Annexure- ‘ B’

## Technical Specification of 25, 63, 100 & 200 LT Transformer protection cum Distribution Box (With incoming DBDM isolator , 4 pole MCCB on incoming and Single Pole MCCB on Outgoing)

* 1. **SCOPE:**

This Specification covers the design, manufacture, testing at works and supply of Distribution Boxes made out of CRCA MS for controlling the L.T. feeders from the L.T. side of Distribution Transformers. The system shall be A.C. 3 phase, 4 wire, 433 V, 50 HZ with effectively grounded neutral.

## CLIMATE CONDITIONS:

The climatic conditions at site under which the equipment shall operate satisfactorily are as under:

* + - Maximum ambient temperature : 50°C
    - Maximum ambient temperature in shade : 45 °C
    - Relative Humidity 10 to 95 %
    - Maximum annual rainfall 1450 mm
    - Maximum wind pressure 150 Kg/m.sq
    - Maximum altitude above mean seal level 1000 meters
    - Isoceranic level : 50 days/year
    - Seismic level (Horizontal acceleration) : 0.3g
    - Moderately hot and humid tropical climate

The system generally be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth unless otherwise specified

* 1. **Applicable Standards:**

IS :13947/ (Part 3) (amended upto date) for Isolator (Switch Disconnector) IS: 13947/ (Part2)(amended upto date) for L.T. MCCBs.

IS: 8623 (amended upto date) for enclosure Box & for degree of protection provided by enclosures of electrical equipments.

IS: 4237, IS:8623 (amended upto date) – for general requirement of L.T. switchgears. IS: 5 /2007 - Colours of Ready Mixed paints and Enamels.

IS: 13871/1993 (amended upto date) – Powder coatings – specifications

IS : 6005/1998 (amended upto date) – Code of Practice for phosphating of iron and steel. IS: 13411/1992 (amended upto date) – Glass Reinforced Polyester Dough Moulding

Compounds.

* 1. **General Requirements:**

|  |  |  |
| --- | --- | --- |
| S.No | Particulars |  |
| 1 | Scope | Maufacturing, testing & supply of L.T Transformer  Distribution system |
| 2 | System | 415 Volts, AC 3 Phase 4 wire 50 Hz with effectively  grounded neutral system |

**Technical Specification of 25 KVA LTDB**

One chamber to house incoming, one Isolator double make double break type 63 A, as per IS/IEC60947- 2:2003, Four Pole MCCB double make double break type 63Amp. - 20 KA as per IS/IEC60947-2:2003 with Bus bar connection system. This chamber may be called CHAMBER NO. 1 or Protection Chamber.

* 1. Other chamber to house 6 numbers of Single Pole MCCB's 32 Amp. 10 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- 2:200.

* 1. Supporting MS Frame work for the above Chambers Nos. 1to 2.
  2. Spacers for connecting the chambers.
  3. External Earthing Plate for earthing of connections.
  4. Cable Clamps for incoming & outgoing cables.

Further details of the above are :

* 1. CHAMBER NO. 1 : PROTECTION CHAMBER :

Construction Features : 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 roof tapering back side for easy flow of rain water.

Dimensions: Dimensions of the Chamber No. 2 or Protection Chamber

Thickness: Base: 2.0 mm + 0.25 mm : Ms Sheet Powder coated grey colour Cover: 2.0 mm + 0.25 mm Ms Sheet Powder coated grey colour.

* 1. MCCB: Four Pole MCCB 63 Amp. - 20 KA

A four pole MCCB of rating 63 Amp. should be provided in this chamber for protection. The following make of MCCB shall be acceptable. : Siemens / L&T / ABB I/GE POWER / MONTEL / SCHNEIDER / SPACEAGE Hyundai or any other make which conforms to the specifications. Detailed technical parameters of Four Pole MCCB 63 Amp. MCCB - 20 KA as per Schedule .

* 1. Four Pole Isolator 63 Amps

A four pole Isolator of rating 63 Amp. should be provided in this chamber for protection. The following make of Isolator shall be acceptable. : Siemens /L&T / ABB / GE POWER /MONTEL / SCHNEIDER

/SPACEAGE Hyundai or any other makes which conforms to the specifications. Detailed technical parameters of Four Pole Isolator 63 Amp. Isolator- as per Schedule

* 1. Mounting Arrangement of Four Pole MCCB 63 Amp. – 20 KA :

M.S. 2.0 mm + 0.2 mm thick mounting bracket should be provided with proper mounting holes and clamps to accommodate four pole MCCB 63 Amp. - 20 KA. The plate should be zinc plated and yellow passivative.

* 1. Arrangement of inter connection of Bus bar :

Inter connection of bus bar should be done, and proper gap should be maintained between all phase and neutrals. DMC moulded support should be used to provide rigid support and insulation.

* 1. Holes for incoming Cables: For incoming cable 4 Nos. hole with insulated plastic glands on the

base of the chamber shall be provided and gland plates with suitable holes for incoming cable shall be provided.

* 1. Gland Plate: M.S. 2.0 mm + 0.2 mm thick zinc plated yellow passivated gland plate

Knockout type should be provided at the incoming side of the box i.e. at the bottom of the box.

* 1. 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. The cover should be closed from top to bottom with pull push facility separately for box no. 1 and box 2 with moving lever arrangement each side of box.
  2. 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 an 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.

* 1. 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.

* 1. Padlock Arrangement: Pad lock arrangement should be provided to lock I seal the base and cover.
  2. Bus Bar: Size of Bus Bar should have cross sectional area of 30 x5 mm + 2.5% made of EC

Grade Aluminium Covered with Phase identification PVC Colour Coding Sleeves and main bus bar should be connected to the 63 Amp. MCCB by means of Aluminium strip of cross section of 50x4. mm

+ 2.5% made of EC Grade Aluminium.

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

CHAMBER NO. 2 : Six (6) Nos. 32 Amp. 10 KA

Single Pole MCCBs, incoming and outgoing Bus bar connections and neutral bus bar.

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

The box shall be adequately protected against rust,dust, water and corrosion both from inside and outside..

Dimensions: Dimensions of the Chamber No. 2 or Distribution System

Thickness: Base : 2.0 mm + 0.25 mm : Ms Sheet Powder coated grey colour Cover : 2.0 mm

+ 0.25 mm : Ms Sheet Powder coated grey colour.

* 1. Mounting arrangement of Bus bar : D.M.C. Moulded Bus bar holding supports should be mounted in the chamber so that all the bus bars can be interconnected through Chamber No. 1 with

Chamber No. 2 with proper gap and insulation. The cross sectional area of Bus bars is to be 50 x4 mm.

* 1. MCCB: Single Pole MCCB 32 Amp. - 10 KA Six (6) numbers single pole MCCBs of rating

32 Amp. should be provided in this chamber. The following make of MCCB shall be acceptable : Siemens / L&T / ABB / GE POWER / MONTEL / SCHNEIDER/ SPACEAGE Hyundai or any other make which conforms to the specifications.

* 1. Mounting Arrangement of Single Pole MCCB 32 Amp. - 10 KA : M.S. 2.0 mm + 0.25 mm

thick mounting bracket should be provided with proper mounting holes and clamps to accommodate 6 numbers of single pole 32 Amp. MCCBs- 10 KA. The plate should be zinc plated and yellow passivative.

* 1. Neutral Bar: A pre drill and tapped neutral bar should be provided of cross sectional area 150 Sq. mm + 2.5% to take the neutral for outgoing connections.
  2. Holes for incoming and outgoing : For outgoing connections 9 number of holes with

Engineering Plastic glands will be provided at the bottom of the chamber. A gland plate of M.S. 2.0 mm thick zinc plated yellow passivated should be provided.

* 1. 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. The cover should be closed from top to bottom with pull push facility separately for box no. 1 and box 2 with moving lever arrangement each side of box.

* 1. Rubber Gasket : The collar of the body shall be provided with good quality rubber '0' ring. The

design of lining shall be such that it provides proper sealing betvveen the cover and base of chamber to avoid penetration of dust and ingress of water. This may be achieved by providing an 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.

* 1. 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.

* 1. Padlock Arrangement: Pad lock arrangement should be provided to lock I seal the base and cover.
  2. Bus Bar: Size of main Bus Bar should be 30x5 mm + 2.5% and main bus bar should be

connected to the 200 Amp. MCCB by means of EC grade Aluminium strip of cross section of 100 sq. mm + 2.5% made of EC Grade Aluminium .

* 1. Sealing Arrangement : 2 Nos. of sealing bolts & nuts should be provided to seal the box and also to close the cover on base.
  2. Supporting MS Frame for Chamber Nos. 1to 2 : MS Angle 30x30x5 mm + 2.5% with 6 mm

flats in betvveen 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.

* 1. Spacers for connecting the Chambers: For joining the Chamber No. 1 with Chamber No. 2

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 betvveen 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.

* 1. External Earthing Plate for Earthing : M.S. 2.0 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.

* 1. 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.
  2. 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.

## Technical Specification of 63 & 100 KVA LTDB

* 1. One chamber to house incoming, one Isolator double make double break type 250 A, as per IS/IEC60947-2:2003, Four Pole MCCB double make double break type 200 Amp. - 36 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- 2:200.

* 1. Supporting MS Frame work for the above Chambers Nos. 1to 2.
  2. Spacers for connecting the chambers.
  3. External Earthing Plate for earthing of connections.
  4. Cable Clamps for incoming & outgoing cables.

Further details of the above are :

* 1. CHAMBER NO. 1 : PROTECTION CHAMBER :

Construction Features : 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 roof tapering back side for easy flow of rain water.

Dimensions: Dimensions of the Chamber No. 2 or Protection Chamber

Thickness: Base: 2.0 mm + 0.25 mm : Ms Sheet Powder coated grey colour Cover: 2.0 mm + 0.25 mm Ms Sheet Powder coated grey colour.

* 1. MCCB: Four Pole MCCB 200 Amp. - 36 KA

A four pole MCCB of rating 200 Amp. should be provided in this chamber for protection. The following make of MCCB shall be acceptable. : Siemens / L&T / ABB I/GE POWER / MONTEL / SCHNEIDER / SPACEAGE Hyundai or any other make which conforms to the specifications. Detailed technical parameters of Four Pole MCCB 200 Amp. MCCB - 36 KA as per Schedule .

* 1. Four Pole Isolator 250 Amps

A four pole Isolator of rating 250 Amp. should be provided in this chamber for protection. The following make of Isolator shall be acceptable. : Siemens I L&T I ABB I GE POWER I MONTEL I SCHNEIDER I SPACEAGE Hyundai or any other makes which conforms to the specifications.

Detailed technical parameters of Four Pole Isolator 250 Amp. Isolator- as per Schedule

* 1. Mounting Arrangement of Four Pole MCCB 200 Amp. - 36 KA :

M.S. 2.0 mm + 0.2 mm thick mounting bracket should be provided with proper mounting holes and clamps to accommodate four pole MCCB 200 Amp. - 36 KA. The plate should be zinc plated and yellow passivative.

* 1. Arrangement of inter connection of Bus bar :

Inter connection of bus bar should be done, and proper gap should be maintained between all phase and neutrals. DMC moulded support should be used to provide rigid support and insulation.

* 1. Holes for incoming Cables: For incoming cable 4 Nos. hole with insulated plastic glands on the

base of the chamber shall be provided and gland plates with suitable holes for incoming cable shall be provided.

* 1. Gland Plate: M.S. 2.0 mm + 0.2 mm thick zinc plated yellow passivated gland plate

Knockout type should be provided at the incoming side of the box i.e. at the bottom of the box.

* 1. 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. The cover should be closed from top to bottom with pull push facility separately for box no. 1 and box 2 with moving lever arrangement each side of box.
  2. Rubber Gasket : The coller 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 an 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.

* 1. 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.

* 1. Padlock Arrangement: Pad lock arrangement should be provided to lock I seal the base and cover.
  2. Bus Bar: Size of Bus Bar should have cross sectional area of 50 x5 mm + 2.5% made of EC

Grade Aluminium Covered with Phase identification PVC Colour Coding Sleeves and main bus bar should be connected to the 200 Amp. MCCB by means of Aluminium strip of cross section of 50x4. mm

+ 2.5% made of EC Grade Aluminium.

* 1. Sealing Arrangement: 2 Nos. of sealing bolts & nuts should be provided to seal the box and also to close the cover on base. 19.6 CHAMBER NO. 2 : Six (6) Nos. 200 Amp. 36 KA Single Pole MCCBs, incoming and outgoing Bus bar connections and neutral bus bar.
  2. Construction Features : The base and cover should be made by means of MS sheet of IS: 2147/1962 or to equivalent any international standard.

The box shall be adequately protected against rust,dust, water and corrosion both from inside and outside..

Dimensions: Dimensions of the Chamber No. 2 or Distribution System

Thickness: Base : 2.0 mm + 0.25 mm : Ms Sheet Powder coated grey colour Cover : 2.0 mm

+ 0.25 mm : Ms Sheet Powder coated grey colour.

* 1. Mounting arrangement of Bus bar : D.M.C. Moulded Bus bar holding supports should be mounted in the chamber so that all the bus bars can be interconnected through Chamber No. 1 with

Chamber No. 2 with proper gap and insulation. The cross sectional area of Bus bars is to be 50 x4 mm.

* 1. MCCB: Single Pole MCCB 200 Amp. - 36 KA Six (6) numbers single pole MCCBs of rating

200 Amp. should be provided in this chamber. The following make of MCCB shall be acceptable : Siemens / L&T / ABB / GE POWER / MONTEL / SCHNEIDER/ SPACEAGE Hyundai or any other make which conforms to the specifications.

Detailed technical parameters of Single Pole MCCB 200 Amp. - 36 KA as per Schedule- B.

* 1. Mounting Arrangement of Single Pole MCCB 200 Amp. - 36 KA : M.S. 2.0 mm + 0.25 mm

thick mounting bracket should be provided with proper mounting holes and clamps to accommodate 6 numbers of single pole 200 Amp. MCCBs- 36 KA. The plate should be zinc plated and yellow passivative.

* 1. Neutral Bar: A pre drill and tapped neutral bar should be provided of cross sectional area 150 Sq. mm + 2.5% to take the neutral for outgoing connections.
  2. Holes for incoming and outgoing : For outgoing connections 6 number of holes with

Engineering Plastic glands will be provided at the bottom of the chamber. A gland plate of M.S. 2.0 mm thick zinc plated yellow passivated should be provided.

* 1. 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. The cover should be closed from top to bottom with pull push facility separately for box no. 1 and box 2 with moving lever arrangement each side of box.

* 1. Rubber Gasket : The collar of the body shall be provided with good quality rubber '0' ring. The

design of lining shall be such that it provides proper sealing betvveen the cover and base of chamber to avoid penetration of dust and ingress of water. This may be achieved by providing an 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.

* 1. 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.

* 1. Padlock Arrangement: Pad lock arrangement should be provided to lock I seal the base and cover.
  2. Bus Bar: Size of main Bus Bar should be 50X5 mm + 2.5% and main bus bar should be

connected to the 200 Amp. MCCB by means of EC grade Aluminium strip of cross section of 100 sq. mm + 2.5% made of EC Grade Aluminium .

* 1. Sealing Arrangement : 2 Nos. of sealing bolts & nuts should be provided to seal the box and also to close the cover on base.
  2. Supporting MS Frame for Chamber Nos. 1to 2 : MS Angle 30x30x5 mm + 2.5% with 6 mm

flats in betvveen 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.

* 1. Spacers for connecting the Chambers: For joining the Chamber No. 1 with Chamber No. 2

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 betvveen 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.

* 1. External Earthing Plate for Earthing : M.S. 2.0 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.

* 1. 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.
  2. 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.

## Technical Specification of 200 KVA LTDB

One chamber to house incoming, one Isolator double make double break type

without fuse and MCCB 400 A , as per IS/IEC60947-2:2003, Four Pole MCCB double make double break type 400 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

23.4.2 Other chamber to house 9 numbers of Single Pole MCCB's 100 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

* + 1. Supporting MS Frame work for the above Chambers Nos. 1to 2.
    2. Spacers for connecting the chambers.
    3. External Earthing Plate for earthing of connections.
    4. Cable Clamps for incoming & outgoing cables.

Further details of the above are :

* + - 1. 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.

* + - 1. Material :(i) Base : Ms Sheet of grey colour.

ii) Cover; Ms Sheet of grey colour

* + - 1. Dimension s : Dimensions of the Chamber No. 1or Metering Chamber
      2. Thickness Base: 2.0 mm ± 0.25 mm Cover 2.0 mm ± 0.25 mm
      3. Holes for incoming Cables For incoming cable 4 Nos. hole with insulated plastic glands on the base of the chamber shall be provided and gland plates with suitable holes for incoming cable shall be provided.
      4. Gland Plate : M.S. 2.0 mm ± 0.2 mm thick zinc plated yellow passivated gland plate knock out type should be provided at the incoming sideof the box i.e. at the bottom of the box.
      5. 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.
  1. CHAMBER NO. 1 ; PROECTION CHAMBER ;
     1. 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.

* + 1. Material : i) Base : Ms Sheet of grey colour. ii) Cover ; Ms Sheet of grey colour
    2. Dimensions : Dimensions of the Chamber No. 2 or Protection Chamber .
  1. Thickness : Base 2.5 mm ± 0.25 mm Cover 2.5 mm ± 0.25 mm
  2. MCCB: Four Pole MCCB 400 Amp.- 50 KA. A four pole MCCB of rating 400 Amp.

should be provided in this chamber for protection. The following make of MCCB shall be acceptable. : Siemens /L&T /ABB /GE POWER /MONTEL/SCHNEIDER/ SPACEAGE Hyundai or any other make which conforms to the specifications.1 No. Four Pole, MCCB is to be provided on LV side for overload protection and magnetic trip release for instantaneous tripping in the wake of short-Circuits.The MCCB should be double make I double break Type (It should have 2 sets of contacts i.e. 4 Nos. of contacts and 2 Nos. of Arc extinguishers per pole).

These MCCB's shall be confirming to IS I IEC 60947-2:2003 as amended upto date. The rated un- interrupted current of MCCB shall be 400 Amp.

The MCCB's shall be manually independent & shall have quick make, quick break Mechanism , the detailed specification of MCCB shall be as under :

The MCCB shall not cause any nuisance tripping due to switching current of motor & capacitor loads. The Bidder shall submit the type test reports as per ISIIEC:60947-2:2003 for test sequence I & II complete with certified drawings, Oscillograms and approved drawing from CPRI / ERDA/ NABL accredited laboratory along with the offer. The MCCB's shall be marked with

'Brand Name' of manufacture and IC’S in KA and other particulars may be marked as per the manufacturer's standard practice.The contacts of MCCB should be self-wiping type so as to keep the contacts clean and milli-volt drop low. The MCCB shall be provided with push to trip facility.

Four Pole Isolator 400 Amp

A four pole Isolator of rating 1SO Amp. should be provided in this chamber for protection. The following make of Isolator shall be acceptable. : Siemens /L&T / ABB /GE POW ER /MONTEL /SCHNEIDER /SPACEAGE Hyundai or any other make which conforms to the specifications.

* 1. Mounting Arrangement of Four Pole MCCB 400 Amp. - 50 KA : M.S. 2.0 mm ± 0.2

mm thick mounting bracket should be provided with proper mounting holes and clamps to accommodate four pole MCCB 400 Amp. - SO KA. The plate should be zinc plated and yellow passivate.

* 1. 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 MCCB.

* 1. Arrangement of inter connection of Bus bar:

Inter connection of bus bar should be done, and proper gap should be maintained between all phase and neutrals. DMC moulded support should be used to provide rigid support and insulation.

* 1. 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. The cover should be closed from top to bottom with pull push facility separately for box no. 1 and box 2 with moving lever arrangement each side of box.

* 1. Rubber Gasket : The coller 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 an 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.

* 1. 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 cha m b e r. 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.

* 1. Padlock Arrangement : Pad lock arrangement should be provided to lock seal the base and cover.
  2. Bus Bar : Size of Bus Bar should have cross sectional area of 50X8 mm ± 2.5% made of EC Grade Aluminium.

#### Technical Specification for MCCB`s “Moulded Case Circuit Breakers”

MCCB`s should comply with IEC 60947 Part 2.



The MCCB shall be suitable for universal mounting (i.e.) the Load / Line must be interchangeable. The MCCB shall be suitable for operating Voltage of 415V. Insulation voltage for ratings above

160A

shall be 800V.

MCCB shall have impulse withstand (U-imp) capacity up to 8kv.



The MCCB shall comply to the Isolation function as defined by the international standards.

MCCB`s shall be of current limiting type to ensure the low let through energy and further avoid electrical and mechanical stress on cables.

MCCB shall have calibration settings at temp 50degc.



MCCB internal accessories shall be of snap fit type and quick connect technology. MCCB ratings

below

250A shall have window for visibility of installed accessories. MCCB shall have proper wiring path for the accessories for ease of wiring.

MCCB shall have arrangement for quick installation of accessories using single quarter turn front

screw.

Front cover shall also have sealable option to avoid unauthorized access to the settings and accessories.

 MCCB shall have integrated padlocking facility without any additional accessory on lever for locking MCCB in ON or OFF position. This shall ensure operation only by authorized person and avoid operation during maintenance period.

MCCB shall have additional provision for Fast add on connection for wiring for signaling purpose

like

Indicating lights, etc

#### Protection

Overload and short circuit setting details:-

 All MCCB`s in the LV Panels shall be of adjustable overload and short circuit settings. MCCB shall have minimum adjustable settings upto 63% of rated current for Thermal Magnetic and 40% of rated current for microprocessor release. MCCB shall have sealable setting to ensure changes only by authorized person.

 The MCCB`s in the VTPN dbs need to be fixed / variable thermal overload settings and fixed short circuit setting.

Trip reset should be available Manual / Automatic.

#### SURFACE TREATMENT

All sheet metal work shall under go 8 tank chemical & mechanical cleaning process and there after two coats of red oxide and two coats of final weatherproof & corrosion resistance enamel paint shall be applied by powder coating process only. The colour of paint inside shall be same as specified for outside of Dist.Box.

1. The facility for painting including the 8 tank cleaning process shall be in house of the tenderer to ensure proper quality since these panels are for outdoor applications wherein continuous changes in climatic conditions is common phenomena.
2. Final paint from inside and outside shall be smoke grey for all ratings.
3. All other metal parts used in the distribution boxes shall be treated as under:
4. The supplier shall furnish detailed process of manufacturing & Powder coating.

Bus bars and connections: with heat shrinkable color coded insulating

a) sleeves indicating R,Y, B phase and black for neutral.

#### CABLE TERMINATION:-

a) Incoming cables shall enter from the side portion of the box just parallel to the terminals of the installed isolator switch and outgoing cable shall enter of the welded bottom plates with separate gland plate having minimum size of 100 x 100 mm and having suitable knock out / drilled holes suitable for cable sizes as specified in the drawing. The separate gland plate shall be fitted with the proper size of hardware.

The size of cable to be used are as under:-

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | KVA Rating | 25 KVA | 63/100 KVA | 200 KVA |
| 2 | Incoming Cable size mm2 | 70 | 70 | 400 |
| 3 | Outgoing Cable size mm2 | 50 | 50 | 250 |
| 4 | Numbers of circuits/feeders | 2 | 2 | 3 |

#### TESTS & TEST CERTIFICATES:

* + 1. **ACCEPTANCE TESTS (ON COMPLETE DISTRIBUTION BOX):**

In case of bought out items, routine and acceptance tests as per relevant IS and this specification shall be carried out at the original manufacturers' works.

1. Routine Test (Carried out on all boxes):
2. Overall Dimensions Checking.
3. Insulation Resistance Tests.
4. High Voltage Test at 2500 V, 50 Hz AC for one minute.
5. Operation Test on MCCB/Isolator/Link Disconnector/ HRC fuse base and fuse Links.

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 / Link Disconnectors

/ Isolator with 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.

ii) Time-Current Characteristics

The MCCB should be tested for time current characteristics IEC 62271 1.05 & 1.2 times of overload release setting current and should pass the requirement given

1. TYPE TESTS (from CPRI / ERDA./NTH only)
   1. ON **LTDB** of highest rating i,e, for 200 kVA (**type-test report shall not be more than 5 (five) years old from the due date of tender**):

a. Temperature rise test:- The temperature rise test should be carried out as per IS: 8623 High voltage test shall be carried out as per IS:8623 amended upto date.

Short Time Withstand Current Test on Distribution Box shall be carried out as per IS 8623 or latest version all the circuits independently. The test should be carried out after by- passing MCCBs.

Degree of protection for IP-55 on complete box shall be carried out as per IS: 13947/1993 or the latest version thereof.

* 1. ON ISOLATOR (SWITCH DISCONNECTOR):

All type tests on Isolator (Switch Disconnector) as per IS: 13947 (Part III) amended up to date shall be carried out.

* 1. ON MCCB:

All type tests on MCCB as per IS-13947 amended upto date shall be carried out.

5 ON Link Disconnector:

Following tests shall be carried out on link disconnector as per IS:

1. Short Circuit Withstand Strength.
2. Temperature rise Limits.
3. Mechanical Operations

12.4 TYPE - TEST CERTIFICATES:

The Distribution Box, Isolator (Switch Disconnector), MCCB offered shall be fully type tested as per relevant IS and this specification. The Supplier shall furnish detailed type test reports before commencement of supply. The detailed Type Test Reports shall be furnished with relevant oscillogram and certified Drawings of the equipment 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 accredited by National Accreditation Board of Testing And Calibration Laboratories (NABL), Department of science & technology , Govt. of India to prove that the complete Box, Isolator, & MCCB meet the requirements of the specification. The Manufacturer should also furnish certificate from laboratories that laboratories are having all the requisite test facility available in house. The type test Reports conducted in manufacturers own laboratory and certified by testing institute shall not be acceptable.

The Supplier should furnish the particulars giving specific required details of Distribution Boxes, MCCBs, Isolator and Link Disconnector.

* 1. TESTING & MANUFACTURING FACILITIES :

Supplier must be an indigenous manufacturer. The Supplier must clearly indicate what testing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out all Routine & Acceptance Tests. These facilities should be available to Employer’s Engineers, if deputed to carry out or witness the tests in the manufacturer's works. The supplier must have all the in-house testing facilities to carry out the acceptance tests on the Box.

.

* 1. DRAWINGS

The tenderer shall submit detailed constructional and dimensional drawing of complete distribution box for each rating with details rating of isolator, MCCB and Bus Bar, Incoming and outgoing circuits clearance details

3.15 PROTOTYPE

The manufacturer has to manufacture the prototype Unit for each rating as per this specification before bulk manufacturing after approval of drawings and GTP. The manufacturer should intimate the readiness of prototype to employer. The JBVNL will inspect the prototype for approval. The manufacturer should submit the final drawings in line with this specification and prototype to employer for approval before bulk manufacturing. The approval of prototype & drawings shall be a responsibility of manufacturer/Contractor. Tentative drawing of box is enclosed herewith.