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| TPSODL | TP SOUTHERN ODISHA DISTRIBUTION LIMITED, BERHAMPUR | |
| | TECHNICAL SPECIFICATION | |
| Doc. Title | Specification of Center rotating, Double Break Type Isolator - 33KV (1250 Amp) & 11KV (630 Amp) | |
| Doc. No | ENG-ELC-013 | Eff. Date: 01/05/2022 |
| Rev. No | 00 | Page 1 of 24 |
| Prepared by: Ranjan Kumar Sahoo | Reviewed by: Priya Kumar Sharma | Approved & Issued By: Mahendra Kumar Pandey |

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1. SCOPE

Scope covers design, manufacture, assembly, inspection, testing at manufacturer's works, supply and delivery of 33 kV 1250 & 11 KV 630 A Horizontal Operated, Center rotating, Double Break type gang-operated air-break alternating current Isolator (with and without earth switch), with Insulators, Terminal Connectors, auxiliary contact switches, position indicating device, base frames, operating mechanism box, control cabinet, arcing horns (wherever necessary) etc. and other devices whether specifically mentioned herein or not, but required for efficient and trouble free operation.

2. APPLICABLE STANDARDS

Isolators covered by this specification shall unless otherwise stated, be designed, constructed and tested in accordance with latest revisions of following relevant Indian Standards and shall conform to the regulations of local statutory authorities:

| | |
|--------------------|---|
| IS: 9921(Part 1-V) | : Alternating current Disconnecter (Isolators) and Earthing switches for voltages above 1000V |
| IS: 2544: | : Porcelain post insulators for systems with nominal voltages greater than 1000V |
| IS: 2147 | : Degree of protection provided by enclosures for low voltage switchgear and control gear |
| IS:4691 | : Degree of protection provided by enclosure for rotating electrical machinery |
| IS: 2629: | : Recommended practice for hot dip galvanizing of iron & steel |
| IS: 4759 | : Hot-dip zinc coatings on structural steel and other allied products |
| IS: 2633 | : Method of testing weight, thickness & uniformity |
| IS: 1573 | : Electroplated coatings of zinc on iron & steel |
| IS: 6735 | : Fasteners - Spring lock washers for screws with cylindrical heads |
| IS: 2016 | : Plain washers |
| IS 1771 | : Electroplated coatings of silver and silver alloys for general engineering purposes |
| IEC 62271 | : High voltage switchgear and control gear |
| IEC 60129 | : Alternating Current Disconnectors and Earthing switches |

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3. SERVICE CONDITIONS

| | | |
|----|---|---|
| 1 | Maximum ambient temperature | 50 deg C |
| 2 | Max. Daily average ambient temp | 35 deg C |
| 3 | Min Ambient Temperature | 0 deg C |
| 4 | Maximum Humidity | 95% |
| 5 | Average Annual Rainfall | 150cm |
| 6 | Average No. of rainy days per annum | 120 |
| 7 | Altitude above MSL not exceeding | 1000m |
| 8 | Wind Pressure | 300 Km/hr |
| 9 | Earthquakes of an intensity in horizontal direction | equivalent to seismic acceleration of 0.3g |
| 10 | Earthquakes of an intensity in vertical direction | equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity) |

TPSODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.


4. GUARANTEED TECHNICAL REQUIREMENTS

The equipment covered in this specification shall meet the technical requirements listed below. The Isolator must be Double Break, center pole rotating type


| Sl. No | Type | 33KV | 11KV |
|--------|--------------------------------|---|----------|
| 1 | Main switch | Double break, Centre post rotating, gang operated | |
| 2 | Service | Outdoor | |
| 3 | Applicable standard | IS : 9921 / IEC-129/IEC-62271-102 | |
| 4 | Pole | 3 pole gang operator | |
| 5 | Rated voltage nominal/ Maximum | 33/36 kV | 11/12 kV |
| 6 | Rated Frequency | 50 Hz -5% to +3% | |
| 7 | System earthing | Solidly earthed | |

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|----|---|------------------------------------|------------------------------|
| 8 | Temperature rise | As per relevant IS/IEC publication | |
| 9 | Insulation level impulse with stand voltage | | |
| | a) Across Isolating distance | 195 kVpeak | 85 kVpeak |
| | b) To earth & between poles | 170 kVpeak | 75 kVpeak |
| 10 | 1 minute power frequency with stand voltage | | |
| | a) Across Isolating distance | 80 kVpeak | 32 kVpeak |
| | b) To earth & between poles | 70 kVpeak | 28 kVpeak |
| 11 | Rated current in Amp | 1250 | 630 |
| 12 | Short time current for 3 sec | 25kA | 26.3kA |
| 13 | Rated Peak withstand Current | 62.5KAp | 66KAp |
| 13 | Operating mechanism | Isolator: Motorised & Manual | Isolator: Motorised & Manual |
| | | Earth Switch: Manual | Earth Switch: Manual |
| 14 | Auxiliary voltage | | |
| | a) Control & Inter lock | 48 DC (80% to 110%) | |
| | b)For Heater Lamp and Socket | 1ph 240V | |
| 15 | Safe duration of overload | | |
| | a)150% of rated current | 5 minute | |
| | b)120% of rated current | 30 minute | |
| 16 | Minimum creepage distance of support and Rotating insulator | 25mm/KV | |
| 17 | Mounting structure | Upright on G.I structure | |
| 18 | Terminal connector type | Bimetallic clamp Zebra | Bimetallic clamp Panther |
| 19 | Control | Local/Remote | |

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| 20 | Auxiliary Contact | | |
| | Main Isolator | 6 NO / 6 NC | |
| | Earth Switch | 4 NO / 4 NC | |
| | Control Voltage and Current Rating of Contacts | 48 +/- 10% V 10 A DC | |
| 21 | Cantilever Strength Support | 700Kg | |
| 22 | Current Density of Copper | 1.75 Amp/Sqmm | |
| 23 | Control Cabinet | | |
| | Thickness of sheet Metal | 3mm | |
| | Enclosure Protection | IP55 | |
| | Paint | 50-0 Microns inside & 70-80 Microns Outside Powder Coated shade 631 as per IS-5 | |
| | Material of the Box | Stainless Steel | |
| 24 | Material of Moving and Fixed Contact | Copper Silver Plated (min 25 microns) | |
| 25 | Operating Rod Earthing with flexible copper braid of suitable length | 25X6 sqmm | 25X6 sqmm |
| 26 | The moving arm and current carrying contacts/joints to be covered in box type arrangement | Required | Required |
| 27 | Interlock | | |
| | Mechanical | Castel Key Interlock | Castel Key Interlock |
| | Electrical | Solenoid | Solenoid |
| 28 | Mounting Condition | On Galvanised Steel Structure | |
| 29 | Type of Support Insulator | Solid Core Porcelain post insulator | |
| 30 | Minimum Clearance in Air (mm) | | |
| | When switch is closed | | |
| | (a) Between adjacent Pole of different Phases(Centre-Centre) | 1500 | 900 |
| | (b)Between Live Parts and Earth | 508 | 254 |

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|----|---|------|-----|
| | When switch is open | | |
| | Between Poles of the same Phase (Centre to Centre) | 440 | 300 |
| | Between adjacent poles of different phases (Centre-Centre) | 1500 | 900 |
| 31 | Minimum Height of Insulator Stack (mm) | 508 | 254 |

5 GENERAL CONSTRUCTION

5.1 General Arrangement

Type :

Center Rotating, outdoor, gang operated type, with blades rotating in horizontal plane

Base Frame:

All ferrous parts shall be hot dipped galvanized steel structure. Size of base channel shall be 100 mm X 50 mm.

Insulators:

3 nos, porcelain post insulators per phase (Total nos. 9) with creepage length as per GTP.

Gang operated rods:

Galvanized steel rods connected to common operating mechanism.

Gang operated links shall be so designed that all phases shall make and break simultaneously.


Mounting arrangement:

Vertical and Horizontal Mounting: Isolator (with conductive terminals, main contacts, gang-operated operating rod, and insulators) shall be suitable for mounting on galvanized steel structure. Also provision for standing of maintenance personnel shall be provided along with mounting structure.

Limiting pins/Stopper arrangement: Adjustable limiting pins shall be provided to limit over travel of moving post.

Stopper arrangement shall be provided for controlling of opening of isolator main blades for all the three phases. All the interlocks shall have locknut with bush arrangement type provision.

Accidental prevention design/ Dead center interlocking: Isolators shall be constructed such that it cannot be dislodged by gravity, wind pressure, vibrations, shocks, accidental touching,

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breaking of the connecting rods of the operating mechanism, or open under influence of short circuit.

5.2 Hardware items:

Nuts, bolts & washers:

Shall be hot dip galvanized. Sufficient length of bolts shall be provided for current carrying parts

Teflon washer :

Shall be provided between operating rod & arrangement of tandem & coupling pipes.

Spring washer :.

Phosphorus bronze spring washers shall be used in current carrying parts

5.3 Contacts(male and female):

Material : All non-ferrous current carrying parts/ contacts shall be of high conductivity, corrosion resistance, hard-drawn electrolytic copper or copper alloy of proper thickness and contact area with current density of 1.75 A per sq. mm. (max.) with silver plating at the contacts.

Contacts:

- a) Heavy duty, self-aligning, high pressure and self-cleaning type high pressure contacts. The contacts shall wipe the contact surface during opening and closing without causing any abrasion on the contact surface.
- c) All contacts shall be replaceable at site
- d) Contact resistance - 50 micro-ohms, and up to permissible limit as defined in 1S:9921(part-IV)
- e) All movable parts shall be shunted by flexible copper conductor of specified cross-section and capacity
- f) All contact blades of moving arm should have proper contact on the main current carrying rod.
- g) The fixed and moving contacts shall be able to carry the rated current continuously and the maximum fault current as per GTP for 3 seconds without any appreciable rise in temperature.

FC spring:

Material: The springs shall be made of durable and nonrusting type stainless steel.


Vibration and Impact:

The blades shall be self-latching in the closed position or provided with a safety latch to prevent maloperation due to impact gravity, vibration, wind pressure, electromagnetic forces or shocks.

Temperature Rise Limit:

The contacts and other current carrying parts shall be so designed that their temperature rise under different operating conditions shall not exceed the value specified in IS: 99241.

Corona & RIV Corona avoidance:

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Corona and Radio interference Voltages Shall be avoided by eliminating sharp edges, points or loose metal fittings on energized parts.
The design shall be such that it is free from visible corona discharge in both closed and open positions.

5.4 Terminal Connectors:

Material:

High conductivity electrolytic grade copper.

The live parts shall be so designed that as far as possible, sharp points, edges and other corona producing surface are eliminated.

Weight withstand capacity:

The terminal connectors shall be designed to withstand load due to dead weight of Aluminium tube/ACSR conductor connected to it and alignment of the isolator main blade shall not be disturbed..

Suitable for Conductor sizes :

Zebra/Panther conductor .To be finalised during detailed engineering.

Current Carrying Capacity:

Terminal pad (moving arm and contact joints) shall be capable of carrying the rated continuous current as well as short circuit current as specified in GTP without exceeding temperature specified for the main blades.

5.5 Insulator:

Conformance:

Shall conform to 1S:2544 and/or IEC-168

Material :

Porcelain

Glazing: Shall be uniform glazed of brown colour free from blisters, burns and other defects which may affect the mechanical and dielectric quality of the insulators

Type:


Shall be solid core type, homogeneous, free from cavities, tough and impervious to moisture

End fittings :

All ferrous parts shall be of high grade cast steel or malleable steel with smooth surface and shall be hot dip

Galvanized. The porcelain and metal parts shall be assembled in such a manner that any thermal expansion difference between the metal and the porcelain part throughout the range of temperature variation should not create any space and undue internal stresses which may affect the electrical or mechanical strength and rigidity.

5.6 Bearings:

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Type:

Shall be ball or roller type and shall be protected from weather by means of housing arrangement /covers and grease retainers.

All bearings shall be-sealed type such that no lubrication or maintenance is required.

The design and construction of various bearings shall comply all the features required to withstand climatic condition specified, to ensure effective operation even after long period of unoperatability of isolators.

5.7 Manual Operating Mechanism: Control Cabinet of Isolator or Earth Switch:

Housing/Enclosure:

Material: Stainless steel

Degree of protection: IP 55

Housing/Enclosure Sloping rain hood shall be provided to cover all sides.

Thickness of sheet: min. 3 mm.

The cabinet shall be suitable for mounting on support structure.

Earthing terminals:

2 Nos. M12 size

Gland plates:

Control cabinet shall be provided with removable gland plate at the bottom of the box with double compression type brass cable glands shall be provided with each operating mechanism for connection of cables.

Internal wiring:

Size of wire: 2.5 sq.mm.

Material: Copper stranded conductor, 1100 V grade

Hinges:

Hinges on the door of the box shall be concealed. Hinged door shall be provided with padlocking arrangement.

TOM (Top Operating mechanism)

Shall be provided with nylon nut and check nut

Auxiliary Switches:

(i) Each isolator shall be provided with a mechanically driven auxiliary switch with all necessary contacts for control, indication and interlocking purposes with 6 NO and 6 NC contacts and 4 NO and NC contacts for earth switch.


(ii) All isolator and earthing switches shall be provided with auxiliary switches suitable for 48V DC

(iii) Mechanically coupled auxiliary contacts shall not slip during smooth operation of the isolator.

(iv) Remote status monitoring & electrical interlocking:

The contacts of the auxiliary switches shall be used for remote indication of open or close position in the control panel as well as for electrical interlock with other equipments.

Terminal Block and wiring:

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- (i) All auxiliary switches, interlocks and other terminals shall be wired up to 'terminal block' housed in the mechanism box.
- (ii) The spare contacts shall also be bought out on to the terminal block. The terminal block shall have at least 20% extra terminals.
- (iii) it shall be possible to change normally open contacts into normally closed contacts and vice-versa at site if required.
- (iv) Stud type terminals of Elmax or equivalent make of 1100 V grade having washers, nuts & check nuts shall be provided for terminating the control cables/ wire.

Indicator:

Indication of isolator opening & closing shall be provided with direction

Fuse for DC supply :

Fuses for control supply shall be provided

Castile key Provision:

Shall be provided

Fixing bracket :

Of MS HDG shall be provided on the top of the mechanism box

Operating pipe :

Shall be min. of 40 NB dia. GI pipe

Tandem pipe :

3 mm thick

Outer dia — 34 mm

Inner dia ~ 28 mm

Flange:

With 14 holes

Gasket:

EPDM rubber/ Neoprene gaskets shall be provided on a all 4 sides at front between hinged door and cabinet.

Space heater:

Space Heater thermostatically controlled, suitable for single phase 240 V AC supply shall be provided to Space heater prevent condensation. A switch and fuse/link shall be | provided in the operating mechanism.


Switch and Plug :

One 230 V combined 5A/15A AC plug with socket and arrangement switch shall be provided.

Lamp arrangement :

Switch, HRC fuse and holder suitable for a 240 V LED lamp shall be provided in manually operated mechanism box with protective fixture.

Cubicle illumination lamp with door switch shall be provided.

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Limit switches:

Limit switch shall be separate from auxiliary switch.

Limit switch for control shall be fitted on the isolator shaft within the cabinet to sense the open and close positions of the isolators and earth switches. Limit switches shall be of reputed make.

Push button :

Local/Remote selector switch:

A set of open/close push buttons shall be provided on the control cabinet of the isolator to permit its operation through local or remote. Provision shall be made in the control cabinet to disconnect power supply to prevent local/remote power operation.

Operating handle:

Length shall be 180 mm. The operating rods and pipe shall be rigid enough to maintain control under adverse conditions to withstand all torsional and bending stresses arising from operation.

Safety feature:

Isolator shall be self-locking in open and closed positions

Provision for motor Operation:

Shall be provided

Rotating parts:

- All rotating parts shall be provided with grease packed roller or ball bearings in sealed housings designed to prevent ingress of moisture, dirt or other foreign material.
- Bearing pressure shall be kept low to ensure long life and ease of operations.
- Bearings used shall be permanently lubricated and no further lubrication will be required for complete life span.

Reduction Gear mechanism:

The disconnecter may be required to operate after considerably long idle intervals. Special care shall be taken for selection of material for gear and lubrication of gears to meet this requirement. The gears shall be made out of aluminium bronze or forged material and suitably chosen (rust free) to avoid bending/jamming on operation after a prolonged nonoperation and lubricated for life with graphite or better quality non-draining and non-hardening type grease. Wherever necessary automatic relieving mechanism - shall be provided. Complete details of components, material, grade, self-lubricating arrangement, grade of lubricants, details of jig, fixtures and devices used for quality check shall be furnished by bidder in this offer.

5.8 Earth Switch (wherever required):


Material:

Earth switch material shall be silver plated copper of electrolytic grade.

Spring in female contact: Stainless steel

Mechanical Interlock with isolator:

Earth switch shall form an integral part of each pole of the isolator. Each earth switch shall be mechanically interlocked with its own main switch to prevent closure of the earth blades when the main blades are closed and vice versa ,

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Common earth connection:

Multiple flexible tinned copper strips 1 mm thick shall be suitably attached to the earthing connector for common earth connection

Gang Operation:

Three phase operation shall be conducted via gang operation. Earth switch shall be provided with gang operated operating rod mechanism mechanically connected to Earth Control Cabinet

Hot dip galvanization:

The entire ferrous control mechanism shall be hot dip galvanized and design and material shall match in quality with that of the main isolators

Auxiliary contacts :

4 NO+4 NC

5.9 Interlock

Mechanical interlock with circuit breaker:

Provision for mechanical interlock (castle key type) shall be incorporated for interlocking with associated circuit breaker. The key shall be released only when the isolator is fully closed or fully opened.

Interlocking to be compatible with LOTO arrangement.

Electrical interlocking between isolator and circuit breaker:

Sufficient quantity of locks, identical to the one fitted on the isolator, shall be supplied for fixing on the circuit breaker. Exact type and quantity shall be finalized during Tender check. In addition, an electrical interlock also shall be provided.

Mechanical Interlocking of Isolator with Earth Switch:

Earth switches for the line isolators shall be so designed to provide mechanical interlocking to prevent closure of earth switch blades when the isolator is in closed position. Interlocking to be compatible with LOTO arrangement.

All interlocks shall be designed to prevent mal-operation. Failure of supply to any electrical interlocks shall not permit mal operation.

Electrical interlocking of Isolator with Earth Switch:


Electrical interlock shall be through a solenoid operated by AC 110V/230V. Necessary relays shall be provided to attain interlock.

Counter balance spring:

Counter balance springs, cushions etc., shall be provided to prevent impact at the end of travel both on opening and closing of the isolator. The springs shall be made of durable and non-rusting type alloy.

5.10 Performance Requirement:

During the course of normal operation, it is likely that the isolator may be left in the open/closed position for long periods of time. They shall be designed to operate satisfactorily even after being kept in one position for long period,

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The isolator shall be capable of breaking the magnetizing current of associated power transformer.

5.11 Earthing Pads:

- a) Each pole of the isolator shall be provided with 2 nos. earthing pads of noncorrosive material at opposite ends and brazed at the base.
- b) Flexible tinned copper braid of adequate size shall be provided for connecting operating handles, earthing switches for the earthing system.

5.12 Temperature rise:

The temperature rise of any part of the isolator and associated equipment shall not exceed the maximum permissible temperature rise values as stipulated in the applicable standard of latest issue corresponding to ambient temperature.

5.13 Special Requirements:


- a) All joints in link mechanism exposed directly to external environment should not require any periodic lubrication and shall not create jamming which can result into loss of setting of complete isolator or deformation in links and levers.
- b) Provision of continuous adjustment/alignment of insulator should be provided to compensate permitted tolerances of insulator and structure or base frame assembly. Adjustment/alignment using shim washers are not allowed.
- c) Bottom bearing assembly of base frame shall be sealed such that there cannot be ingress of dust/dirt water etc. Whole assembly shall be lubricated for lifelong service.
- d) Terminal head of isolator arms where conductor will be terminated shall be strong and robust. It should have 360 degree freedom of rotation and should have built-in cover to eliminate deposition of dust or foreign particles.
- e) Isolators and Operating mechanisms should not require periodic maintenance for any periodic lubrication/adjustments in linkages, bearings, bush-pins, hinges. Bidder shall enclose test reports for additional extended mechanical endurance test, which justifies that there are no undue wear & tear and loss of adjustment after large number of operations.
- f) Link mechanism shall have 'Dead center interlocking' to prevent any change in end position of disconnector due to external forces on the arm (e.g. Earthquake, Short line fault, Wind etc.) even when the drive is de-coupled from disconnector.

5.14 Duty Requirement:

Isolator and Earth Switch in their closed position shall be capable of withstanding dynamic and thermal effect of maximum short circuit current of the system. They shall be so constructed such that they do not get open under influence of short circuit current.

5.15 Completeness of Supply:

Any fittings, accessories or apparatus which may not have been mentioned in this specification but which are necessary for efficient operation / performance shall be deemed to be included in the contract.

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6.0 NAME PLATE AND MARKING

Following details shall be suitably embossed on a stainless steel name plate fixed on the operating mechanism box:

- Name of manufacturer
- Property of TPSODL
- PO No.
- Month/Year of manufacture
- Type of Isolator
- Rated Voltage
- Rated Normal Current
- Serial No.
- Weight
- Rated insulation level
- Short time current for 3 sec
- Operating mechanism type
- DC Control voltage
- Guarantee period
- Frequency

7.0 TESTS:


All Routine, Acceptance & Type tests shall be carried out in accordance with relevant IS/IEC.
All Routine and Acceptance tests shall be witnessed by TPSODL authorized representative.
All the components should also be type tested as per the relevant standards.
Following tests shall be necessarily conducted on the Isolator:

7.1 ROUTINE TESTS

- Power Frequency test on Control and Auxiliary circuit
- Voltage control tests on auxiliary circuit
- Operation Tests
- Measurement of resistance of main circuit.
- Mechanical Operating Tests.
- Galvanizing Measurement.
- Tinning Thickness Measurement.

7.2 ACCEPTANCE TESTS:

- Verify the Insulation level, including withstand tests at Power frequency voltages on auxiliary equipments.
- Voltage tests on auxiliary circuit
- Operation Tests
- Measurement of resistance of main circuit

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- e) Visual checks
- f) Dimensional checks
- g) Alignment check of post insulator check
- h) Galvanization test
- i) Mechanical operation test

7.3 Type Tests for Isolator:

- a) Lightning impulse voltage test(Dry)
- b) Power frequency voltage withstand test(Dry)
- c) Power-frequency voltage withstand test(Wet)
- d) Short time withstand current test
- e) Peak withstand current test
- f) Temperature rise test
- g) Measurement of contact resistance
- h) Short time withstand current test for Earth Switch
- i) Peak withstand current for Earth Switch
- j) Satisfactory Operation & Mechanical endurance test

7.4 Types Tests for Insulator:


- a) Visual check
- b) Dimensional check
- c) Visible discharge test
- d) 50% lightning impulse voltage flashover test
- e) Lightning impulse voltage withstand test -
- f) Power frequency voltage flashover test(dry)
- g) Power frequency voltage withstand test(dry)
- h) Power frequency voltage flashover test(wet)
- i) Power frequency voltage withstand test(wet)
- j) RIN test at 4 MHz
- k) Temperature cycle test
- i) Mechanical strength test
- m) Porosity test
- n) Galvanizing test
- 0) Artificial pollution test by salt fog method

8.0 TYPE TEST CERTIFICATES:

Bidder shall submit Type test Certificates for the tests as mentioned above. All the tests should have been conducted during the period not exceeding five years from the date of opening the bid and at CPRI/ ERDA accredited lab as per the relevant standards.

In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPSODL.

9.0 PRE-DISPATCH INSPECTION:

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The Material shall be subject to inspection by a duly authorized representative of the TPSODL. Inspection may be made at any stage of manufacture at the discretion of the Purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPSODL's representatives at all times when the work is in progress. Inspection by the TPSODL or its authorized representatives shall not relieve the Bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPSODL.

Following documents shall be sent along with material

- a) Test reports
- b) MDCC issued by TPSODL
- c) Invoice in duplicate
- d) Packing list
- e) Drawings & catalogue
- f) Guarantee / Warrantee card
- g) Delivery Challan
- h) Other Documents (as applicable).

10.0 INSPECTION AFTER RECEIPT AT STORES:

The material received at TPSODL site/store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Projects department.

11.0 GUARANTEE:


Supplier shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 36 months from the date of commissioning or 42 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs within mutually agreed timeframe, and to the entire satisfaction of TPSODL, failing which TPSODL shall be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus TPSODL own charges(@ 20% of expenses incurred), from the supplier or from the " Security cum Performance Deposit" as the case may be.

12.0 PACKING:

The equipment shall be packed in crates suitable for vertical/horizontal transport, as the case may be and suitable to withstand bundling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc., shall be provided. Any material found short inside the packing cases shall be supplied by Supplier without any extra cost.

Each consignment shall be accompanied by a detailed packing, list containing the following information:-

- a) Name of the consignee.
- b) Details of consignment.
- c) Destination.

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- d) Total weight of consignment.
- e) Handling and unpacking instructions.
- f) Bill of material indicating contents of each package.

The supplier shall ensure that the packing list and bill of material are approved by the purchaser before dispatch.

13.0 TENDER SAMPLE: NA

14.0 QUALITY CONTROL:

The Bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPSODL shall reserve the sole rights for the type test of a random sample from the lot and in case of any discrepancy or deviation from the Type test certificates submitted along with the Bid, the complete Lot shall be rejected.

The Purchaser's engineer or its nominated representative shall have free access to the Bidder's works to carry out inspections.

15.0 MINIMUM TESTING FACILITIES:

Bidder shall have adequate in house testing facilities for carrying out the following test at the factory.

- a. Power frequency voltage test
- b. Voltage tests on auxiliary circuit
- c. Operation Tests
- d. Measurement of resistance of main circuit.
- e. Temperature rise test
- f. Mechanical endurance test.

16.0 Manufacturing Activities:

The successful Bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.

17.0 SPARES, ACCESSORIES AND TOOLS:

The bidder shall submit a recommended list of maintenance spares, tools and accessories for smooth and trouble free operation of the isolator.

The bidder, if at any time changes the design of the isolator or discontinue manufacturing of the isolator, shall provide opportunity to TPSODL for purchase of spares for future use so as to ensure smooth & trouble free functioning of the isolators before such change in design or discontinuing of manufacturing activity. The bidder shall arrange for service engineer for proper alignment at the time of erection and testing of isolators.

18.0 Drawings and Documents:

Following drawings and documents shall be prepared based on Purchaser's specifications and statutory requirements and shall be submitted with the bid:

- a) Completely filled in Technical Particulars
- b) Bill of material

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- c) Fault Calculations for Corrugated Aluminum Sheath.
- d) Type Test certificates.
- e) Detailed dimensional cross-sectional drawing of the cable
- f) Experience List

After the award of the contract four (4) copies of drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy of all the drawing, GTP, Test certificates shall be submitted after the final approval of the same to purchaser.

Following drawings / documents shall be submitted by the bidder for Purchaser's approval.

| S.No. | Description | For Approval | For Review Information | Final Submission |
|-------|--|--------------|------------------------|------------------|
| 1 | Technical Particulars | √ | | √ |
| 2 | General Arrangement drawings | √ | | √ |
| 3 | Terminal and connection Drawing | √ | | √ |
| 4 | Drawing showing Mechanical Interlocks b/t line & Earth Switch and Wiring diagram | √ | | √ |
| 5 | Manual / catalogue | | √ | |
| 6 | Installation / Commissioning Manuals | | √ | |
| 7 | Instruction for use | | √ | |
| 8 | Transport / Shipping dimension drawing | | √ | |
| 9 | QA & QC Plan | √ | | √ |
| 10 | Routine, Acceptance and Type Test Certificates | √ | | √ |
| 11 | Sectional view & descriptive details for blades, contacts, arms, contact pressure, contact support bearing, housing of bearing, balancing of heights, phase coupling pipes, base plate, operating shaft, guides swivel joints, operating mechanism & its component etc | √ | √ | √ |


All the documents & drawings shall be in English language.

Instruction Manuals: Bidder shall furnish two softcopies and four (4) hard copies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

19.0 GUARANTEED TECHNICAL PARTICULARS

To be furnished by Bidder

| Sl. No | Type | 33KV | 11KV |
|--------|-------------|------|------|
| 1 | Main switch | | |

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| | | |
|----|---|--|
| 2 | Service | |
| 3 | Applicable standard | |
| 4 | Pole | |
| 5 | Rated voltage nominal/ Maximum | |
| 6 | Rated Frequency | |
| 7 | System earthing | |
| 8 | Temperature rise | |
| 9 | Insulation level impulse with stand voltage | |
| | a) Across Isolating distance | |
| | b) To earth & between poles | |
| 10 | 1 minute power frequency with stand voltage | |
| | a) Across Isolating distance | |
| | b) To earth & between poles | |
| 11 | Rated current in Amp | |
| 12 | Short time current for 3 sec | |
| 13 | Rated Peak withstand Current | |
| 13 | Operating mechanism | |
| 14 | Auxiliary voltage | |
| | a) Control & Inter lock | |
| | b) For Heater Lamp and Socket | |
| 15 | Safe duration of overload | |
| | a) 150% of rated current | |
| | b) 120% of rated current | |
| 16 | Minimum creepage distance of support and Rotating insulator | |

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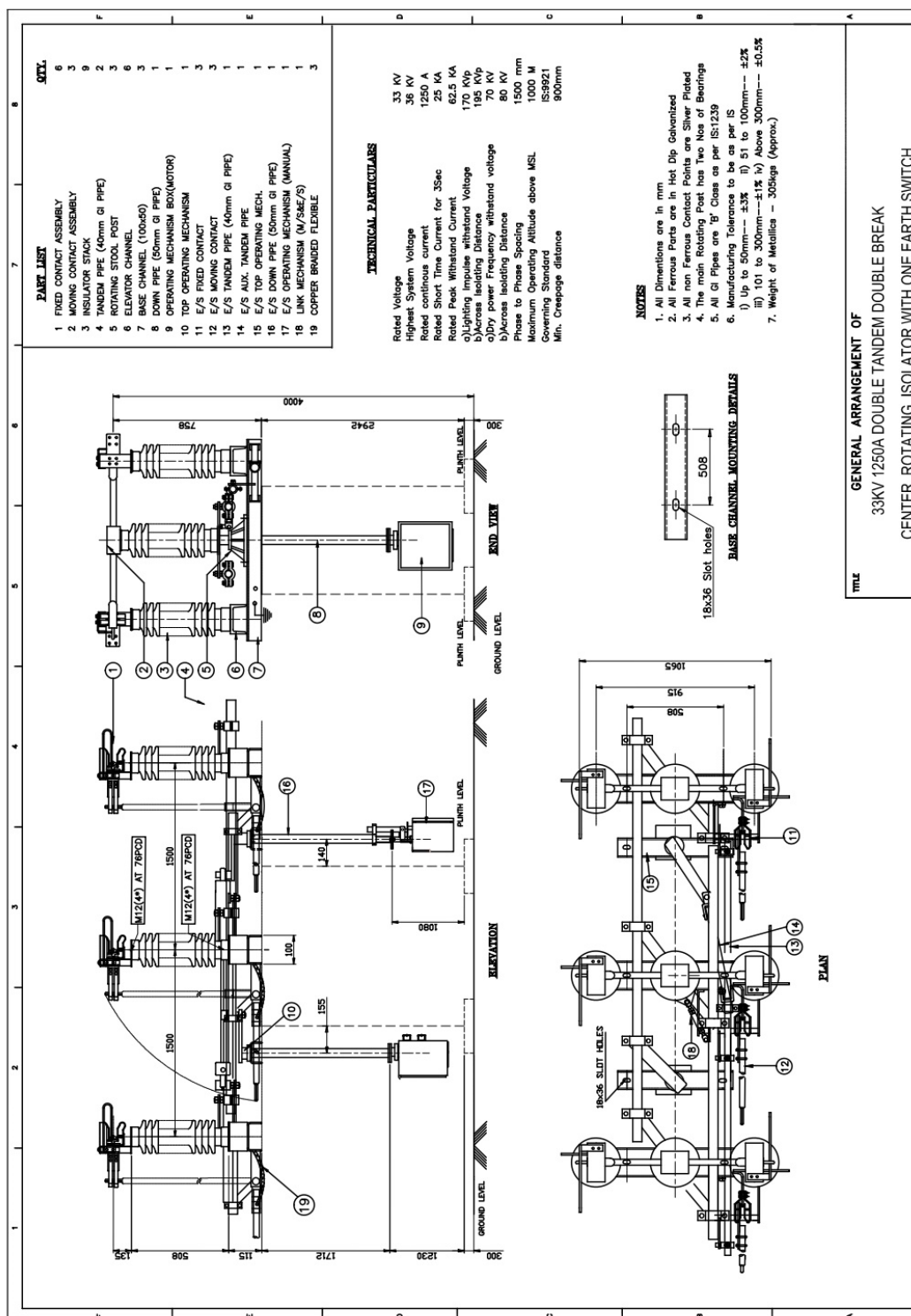
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|----|---|--|--|
| 17 | Mounting structure | | |
| 18 | Terminal connector type | | |
| 19 | Control | | |
| 20 | Auxillary Contact | | |
| | Main Isolator | | |
| | Earth Switch | | |
| | Control Voltage and Current Rating of Contacts | | |
| 21 | Cantilever Strength Support | | |
| 22 | Current Density of Copper | | |
| 23 | Control Cabinet | | |
| | Thickness of sheet Metal | | |
| | Enclosure Protection | | |
| | Paint | | |
| | Material of the Box | | |
| 24 | Material of Moving and Fixed Contact | | |
| 25 | Operating Rod earthing with flexible copper braid of suitable length | | |
| 26 | The moving arm and current carrying contacts/joints to be covered in box type arrangement | | |
| 27 | Interlock | | |
| | Mechanical | | |
| | Electrical | | |
| 28 | Mounting Condition | | |
| 29 | Type of Support Insulator | | |

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| | | | |
|-----------|---|--|--|
| 30 | Minimum Clearance in Air (mm) | | |
| | When switch is closed | | |
| | (a) Between adjacent Pole of different Phases(Centre-Centre) | | |
| | (b)Between Live Parts and Earth | | |
| | When switch is open | | |
| | Between Poles of the same Phase (Centre to Centre) | | |
| | Between adjacent poles of different phases (Centre-Centre) | | |
| 31 | Minimum Height of Insulator Stack (mm) | | |

20. Sample Drawings (For Tendering Purpose only .Dimensions are for reference purpose only and may change as per Manufacturers Type Tested Design. Design Subject to change during detailed engineering)

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Doc. Title

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Prepared by:

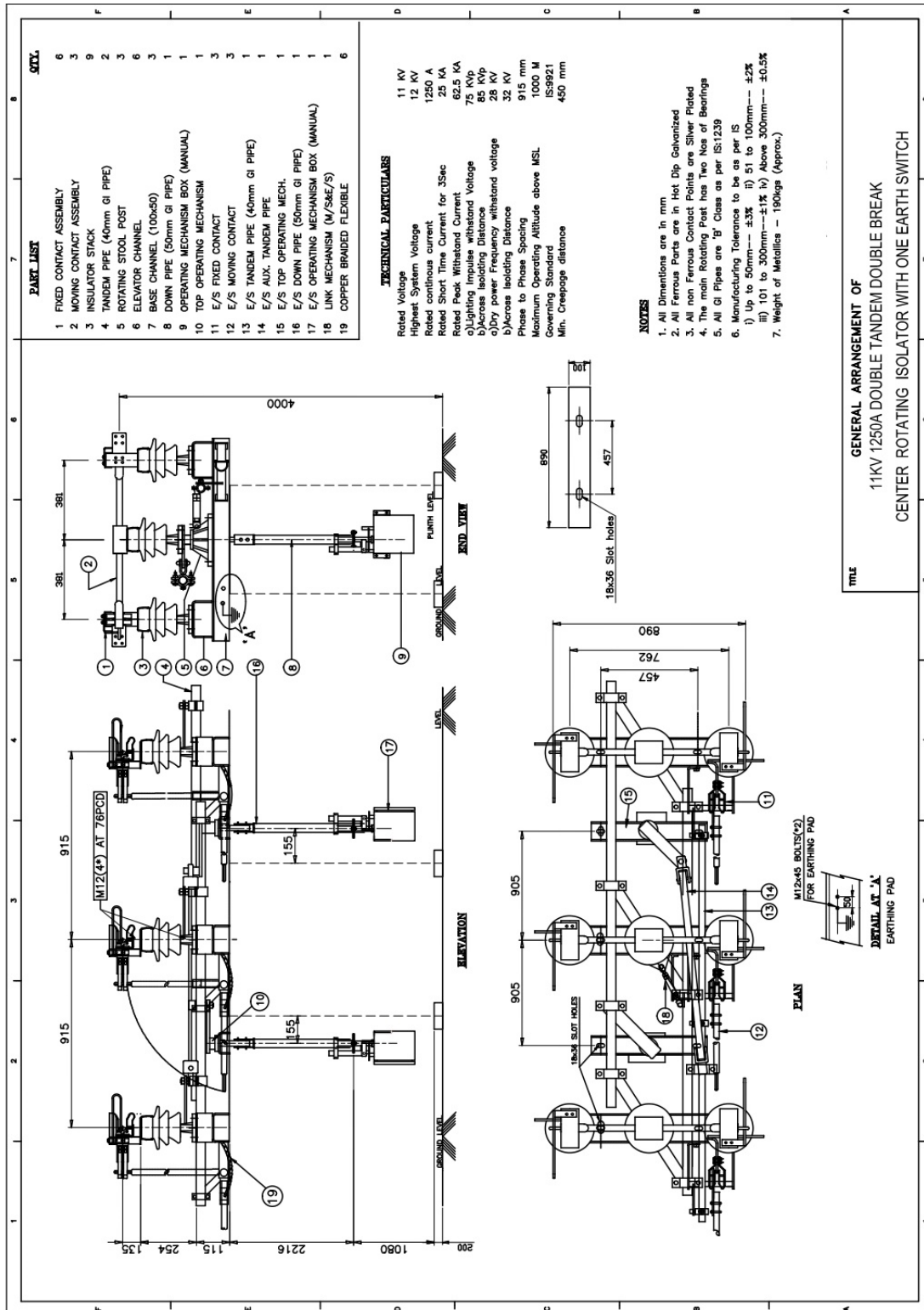
Ranjan Kumar Sahoo


Reviewed by:

Priya Kumar Sharma

Approved & Issued By:

Mahendra Kumar Pandey



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21.

SCHEDULE OF DEVIATIONS
(TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

| S. No | Clause No. | Details of deviation with justifications |
|-------|------------|--|
| | | |

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature

Designation