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1. SCOPE

This Specification covers the design, manufacture, testing at works and supply of L.T Distribution Boxes made out of GI for controlling the L.T. feeders from the L.T. side of Distribution for Feeders. The system shall be AC 3 phase, 4 wires, 433 V, 50 HZ with effectively grounded neutral. LT Feeder shall comprise of 3P MCCB in incomer and HRC fuse in outgoing.

2. APPLICABLE STANDARDS

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International standards and shall confirm to the regulations of the local authorities.

S.NO	Indian Standard	Title
1	IS 5039	Specification for distribution pillars below 1000V AC
2	IS :13947/1993 (Part 3)	Specification for Isolator (Switch Disconnecter)
3	IS: 13947/1993 (Part2) (amended up to date)	Specification for L.T. MCCBs.
4	IS: 8623/1993 (amended up to date)	Specification for enclosure Box & for degree of protection provided by enclosures of electrical equipment.
5	IS: 4237/1982 IS: 8623/1993 (amended upto date)	Specification for general requirement of L.T. switchgears.
6	IS 13703/1993 (Part I & II amended upto date)	Specification for HRC Fuse Base and HRC Fuse Link.
7	IS 4759: 1996	Hot-Dip Zinc Coating On Structural Steel and Other Allied Product
8	IS 2705	Current Transformer

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

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)

TPCODL/TPWODL/TPNODL/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. GENERAL TECHNICAL REQUIREMENTS

Standard General Arrangement MCCB In the incoming & HRC fuse base with HRC fuse links in the Outgoing Circuit. Metering Box to be welded on one side of the box as per sample drawing. Provision space for fixing 3 Phase energy meter to be given

GUARANTEED TECHNICAL PARTICULARS FOR LTDB 250 KVA DISTRIBUTION TRANSFORMER

Sr	PARTICULARS	OFFERED
1	Material of LTDB	GI Sheet (220 GSM) with Powder Coated Preferred make for GI sheet- SAIL, JINDAL, TATA, RINL Thickness of Powder Coating: min 60-70 microns
2	Color of Box	RAL 7032 as per IS 5
3	Dimension of Box (Height X Width X Depth)	1550x1650x500 mm (Tolerance $\pm$ 5%)
4	THICKNESS OF BOX	
i	Load Bearing Size	3.0 mm (Min.)
ii	Non Load Bearing size	3.0 mm (Min.)
iii	Type of Door	Double door centre opening swing type
5	Hinges	High quality bottle type hinges of reputed make Minimum 4 hinges per door (Total 8 Hinges)
6	Lock Arrangement	Allen Key Panel Lock (2 for each door, Top and Bottom) along with standard L Drop arrangement of reputed make
7	Sealing/Gasket Arrangement	Superior Quality gasket of reputed make. To be used to achieve dust proofing, vermin proofing and IP 55
8	Cable connection arrangement	Separate Removable Gland Plate shall be provided for each incoming and outgoing feeder. Knockout punch holes to be provided and required Holes shall be done at site. Size of holes will be provided during detail Engineering.
9	In coming aluminum Bus Bar R,Y,B,N	For 250 KVA: 50 x 8mm , (R,Y,B,N)
10	Outgoing Aluminum Riser /Dropper	50 x 8 mm, EC grade Al
11	Bus bar arrangement	As per drawing (Subject to change as per Manufacturer's Type Tested Design while maintaining Clearance as per Relevant Standards)
12	Busbar mounting insulator	Epoxy resin cast bus insulators / DMC Insulator
13	Clarence between busbars.	Ph-Ph Clearance shall be 40mm throughout busbar section At the point of cable termination of I/c Busbar, clearance shall be 60mm. Clearance at the connection point (Spreader) of MCCB shall be maintained min. 20 mm
14	Clarence between busbar & Box walls.	100mm (Min) side clearance, 70mm (Min) Top clearance

 		Document No: ENG-LV-3014-R1 Document Title: Specification of 250KVA, 500KVA LTDB with GI Enclosure
		250mm (Min) Bottom clearance
15	Sealing arrangement of Metering Box	Suitable Arrangement to install 2 seals on metering Box, apart from standard locking arrangement.
16	Degree of protection	IP-55 (Min) For Cross ventilation Louvers shall be provided (Shall be confirmed during Detailed Engineering)
17	Packing	Standard Corrugated box packing
18	Earthling Provision	M8 x 50 mm, 02 Nos
19	Incoming MCCB	For 250 KVA : 400 Amp 35KA TP MCCB- 01 Nos MCCB Should have integrated OL, SC & E/F Protection
20	Make of MCCB	ABB, Siemens, Lauritz Knudsen Electrical & Automation, EATON, Schneider, Legrand, HPL, Havells & C&S MCCB Should have integrated OL, SC & E/F Protection
21	Outgoing arrangement HRC Fuse	a) For 250 KVA : OG-1:200A,OG-2:200A,OG-3:160A HRC Fuse make- Lauritz Knudsen Electrical & Automation, Siemens, EATON, ABB, Schneider, Havells, HPL, C&S b) Extended terminal in both the sides of HRC fuse with bus post insulator shall be provided for cable termination. The height of insulator to be such that the phase cable does not hinder access to the neutral busbar. c) One side of extended terminal of HRC fuse shall be connected with the busbar extension ensuring equal cross-section of both busbar and the extended terminal of HRC fuse. d) Another end of extended terminal of HRC fuse shall be with lugs for cable termination.
22	Terminal Spreader rating	Minimum cross sectional area must be equivalent to the Incoming bus bar size. Spreader needs to be L-shaped for R and B-phase and straight type for Y-phase
23	LT switch & socket	1 set of light, socket & switch is provided for availing power auxiliary single phase supply of 16Amp with 16A 2P MCB
24	Energy Meter	a) Provision to install Energy meter as per Sample drawing b) Wires from CT to be wired up to TTB, 2.5 sqmm FRLS PVC wire shall be provided and colored wire with proper ferruling to be provided. c) For Smart Meter connection, 150mm colored wire shall be provided and one side terminated at TTB end and other part to be kept loose for meter termination. d) 500 X 350 X 250 mm Meter Box provided on side wall with terminal block provision to install Energy meter e) Thickness of sheet: 3mm f) The meter viewing window shall be provided with toughened safety glass and A protective wire mesh shall be installed on the inner side of the glass to prevent accidental damage and unauthorized access.
25	CT for Metering	0.5s Accuracy Class on 3 Phase and neutral Burden 5 VA For Neutral CT, Secondary wires to be wired up to TTB
26	CT for Protection	Neutral CT of protection class shall be provided and wired for E/F protection (As it is Optional requirement, so shorting link with disconnecting type shall be provided.)

 		Document No: ENG-LV-3014-R1 Document Title: Specification of 250KVA, 500KVA LTDB with GI Enclosure
26	LED Indication	On Incoming supply R, Y, B with Fuse protection

GUARANTEED TECHNICAL PARTICULARS FOR LTDB 500 KVA DISTRIBUTION TRANSFORMER

Sr	PARTICULARS	OFFERED
1	Material of LTDB	GI Sheet (220 GSM) with Powder Coated Preferred make for GI sheet- SAIL, JINDAL, TATA, RINL Thickness of Powder Coating: min 60-70 microns
2	Color of Box	RAL 7032 as per IS 5
3	Dimension of Box (Height X Width X Depth)	1700X1900x500 (Tolerance $\pm$ 5%)
4	THICKNESS OF BOX	
i	Load Bearing Size	3.0 mm (Min.)
ii	Non-Load Bearing size	3.0 mm (Min.)
iii	Type of Door	Double door Centre opening swing type
5	Hinges	High quality bottle type hinges of reputed make Minimum 4 hinges per door (Total 8 Hinges)
6	Lock Arrangement	Allen Key Panel Lock (2 for each door, Top and Bottom) along with standard L Drop arrangement of reputed make
7	Sealing/Gasket Arrangement	Superior Quality gasket of reputed make. To be used to achieve dust proofing, vermin proofing and IP 55
8	Cable connection arrangement	Separate Removable Gland Plate shall be provided for each incoming and outgoing feeder. Knockout punch holes to be provided and required Holes shall be done at site. Size of holes will be provided during detail Engineering.
9	In coming aluminum Bus Bar R, Y, B, N	For 500 KVA: 75 x 12mm, (R, Y, B, N)
10	Outgoing Aluminum Riser /Dropper	50 x 8 mm, EC grade Al
11	Bus bar arrangement	As per drawing (Subject to change as per Manufacturer's Type Tested Design while maintaining Clearance as per Relevant Standards)
12	Busbar mounting insulator	Epoxy resin cast bus insulators / DMC Insulator
13	Clearance between busbars.	Ph-Ph Clearance shall be 40mm throughout busbar section At the point of cable termination of I/c Busbar, clearance shall be 60mm. Clearance at the connection point (Spreader) of MCCB shall be maintained min. 20 mm
14	Clarence between busbar & Box walls.	100mm (Min) side clearance, 70mm (Min) Top clearance 250mm (Min) Bottom clearance
15	Sealing arrangement of Metering Box	Suitable Arrangement to install 2 seals on metering Box, apart from standard locking arrangement.
16	Degree of protection	IP-55 (Min)

		For Cross ventilation Louvers shall be provided (Shall be confirmed during Detailed Engineering) IP-33 With Louver along with canopy
17	Packing	Standard Corrugated box packing
18	Earthling Provision	M8 x 50 mm, 02 Nos
19	Incoming MCCB	For 500 KVA: 800 Amp 35KA TP MCCB- 01 Nos MCCB Should have integrated OL, SC & E/F Protection
20	Make of MCCB	ABB, Siemens, Lauritz Knudsen Electrical & Automation, EATON, Schneider, Legrand, HPL, Havells & C&S MCCB Should have integrated OL, SC & E/F Protection
21	Outgoing arrangement HRC Fuse	a) For 500 KVA: OG-1:315A, OG-2:200A, OG-3:200A, OG-4:160A HRC Fuse make- Lauritz Knudsen Electrical & Automation, Siemens, EATON, Schneider, Havells, C&S a) Extended terminal in both the sides of HRC fuse with bus post insulator shall be provided for cable termination. The height of insulator to be such that the phase cable does not hinder access to the neutral busbar. b) One side of extended terminal of HRC fuse shall be connected with the busbar extension ensuring equal cross-section of both busbar and the extended terminal of HRC fuse. c) Another end of extended terminal of HRC fuse shall be with lugs for cable termination.
22	Terminal Spreader rating	Minimum cross sectional is must be equivalent to the Incomer bus bar size. Spreader needs to be L-shaped for R and B-phase and straight type for Y-phase
23	LT switch & socket	1 set of light, socket & switch is provided for availing power auxiliary single phase supply of 16Amp with 16A 2P MCB
24	Energy Meter	a) Provision to install Energy meter as per Sample drawing b) Wires from CT to be wired up to TTB ,2.5 sqmm FRLS PVC wire shall be provided and colored wire with proper ferruling to be provided. c) For Smart Meter connection, 150mm colored wire shall be provided and one side terminated at TTB end and other part to be kept loose for meter termination. d) 500 X 350 X 250 mm Meter Box provided on side wall with terminal block provision to install Energy meter e) Thickness of sheet: 3mm f) The meter viewing window shall be provided with toughened safety glass and A protective wire mesh shall be installed on the inner side of the glass to prevent accidental damage and unauthorized access.
25	CT for Metering	0.5s Accuracy Class on 3 Phase and neutral Burden 5 VA For Neutral CT, Secondary wires to be wired up to TTB
26	CT for Protection	Neutral CT of protection class shall be provided and wired for E/F protection (As it is Optional requirement, so shorting link with disconnecting type shall be provided.)
26	LED Indication	On Incoming supply R, Y, B with Fuse protection

5. GENERAL CONSTRUCTIONS

Distribution Boxes shall have triple-pole MCCB on incoming circuit and HRC fuse base with HRC fuse links on outgoing circuits with necessary interconnecting Bus Bars/Links. The distribution box shall have provision for installation of 3 Phase energy meter. Metering Box welded to LTDB as per sample drawing

Enclosure shall be of GI sheet

LTDB for 250KVA & 500KVA LTDB will be Plinth mounted.

Bidder has to supply suitable GI frame of 300mm height along with Distribution box for 250KVA & 500KVA LTDB.

Process for Galvanization shall be as per Annexure-1

Note: Before starting Mass Production, Supplier has to fabricate one prototype and get it Inspected and Approved by TPCODL/TPWODL/TPNODL/TPSODL Engineering & Quality Department.

5.1 INCOMING CIRCUIT

Each distribution box shall have 1 no. of triple-pole MCCB rating suitable for 250 KVA /500 KVA Box to protect outgoing circuits. MCCB shall be conforming as mentioned below table. The bidder shall indicate the makes and types of MCCBs offered in GTP. The Bidder shall furnish detailed type test reports before or on due date & time of submission of tender. Opening & Closing of MCCB shall be manual. MCCB should electrically open during fault. The MCCB should be front operated triple pole type.

5.2 OUTGOING CIRCUIT

1. HRC FUSE: -

HRC Fuse of suitable capacity shall be provided on outgoing terminal of MCCB to facilitate electrical breaking of the circuit. Each Distribution Box shall have HRC Fuse Base with HRC Fuse (Blade type Contacts) on Outgoing Circuit. The bidder shall indicate in GTP, the make, type, Fault Rating and capacity of HRC Fuse Base and Fuse offered.

2. HRC FUSE BASE

The base of the HRC Fuse shall be of non-tracking, heat resistant insulating material of Dough Moulding Compound (DMC) of D3 Grade as per IS: 13411/1992. The Fuse Base shall be sturdy in construction. The extension terminal connector strips of the Fuse Base shall be projecting out on both sides, made with two pieces (half portion of the terminal contact and extension strip should be continuous in one piece).

DT RATING	LTDB Incoming MCCB-3P	O/G-1 HRC Fuse Base Rating	O/G-1 HRC Fuse Link Rating	O/G-2 HRC Fuse Base Rating	O/G-2 HRC Fuse Link Rating	O/G-3 HRC Fuse Base Rating	O/G-3 HRC Fuse Link Rating	O/G-4 HRC Fuse Base Rating	O/G-4 HRC Fuse Link Rating
250KVA	400A	315A	250A	315A	250A	315A	250A	NA	NA
500KVA	800A	400A	315A	400A	315A	400A	315A	400A	315A

3. 250kVA LTDB: HRC Fuse Base of rating 315A shall be identical for all 3 out goings.
4. 500kVA LTDB: HRC Fuse Base of rating 400A shall be identical for all 4 out goings.
5. The Bidder shall furnish detailed type test reports before or on due date & time of submission of tender. The HRC fuse base with HRC fuse to be provided in the Distribution Box.
6. Each Distribution box shall have provision for fixing Smart Energy meter in attached Metering Compartment with suitable rating CTs for DT metering.
 - a) Metering Compartment Size: (in mm): 500 X 350 X 250
 - b) CT arrangement will be on the outgoing side of MCCB.
 - c) Neutral Protection to be provided for earth fault separately. Bidder may provide TP MCCB with NCT (Similar OEM make of MCCB) or TPN MCCB, in case of TPN MCCB neutral busbar to be connected with MCCB
 - d) The Metering Compartment shall be IP55 and to be fixed to the side-wall of LTDB (Drawing Attached).
 - e) All required Wirings for Current and Voltage measurement, from LTDB to Metering Box TB is in scope of supplier.
 - f) TTB, 3ph 4 wire, Front connection screw type 50 Amp to be used for CT/PT wirings to Energy meter. Provision for CT Shorting to be provided in TB.
 - g) Min clearance between TTB & Meter: 50mm

- h) Make of TTB: DAV/IMP
- i) Make of Energy Meter: Secure make
Approx. Dimension (L x B x W) – (300 x 200 x 100) which to be finalized during detailed Engineering.
- j) 2 Amp MCB to be used for isolation purpose in Voltage circuit wiring to Metering Compartment.
- 7. Current Transformers: The Bidder has to supply Base Mounted Current Transformers.
- 8. CT Specification as per Annexure-2.
- 9. Suitable CT Ratios to be selected by Bidder.

5.3 BUSBARS AND CONNECTIONS:

The Incomer feeder should be on Left side of the distribution box and all outgoing feeders will be on Right side of the distribution box, with phase sequence RYB to be maintained. The phase bus bars and feeder droppers from bus bars shall be of electrolytic grade Aluminum with purity 99.5%.

Bus-Bar sizing subject to minor changes as per Manufacture's Type Tested Design ensuring adequate clearance between electrical components as per relevant Standards.

- 1) **The Incomer Feeder dropper & Bus Bar for 250KVA LTDB will be 50 x 8 mm cross section.**
- 2) **The Incomer Feeder dropper & Bus Bar for 500KVA LTDB will be 50 X 8 & 75 X 12 mm cross section respectively.**

All bus bars and droppers shall be properly drilled and deburred. Each bus bars shall be of one single strip without any joint. At the joint with copper part the aluminum end piece shall be bimetallic with sufficient thickness. There should be Heat Shrinkable bus bar insulation Sleeves of Red, Yellow, Blue & Black. Bus bars shall be mounted on suitable size support insulators which should be tightened from inside. i.e. once fitted, should not be able to removed. Minimum clearances, wherever shown, shall be as per General

Arrangement shall be as per requirement of IS: 4237/1982 amended up to date.

- 1) Minimum Clearance between Phase to Earth after all Cable Connections: 40mm
- 2) Minimum Clearance between Phase to Phase after all Cable Connections: 40mm
- 3) Minimum Clearance between Phase to Panel Wall: 100mm
- 4) Minimum Clearance between Phase to Panel top wall of enclosure: 70mm
- 5) Minimum Bottom Clearance between Phase and gland plate: 250mm

5.4 ENCLOSURE:

The L.T. Distribution Cabinets shall be Plinth Mounted. These Distribution Cabinets are to be outdoor type and to be fabricated out of 3 mm GI sheet. The body of the boxes shall have sufficient re- enforcement with suitable size of channels keeping a provision for fixing these boxes on plinths. Enough reinforcement should be provided to make the enclosure suitable to be used in Cyclone prone/High intensity wind areas.

All sheets, angles, channels used in the construction of LTDB enclosure shall be Hot Dip Galvanized.

The general clear dimensions of Distribution boxes shall be as follows:

Note:(Dimensions are subject to small variations as per Manufacturer's Type Tested Design ensuring necessary clearance as per relevant IS between all Electrical Components)

Dimensions in mm (Height X Width X Depth):

For 250KVA Distribution box :1550x1650x500 (Tolerance ± 5%)

For 500KVA Distribution box :1700x1900x500 (Tolerance ± 5%)

The above dimension are indicative, the box should be able to accommodate all equipment's with sufficient rating & required clearances as per relevant standards. The design should also be maintenance friendly so that the replacement of any equipment can be done without any difficulty.

The nuts, bolts, washers used in the box shall be galvanized to avoid rusting.

The box shall have two no's of solid Earthing points on either side.

Boxes shall have Centre opening swing double door type with four number of hinges. On closing of doors, right door

shall rest on the left door. Base and doors shall have flange / collars. Collar of Base and doors shall overlap by 10mm. Rubber gasket of suitable size shall be provided in between base and doors, such that it provides proper sealing between the door and base of box to avoid penetration of dust & ingress of water. **Degree of protection shall be IP-55**. Rubber Gasket shall be fixed with suitable adhesive. Hinges shall be stainless type, minimum 50 mm in length & made from 2mm thickness or suitable size to provide enough strength. The hinges shall not be visible from outside. Padlocking arrangement should be provided outside the Door. The MCCBs, HRC Fuse, Meter, CT and HRC fuse base shall be housed inside the enclosure.

Mounting of components inside the enclosure shall allow free air circulation keeping the clearances as per drawings

Painting

All paint shall be applied on clean dry surfaces under suitable atmospheric conditions by seven tank process and powder coating. The overall paint thickness shall not be less than 70 microns.

The paint shall not scale off or crinkle or be removed by abrasion during normal handling.

The enclosure of the Panel shall be painted with shade light Grey, i.e. RAL 7032. The Panel should be painted with Anticorrosive paints. If any damage observed after delivery same need to be touch-up painted after delivery at site.

The paint should sustain for harsh environment & saline weather, Corrosion Protection for Panel entire life cycle (minimum 10 yrs).

5.5 LOCKING ARRANGEMENT TO THE BOX

- A. The door should be front operated with a common handle provided outside the door. In addition to this, Pad lock to be provided in Centre & C&R panel door locks shall be provided to the door at top & bottom. Key way shall be provided on the door for operating the lock from outside. Key way shall be provided with cover. A nylon washer shall be provided between the handle and door to avoid penetration of water.
- B. Electrolytic grade aluminum neutral busbar will be same rating as phase bus bar with current density 1 Amp/sqmm.
- C. Neutral Busbar shall be isolated with respect to body. The bimetallic lugs of adequate size, as per enclosed specification & drawing, shall be provided. Neutral Busbar shall be as shown in the drawing attached with the specifications.
- D. Two galvanized earthing Bolts of M8 x 40 mm size shall be fixed from inside and projecting outside of the box. There should be no powder coating on the earthing bolts. Two Nuts with washers shall be provided on each bolt.
- E. All the components inside the Box shall be mounted on GI BOX. The mounting strips shall be provided with required bends or ribs to give the extra strength and shall be powder coated or zinc plated.
- F. All joints of current carrying parts shall be bolted with 8.8 grade High Tensile SS Nuts & Bolts, Corrugated/spring & Plain Washers. The nuts & bolts should be of hexagonal type. All the nuts, bolts & washers should be properly zinc plated.
- G. Each distribution box shall be supplied with proper packing in five ply - corrugated box.
- H. Name plate having details such as Month & year of manufacturing, Name of manufacturer/Trade mark, Sr.No, and rating of Distribution box, Danger Plate shall be riveted on the Distribution box door. The nameplate should be of stainless steel of thickness 1 mm. TPCODL/TPWODL/TPNODL/TPSODL logo shall be embossed on the door of the distribution box.
- I. Incoming and outgoing circuit should be duly highlighted with paint by stencil printing.
- J. Adequate slope on the top of box shall be provided to drain out rainwater from the top. Good-quality plastic sticker leaflet should be riveted inside of distribution box door. The matter of instruction leaflet is given along with this specification. All the instructions in leaflet should be in Odia/Hindi/English language.
- K. Danger boards shall be riveted on the box as per IS 2551. Danger board marking by painting shall not be accepted.

6. MARKING

The LTDB box shall carry the following information contained in a label attached to it:

- a) Reference to the Standards.
- b) Manufacturer's name
- c) Year of manufacture.
- d) The following shall be embossed on the LTDB," PROPERTY OF TPCODL/TPWODL/TPNODL/TPSODL."

- e) Danger Name plates, Supply voltage-415v (In Odia, Hindi and English as per IS 2551)
- f) Purchase Order number
- g) Warranty has to be marked on the nameplate of the enclosure with another warranty sticker (Metal Riveted) to be placed inside the enclosure with date and other details related to warranty.

7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Acceptance Tests shall be witnessed by the purchaser/his authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the LTDB components in additions to others specified in the IS/IEC Standards. All these Type Test should be conducted at CPRI/ERDA. Type Test report validity should not exceed timespan as per CEA Latest Guidelines from the date of testing.

TYPE TESTS

ON COMPLETE BOX:

- Temperature rise test: - The temperature rise test should be carried out as per IS: 8623 -1993.
- High voltage test shall be carried out as per IS:8623/ 1993 amended upto date.
- Short Time Withstand Current Test on Distribution Box shall be carried out as per IS 8623 or latest version.
- Degree of protection for IP- 55 on complete box shall be carried out as per IS: 13947/1993 or the latest version thereof.
- Time /current characteristic test on MCCBs shall be carried out as per clause 7.2 of this specification as stated above.

ON HRC fuses base and HRC fuse:

Type tests on HRC fuses and HRC fuse links IS 13703 (Part I & II) for HRC Fuse Base and HRC fuse link shall be carried out.

ON MCCB:

Type tests on MCCB as per IS-13947

ACCEPTANCE TESTS

Following tests shall be carried out as per acceptance tests in addition to routine tests on one random sample of each rating out of the lot offered for inspection:

1. Temperature rise test on one sample of each rating. Temperature rise test will be carried out as per the procedure given below: For temperature rise test, a distribution box with all assembly of MCCBs / HRC fuse base with HRC fuse link shall be kept in an enclosure such that the temperature outside the box shall be maintained at 50 ° C.
20% more current than transformer secondary capacity i.e. for 63 KVA Distribution Transformers full load current 84A, 20 % more is 100 A shall be kept in incoming circuit keeping outgoing circuits short, till the temperature stabilizes and maximum temperature rise should be recorded.
2. Time-Current Characteristics the MCCB should be tested for time current characteristics at 1.05 & 1.2 times of overload release setting current.

ROUTINE TESTS

1. Overall Dimensions Checking.
2. Insulation Resistance Tests.
3. High Voltage Test at 2500 V, 50 Hz AC for one minute.
4. Operation Test on MCCB/ HRC fuse base and HRC fuse links.
5. Thermal overloading Test for MCCB
6. Contact Resistance Test

For MCCBs and HRC Fuse, Routine Test reports of OEM is accepted.

8. TYPE TEST CERTIFICATES

The Bidder shall furnish the type test certificates of the LTDB for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA as per the relevant standards. Type tests should have been conducted in certified Test laboratories during the period not exceeding as per CEA guideline from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, same shall be carried out without any cost implication to TPCODL/TPWODL/TPNODL/TPSODL

9. PRE-DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPCODL/TPWODL/TPNODL/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 TPCODL/TPWODL/TPNODL/TPSODL's representatives at all times when the work is in progress. Inspection by the TPCODL/TPWODL/TPNODL/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 TPCODL/TPWODL/TPNODL/TPSODL.

Following documents shall be sent along with material

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

10. INSPECTION AFTER RECEIPT AT STORES

The material received at TPCODL/TPWODL/TPNODL/TPSODL store will 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 Project Engineering department.

11. GUARANTEE

Bidder 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 Purchaser up to a period of 54 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier. Bidder shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be. In case of any issue in LTDB and its components within the guarantee period the purchaser will immediately inform the Bidder who shall take back the LTDB components within 15 days from the date of intimation at his own cost and replace / repair the faulty component within forty-five days of date of intimation with a roll over replaced shall not be counted for arriving at the guarantee period.

12. PACKING

Supplier shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport and be packed in such a manner so as to protect the equipment from damage in transit. The material used for packing shall be environmentally friendly.

13. TENDER SAMPLE

Bidder shall submit the sample of material with the offer (in case of first supply to TPCODL/TPWODL/TPNODL/TPSODL).

14. 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. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.

15. MINIMUM TESTING FACILITIES

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

16. 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. SPARES, ACCESSORIES AND TOOLS

Bidder shall provide a list of recommended spares with quantity and unit prices for 5 years of operation after commissioning. The Purchaser may order all or any of the spare parts listed at the time of contract award and the spare parts so ordered shall be supplied as part of the definite works. The Purchaser may order additional spares at any time during the contract period at the rates stated in the Contract Document. Bidder shall give an assurance that spare parts and consumable items will continue to be available through the life of the equipment which shall be 25 years minimum. However, the Purchaser shall be given a minimum of 12 months' notice in the event that the Bidder or any sub-vendor plans to discontinue manufacture of any component used in this equipment. Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similar material supplied under the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification.

18. DRAWINGS AND DOCUMENTS

Following documents shall be prepared based on TPCODL/TPWODL/TPNODL/TPSODL specifications and statutory requirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List/Performance Certificates from end users.

After the approval of the contract, four (4) copies of the 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 the purchaser

Following Drawings/Documents shall be submitted after the award of the contract

S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/Autocad drawings for all components.		√	
3	Technical details and test certificates.		√	√
4	Installation Instructions		√	√
5	Transport/shipping dimension drawing		√	√
6	QA & QC Plan	√	√	√

7	Routine, Acceptance and Type test Certificates	√	√	√
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All the Documents and Drawings shall be in English Language.

Instruction Manuals: Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of nicely bound manual (in English Language) covering erection and maintenance instructions and all relevant information pertaining to the main quipment as well as auxiliary devices.

19. GUARANTEED TECHNICAL PARTICULARS

GUARANTEED TECHNICAL PARTICULARS FOR LTDB 250 KVA DISTRIBUTION TRANSFORMER

Sr	PARTICULARS	OFFERED
1	Material of LTDB	
2	Color of Box	
3	Dimension of Box (Height X Width X Depth)	
4	THICKNESS OF BOX	
i	Load Bearing Size	
ii	Non Load Bearing size	
iii	Type of Door	
5	Hinges	
6	Lock Arrangement	
7	Sealing/Gasket Arrangement	
8	Cable connection arrangement	
9	In coming aluminum Bus Bar R,Y,B,N	
10	Outgoing Aluminum Riser /Dropper	
11	Bus bar arrangement	
12	Busbar mounting insulator	

   		Document No: ENG-LV-3014-R1 Document Title: Specification of 250KVA, 500KVA LTDB with GI Enclosure
13	Clearance between busbars.	
14	Clarence between busbar & Box walls.	
15	Sealing arrangement of Metering Box	
16	Degree of protection	
17	Packing	
18	Earthling Provision	
19	Incoming MCCB	
20	Make of MCCB	
21	Outgoing arrangement HRC Fuse	
22	Terminal Spreader rating	
23	LT switch & socket	
24	Energy Meter	
25	CT for Metering	
26	CT for Protection	
26	LED Indication	

GUARANTEED TECHNICAL PARTICULARS FOR LTDB 500 KVA DISTRIBUTION TRANSFORMER

Sr	PARTICULARS	OFFERED
1	Material of LTDB	
2	Color of Box	
3	Dimension of Box (Height X Width X Depth)	
4	THICKNESS OF BOX	

I	Load Bearing Size	
li	Non-Load Bearing size	
lii	Type of Door	
5	Hinges	
6	Lock Arrangement	
7	Sealing/Gasket Arrangement	
8	Cable connection arrangement	
9	In coming aluminum Bus Bar R, Y, B, N	
10	Outgoing Aluminum Riser /Dropper	
11	Bus bar arrangement	
12	Busbar mounting insulator	
13	Clearance between busbars.	
14	Clarence between busbar & Box walls.	
15	Sealing arrangement of Metering Box	
16	Degree of protection	
17	Packing	
18	Earthling Provision	
19	Incoming MCCB	
20	Make of MCCB	
21	Outgoing arrangement HRC Fuse	
22	Terminal Spreader rating	
23	LT switch & socket	
24	Energy Meter	
25	CT for Metering	
26	CT for Protection	
26	LED Indication	

20.

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:

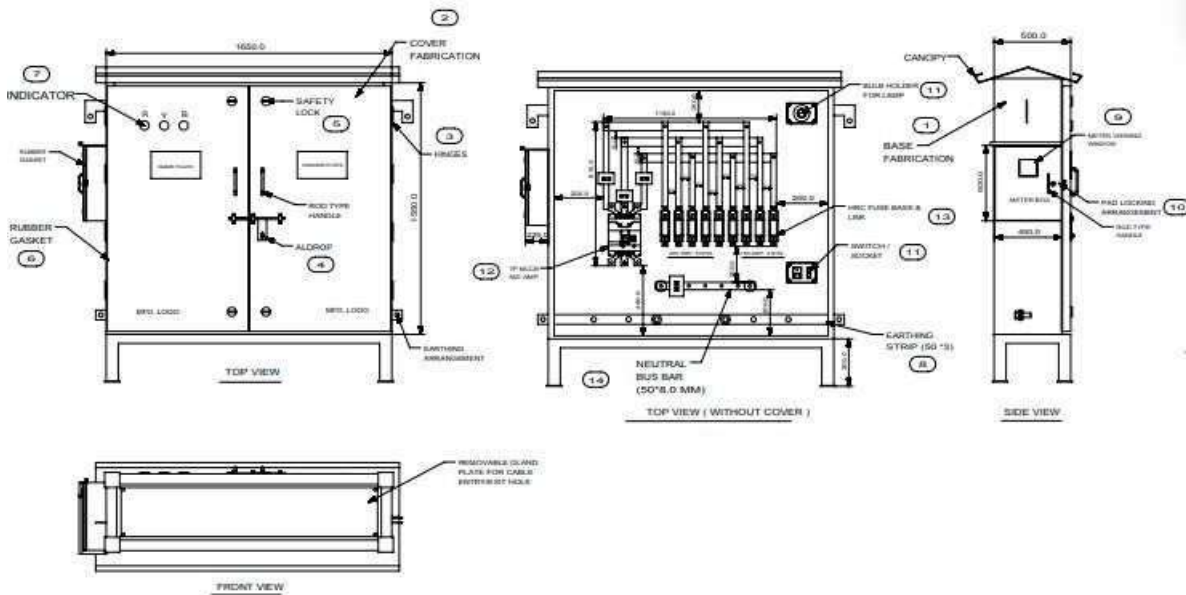
Signature

Designation

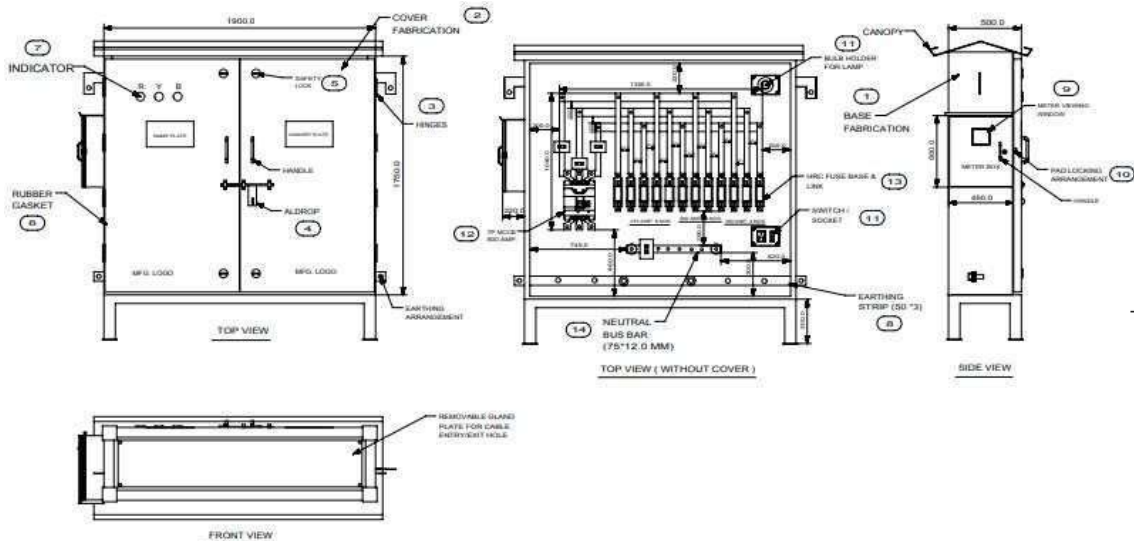
22. DRAWING (Subject to change as per manufacturers design while maintaining required clearances and relevant Specification). For reference in dimensions

Annexure-1

250 KVA



500KVA



Annexure-2

**TECHNICAL SPECIFICATION FOR RESIN CAST RING TYPE CURRENT TRANSFORMERS FOR USE INSIDE THE BOX.
(To be Housed Inside the DSS Box)**
1.0 SCOPE

This specification covers resin cast ring type LT Current Transformers confirming to IS-2705/1992 or the latest version thereof are of class 0.5 accuracy, 5VA burden, for use in conjunction with -/5A or 100/5A energy meters of class 0.5. CTs will be design for indoor use to install in the metering box.

2.0 APPLICABLE STANDARDS:

LT CTs shall comply with the Indian Standard Specification IS: 2705/1992 (Part- I & II) and the latest version thereof

3.0 TYPE AND RATING OF L.T. CURRENT TRANSFORMERS:

LT CTs shall be of the following type and ratings:

Sl.No.	Particulars	Requirement
1.0	Capacity or Rating	
	a) Rated Voltage b) No. of Cores c) Primary Current / Ratio d) Rated Output Burden. e) Rated Continuous Thermal current temperature rise over ambient f) Continuous Primary Current g) One Minute withstand Power Frequency Voltage for Primary & secondary winding h) ISF i) Rated Short Time Current j) Frequency k) Type	a) 415 V, 50 Hz (Phase to phase) b) One c) 400/5A, 800/5A, d) 5VA e) As per IS:2705/1992 or latest version thereof f) 1.2 times of rated current g) 3 KV h) Less than 5 i) 5 kA for 1 Second j) 50 Hz k) Ring Type
2.0	Class of Accuracy	0.5
	Material i. Core ii. Conductor iii. Insulation	High-grade non-ageing electrical low loss core Super enamelled copper wire of requisite diameter. Resin cast
3.0	Primary & secondary Terminals i. Primary ii. Secondary terminal	Primary Conductor (Bus Bar of required current carrying capacity) will pass through Ring type CT. Proper marking will be provided for current direction identification. Inner diameter (I.D.) of CT will be minimum 45mm or as per size of bus bar for all ratings of CT & will increase as per the current rating of CTs. Secondary Terminals S1 & S2 will be clearly marked.

 	 	Document No: ENG-LV-3014-R1 Document Title: Specification of 250KVA, 500KVA LTDB with GI Enclosure
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4.0	Clamping of CT	Sufficient Clearance must be kept between CTs to ensure Safe Operation and Efficient Heat Dissipation . The CTs are to be suitably clamped on to LTDB Mounting plate and Should not touch the Busbars going through it.
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4.0 TESTS:

4.1 Routine Test

Current Transformer shall comply to routine tests including accuracy test as per IS: 2705/1992.

4.2 ACCEPTANCE TEST:

All routine tests as stipulated in the relevant standards shall be carried out by the manufacturer and to produce at the time of inspection before the inspector.

4.3 TYPE TEST

Type test of CT shall be submitted with the bid carried out as per IS:2705 by NABL approved laboratory / test house. Type test shall be not earlier than 5 years from the date of bid opening. Drawing of the CT and its arrangement on bus bar shall be submitted with the offer .

5.0 RATING PLATE:

Following shall be printed/engraved on the name plate of CTs.

1. Sl.No.
2. CT ratio
3. VA burden
4. Class of accuracy.
5. Name of manufacturer
6. Year of manufacturing
7. PO No. & Date
8. Property of TPCODL/TPWODL/TPNODL/TPSODL” should be mentioned on name plate
9. Polarity should be marked on the body of the offered LT CTs.

6.0 GENERAL TECHNICAL SPECIFICATION

Current transformer shall have an opening in the center to accommodate a primary conductor that will be bus-bar.

Current transformers shall be of Resin cast type, suitable for indoor installation, type of resin shall be “Cycloaliphatic Resin” class of insulation shall be “F” as specified in IS:2705.

The minimum internal diameter for ring type CTs should suitable to accommodate a primary conductor i.e. bus-bar of Distribution transformer.

The polarity marking on the offered CT primary & secondary side should be embossed.

A two core (2.5sq. mm, as per relevant IS) HR FR PVC insulated flexible multi strand copper cable shall come out directly from the CT as secondary terminal. The length of the wire shall be around 2 Mtrs. Which is directly connected to the energy meter’s terminals, pin type lugs shall be required on open end of cable.

Core details of cable shall be : Core-1 : S1, Core -2 : S2.

- i) LT CTs shall be of Brick red colour.