechanism at end for easy operation. This handle shall be located near the switch and whenever manual operation is required this Handle to be inserted and operated.

9.	Auxiliary switch	:	Earthing switch shall be provided with Auxiliary switch of 4 NO + 4 NC for customer usage. (Rating 220V DC, 2A)
10.	Terminal Box/ Marshalling Box	:	Terminal Box/ Marshalling Box shall be provided for connection to customer's control panel.

TYPE TESTING REQUIREMENT:

The complete cubicle including its constituents like earthing switch, shorting bar, support etc. shall be of proven design by successfully clearing type test. Type Test certificates, not older than 5 years, of all required Type Tests will be acceptable. If design of the cubicle is not type tested, the same shall be Type Tested on One No. earthing switch cubicle without any cost implication to BHEL.

NOTES:

1. The cubicle support structure shall be hot dip galvanized.
2. Material T.C. of Cu parts to be submitted by the vendor.
3. Party shall submit a brief write-up on the operation of earthing switch assembly being offered.
4. Party shall submit mandatory spares list for which a separate order may be processed by us later.
5. The drawing being forwarded along with the enquiry is indicative and supplier may submit their tested arrangement, mechanism fulfilling all the major requirements of the specification.
6. A data sheet shall be furnished listing details, ratings of all the components.
7. Party shall submit the QAP, OGA and wiring diagram of the Earthing Cubicle.
8. Functionality and the interlocking arrangement as specified above shall be demonstrated by the vendor as a functional test during inspection.
9. Any other item not specifically mentioned but necessary for the successful and intended operation of the earthing switch cubicle shall be in the scope of vendor to make the system functional.
10. For earth switch, the type test reports as per IEC 129 shall be submitted.