



**SPECIFICATIONS FOR TAMPER PROOF SERVICE CONNECTION BOX FOR L.T. LINES / CONSUMER MAINS
(Spec No. Dist/MS-III/Spring Loaded Connector Box /05/10/R0/200510)**



MAHAVITARAN

Maharashtra State Electricity Distribution Co. Ltd.

**SPEC.NO. MSEDCL/ DIST:MSC-III/SPRING LOADED CONNECTOR BOX/05/10/R0/
200510**

TECHNICAL SPECIFICATIONS

FOR

TAMPER PROOF SERVICE CONNECTION BOX

FOR

L.T. LINES / CONSUMER MAINS

(20.05.2010)

**TECHNICAL SPECIFICATIONS FOR TAMPER PROOF SERVICE
CONNECTION BOX FOR L.T. LINES / CONSUMER MAINS**

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**TECHNICAL SPECIFICATIONS FOR TAMPER PROOF SERVICE
CONNECTION BOX FOR L.T. LINES / CONSUMER MAINS**

1.0 SCOPE:

1.1 This specification covers the design, manufacture, testing of tamper proof, shock proof and rust proof Service Connection Boxes duly fitted with spring loaded constant pressure multi connection Bus Bar in Thermoset casing system. The Box is intended to be used for giving Service Connections to consumers. It should be suitable for out door use for mounting on pole as well as for mounting in meter cabinet of multistoried buildings.

1.2 It is not the intent to specify herein complete details of design and construction. The Service connection boxes offered shall conform to relevant standard and high quality and workmanship capable to perform continuous and satisfactory operations in the actual service conditions at site.

1.3 Bidder shall have proven experience of 3 years of manufacturing of similar products and supplying to electrical utilities.

2.0 SERVICE CONDITIONS:

The material to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

2.1	Maximum ambient temperature (deg C)	50
2.2	Minimum ambient temperature (deg C)	3.5
2.3	Relative humidity (%)	10 to 100
2.4	Maximum rainfall (mm)	1450
2.5	Maximum wind pressure (kg/sq m)	150
2.6	Maximum altitude above mean sea level (Meters)	1000
2.7	Isoceraunic level (days/year)	50
2.8	Seismic level (Horizontal acceleration) (g)	0.3
2.9	Climate Moderately hot and humid tropical climate, conducive to rust and fungus growth.	

3.0 STANDARDS:

All components used in the manufacture of the materials shall conform to the relevant Indian standards and especially to the followings:

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3.1	IS:14772/2000	General Requirements for Enclosures for Accessories for Household and Similar Fixed Electrical Installations - Specification
3.2	IS:13947/1993 (Part 1)	Specification for Low-voltage Switchgear and Controlgear – Part 1 : General Rules & Annex 'C' for Degrees of Protection provided by enclosures of electrical Equipments
3.3	IS: 13410/ 1992	Glass reinforced polyester sheet moulding compounds (SMC)
3.4	IS: 13411/1992	Glass reinforced polyester dough moulding compounds (DMC)
3.5	IS: 732/1989	Code of Practice for Electrical Wiring Installations
3.6	IS: 4249/1967	Classification and methods of tests for non-ignitable and self-extinguishing properties of solid electrical insulating materials

4.0 GENERAL TECHNICAL REQUIREMENTS:

4.1 ENCLOSURE:

- 4.1.1 The service connection box shall be made out of thermosetting plastic i.e. glass reinforced polyester sheet moulding compound (SMC) conforming IS: 13410-1992 grade and also conform to self extinguishing properties as per IS-4249 & requirements of this specification.
- 4.1.2 The enclosures shall be made of high grade virgin material with anti-corrosive, rust proof, shock proof, dust and vermin proof, U.V. stabilized with flame retardant property.
- 4.1.3 The S. C. box shall comply with the requirement of IP- 44 type as per the IS – 13947 or the latest version thereof.
- 4.1.4 The wall thickness of the box shall be minimum 2mm. The S.C. Box should have minimum 40 mm clearance on all three sides and bottom clearance of minimum 60 mm for pole mounted boxes & 100 mm for boxes used in the metering cabinet.
- 4.1.5 The enclosures should be suitable for outdoor use, Pole mounting and should not soften, bend or melt at high temperature. It should have flame retardant properties and material of it should not generate burning droplets in the event of fire.
- 4.1.6 The Service Connection Box shall be suitable for housing Bus Bar system with adequate clearances. The General arrangement drawing shall be as per the attached drawing.
- 4.1.7 The base and door should be single piece moulded individually with rounded corners without any construction/ fabrication joint.

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- 4.1.8 The door in closed position should overlap on base such that direct entry of screw driver, tool or rod is not possible.
- 4.1.9 Concealed hinges should be provided to the S. C. boxes.
- 4.1.10 The Box should have positive locking system by way of bolt and nuts in addition to “U” Clamp as shown in the Drawing. “U” clamp should have matching Holes on base and door to facilitate wire sealing.
- 4.1.11 Holes for in-coming and out-going Cables should be provided at bottom as shown in the G.A. Drawing. Suitable number of holes with rubber grommets of suitable size shall be provided at the bottom of S. C. box for incoming and outgoing cables.
- 4.1.12 The box should have holes on the back-side as shown in Drawing for fixing it on Pole with suitable clamping arrangement or in metering cabinet in the buildings.
- 4.1.13 The Bus Bar mounting system should be angled and stepped so as to facilitate easy connection and disconnection of cable without twisting and sharp bending of wire/cable. The mounting steps shall be made out of Thermosetting Plastic insulating material as given above.
- 4.1.14 Fixing of accessories like clamp, handles etc and all metal part excluding hardware shall be of stainless steel only.
- 4.1.15 The surface appearance or part of S. C. Box must be smooth, non porous and homogeneous, free from ripples, defects and marks. No fillers or fibres should be visible at any place.
- 4.1.16 One no Earthing Bolt of size M6 having length of min 25mm with two washers & nuts shall be provided on the connection box for necessary earthing.

5.2 SPRING LOADED BUS BAR :

- 5.2.1 The Bus Bars module shall have casings made out Thermosetting Plastic confirming to IS-13410. Each module shall contain two Bus Bar; assembly of sliding type pressure plate & spring at bottom of each pressure plate. All such assemblies shall be housed in the casing along with Bus bar. The assembly shall facilitate definite pressure overlap electrical connection on Bus bar.
- 5.2.2 The Bus Bars shall be made out of EC grade copper and shall be tin plated. The size of Bus Bars shall be adequate as per rating.
- 5.2.3 The pressure plates shall have built in flat flap to hold conductor flat on Bus Bar. It shall ensure definite overlap contact on the Bus Bar so as to avoid

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loose contact subsequent over heating at contact. Thus it shall help in line loss reduction.

- 5.2.4 Multiple modules shall be fitted in a box so as to fulfill the system requirement.
- 5.2.5 The current carrying parts shall be of electrolytic grade and the hardware, spring, links etc. used along with shall be of non- magnetic type. The Bus bar shall be made of EC grade copper with total cross section of 75 sq mm & length as per the requirement. (Two nos of copper conductors of 37.5 sq mm. each making a total of 75 sq mm may be used.)
- 5.2.6 The pressure plates which keep pressing the cable conductor & springs with sufficient strength of thickness 2mm. The diameter of the spring wire shall not be less than 2.0 mm. Both are to be made of Stainless steel only.
- 5.2.7 The springs are required to be retained in the housing by means of a stainless steel rod at the bottom end of the housing so as to exert pressure on the pressure plate when cable is inserted in the bus bar.
- 5.2.8 The connection system shall be spring loaded so that no fasteners are required to add a new connection from the distribution system. Also each connected cable shall have a pressure applied to it at the point of connection to provide connection integrity & eliminate loose connections.
- 5.2.9 Provision for one incoming circuit of single/three phase with neutral of cable size 50 or 35 or 16 Sq mm cable & outgoing connections of cable size 2.5 to 6 sq mm. size as per requirement on each phase bus bar & neutral shall be provided.
- 5.2.10 Single/Three phase S. C. Boxes shall have following combinations.
- | | |
|-------------------------------|-------------------------------|
| 1) one incoming & 3 outgoing | 2) one incoming & 6 outgoing |
| 3) one incoming & 9 outgoing | 4) one incoming & 12 outgoing |
| 5) one incoming & 15 outgoing | 6) one incoming & 18 outgoing |

The successful bidder shall submit the detailed drawings of the boxes for necessary approval of C.E.(Distribution) or Concerned C.E. of the Zone.

6.0 TESTS:

6.1 TYPE TESTS:

Type tests as mentioned in annexure A shall be carried out on SMC material as per IS 13410/13411. In addition to above following type tests shall be carried out on complete box

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1. High Voltage test on Bus bar as per IS 8623 (A.C. voltage 2.5KV applied for one minute).
2. Temperature Rise Test at 100% rated current as per IS 8623.
3. Degree of protection Test for IP44 as per IS 13947/1993 (Part 1).
4. Mechanical Strength Test as per IS 14772.

6.2 ACCEPTANCE TESTS:

Following acceptance tests shall be carried out.

- 1) Acceptance tests as mentioned in annexure A shall be carried out on SMC material as per IS 13410/13411.
- 2) Verification of dimensions & construction as per IS 14772.
- 3) High Voltage test

6.3 TEST CERTIFICATES:

The material offered shall be fully type tested as per relevant IS and this specification. The successful Bidder shall furnish detailed type test reports before commencement of supply for necessary approval of the CE Concerned. The detailed Type Test Reports shall be furnished with relevant oscillogram and certified Drawings of the material tested. The purchaser reserves the right to demand repetition of some or all the Type tests in presence of purchaser's representative at purchaser's cost.

All the Type Tests shall be carried out from laboratories which are accredited by the National Board of Testing and Calibration Laboratories (NABL) of Government of India such as CPRI Bangalore/ Bhopal, ERDA Baroda, to prove that the material offered meet requirements of the specification. The tenderer should also furnish certificate from laboratories that laboratories are having all the requisite test facility available in house. The type tests reports conducted in manufacturers own laboratory and certified by testing institute shall not be acceptable.

7.0 TESTING AND MANUFACTURING FACILITIES:

- 7.1 The manufacturers must have necessary machinery for production of SMC Service Connection LT Distribution Box.
- 7.2 The manufacturer should have in house testing facilities for carrying out acceptance test as per mentioned above.

8.0 GUARENTEE :

The material supplied shall be guaranteed for the period of 60 months from the date of commissioning or 66 months from the date of dispatch whichever is earlier.

The material found defective within the above guarantee period shall be replaced /repaired by the supplier free of cost within one month of receipt of

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intimation. If the defective instrument is not replaced/repaired within the specified period mentioned above, the MSEDCL shall recover an equivalent amount plus 10 % supervision charges from any of the bills of the supplier.

9.0 MARKING:

The following information shall be legibly and indelibly marked to show the following

- a) Name or trade mark of the manufacturer.
- b) Month and year of manufacturing.
- c) "MSEDCL" Mark
- d) Danger Logo

10.0 SCHEDULES:

The tenderer shall fill in the following schedules and submit along with the offer. If the schedules are not submitted duly filled in with the offer, the offer shall be rejected.

Schedule – A : Guaranteed Technical Particulars

Schedule – B : Deviation from Specification

Schedule – C : Tenderer's Experience

Annexure 'A'

Specifications for Fiberglass Reinforced Plastic Sheet moulding compound

- 1) FRP Sheet Moulding Compound shall conform to IS:13410-1992
- 2) The Surface appearance of the door must be smooth, non porous, and homogeneous, free of ripples, defects, and marks. No filler or fiber shall be visible at any place.
- 3) Other properties of SMC material shall be as follows & shall pass the test mentioned against the same.

Sr. No.	Characteristic	Requirement	Type of test	Method of test Ref. to
1.	Material.	Thermosetting Plastic		
2.	Grade of material	SMC Electrical grade S3		IS:13410-1992
Material requirement for Sheet Moulding Compound				
4.	Glass content, percent by mass (Min.)	20	Type	Annexure A of IS:13411-1992
5.	Mould shrinkage, linear % Max	0.25	Acceptance	Annexure B of IS:13411-1992
6.	Flow, mm, Minimum	170	Acceptance	Annexure C of IS:13411-1992
Requirement for Moulded Sheet Moulding Compound				
7.	Water Absorption, % Max	0.20	Type	Annexure D of IS:13411-1992
8	Izod impact strength (Notched), KJ/m ²	55	Type	Annexure E of IS:13411-1992
9	Flexible Strength ,MPa , Min	170	Type	Annexure F of IS:13411-1992
10	Power Arc Resistance Sec. Min.	180	Type	Annexure G of IS:13411-1992
11	Modulus of Elasticity, 10 ³ , MPa	12 to 15	Type	IS: 8543 Part-4 (Sec-1)/1984
12	Tracking Resistance CTI, Min	1000	Type	IS: 2824/1975
13	Dielectric Strength at 90°C in Oil KV/mm	11	Type	IS:6262/1971
14	Dissipation factor (4 days at 80 % RH & 1 KHz)	0.01	Type	IS: 4486/1967
15	Heat Distortion Temperature, °C ,Min	150	Type	Annexure H of IS:13411-1992

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16	Oxygen Index,% Min	24	Type	IS: 13360 Part-6 (Sec-6)/1992
17	Post shrinkage, % Max	0.01	Acceptance	Annexure B of IS:13411-1992
18	Tensile Strength ,MPa , Min	70	Acceptance	IS: 8543 Part-4 (Sec-1)/1984
19	Density of Moulding, g/ml	1.8 to 2.1	Routine	IS: 8543 Part-I /Sec 2/1979
20	Surface resistivity (24 H in water), Ohm,Min	1×10^{13}	Routine	IS: 3396/1979
21	Volume resistivity, Ohm-cm, Min	1×10^{14}	Routine	IS: 3396/1979
22	Exposure to flame	Self-Extinguishing		IS:4249
23	Melting Point	test up to 400°C		IS:13360 Part6 : Sec 10 : 1992
24	Cross Breaking Strength	(1723 Kg/sq.cm)		As per ASTM D790
25	Shear Strength	(879 Kg/sq.cm)		As per ASTM D732
26	Flammability (V2)	UL 94 or IS : 11731 (Pt.II)		IS : 11731 (Part- II)
27	Marking, Dimensions and construction			IS : 14772

SCHEDULE – A

GUARANTEED TECHNICAL PARTICULARS

For tamper proof service connection box for L.T. Lines / Consumer Mains

Sr. No.	Parameter Name	Parameter type
1.	Name or Trademark of Manufacturer.	Text
2.	Type of Service connection Box (Type & total No. of Outgoing connections) provided	Text
3.	Rated normal voltage	Text
4.	Material of construction	Text
5.	Thickness of SMC sheet for enclosure	Text
6.	Dimensions of Service connection Box Width x Depth x Height (in mm)	Text
7.	Degree of protection of the Box	Text
8.	Sealing U clamps details {2 Nos. S.S."U" Clamp of minimum thickness (0.8 ± 0.1 mm)}	Text
9.	No. of Holes provided for cables A) Incoming Cable B) For Outgoing Cables	Text
10.	Minimum side clearances from spring loaded Bus Bar module in the box (in mm)	Text
11.	Marking on the box is as per the specifications	Text
12.	Fiberglass Reinforced Plastic Sheet Moulding Compound	Text
12.1	Material (Thermosetting Plastic)	Text
12.2	Grade of material (SMC as per IS:13410-1992)	Text
12.3	Heat deflection Temperature (As per IS:13411)(min 150°C)	Text
12.4	Exposure to flame (Ref. Std. IS:4249) (Self-Extinguishing)	Text
12.5	Melting Point (Ref. Std. IS:13360) (Does not melt)	Text
12.6	Door material (U.V. resistant & resistant to salty & humid atmosphere)	Text
12.7	Specific Gravity as per IS:10192 of SMC material (1.8)	Text
12.8	Dielectric Strength as per IS:1998	Text
12.9	Tensile Strength as per IS:867-1963 (1058 Kg/sq.cm)	Text
12.10	Cross Breaking Strength as per ASTM D790 (1723 Kg/sq.cm)	Text
12.11	Insulation Resistance (As per ASTM D257)	Text
12.12	Water Absorption as per IS:14772	Text
12.13	Mechanical Strength as per IS:14772	Text
13.	Type of clamping/fixing Arrangement for box	Text
14.	Type of hinges for door (Clause no. 4.1.9)	Text
15.	Number of hinges provided.	Text
16.	Earthing bolt as per specification with earthing logo provided	Boolean

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Sr. No.	Parameter Name	Parameter type
17.	Spring Loaded bus bar system	
17.1	Mounting Material of spring loaded Bus Bar & mounting Bus bar Supports (Thermosetting Plastic (SMC) as per IS-13410-1992)	Text
17.2	Material of Bus Bar (EC Grade Copper tin plated)	Text
17.3	Cross Section area and length of Bus Bar (Total 75 Sq. mm) (2 Nos. of 37.5 Sq.mm each)	Text
17.4	Length of bus bar (mm)	Text
17.5	No. of Bus Bar module complete with fitting	Text
17.6	Pressure Plate thick & MoC (Thickness 2.0 mm stainless)	Text
17.7	Distance between Bus Bars module (Center to Centre distance 35 mm (Min.))	Text
18	Details of Type Tests Carried out	Text
19	Other detail if any	Text



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SCHEDULE –B

DEVIATIONS FROM SPECIFICATION

All deviations from this specification shall be set out by the tenderer clause by clause in this schedule. Unless mentioned in this schedule the tender shall be deemed to confirm to the specification.

Clause Number	Details of deviations	Justification
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NAME OF FIRM _____

NAME & SIGNATURE OF TENDERER _____

DESIGNATION _____

DATE _____



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SCHEDULE – C

SCHEDULE OF TENDERERS' EXPERIENCE

The tenderer shall furnish a list of similar orders executed under execution by him and name of persons to whom reference may be made by the purchaser in care such a reference is considered necessary.

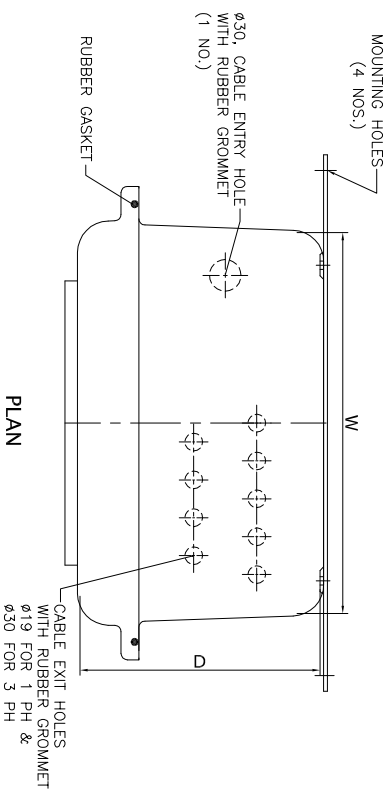
Sr. No.	Name and Description of work executed	Month and year of commissioning	Client	Name of person
---------	---------------------------------------	---------------------------------	--------	----------------

NAME OF FIRM _____

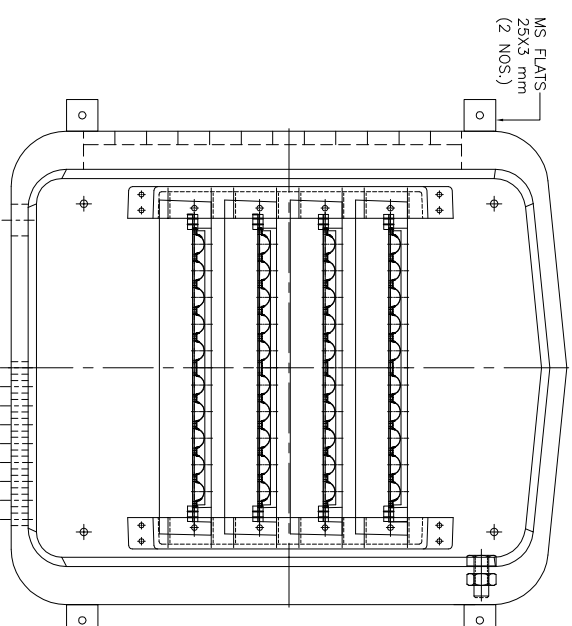
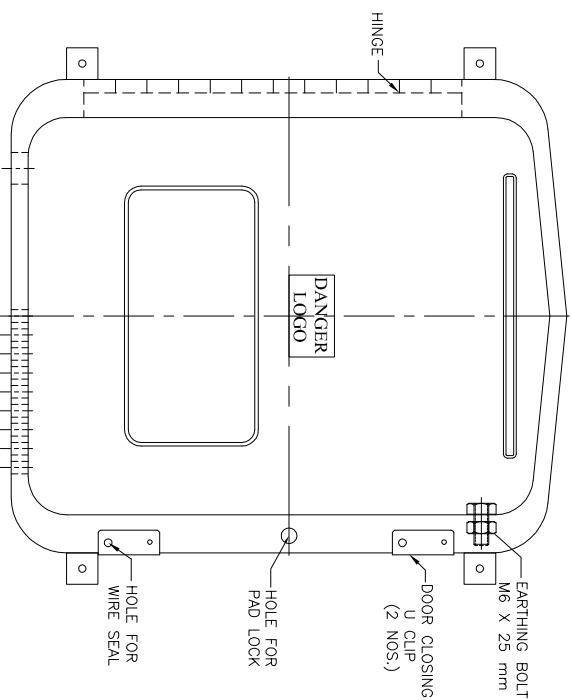
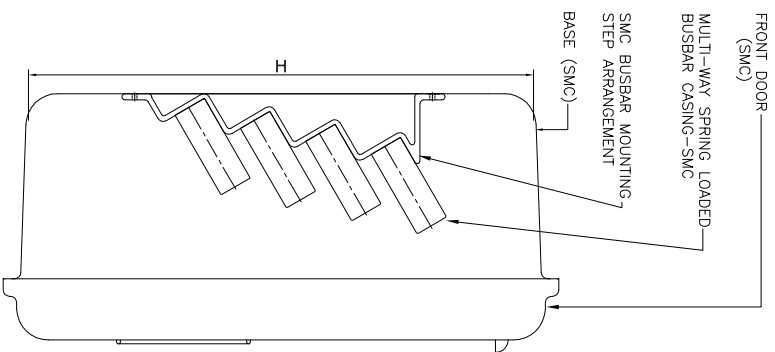
NAME & SIGNATURE OF TENDERER _____

DESIGNATION _____

DATE _____



- NOTES :-**
- (1) ENCLOSURE, SPRING LOADED BUSBAR CASING AND MOUNTING MADE OUT OF SHEET Moulding Compound BY THE PROCESS OF HOT PRESS COMPRESSION Moulding CONFIRMING TO IS : 13410.
 - (2) SMC BASE, DOOR, BUSBAR CASING OR MOUNTING SHALL NOT SOFTEN OR BEND ON HEATING.
 - (3) DOOR FITTED TO BASE BY HINGES WITH DOOR CLOSING U CLIPS.
 - (4) COLOUR :- OFF WHITE/GREY



THIS IS AN INDICATIVE DRAWING

ALL DIMENSIONS IN MM		M.S.E.D.C.L.	
DESIGNATION		DISTRIBUTION SECTION	
DESIGNATION	SIGN	DATE	TITLE
DRAWN BY DY E E (MSC-II)			SPRING LOADED SERVICE CONNECTION BOX
CHECKED BY EE (MSC-III)			
RECOMMENDED BY SE (MSC)			
APPROVED BY CE (DIST)			SCALE - N.T.S.
THIRD ANGLE PROJECTION		DRG NO. MSEDCL/DIST/MSC-II/0510/01 Rev 0	