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ANNEXURE

TECHNICAL SPECIFICATION FOR LT POWER DISTRIBUTION PANEL.

Scope of Work:

- The scope of work includes dismantling of old LT power Distribution panel with terminations, shifting to safe place inside the factory as instructed by Engineer In-charge, erection of new panel, installation, testing and commissioning including re-termination of existing cables to incomer and feeders.
- The scope of work covers the Design, Manufacture, assembly, testing at Manufacturer's works, supply, Installation, Testing at site and Commissioning of LT Power Distribution panel panel with all the accessories required for complete and successful installation of panel.

General Design of MCCB Cubicle:

The L.T. Panel board cubicle shall be of metal clad, totally enclosed, sheet steel cubicle of thickness not less than 2mm, indoor floor mounting, and freestanding type. It shall be completely dust-tight, weather & vermin proof and highly corrosion-resistive. Neoprene/Synthetic rubber gasket shall be provided between adjoining surfaces of the doors and enclosures to make the switchboard dust-tight and vermin proof. The panel will be suitable for IP-54 degree of protection.

The sheet steel parts shall be subjected to finishing process of chemical degreasing, pickling, phosphate coating, a primer coat and finally a two tone finishing shall be given by using two shades of synthetic enamel paint as per IS. The finishing shall be elegant and enduring. The color scheme shall be subject to purchaser's approval.

The L.T. Panel board shall be of unit type in construction, compact in size and neat in appearance. They shall be capable of being easily extended on either side / top and shall have a high degree of flexibility. The design of feeder units shall be such as to minimize the floor area required. The overall dimensions of the L.T Panel board cubicle shall be as near as possible.

The feeder units shall be arranged in individual compartments in vertical section and a vertical wire way shall be provided to accommodate all control cables. Wire way shall be so designed that even if the doors of wire way is opened, there is no access to the bus bars. The wiring layout shall be planned for easy screw and quick circuit tracing. Wiring shall be properly bunched and arranged in such a way that there shall be no sag. Each compartment shall be covered with sheet steel hinged door having rounded edges and maintenance to be carried out from the front. Inspection as well as maintenance shall be done safely and easily without affecting the other feeders. All MCCBs / switches shall be front operated type and shall be interlocked with the hinged doors. The sheet steel used shall be not less than 2 mm thick for all sides.

The bus-bars shall be of suitable size and good quality Aluminium, arranged vertically & supported by non hygroscopic non combustible, track resistant and high strength type Polyester fibre glass moulded insulators.

The cable box chamber shall have adequate space to accommodate cable boxes, glands packing glands and incoming and outgoing power and control cables. Outgoing feeder terminals shall be brought out into the cable box chamber for easy connection of cables. Crimp type Aluminium lugs terminal arrangement according to the rating of the feeders and associated cable shall be provided. Cable entries shall be arranged



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from bottom. Cable chamber shall be designed as per the site conditions and as approved by Engineer In-charge.

Incomers shall be designed for connecting cable termination upto 3 runs of 300Sqmm LT power cable.

Earthing bus-bars of suitable size and good quality Aluminium shall be provided running through the entire length at the bottom of each control center with the arrangement for connection to purchaser's earthing strip of 50 mm x 6 mm.

Indicating instruments [viz. Multifunction meter, Ammeter, LED type indicating lamps for supply 'ON' indication] shall be mounted on the front on the all incoming, Ammeters and Multifunction meters shall be of Digital, communicable and flush mounting type and preferably of 96 x 96 mm size. The switchboard panel shall be, completely wired, ready for connecting to the purchaser's equipment. Nameplate with required details including name of the panel shall also be provided on the front.

Wiring shall be done with 1.1KV PVC copper conductors of suitable size.

KWH METER : A Multifunction Digital type and communication enabled meters shall be provided as per schedule.

Current Transformers: Resin insulated.

C.T. shall be ring type as per IS: 2705 of latest version for CT operated Energy meters.

C.T. shall have a short circuit current 3.0 KA (rms) for 1.0 second and dynamic peak current 7.5 KAp (shall not be less than 2.5 times rated thermal current).

The C.T.s. shall have following characteristics:

- a) No. of core : One for metering.
- b) Class of Accuracy : 1
- c) Burden : 10 VA
- d) ISF : 5
- e) C.T. Ratio : as per the requirements of schedule
- f) Rated service voltage : 660 volts
- g) Frequency : 50 Hz
- h) One minute P.F. : 3 kV (rms) for 1.0 minute voltage withstand test on winding

Tests : All routine and type tests as per IS: 2705 of latest version (Manufacturer's test certificates are required to be submitted by successful Bidder).

CTs.: Required for metering and instrumentation shall be within the scope of supply. All wiring required for current and potential terminals of the C.T. operated KWH meter shall be provided.

Note: Each C.T. shall have sleeved secondary heads with tinned copper crimping pins of required length for connecting directly to KWH meter of the L.T. Panel.



MAIN BUS:

The main bus bar shall be rated for 500V, with continuous current @0.8A/Sq.mm. The short time current rating shall be 65KA. All bus- bar connections shall be silver-plated and the bus bar shall be high conductive and good quality Aluminium. Bus Bars shall be suitably insulated by means of insulating colour sleeves of 1.1 KV rating. The temperature of bus bar and bus bar connections when carrying rated current at rated frequency shall not exceed 90 °C for a maximum ambient temperature of 50 °C.

ROUTINE TEST

Routine tests shall be performed at manufacturers' place in presence of the representative of purchaser in compliance of relevant IS to ensure that the equipment comply with the requirements of this specification.

The routine test certificates shall be submitted to the purchaser for his approval prior to the dispatch of the equipment.

DRAWINGS :

Drawings in triplicate incorporating the following particulars shall be submitted by the Bidder to obtain approval from ECIL before proceeding for manufacturing.

The Bidder may submit any other drawings found necessary in addition to the drawings stated above.

On receipt of order the supplier shall have to get approval of the following drawings.

- 1) G.A.D. showing front elevation, side elevation and plan of the L.T. Panel board with detailed dimensions (Dimensions shall be in metric units only).
- 2) Detailed drawing of mounting arrangement.
- 3) Outline drawing of internal wiring and cabling arrangement.
- 4) Single Line Diagram and Bill of Material with specifications

MOULDED CASE CIRCUIT BREAKERS.

GENERAL

Moulded Case Circuit Breaker shall be incorporated in the panel wherever specified. MCCBs shall conform to IS 13947 (Part 2) & IEC 947 (2) in all respects. MCCBs shall be suitable for three phase 415volts. All MCCBs shall have microprocessor based **over current and short circuit releases with adjustable current setting from 0.4In to 1.0 In and Ground fault (G) setting from 0.4In to 1.0 In. or as specified in BOQ.**

Technical Specifications

The MCCB should be current limiting type with trip time of less than 10 milli sec under short circuit conditions. The MCCB should be either 3 or 4 poles as specified in BOQ.

MCCB shall comply with the requirements of the relevant standards IS13947 – Part 2/IEC 60947-2 and should have test certificates for breaking capacities from independent test authorities CPRI / ERDA.



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MCCB shall comprise of Quick Make - break switching mechanism, arc extinguishing device and the tripping unit shall be contained in a compact, high strength, heat resistant, flame retardant, insulating moulded case with high withstand capability against thermal and mechanical stresses.

The breaking capacity of MCCB shall be minimum 35KA / 50 KA or as specified in BOQ. The rated service breaking capacity should be equal to rated ultimate breaking capacities ($I_{cs}=I_{cu}$).

All MCCBs shall be provided with Microprocessor based having inbuilt adjustable protections against Over Load (L), Short Circuit (S) and Ground Faults (G) with time delay.

All MCCBs should be provided with the Rotary Operating Mechanism. The ROM should be with door interlock (with defeat feature) & padlock facility

MCCB should have Spreader links & Phase barriers as standard feature. Superior quality of engineering grade plastics confirming to glow wire Tests as Per IEC60695-2-1 should be used for insulation purpose.

The handle position shall give positive indication of 'ON', 'OFF' or 'Tripped' thus qualifying to disconnection as per the IS/IEC indicating the true position of all the contacts.

CONSTRUCTIONS

The MCCB's cover and case shall be made of high strength heat treatment and flame retardant thermo-setting insulating material. Operating handle shall be quick make/quick break, trip-free type. The operating handle shall have suitable "ON", "OFF" and "tripped" indicators. Three phase MCCBs shall have common operating handle for simultaneous operation and tripping of all the three phases. MCCBS shall be provided with rotary handle.

Suitable extinguishing device shall be provided for each contact. Tripping unit shall be of thermal magnetic or static release type provided in each pole & connected by a common trip bar such that tripping of any pole operates all three poles to open simultaneously. MCCB shall be current limiting type.

Contact trips shall be made of suitable air resistant, silver alloy for long electrical life. Terminals shall be of liberal design with adequate clearance.

BREAKING CAPACITY

Unless otherwise specified, rated service breaking capacity of the Moulded Case Circuit Breakers shall be minimum 35kA /50KA or as mentioned in the BOQ

TESTING

- a. Original test certificate of the MCCB as per Indian Standards (IS) 315-C-8370 shall be furnished.
- b. Pre-commissioning tests on the Main Distribution/Sub Distribution Board incorporating the MCCB shall be done as per standard.

MISCELLANEOUS

Control switches shall be of the heavy-duty rotary type with escutcheon plates clearly marked to show the operating position. They shall be semi-flush mounting with only the front plate and operating handle projecting.



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Indicating lamps shall be of LED type and with translucent lamp covers, shall be easily replaced from the front .

Push buttons shall be of the momentary contact, push to actuate type fitted with self reset contacts & provided with integral escutcheon plates marked with its functions.

LIST OF APPROVED MAKES:

- 1) MCCB: LK (former L&T) / ABB / Siemens / Schneider
- 2) Multifunction Meters: Schneider / Neptune / LK
- 3) Indication Lamps: Schneider / LK / Siemens
- 4) CTs: recommended by panel manufacturer

