**Annexure – ‘B’**

**TECHNICAL SPECIFICATION FOR Trolley Mounted substation suitable with 250 kVA 11/0.433 kV, distribution transformers with all MS Channel & angles, Nuts & Bolts and Accessories including 11 kV XLPE cable 3 x95 mm2. Head Shrinkable termination kit (Outdoor type) suitable for 3 x95 mm2 cable, 250 KVA distribution box with MCBs, 3.5x95 mm2 LT PVC cable**

1. **SCOPE:**

This specification covers design, engineering, manufacture, assembly, inspection and testing before supply and delivery at site of trolley mounted substation suitable for 11 kv/433v 250 kva distribution transformer.

It is not the intent to specify completely herein all the details of the design and construction of equipment. However, the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered equipment shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of bidder’s supply irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.

The Item and accessories shall be designed to facilitate operation, inspection, maintenance and repairs. The design shall incorporate every precaution and provision for the safety of equipment as well staff engaged in operation and maintenance of equipment.

1. **Requirements**
2. **Trolley for Substation**
3. Dimension of trolley

Length 4000mm ±2%

Breadth 2100mm ±2%

Height form GL 2000mm ±2%

Height from trolley base 1500 mm ±2%

1. ISMC channels of 100X50 mm for construction of Trolley.
2. ISMC H beam of suitable size to form a DP structure for mounting gang operated 11KV AB Switch & 11KV DO fuse
3. 4 Wheels for trolley of standard size as per load requirement.
4. Tyre shall be of reputed make (MRF/CEAT)
5. Trolley shall be fitted with shock absorber for each wheel (i.e. kamani patta). kamani patta as per load requirement.
6. There should be provision for break at rear wheel.
7. Tochen hook also provided in front side of Trolley.
8. There should be provision for ladder on both side of Trolley. Ladder should be slid able or designed in such a way so it can be easy to transport the Trolley at any required place.
9. There should be provision of fencing around the substation by wire mesh 10 SWG GI wire. The height of fencing should not be less than 5 ft.
10. GI angle and GI flat for substation fencing should be fitted on each corner and middle edge.
11. All the channel angle painted with Black colour & wire mesh by yellow colour & Paint should be liquid enamel.
12. For trolley base GI Chequered Plate of min 6mm thickness shall be used.
13. 2 no GI channel should be welded on top of chequered plate for fixing of transformer by suitable bolt size.
14. **Substation Requirements**
15. LT Distribution box suitable for 250 KVA DTR
16. 11KV 3X95 sq mm XLPE insulation PVC sheathed Armoured cable of 35 mtr length for incoming connection from 11KV line to AB Switch and DO fuse to HT bushing of 250KVA distribution transformer with all required accessories (termination kit & lug etc).
17. 1X400 sq mm 1100V XLPE insulation PVC sheathed unarmoured cable of 12 mtr length for outgoing connection form LT bushing to incoming of LTDB with lugs. (3 mtr for each phase/neutral)
18. 1X400 sq mm 1100V XLPE insulation PVC sheathed unarmoured cable of 50 mtr length for outgoing connection form outgoing of LTDB to LT line with lugs. (12 mtr for each phase/neutral)
19. 11 KV 200A AB Switch with 200A DO fuse for incoming line of transformer.

**LT DISTRIBUTION BOX FOR 250KVA DISTRIBUTION TRANSFORMER**

LT Transformer Distribution System mainly consists of following main items detailed below:

1. One chamber to house incoming, one Isolator double make double break type without fuse and MCCB 500 A, as per IS/IEC60947-2:2003, Four Pole MCCB double make double break type 500 Amp. - 50 KA as per IS/IEC60947-2:2003 with Bus bar connection system. This chamber may be called CHAMBER NO. 1 or Protection Chamber.
2. Other chamber to house 6 numbers of Single Pole MCCB's 200 Amp. 36 KA double make/ double break capacity with outgoing Bus bar connections and neutral bus bar. This chamber may be called CHAMBER NO. 2 or Distribution Chamber. The MCCBs shall be confirming to IS/IEC60947-2:2003
3. Supporting MS Frame work for the above Chambers Nos. 1 to 2.
4. Spacers for connecting the chambers.
5. External earthing Plate for earthing of connections.
6. Cable Clamps for incoming & outgoing cables.

**Construction Features:** The base and cover should be made by means of MS Sheet confirming to IS: 2147/1962 or to any equivalent international standard.

The box shall be adequately protected against rust, dust, water and corrosion both from inside and outside. The box shall be so constructed as to have top side slight taper for easy flow of rain water.

The enclosure shall have degree of protection IP55.

**Material**:

1. Base: Ms Sheet of grey colour.
2. Cover: Ms Sheet of grey colour

**Painting**: Powder coated grey colour through 7 tank process min 80-90 micron.

**Dimensions:** Dimensions of the Chamber No. 1 or Metering Chamber will be as per drawing

**Thickness** Base : 2.5 mm ± 0.25 mm

Cover : 2.5 mm ± 0.25 mm

**Holes for incoming Cables:**

For incoming cable 4 Nos. hole with insulated plastic glands on the base/bottom of the chamber shall be provided and gland plates with suitable holes for incoming cable shall be provided.

For outgoing cable 8 Nos. hole with insulated plastic glands on the base/bottom of the chamber shall be provided and gland plates with suitable holes for outgoing cable shall be provided.

**Gland Plate**: M.S. 4.0 mm ± 0.2 mm thick zinc plated yellow passivated gland plate knock out type should be provided at the incoming side of the box i.e. at the bottom of the box.

**Hinges**: Two Nos. of hinges should be provided to join base with cover from one side in such a manner that no screw or rivets will be visible from outside.

**Operation of MCCB**: MCCB should be fitted in such a manner that it can be operated without opening the door of Unit. Opening window should be provided for operating Main 4pole MCCB.

**Rubber Gasket**: The collar in the Base of Chamber shall be provided with good quality rubber '0' ring. The design of lining shall be such that it provides proper sealing between the cover and base of chamber to avoid penetration of dust and ingress of water. This may be achieved by providing a U shape groove in the outer flange of the base and all around projection provided on the cover periphery, which keeps the '0' ring pressed and also to provide an outside caller to cover the groove. This will avoid ingress water, dust etc.

**Ventilation**: Ventilation plugs (Elbow type) has to be provided having built in mesh to protect against entry of insects and lizards. These vents shall be fixed *I* tightened from inside facing down as not to allow water inside. These plugs will provide breathing inside the chamber. The IP rating of individual chambers should be IP 55 but the test has to be done on enclosures in which the holes have been blocked.

**Padlock Arrangement**: Pad lock arrangement should be provided to lock*I*seal the base and cover.

**Bus Bar**: Size of Bus Bar should have cross sectional area of 50X8 mm ±2.5% made of EC Grade Aluminium Covered with Phase identification PVC Colour Coding Sleeves.

**Neutral Bar**: A pre drill and tapped neutral bar should be provided of cross sectional area 50X 8 mm ± 2.5% made of EC Grade Aluminium to take the neutral for outgoing connections.

**Sealing Arrangement**: 2 Nos. of sealing bolts & nuts should be provided to seal the box and also to close the cover on base.

**Supporting MS Frame for Chamber Nos. 1 to 3**:

MS Angle 40x40x6 mm ± 2.5% with 6 mm flats in between should be used to make the back frame of the entire system. It should be made in such a manner that entire back side edge *I* corner should be held by this frame rigidly. Each box is to be fixed at min. 4 places at Base. MS Frame should be Hot Dip Galvanised material.

**Spacers for connecting the Chambers**

For joining the Chamber No. 1 with Chamber No. 2; Chamber No. 2 with Chamber No. 3 especially designed spacers are to be used with 0 ring all around on both sides to avoid ingress of water and dust. This spacer is sandwiched between 2 chambers in a fashion, so it fit into the groove provided on the sides of the chambers and duly bolted with each other. The spacers shall have openings for bus bars to pass through the joints and spacers.

**External Earthing Plate for Earthing:**

M.S. 50X12 mm ± 2.5% thick hot dip galvanised plate with 6 Nos. of M8x40 Nut, bolts and washer should be fitted on the bottom of chamber for providing earthing for outgoing connections.

**Cable Clamps for incoming Cables:**

Sufficient numbers of MS U Shaped bend clamps with bots and nuts should be fitted on metal frame to hold and support the incoming cables firmly.

**Cable Clamps for outgoing Cables:**

Sufficient numbers of MS U Shaped bend clamps with bots and nuts should be fitted on metal frame to hold and support the outgoing cables firmly.

**SPECIFICATION FOR Four Pole Isolator- 500A**

Application : Outdoor (enclosed).

Utilization category : 'AC' 23 A as IS/IEC 60947-2:2003 as amended up to

date

Type : Thermal-Magnetic trip free mechanism.  
Number of poles : Four  
Peak ambient

temperature : 50 ºC.  
Rated insulation level : 750 V.  
Rated operational

voltage : 430 V.  
Continuous current

rating : 500A  
Rated service Short

Circuit making capacity

(ICM) : 20  
Application Standard : IS: 60947-2:2003  
Short time withstand :

current (A rms) ICW : 1 Sec-20000A

3 Sec-11500A

20 Sec-5000A

30 Sec-4000A

**SPECIFICATION FOR Four Pole MCCB- 500A**

Application : Outdoor (enclosed).

Utilization category : 'A' (ISIIEC: 60947-2: 2003) as amended up to

date

Type : Thermal-Magnetic trip free mechanism.  
Number of poles : Four  
Peak ambient

temperature : 50 ºC.  
Rated insulation level : 690 V.  
Rated operational

voltage : 430 V.  
Continuous current

rating : 500A  
Ultimate Short

Circuit breaking capacity

(ICU) : 50KA  
Rated service Short

Circuit breaking capacity

(ICS) : 50KA

Power factor for

Short Circuit (max.) : 0.4(lag.)  
Application Standard : IS: 60947-2:2003  
Time current

characteristics : To co-ordinate with HV fuse

**SPECIFICATION FOR Single Pole MCCB- 200A**

Application : Outdoor (enclosed).

Utilization category : 'A' (ISIIEC: 60947-2: 2003) as amended up to

date

Type : Thermal-Magnetic trip free mechanism.  
Number of poles : Single  
Peak ambient

temperature : 50 ºC.  
Rated insulation level : 690 V.  
Rated operational

voltage : 430 V.  
Continuous current

rating : 200A  
Ultimate Short

Circuit breaking capacity

(ICU) : 36KA  
Rated service Short

Circuit breaking capacity

(ICS) : 36KA

Power factor for

Short Circuit (max.) : 0.4(lag.)  
Application Standard : IS: 60947-2:2003  
Time current

characteristics : To co-ordinate with HV fuse