

ANNEXURE- A

L.T. Panel general specification

SRNO.	PARAMETERS	DESCRIPTION
A. GENERAL.		
1	TYPE	LT Panel
2	Rated operational voltage	415 ± 10% V AC, 3 Phase 4Wire
3	Construction	Modular construction Fully compartmentalized with insulation material partition
4	Enclosure class(panel)	IP54.
5	Type of execution.	single front
6	Mounting.	wall/ floor mounted
7	Installation	Indoor
B. CONSTRUCTION FEATURE		
1	Sheet steel thickness.	2 mm for load bearing numbers & 1.6mm non load bearing numbers
2	Material.	CRCA
3	Cable entry	Incomer - Bottom cable entry. Outgoing- cable Allay.
4	Design	Each module can be accessed from front. Each module has covering at top. separate cable allay, Extendable at both ends
5	Interlocking and protection	Module door interlock with main power isolating device. power circuit isolation device to have locking in the OFF position
6	Operating height	Min-300 mm, Max- 2000 mm
7	Gland plate	Undrilled removable bottom gland plate. Rubber gasket will be providing for all the doors, removable
8	Miscellaneous	Rubber gasket will be providing for all the doors, removable covers and adjacent covers.
		Lifting hook for the panel
		Doors shall have concealed hinges
9	Levels	Clear legible identification labels
		25-60mm for starter panel
		2 mm for components and ,module name plates
		Danger board on front and rear sides in English, Hindi and local language
10	Paint	Shade no. RAL 7032 Siemens Gray
11	Earthing	Two separate earthing terminals will be Both side provided
		Bolted joints with tooth spring washers for good earth continuity.
C-BUS BARS		
-Bus bar & associated connections shall be constructed from 99.98% E-Cu (Electrolytic Grade of Copper) with tinning thickness of 4 to 5 microns as per DIN EN13601 with bus-bar rating		

according to DIN 43 761 standard or latest amendment. Tinning is done to avoid oxidation of copper.

-The bus-bar support shall be of Polyamide fiberglass –reinforced with fire protection corresponding to UL 94 – V0.

-The bus-bar system shall be capable of withstand stress due to fault current of up to. 35kA for one second below 800A.

50kA for one second 800 – 1600A.

75kA for one second 1600 – 3200A

110 kA for one second for 4000A.

The bus-bar cover shall be complied with UL 94 – V0. Tested under IEC60439.

- Heat shrinkable sleeves should be provided for identification and protection.

-Hardware used in bus-bar system should be of high tensile strength of grade 8.8 or better.

1.	Arrangement	Three phase & neutral
2.	Phase Busbar Rating	Shall be able to carry continuously the connected load (considering all derating factors) plus a 25 % margin
		Max. current density 1.5A/ sq.mm for Copper.
3.	Max. Temp. rise of bus	Not to exceed 40 deg.C. above ambient of 50 deg. C.
4.	Air clearance for bare busbar	Phase to phase – 25.4mm (minimum)
		Phase to earth – 19.0 mm (minimum)
5.	Neutral bus isolation	Through disconnecting link
6.	Insulation Level	
	Rated insulation voltage	1100V
7.	Impulse withstand voltage	4 KV as per IS-13947(PartI)1993 or latest
	One minute power frequency withstand voltage	2.5 KV for power circuit & 500 V for control circuit

D. Painting / Surface treatment

-The manufacturer should have RoHS compliance for painting process & paintings should comply with DIN EN ISO 1520, 2815 2409. Anodic dip coat painting & textured powder coating performance shall be as per DIN EN ISO 9227 NSS. Alternatively, Painting process should comply with IS 3618- class -c for phosphating (Tri catena zinc - phosphate) & Powder coating as per IS 101 & IS 13871 and Coating weight to confirm the requirement of IS 2618. In order to ensure optimum corrosion protection in all climatic zones, Aluminium or Galvanized/zinc plated metal with subsequent Nano-ceramic/zinc-phosphate & powder coating should be used with the materials that are specified to be intended for outdoor application.

-The thickness of paint should be 70 – 135 micron.

E. Gasket

-The gasket should be of tri functional (functioning as a sealant, elastic in nature and non- water absorbant), CFC free Polyurethane Gasket to provide maximum IP protection & can withstand a temperature range of -40°C to +90°C. It should comply with burning behaviour According to DIN755200; also flexible cellular polymeric materials should be used according to EN ISO 1856 and DIN EN ISO 1798. Gasket should with stand Compress strength of 5 kPa to 200 kPa (at 25% compression) according to DIN 53 577. Gasket should with stand tensile strength up to 2 MPa [N/cm²] according to DIN53 504. Gasket should be long lasting according to DIN 53 508. Gasket should be with stand high temperature according to DIN 75200.

- It should Capacity to withstand high temperature: PU gasket should withstand 180° C/15 minutes.

High Adhesiveness: Gasket should be with good quality of Adhesive or mixture of liquid

<p>Polyurethane and Isocyanides (Resin & Hardener) & should be poured on the door/covers by a CNC machine. Upon drying the mixture should solidifies and gets bonded to the surface of the part permanently.</p> <p>-It should have Hygroscopic feature that is Polyurethane gasket should be non hygroscopic.</p>
<p>F. Control wiring</p> <p>All control wiring, indication etc. shall be carried out using 650V grade 1.5 sqmm copper conductor cables PVC insulated conforming to IS 1554 Part-I or latest. CT wiring shall be with 4/2.5 sqmm copper conductor with suitable CT shorting links. Wiring shall be suitably protected within the switchboard. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of the wires. Identification ferrules shall be used at both the ends of the conductors.</p>
<p>G. Earthing</p> <p>The panel shall be provided with copper earth bus running throughout its length as per IS: 3043 or latest. Suitable earthing eyes/bolts shall be provided on the main earthing bus to connect the same to the earth grid at site. Sufficient no. of star washers shall be provided at joints to achieve earth continuity between panels and sheet metal parts.</p>
<p>H. Name Plate The panel as well as the feeder compartments door shall be provided with the name plates giving the feeder description as required. Permanent identification shall be provided.</p>
<p>I. Basic Design Parameter</p> <ul style="list-style-type: none"> -The enclosure should be provided with a degree of protection as per IEC – 60529 / IS: 13947 part 1, of not less than IP-54 for indoor and IP-55 with Rain Canopy and Fan-Filter /outlet filter with Hood for all outdoor mounted panels. - The enclosure should be provided with bus-bar cover (UL 94 V0) made of Polymide (PA6.6) running all along the length of the switchgear in a separate enclosure & also It should compliance for any accidental arc conditions as per EN - 61641. - Vertical Bus bars shall run at the middle of two adjacent panels to take off for individual feeders. The Bus bars shall be fully shrouded with bus-bar cover (UL 94 V0) heat shrinkable PVC sleeve to ensure safety of operation when rear doors are opened. - The switchgear and distribution panels with ACB's & MCCB's shall be front operated with Breaker operating knobs clearly indicating position of Breaker ON / OFF / TRIP. - The switchgear and distribution panels shall be interlocked from door such that only after tripping of the ACB's or MCCBs the front door can be opened. - Even with the door closed, the test / service position of Breaker (ACB) shall be achieved. Rack in / Rack out of Breaker from above test to isolated position can be done with the door closed from outside. It shall have a locking facility to lock the Breakers in service & test positions. -The enclosure should be with insertion of an extended arm the Breaker can be fully drawn out from the compartment but remains mechanically attached to the panel so that routine inspection and maintenance checks can be easily carried out. - The Panel should be Form 1 for LT distribution Panels below 800A as per IEC 60439-1: 1999, Annex D. The Panel should be Form 4a for LT distribution Panels above 800A as per IEC 60439-1: 1999, Annex D, - Incomer shall have RYB lamp indication, On Off & Trip indication, & Digital ammeter shall be operated through CT and suitably rated PT shall be provided for Digital Voltmeter - All bus-bar shall be made with Electrolytic Grade of Copper E-Cu 99.98% purity as per DIN EN 13601with current rating acc. to DIN 43 761. -All cable shall be FRP type with copper conductor. - CTs wherever used shall be resin cast type.

<ul style="list-style-type: none"> - The selection of components shall be made in accordance with feeder rating keeping 20% extra. - There shall be suitable provision for termination of cable Cu. / Al. from field. - There shall be separate bus-bar chamber at the top for horizontal busbar. - Minimum 300mm clearance shall be maintained between floor & last terminal row. - The Panels shall be of single front, double access type having feeder controls located in the front and vertical Bus bars and cable chamber located in the rear. Control and selector switches, Push Buttons, indicating instruments, lamps protective relays, single phasing relays shall be mounted on the front doors of the respective compartments. Current Transformers and Circuit Breaker control circuits shall be mounted on the fixed portion of the compartment; CTs shall not be directly mounted on the Buses. - Suitable liberally designed barriers shall be placed between Circuit Breakers and all control protective and indication circuits, equipment including Instrument Transformers. External cable connections shall be carried out in a separate cable compartment. Separate cable chambers shall be provided for Power & Control cables. - After isolation of the power and control connections of a circuit, it shall be possible to safely carry out maintenance in a compartment with the Bus bars and adjacent circuit in 'live' condition. - All the assembly or installation for Low-voltage switchgears & control gears assemblies should be as per IEC – 60947 or IEC – 60439 – 1, & IS : 3072. -All the enclosure climate control unit, like panel AC, etc, if required should be as per DIN – 3168.
<p>J. Current Transformer</p> <p>CT s should be cast resin type. They shall be of accuracy class 10 P 10/5 P 10 (as per requirement) of IS 2705 part-III 1964 or latest, Where ammeters are called for C.T.s shall be provided for current measuring. Each phase shall be provided with separate current transformer of accuracy Class I and suitable VA burden for operation of associated metering and controls.</p>
<p>K. DOCUMENTATION:</p> <p>Detailed technical manuals, handbooks, warranty card and factory quality assurance checklist, test results and any other certifications, if any, shall be supplied along with the consignment.</p> <p>Supplied manuals/handbooks must cover detailed technical specifications and installation, operation, maintenance and system safety procedures.</p> <p>The receipts for taxes paid, if any, for the supplied equipment should also be submitted.</p> <p>Any other relevant documents, instruction manual, specifications or data necessary for satisfactory installation, operation and maintenance to be submitted as & when required.</p>
<p>L. DRAWINGS: Drawing in triplicate incorporating the detailed dimensional cross-sectional drawing of the panels, General Arrangement Drawing, Foundation Drawing, Structural Drawing or any other required drawing are to be submitted with the tender for the purpose of preliminary study. After award of the contract the successful tenderer shall required to be submitted reproducible copies of final drawings must be got approved by Sr. DEE/G/ASN or AEE/G/ASN before inspection & supply of items. These Drawings should have proper spaces for signature of checking authority & approval authority.</p>
<p>M. WARRANTY: The panels must be guaranteed for satisfactory operation for a period of 12 months from the date of commissioning.</p>

N. INSPECTION:-

1. Supply items (likes P&M items, Luminaries and any special items included in LOA having bid value more than Rs. 5,00,000/- should be inspected / tested by RITES (as per Railway Board's Circular) with firm cost at manufacturer's premises / site as decided by Railway.
- 2 Material supplied should be as per the description, scope and specification in the tender document. Contractor will intimate in advance for readiness of materials for inspection.
- 3 Manufacturers test certificates for the different test carried out should be submitted by the tenderer.

The decision of Railway Administration for inspection of supply items by RITES / Consignee by firm own cost over the matter will be final.

All relevant items of the panel as per Indian Standard Specification (ISS) as below or latest amendment.

1	FOR GENERAL USE IN FACTORIES, WORKSHOP AND WAREHOUSES	AS PER BSS 466; 1974.
2	LOW VOLTAGE SWITCH GEAR & CONTROL GEAR.	AS PER IS 13947; 1993
3	MAKING OF SWITCHGEAR bus-bar.	AS PER IS 11353; 1985
4	DEGREES OF PROTECTION PROVIDED BY ENCLOSURES FOR OUDOOR APPLICATION FOR LOW VOLTAGE SWITCH GEAR & CONTROL GEAR.	AS PER IP-54 OF ISS - 2147; 1962
5	MARKING AND ARRANGEMENT FOR SWITCHGEAR BUS-BARS, MAIN CONNECTIONS AND AUXILIARY WIRING.	AS PER IS-375; 1963.
6	GUIDE FOR PREPERATION OF DIAGRAMS, CHARTS AND TABLES FOR ELECTROTECHNOLOGY.	AS PER IS - 8270(PART-ii); 1976
7	ENVIROMENTAL TESTS FOR ELECTRONIC AND ELECTRICAL EQUIPMENT.	AS PER IS- 2106(PART XII); 1965
8	SPECIFICATION FOR OF SWITCHGEAR AND CONTROL GEAR FOR VOLTAGES UP TO AND INCLUDING 1000V AC AND 1200V DC.	AS PER IS- 8623(PART-II); 1980
9	GENERAL REQUIREMENTS FOR SWITCH GEAR AND CONTROL GEAR FOR VOLTAGES NOT EXCEEDING 1 OOOV.	AS PER IS-4237 ; 1967
10	MOULDED CASE CKT. BREAKERS & MCB.	AS PER IS- 13947-2 - 1993
11	FUSE BASE.	AS PER IS - 9224 AND IEC - 269

12	HRC FUSE LINKS.	AS PER BS88PART-II.
13	CURRENT TRANSFORMER.	AS PER IS -2705, BS 3938, IEC-185-186
14	METERING.	AS PER IS - 1248, IEC - 60051(PART-II)
15	AIR BREAK CONTACTOR.	AS PER IS - 6875 - 1973 PART 1
16	APFC RELAY.	AS PER IS - 8544 & IEC-292
17	PUSHBUTTONS.	AS PER IS - 13947 -5
18	ROTARY SWITCH.	AS PER IS - 13947 -5
19	For Bus-bar Current rating	DIN - 43671
20	For quality of sheet steel	IS : 5138
21	For LT Cables	IS : 7098 (part-1
22	For material of copper Bus-Bars	DIN EN 13601

General Technical details of L.T. Panel

Item no.- 64

Note: Guideline / scheme for fire suppression system in Lift Control panels, LT panels, HVAC panel should be followed as per RDSO Letter No.- RDSO-EEM0LKO(GUID)/1/2026, Dated: 22.04.2026 or latest.

Sl no	Item Description	Qty
	Incoming 630A	
1	630A ,ACB, 4P, 50KA, MDO, with microprocessor release based and (Ics= 100%Icu) having LSING Protection with inbuilt current metering with inbuilt microprocessor release along with digital display on release of ACB. Feature of Last 10 trip history shall be inbuilt in ACB.	2
2	UV Release 240V AC	2
3	630A Spreader Terminal	2
4	Extended rotary	2
5	Digital Multifunction Meter	2
6	630/5A Current Transformer 10VA CI-1	2
7	Red Indication Lamp	2
8	Blue Indication Lamp	2
9	Yellow Indication Lamp	2
10	On Indication Lamp	2
11	Off Indication Lamp	2
12	Trip Indication Lamp	2

13	Common fault micro switch	2
14	Auxiliary Contactor with 2NO+2NC	2
15	6A MCB DP 10KA	2
16	6A MCB SP 10KA	4
17	Mechanical interlock kit	2
	Outgoing 320A Feeder	
1	320A ,MCCB, 4P, 50KA, with microprocessor release based and complying IS/IEC 60947-2 standard having double break mechanism for achieving isolation and lower let through energy ICS= 100% ICU at 415 V	2
2	320A Spreader Terminal	2
3	Extended rotary	2
4	Auxiliary IC/O + TAC 1 C/O	2
5	On Indication Lamp	2
6	Off Indication Lamp	2
7	Trip Indication Lamp	2
	Outgoing 200AFeeder	
1	200A, MCCB, 4P, 36KA,with microprocessor release based and complying IS/IEC 60947-2 standard having double break mechanism for achieving isolation and lower let through energy ICS= 100% ICU at 415 V	4
2	200A Spreader Terminal	4
3	Extended rotary	4
4	Auxiliary IC/O + TAC 1 C/O	4
5	On Indication Lamp	4
6	Off Indication Lamp	4
7	Trip Indication Lamp	4
	Outgoing100AFeeder	
1	100A, MCCB, 4P, 36KA,with microprocessor release based and complying IS/IEC 60947-2 standard having double break mechanism for achieving isolation and lower let through energy ICS= 100% ICU at 415 V	2
2	100A Spreader Terminal	2
3	Extended rotary	2
4	Auxiliary IC/O + TAC 1 C/O	2
5	On Indication Lamp	2
6	Off Indication Lamp	2
7	Trip Indication Lamp	2
	Outgoing 63AFeeder	
1	63A, MCCB, 4P, 36KA,with microprocessor release based and complying IS/IEC 60947-2 standard having double break mechanism for achieving	2

	isolation and lower let through energy ICS= 100% ICU at 415 V	
2	63A Spreader Terminal	2
3	Extended rotary	2
4	Auxiliary 1C/O + TAC 1 C/O	2
5	On Indication Lamp	2
6	Off Indication Lamp	2
7	Trip Indication Lamp	2
	Electrolytic grade Copper busbar of 800A, 4 bar	
	Indoor type , IP 54, CRCA sheet, 2.0/1.6 mm sheet (as per site requirement) with both side Bus alley and back side cable alley, with Copper busbar of 800A , 4 Bar considering electrolytic grade, double door, floor mounted, panel IEC 61439-1&2 , latest standard compliant fully type tested panel with production of type test and design verification certificate from OEM has to be submitted.	1
Note:- The LT panel shall be designed, manufactured in switchgear OEM factory or switchgear OEM Licensee Partner factory of reputed make panel builder followed by PUBLIC PROCUREMENT POLICY (MAKE IN INDIA) as per Preliminary condition and all type tested in accordance with the latest relevant IEC (viz. IEC 61439- 1&2: 2020) latest standards. Drawing must be approved by competent authority before supply of material. Decision of Railway administration over the standardization of the job & make of the material will be final.		

Panel must have provision of Over-current protection, Short-circuit protection, Ground Fault protection, Instantaneous protection, Over voltage protection, Under Voltage protection and all additional protection followed by Guideline / scheme for fire suppression system in Lift Control panels, LT panels, HVAC panel as per RDSO Letter No.- RDSO-EEM0LKO(GUID)/1/2026, Dated: 22.04.2026 or latest as per site requirement for smooth running of electrical equipment . The decision of Railway Administration over the standardisation & make for execution of the work will be final.

TEST REPORTS: Agree to provide all relevant documents Test Report / supporting document /reports etc. (from authorized government designated agency) to the buyer at the time of bidding or on demand.

The description of scheduled item is indicative. Entire Electrical Work is to be done in line of relevant RDSO's specification & **Guideline / scheme for fire suppression system in Lift Control panels, LT panels, HVAC panel should be followed as per RDSO Letter No.- RDSO-EEM0LKO(GUID)/1/2026, Dated: 22.04.2026 or latest or IS or PCEE/ER's specification & design, Electrical General Service Manual ,Volume-I (Power Supply) & latest** or OEM Standardisation or equivalent international standard for detail technical specification and all other clauses, terms & conditions for design, manufacture, testing, supply, installation and commissioning followed by statutory rules and common prudence and shall confirm to the rules & regulations of Railways.**The decision of Railway Administration over the standardisation & make for execution of the work will be final.**

The eligible contractor must furnish the detail of material which is proposed to be supplied or used inevitably got approved from Sr.DEE(G)/ASN or Sr.SE/Elect/G- the Supervision-in-charge of the work or authorized representative of Sr. SE/Elect/G

before commencement of work. Decision of Railway administration over the standardisation & make of all the material for the items of work schedule will be final.

PUBLIC PROCUREMENT POLICY (MAKE IN INDIA): Bidder must follow Public Procurement Policy (Make in India) Order 2017, dated 15/06/2017, issued by Department of Industrial Promotion and Policy, Ministry of Commerce, circulated vide Railway Board letter no. 2015/RS(G)/779/5 dated 03/08/2017 and 27/12/2017. The definition and calculation of local content in accordance with the Make in India policy as approved by PCEE/ER is 50% of Minimum Local Content (MLC).

NOTE:-

These technical details / general specifications are indicative only. In case of any ambiguity in the General specification or Technical Details it may be collected from Sr. DEE (G)/Asansol's office if required. All items pertaining to Electrical should confirm to relevant IS or equivalent international standard. Any deviation must be got approved by Sr. DEE/G/ASN.

Any typographical error shall not be construed to be benefit of the Contractor; In all cases the interpretation and decision of Sr. DEE/G/ASN shall be final and binding upon the contractor.

The issues not covered under these tender documents shall be governed by General Conditions of Contract April-2022 or its time to time latest amendments if any.

**Sr. Divl. Electrical Engineer (Genl.)
Eastern Railway, Asansol**