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TECHNICAL SPECIFICATIONS FOR 5/7/8 WAY LT FEEDER PILLAR WITH PROVISION OF ENERGY METER, AIR CIRCUIT BREAKER AND HRC FUSES

1. SCOPE

- 1.1. This specification covers design, manufacture, testing, inspection at manufacturer's works, packing and supply of LT Feeder Pillars made from GI Steel. The system shall be A.C. 3 phase, 4 wire, 433 V, 50 Hz with effectively grounded neutral. L.T. feeder pillars shall be 5 Way /7 Way/ 8Way with ACB along with provision for Energy meter and Resin cast CT arrangement complete with all accessories for efficient and trouble-free operation of the distribution network of four no's of GUVNL owned Gujarat DISCOMs. i.e. UGVCL, DGVCL, MGVCL and PGVCL. The Supply of the Energy meter shall not be in the scope of the successful bidder.
- 1.2. The complete enclosure of LT Feeder pillar shall be suitable for outdoor application under all environmental conditions mentioned in these specifications. The design shall be compact, and easily transportable which supports easy installation and commissioning. The panel shall have minimum maintenance requirements with no accidental access to live parts and fully comply with all statutory requirements.
- 1.3. Accessories that are mandatory for the smooth functioning of the equipment and which are specifically not mentioned but essential shall be deemed to be included in the scope of supply.
- 1.4. The L.T. feeder pillars shall be suitable for bottom cable entry, and exit, and shall have adequate mechanical strength for lifting.
- 1.5. Design and manufacturing shall be made through state-of-the-art technical applications and best workmanship in accordance with the applicable standards GTP and considering the safety factors to the greatest extent.
- 1.6. It is not our intent to specify completely herein all details of design and construction of the equipment. However, the equipment shall conform in all respects to high standards of Engineering design and workmanship and shall be capable of performing in a manner acceptable to the purchaser who will interpret the meaning of drawings and specification and shall be entitled to reject any work or material which in his judgement is not in full accordance therewith.

2. SYSTEM PARTICULARS/DISTRIBUTION NETWORK PARAMETERS:- The normal system parameters of the distribution network are as below.

1	System Configuration	3 Phase 4 Wire with neutral solidly grounded
2	Rated LT System Voltage	0.433 KV (+/- 10 %)
3	System Frequency	50 Hz± 3%
4	Location	Outdoor

- 3. ATMOSPHERIC CONDITIONS:** The atmospheric conditions under which all the individual components of the LT Feeder Panels shall be required to perform continuously and trouble-free; are as mentioned below.

Maximum Ambient Air Temperature	50° C
Minimum Ambient Air Temperature	5° C
Maximum daily average ambient air temperature	40°C
Maximum humidity	95%
Altitude above M.S.L. (maximum)	1000Mtr
Average annual rainfall (mm)	925
Max. wind pressure(Kg/sqm)	200
Seismic level (Horizontal accn.)	0.3 g
Iso-ceraunic level(Days per Year)	50
The average number of Rainy days/year	120
Note: The climatic conditions are prone to wide variations in ambient conditions and hence the equipment shall be of suitable design to work Satisfactorily under these conditions.	

- 4. Applicable standard:** The equipment covered by these specifications 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 statutory authorities.

Sr. No.	Applicable IEC/IS	Description
1.	IS 5039	Specification for distribution pillars below 1000V AC
2.	IS/IEC – 60947 Part -1	Low-voltage switchgear and control gearassemblies – Part 1: General rules
3.	IS/IEC – 60947 Part -2	Low-voltage switchgear and control gear assemblies - Part 2: Power switchgear and control gear assemblies
4.	IS/IEC – 60947 Part -5	Low-voltage switchgear and control gear assemblies - Part 5: Assemblies for power distribution in public network
5.	IS/IEC 61439-2 : 2011	Low Voltage Switch Gear and Control gear Assemblies Part 2 Power Switch Gear and Control Gear Assemblies
6.	IS/IEC 61439-1 : 2011	Low-Voltage Switchgear and Control gearAssemblies Part 1 General Rules
7.	IS 13703 / IEC 60269	LV Fuses for voltages not exceeding 1000 V ac or 1500 V dc, Part 1: General requirements

8.	IS 12063 /IEC 60529	Degrees of protection provided by Enclosures
9.	IS 16227 (Part 2) : 2016/IEC 61869-2 : 2012	Current transformers: Part 2 Measuring current transformers
10.	IS 2705 : Part 1 : 1992	Current transformers: Part 1 General requirements
11.	IS 2551	Danger Notice plates
12.	IS 5	Color of ready mixed paints
13.	IS 5082 (1998)	Wrought aluminum and aluminum alloy bars, rods, tubes and sections for electrical purposes
14.	IS: 13410/1992	Glass reinforced polyester sheet molding compounds (SMC)
15.	IS: 13411/1992	Glass reinforced polyester dough molding compounds (DMC)
16.	IS 8588 (Part 1) : 1977	Specification for thermostatic bimetals: Part 1 general requirements and methods of tests
17.	IS 4759 (1996)	Hot-dip zinc coatings on structural steel and other allied products
18.	IS 277	Galvanized Steel Sheets (Plain and Corrugated)
CEA safety regulations 2023/ Bills amended up to date and applicable for clearances, Safety and operation of the equipment.		

Equipment meeting with the requirements of any other authority's standards, which ensures equal or better quality than the standard mentioned above as well as the latest standard shall also be acceptable. If the equipment's, offered by the Bidder conform to other standards, salient points of difference between the standards adopted and the specific standards shall be brought out in the relevant schedule. In case of any difference between the provisions of these standards and provisions of these specifications and GTP, the provisions contained in this specification shall prevail. One hard copy of such standards with authentic English Translations shall be furnished along with the offer.

5. Configurations of L.T Feeder pillar: The different types of The L.T feeder pillar panel shall have following configuration,

Sr. No	Feeder Pillar Type	Incoming Feeder		Outgoing Feeders	
		Type and Rating	Cable Size	Type and Rating	Cable Size
1	5 Way	1600A ACB	1CX630 Sq.mm, Al. XLPE cable*2Runs	5X315A TP HRC Fuse	4CX240/300 Sq.mm
2	7 Way	2000A ACB	1CX630 Sq.mm, Al. XLPE	7X315A TP HRC Fuse	4CX240/300 Sq.mm

			cable*2Runs		
3	8 Way	2500A ACB	1CX630 Sq.mm, Al. XLPE cable*3Runs	8X315A TP HRC Fuse	4CX240/300 Sq.mm
Note: The cable size details for incoming and outgoing circuits are for the design reference only. Supplying the mentioned cables shall not be in the scope of the bidder.					

6. Design Criteria

6.1. The L.T. feeder pillar shall be a free-standing, floor-mounted enclosure.

6.2. Incoming Circuit:

6.2.1. The incoming feeder shall be equipped with an air circuit breaker (ACB) for overload, short-circuit and earth fault protection.

6.2.2. Current transformers (CTs) shall be installed within the metering / ACB compartment for metering purposes.

6.3. Outgoing Circuit:

6.3.1. The outgoing circuit shall be equipped with HRC fuses for overload protection of individual outgoing feeders.

6.3.2. The HRC fuse ratings shall be as per specified requirements.

6.4. The complete unit shall be installed on outdoor plinth (base). The outdoor locations may be located at very congested and public gathering crowded places. The L.T Feeder pillar shall be installed in hot, dusty, saline and humid atmosphere. All equipment, accessories and wiring shall be provided with tropical finish to prevent rust and fungus growth.

6.5. Standard General Arrangement of Air Circuit Breaker, HRC fuse base with links, Link Disconnecter, Bus Bars, connecting links, Cable termination arrangement etc. inside the L.T. pillars shall be as per the general arrangement indicative drawings of the specification for various types of L. T. Feeder pillars. The clearances & creepage distances shall be in accordance with IS/IEC – 60947 Part -1. Air Circuit breaker's operating handle shall be accessible only after opening of the doors.

6.6. The Feeder Pillar and all the components shall be capable of Continuous operation of rated output under the operating conditions of voltage and frequency variations as per statutory limits governed by relevant Indian Standard and their amendments in force.

6.7. The Feeder Pillar shall be designed for a) Compactness, b) fast installation, c) maintenance free operation, d) safety for worker/operator & public.

6.8. For continues operation at specified ratings temperature rise of the various switchgear components shall be limited to permissible values stipulated in the relevant IEC/IS standard and / or this specification.

6.9. All materials used should be of the best quality suitable for withstanding variations of temperatures and atmospheric conditions without undue deterioration or setting up of undue stresses anywhere. All mountings should be so designed as to avoid collection of water anywhere. All connections and contacts shall be of ample cross sections and surface for carrying specified currents continuously without undue heating and shall be secured by nut bolts, screws with adequate loading arrangement.

6.10. A 50mm wide horizontal strip of fluorescent paint or reflective sticker shall be applied around the panel as per the drawing. The strip shall reflect vehicular lights during night time. The sticker shall be verified and approved during the proto inspection.

7. Enclosure:

- 7.1. The Enclosure of LT feeder pillars shall be made from GI sheet of 220 gsm (Min.).
- 7.2. Frames shall be enclosed by GI sheet of thickness 2.5 mm, smoothly finished, levelled and free from flaws.
- 7.3. Doors and cover shall be made of GI sheet of thickness not less than 2.5 mm. Stiffeners shall be provided, wherever necessary.
- 7.4. The complete cubical shall be rigid self-supporting and free standing. The enclosure shall comply with the requirement of IP- 54 as per the IS/IEC 60529.
- 7.5. The panel shall be of dust and vermin proof construction and of self-cooled design. Four Louvers (two on each side) shall be provided to L.T. pillar panels. Louvers with stainless steel wire mesh with shall be provided on both sides of the feeder pillars and at the top and bottom of both sides of L.T. pillars. Mounting of components inside the enclosure shall allow free air circulation keeping the clearances as per specification
- 7.6. The L.T. feeder pillar shall be equipped with double leaf doors on the front side for easy access to internal components for outgoing circuit compartment. A separate door shall be provided for ACB and Meter compartment. A bolted cover will be provided on the rear side. Door side of panel shall utilize a center-opening double leaf design with insulating rubber grip handles for comfortable operation. To ensure proper access sequence and security, the right-hand side leaf shall only open after the left-hand side leaf is unlocked.
- 7.7. The back-side doors shall have nut and bolt arrangement with handles. All Hinged doors shall be connected to the earth terminal with 2.5 Sq.mm braided copper wires.
- 7.8. Double leaf doors L.T. feeder pillar door shall be secured with a minimum of three heavy-duty stainless steel (SS) anti-theft hinges. These concealed hinges shall be invisible from the outside and tamper-proof, preventing removal without authorized access. The hinges shall be designed to allow the doors to swing open a minimum of 120 degrees allowing for ample space to work inside the pillar. The door stoper shall be provided in each door to fix the door in an open condition, while working.
- 7.9. The L.T. feeder pillar shall offer three types of locking options for enhanced security: 1) Two no's of padlock having a L- drop type arrangement for double leaf doors 2) a sliding bolt latch made of aluminum for all doors and 3) internal tower bolts of stainless steel at the top and bottom of the double leaf doors for additional reinforcement.
- 7.10. The panel shall be provided with gasket all-round the perimeter of covers, gland plates, removable covers and doors.
- 7.11. The L.T. feeder pillar shall be equipped with a canopy on the top for weather protection. The canopy shall have a minimum slope of 10 degrees (towards the front and rear) to ensure proper drainage of rainwater. The canopy design shall extend a minimum of 50 mm from the front and rear enclosure panels when the doors are closed.
- 7.12. The L.T. feeder pillar shall be equipped with two lifting lugs securely welded onto the top for easy transportation and installation. Eyebolts of appropriate sizes will be provided to facilitate the lifting process.
- 7.13. SLD shall be engraved & pasted on the inside part of door.
- 7.14. The cubicles shall be provided with pedestal arrangement having appropriate number of bottom holes for grouting bolts at all four corners and the middle, as required. The pedestal arrangement shall be constructed using hot dipped galvanized ISA 50x50x6 mm and shall have a height of 400 mm. The covers shall be fabricated from 3 mm thick galvanized mild steel (MS) sheets and painted black.

- 7.15. All fasteners used in the L.T. feeder pillar panel, including nuts and bolts, shall be manufactured from stainless steel (SS) for superior corrosion resistance. The marking on these fasteners shall comply with the relevant standard, ensuring proper identification and traceability.
- 7.16. There should not be any sharp corner or edges. All such corners should be rounded.
- 7.17. The bidder is required to provide provision for Fuse Puller Pocket on the back side of the Feeder pillar door and also to provide one set of Fuse puller in each unit.
- 7.18. **Paint:** The outer side and inside surface of the panel shall be properly Pre-treated / Phosphated and shall be applied with a powder coating of a minimum 80-micron thickness. The Colour shade shall be of smoke gray (Code-692) as per IS: 5/2007 (Colours of Ready Mixed paints and Enamels) shall be applied inside & outside surface of the box. Powder coating shall be suitable for outdoor use, conforming to IS 13871/1993 – Powder coatings. The paint on the enclosure and external parts of the assembly shall have good color retention properties and shall be weather and UV resistant as per IS/IEC: 61439 (part I).
- 7.19. The enameled danger notice plate as per IS: 2551 /1982 with the latest amendment/revision of size 200x150mm shall be riveted in a pilfer-proof manner on the front cover of the box. Danger board marking by painting shall not be accepted.
- 7.20. The panel shall be equipped with two separate M12 x 50 mm galvanized earthing bolts and shall be welded from inside the Enclosure. The earth terminals shall be provided to diagonally opposite sides of the feeder pillar.
- 7.21. A safety instruction sheet shall be provided in Gujarati and pasted on the inside of the right-hand side (RHS) door for easy operator reference. Additionally, following essential safety instructions shall be printed directly on the front side of the door in a clear white color and Gujarati language for quick visibility.
 - a) ફૂઝ પુલર અને હાથમોજનો ઉપયોગ અવશ્ય કરવો
 - b) જાહેર ખબર ચોટાડવી કાયદેસર ગુન્હો બને છે.

8. General Technical Requirements:

- 8.1. The enclosure shall have cable entry at the bottom, with a minimum clearance of 300 mm between the cable termination and the gland plate. Distance between Gland plate and cable termination of Air Circuit Breaker should be minimum 600mm.
- 8.2. Gland Plate: Gland plates shall be of galvanized MS thickness not less than 3 mm. alternatively gland can also be provided between two angles so that removal of gland is easy. It shall be possible to temporarily detach the base plate for installation and connection of cables. Gland plate shall be provided with four SS nut bolts for fixing the plate from inside. Size & no. of the glands to be provided will be intimated to the successful tenderer along with approval of drawings.
- 8.3. The earth bus of 50 x 10 mm Al shall be internally connected to two separate earth terminals located outside (on both sides of enclosure).The earth bus-bar shall be located at sufficient height from the gland plate.
- 8.4. Enclosure having a live parts shall be covered with bolted min 1.5 mm thick SMC/FRP sheets from inside.
- 8.5. Doors of feeder pillar shall be provided with 3mm thick neoprene gasket. Feeder pillar is installed outdoor hence manufacturer shall use epoxy adhesive while sticking the gasket on MS surface inside pillar.
- 8.6. Nonferrous clamps (Al material) at bottom shall be provided for incoming and outgoing cable support.

- 8.7. Lighting System in Feeder Pillar should be LED based.
- 8.8. To prevent accidental contact with live parts, the busbars shall be separated by phase barriers made of either FRP (Flame Retardant Plastic) or acrylic insulating sheet with a minimum thickness of 3mm and a width of 65mm in outgoing feeder compartment. Additionally, The phase barriers shall be provided between front and rear compartment.
- 8.9. Terminals suitable for cables of aluminum grade 19501 (H2) as per IS 5082 standard shall be provided, complete with galvanized steel nuts, bolts, two plane washers, spring washers, and spacers.
- 8.10. Three pin 5/15 amp socket shall be provided through 10A MCB in metering compartment.

9. Air Circuit Breaker

- 9.1. ACB shall be of 440V, 50 HZ, 1600/2000/2500 A (as per actual requirement) with short time current rating of 50KA for 1 sec (Min.). Air Circuit Breaker shall conform to IS/ IEC 60947-1 & 2 with latest amendments.
- 9.2. The Circuit breaker shall be air break type, 3 Pole, electrically operated, fixed mounting type.
- 9.3. The Air Circuit Breaker (ACB) shall be equipped with a motorized spring-charging mechanism for automatic operation. Additionally, it shall have a manual charging facility. Switching ON & OFF the ACBs shall be independent of the speed of the operator. it shall also prevent contact with live parts when the enclosure door is opened.
- 9.4. The operating mechanism must be stored energy type with operation by means of chargeable springs fitted with anti - pumping facility. The springs charging shall be by means of geared motor and also manually by activating the front lever. The operating mechanism shall be of the Open/Close/Open stored energy type.
- 9.5. The circuit breaker shall be mechanically and electrically "trip free".
- 9.6. The mechanical indicators on the front panel of the circuit breaker shall indicate 'ON','OFF' 'Spring Charged' and 'Spring Discharged' status conditions.
- 9.7. The ACB shall be provided with separate Position limit Switches having 2 N/O and 2 N/C contacts for both 'SERVICE' and 'TEST' position.
- 9.8. The ACB shall be provided with separate Position limit Switches having 2 N/O and 2 N/C potential free contacts for 'ON','OFF', 'TRIP' and 'Spring Charged' position.
- 9.9. ACB shall have separate potential free contacts for ON, OFF and Trip status.
- 9.10. Air circuit breakers shall be motor operated by giving 24V DC. However, manual operation of circuit breaker shall be possible locally.
- 9.11. Potential free contacts for operation of the circuit breaker and its accessories shall be brought to meter compartment TB.
- 9.12. The circuit breaker shall be capable of rapid and smooth interruption of currents under all conditions, completely suppressing all undesirable phenomena even under the most severe and persistent short circuit conditions.
- 9.13. The circuit breaker shall be suitable for rapid closing and tripping. The breaker opening and closing operations shall be obtained from compressed spring charging mechanism. The mechanism for spring charging shall be motor operated with facility for manual, charging when required. It shall be suitable for re-closing once. Spring operated mechanism shall be complete with an opening spring, closing spring and all

necessary accessories to make the mechanism a complete unit. Each mechanism shall be designed to have a continuous sequence of circuit breaker opening and closing operations, to be obtained by control switch.

- 9.14. The operating mechanism shall be operated by local / remote electrical control.
- 9.15. The Circuit breaker shall be equipped with position and door interlocks, Test - service position micro switches/ limit switches, required No. of Auxiliary contacts, isolating contacts, closing and shunt releases, spring charge motor, safety interlocks, barriers, Mechanical Indicators , Push buttons etc. required for safe and reliable operation.
- 9.16. Motor shunt trips and closing coils shall be compatible with both AC and DC rated voltages, providing operational flexibility across varying power supply systems.
- 9.17. Mechanical indicators to show the 'close' or 'open' position of the contacts shall be provided. The operating handle shall be provided for charging the operating mechanism.
- 9.18. All MS parts of breakers and ferrous parts such as hangers, supports, bolts & nuts shall be hot dip galvanized as per IS:2629 (latest edition) with zinc plating & olive green passivation. The material for spring shall be rust proof.
- 9.19. The circuit breaker and their drawings shall have phase indications as R-Red, Y- Yellow and B-Blue or equivalent.
- 9.20. The ACB shall be designed and constructed in such a way as to avoid introducing any danger in use and under normal conditions so as to ensure specially
 1. Personnel safety against electric shock
 2. Personnel safety against effects of excessive temperature.
 3. Protection against spread of fire
 4. Protection against penetration of solid objects, dust and water.

9.21. Guarantee technical particulars:

Sr. No	Particulars	Value
1.	ACB Mounting	Fixed Type
2.	Application standard	IS/ IEC 60947-1 & 2
3.	Rated Current (Amps) at 40 Deg. C for Phases	1600A, 2000A, 2500 A
4.	No of poles	3 Pole
5.	No of Breaks per Pole	1
6.	Rated AC Voltage	415
7.	Utilization category	B
8.	Rated Frequency	50 Hz
9.	Rated Insulation Level (Min.)	1000 Volts
10.	Rated Impulse withstand voltage (1.2/50) – Power Circuit	8 KV
11.	Power Frequency Dielectric Test Voltage (rms)	3 KV for 1 Minute
12.	Rated duty	Uninterrupted
13.	Ultimate Breaking Capacity (Icu at 415V)	1600A- 50 kA 2000A- 50 kA 2500 A-65 KA

14.	Minimum SC Breaking Capacity (kA) (Ics at 415V)	Ics= 100 % Icu
15.	Rated short term withstand current for 1 sec at rated voltage – Icw	Icw= 100 % Icu
16.	Minimum short circuit making capacity	2.1 x Icu
17.	Min. Mechanical Endurance without the need for maintenance of the contacts and arcing chambers	15000 Operations
18.	Min .Electrical Endurance without the need for maintenance of the contacts and arcing chambers	5000 Operations
	General requirements	
19.	ACB - ON & OFF Operation	Manual and electrical operated
20.	ACB operating mechanism	Trip free, anti-pumping type
21.	Spring charging method	Spring charging method
22.	Spring charging motor supply	Single Phase 240 (+/-10 %) Volts tapped from LV bus bar
23.	Close & trip coil supply	Single Phase 240 Volts tapped from LV bus bar
24.	ACB indications	-ON, OFF , TRIP and Spring charge - Separate, day-bright visible LEDs for ON, OFF, and TRIP status.
25.	ACB operation - Manual	ON & OFF by Push buttons
26.	ACB operation - Electrical	ON & OFF by TNC switch
27.	ACB overload, short circuit & earth fault protection	By microprocessor based releases-Self-powered
28.	Sensing	True RMS based
29.	Auxiliary contacts	4 NO + 4 NC minimum
30.	Provision for following measurement functions shall be made on the Release	a. Phase wise current b. Phase wise voltage c. Power factor d. Maximum current with date and time e. Release should store 10 fault records on FIFO basis with date and time stamp.
	Protection requirements (better/wider protection band are acceptable)	
31.	Overload (with time delay)	50% -100% In

		Time Delay- 2.5 s to 40 s minimum three settings
32.	Short Circuit Setting (with time delay)	200% - 800% of In Time Delay- 50ms - 400 ms in steps of 50ms
33.	Earth fault setting (with time delay)	20- 100 % of In Time Delay- Time delay: 100 to 400 msec
34.	Instantaneous setting	400% - 1500% of In & OFF
	Other requirements	
35.	Earth fault protection should not operate during neutral unbalance. Separate NCT shall be Provided	
36.	Separate fault indication shall be provided for each protection stage i.e overload, short circuit, earth fault.	
37.	Special tools and standard accessories required for assembly and for maintenance, if any, of ACB shall also form a part of the supply. A list of tools shall be submitted along with the offer.	
38.	The ACB shall have the provision to lock the operating mechanism in off position.	
39.	Release shall have backlit display. Release should be plug-in type and easily replaceable in field.	
40.	Release should have in built RS485 port for remote communication on open Modbus protocol. It should be able to transmit all measured, monitored and recorded data to SCADA from this port including status of DIs and DOs.	
41.	Release should have 2DIs for CB ON and OFF status shall be wired to DIs through auxiliary switch. Remote time synchronization through SCADA should be possible	
42.	A minimum 4-digit, non-reversible operation counter shall be provided.	

10. Fuse and Fuse base:

- 10.1. The Fuse bases shall be suitable for HRC fuse links and strips. All fuse bases shall be identical and interchangeable and shall be capable to carry rated normal current without exceeding safe temperature.
- 10.2. The base of the HRC Fuse shall be of non-tracking, heat resistant insulating porcelain material of superior electrical and mechanical properties equivalent to Dough Molding Compound (DMC) as per IS:13411/1992. The Fuse Base shall be sturdy in construction. The insulation shall not get affected due to dust, moisture etc, at wide fluctuation in temperature. The holes for fasteners shall be plugged by insulating filling compound which shall not drain at operating temperature in service.
- 10.3. HRC Fuse Base should withstand the breaking capacity of the fuse link of 80kA.
- 10.4. Thermostatic bimetal device shall be provided between terminal pad and bus bars and between terminal pad and cable terminals (Z Patti) to prevent bimetallic deterioration.
- 10.5. Fuse bases shall have adequate contact surface with the bus bars provided to ensure that no local heating takes place.
- 10.6. The contacts shall be composed of electrolytic grade copper alloy with corrugated terminal pads and spring action to ensure high contact pressure. The spring ring shall

be designed to maintain consistent spring action unaffected by operational use and variations in operating temperatures.

- 10.7. **Fuse Link:** The HRC Fuse Links shall be sturdy in construction of “Din Type”. The fuse links shall be made from electrolytic grade copper and shall be capable of carrying the rated current of the fuse base and shall be suitable for inserting and pulling out by insulated fuse pulling handle. Breaking capacity shall be 80 kA. For fault indication red pop up indicator should come out instantly on fusing. Manufacturer’s name, current rating, breaking capacity and type shall be marked on HRC fuse link.

- 10.7.1. The HRC fuse link shall be designed to carry continuously its rated current without exceeding its temperature rise and maximum heat dissipation as defined in IS 13703 Part 1 & 2 / IEC 60269-1 & 2.

10.7.2. Guarantee technical particulars:

Sr No.	Parameter	Requirements
1.	Type of HRC Fuse	Knife type DIN HRC fuse with fuse links as per IEC 60269-1, with tinned copper contacts.
2.	Fuse puller	It shall be possible to replace the fuses on live system without compromising on safety.
3.	Fuse base current carrying part	Tin plated copper (with spring) as IS 191
4.	Fuse base material	DMC
5.	Fuse links	315 A , HRC plug-in type gG (General Purpose, Fast acting fuse)
6.	Fuse Base	Fuse base shall have adequate contact surface with the busbars provided to ensure that no local heating takes place.
7.	Current rating of fuse base at maximum ambient temperature 50°C	400 A
8.	Fuse base mounting screws	With insulating caps
9.	HRC fuse pullers	1 Nos / Panel suitable for 315 A Fuse
10.	Fuse Outlet Clearance	Clearance of minimum 100mm between each fuse outlet and 125mm between fuse outlet and body of panel to be maintained.
11.	Polycarbonate/FRP Barriers for open live parts	1.6mm thick transparent sheet

11. Bus-bar:

- 11.1. The bus bars shall be made up of electrolytic grade aluminum confirming to Aluminium grade 19501 (H2) of IS:5082.
- 11.2. Current Density of Aluminum busbars shall not be more than 1A /sq.mm
- 11.3. The busbars shall be colour coded for phase identification using heat shrinkable tape: red for phase R, yellow for phase Y, blue for phase B, and black for neutral.

- 11.4. Electrolytic grade aluminum twin flat cable terminals (Z Patti) shall be provided in staggered formation for connecting cable cores for each phase from rear side in all. L. T. pillars .The arrangement shall be suitable for taking Load current reading with clip on type of meter.
- 11.5. Main bus bar short circuit withstand capacity shall be 50 KA/1 sec.
- 11.6. The temperature rise limit above 45 degree ambient shall be as per IS/IEC 60947-1.
- 11.7. The bus bars shall be supported by 1100V grade SMC/DMC bus bar support insulators.

11.8. Bus bar Size:

Sr No.	L.T Feeder Type	Incomer Feeder		Outgoing Feeder	
		Bus bar Size/Rating (A)	I/C Cable Size	Bus bar Size/Feeder	O/G Cable Size
1	5 Way	1600A for Phase & Neutral (Minimum)	1CX630 Sq.mm, Al. XLPE cable*2Runs	50x10mm (Minimum)	4CX240/300 Sq.mm
2	7 Way	2000A for Phase & Neutral (Minimum)	1CX630 Sq.mm, Al. XLPE cable*2Runs	50x10mm (Minimum)	4CX240/300 Sq.mm
3	8 Way	2500A for Phase & Neutral (Minimum)	1CX630 Sq.mm, Al. XLPE cable*3Runs	50x10mm (Minimum)	4CX240/300 Sq.mm

12. Metering Compartment

- 12.1. A meter compartment shall be located above the ACB compartment as per GA drawing of LT Feeder Pillar.
- 12.2. This compartment shall house a terminal block arrangement for terminating CTs and PTs terminals with ferrule markings.
- 12.3. Droppable link terminal blocks (TBs) shall be provided for terminating CTs terminal. The CT terminals shall be shorted within the TBs. Incoming CT and PT connections shall enter the TBs from the bottom, while outgoing connections to the meter shall exit from the top of the TBs.
- 12.4. Additionally, sufficient space shall be provided to accommodate a modem/IoT device with its SMPS (Switch Mode Power Supply).
- 12.5. An inspection window made of transparent toughened glass shall be included for easy meter viewing.

13. Current Transformer (CTs):

- 13.1. The incoming Feeder shall have a current transformer of the cast resin, rectangular type having an accuracy Class 1.0 and the necessary VA burden for the metering facility.
- 13.2. The CT ratio for incoming and outgoing LV feeders shall be as shown in Table. A current transformer shall be type tested as per IS 2705-2:1992/IS: 16227-part-2
- 13.3. Secondary wiring shall be carried out with 1.1KV grade PVC insulated stranded copper conductor of 2.5 Sq. mm for CT circuits and 2.5 Sq. mm for PT and other circuits. All wires shall be colour coded.

Note: The supply of the Energy meter shall not be in the scope of the Supplier.

Sr No	Feeder Pillar Type	CT ratio
1	5 Way	1200/5 A
2	7 Way	1600/5 A
3	8 Way	2000/5 A

14. Name plate and Marking:

14.1. The following minimum details shall be provided on name Plate. The name plate shall be fixed on front door at top left side.

1. Type of feeder Pillar
2. Serial Number
3. Manufacturer name
4. Month and Year of Manufacturing
5. Rated Voltage and Frequency
6. Rating of ACB
7. Rating of HRC Fuse
8. AT No and date
9. Property of "DISCOM Name"

14.2. The panel shall be clearly marked for safety and identification with the following features:

- 14.2.1. Earthing stud: Marked with a black letter "E" on a riveted aluminum (Al) label.
- 14.2.2. Danger board: Riveted to the door with a white background and red lettering in English and the local language on a 1.6mm thick aluminum plate.
- 14.2.3. Single Line Diagram (SLD): Engraved and pasted on the inside of the door.
- 14.2.4. CT & ACB information: CT serial numbers, ratios, and ACB serial numbers and ratings written on the ACB door with a permanent marker /Sticker type Label.

15. Type Test: The outdoor L.T feeder panel shall be of proven design for outdoor installation and type tested as per IS: 5039/1983 for the following type tests, carried out in NABL approved laboratory, within the last seven years before the date of bid opening.

15.1. **On Complete L.T Feeder Pillar:** Following type tests as per IS:5039/1983 shall be carried out on complete L.T. feeder pillars

- 15.1.1. Verification of temperature rise limits
- 15.1.2. Verification of Dielectric Properties
- 15.1.3. Verification of short circuit strength
- 15.1.4. Verification of clearance & creepage distances
- 15.1.5. Verification of Degree of protection for IP- 54

15.2. Air Circuit breaker: All type tests as per IS/IEC: 60947 (Part II amended up to date) shall be carried out on Air Circuit Breaker.

15.3. On HRC fuses base and HRC fuse links: All type tests on HRC fuses and HRC fuse links shall be carried out as per IS:13703/of 1993 (Part I & II amended up to date) for HRC Fuse Base and HRC fuse link.

16. Routine/Acceptance Test:

16.1. Routine/Acceptance tests As per the latest edition of IS/IEC shall be carried out on each complete L.T Feeder Pillar unit at the manufacturer's works to ensure that the product is in accordance with the equipment on which the type test has been carried out.

1. Visual inspection, dimension checks as per approved Drawing
 - 1.1 Tolerances on panel dimensions- Maximum +/- 5mm
 - 1.2 No negative tolerance on bus bar dimensions & bus bar clearances
2. Verification of Bill of materials
3. Paint Thickness Verification
4. Wiring Verification
5. IR Test
 - a) The IR value shall be measured with megger of 2500 DC voltage between terminals as mentioned H.V. Test, IR value shall not be less than 10 Mega ohm
6. HV Test (2.5 KV for 1 min. for Ph-Ph)
 - I. Bus bars and ACBs:
 - a. Between individual bus bars
 - b. Between each Busbar and body
 - II. ACBs: a) Between incoming line terminals and outgoing line terminals, keeping ACBs open.

There shall not be any puncture or flashover during his tests. Following these tests IR values shall be measured which shall not be less than 10 Mega ohm

7. Mechanical Operation verifications for ACB
 - a) ACBs shall be tested for 10 Nos of operation cycle of "ON" and "OFF" under No load conditions and after completion of the test no abnormalities to be found.
8. Temperature Rise test shall be carried out on one unit of each type of feeder pillar during the acceptance testing of the first lot of manufacturing. The Bidder shall offer the test of temperature rise, either in their factory site or at government approved NABL lab.
9. Test for verification of overcurrent release using Primary injection test. [Acceptance Test]
- 16.2. **Routine Test:** The following Routine Tests shall be carried out on all ACB and the routine test report shall be submitted to the company's representative at the time of inspection of the materials
 - 16.2.1. Mechanical operation tests
 - 16.2.2. Dielectric tests
 - 16.2.3. Verification of the calibration of releases.

17. Prototype acceptance tests :

- 17.1. Prototype Approval Test shall be conducted on each rated L.T Feeder panel for its design and compliance to this specification. The bidder shall provide estimated time required for manufacturing of proto type along with the offer. Mass production of L.T Feeder panel will be followed by approval of the prototype. The supplier shall have to carry out necessary changes/modifications as per requirements of purchaser.

18. Inspection:

- 18.1. The inspection may be carried out by the purchaser at any stage of manufacture. The successful tenderer shall grant free access to the purchaser's representative at a

reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective. If any equipment/material fails in the tests conducted during factory inspection, necessary rework/replacement shall be done and equipment shall be re-offered for inspection without any cost to the owner.

- 18.2. If DISCOM intends to have inspection by competent/authorized body at manufacturer's premises during the manufacturing and testing process, the selection of the party will be at sole discretion of the company and manufacturer will have to trust & provide all the facilities.
- 18.3. Following test certificates and documents shall be furnished at the time of inspection.
- a) Chemical analysis certificate and documents showing genuine source of procurement of electrolytic grade conductivity Aluminum Sections
 - b) Document showing genuine source of procurement of steel sheet and sections.
 - c) Certificate of painting with degreasing, pickling phosphate, and painting and oven treatment by seven tank oven process in respect of M.S. Cubicles.

19. Guarantee:

- 19.1. Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this 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 at least 36 months from the date of commissioning/installation or 42 months from the date of last supplies made under the contract whichever is earlier.
- 19.2. Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, 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 from the Bidder or from the " Security cum Performance Deposit" as the case may be.
- 19.3. In case of GP failure, bidder shall report at site within 48 hours from intimation and arrange for rectification of fault within a mutually agreed time. In case rectification at site is not possible then alternative arrangement (replacement) to be made by bidder within 15 days of intimation of failure.

20. Packing & forwarding :

- 20.1. The L.T Feeder Panel shall be dispatched with due care and in a packing as per manufacturer's standard practice. The supplier shall ensure that any of the equipment and part of the L.T Feeder Panel shall not get damaged during transportation.
- 20.2. The Manufacturer shall be responsible for the shipping of L.T Feeder Panel & its all accessories from their works to the destinations specified by DISCOM.

- 20.3. The manufacturer shall be responsible for the transportation and shall take all reasonable steps for selecting routes and use appropriate vehicles for transporting so that the risk of damage to the equipment shall be eliminated.
- 20.4. All components shall be installed in such that it shall not get damaged during transportation.
- 20.5. The name of the consignee of each consignment shall be accompanied by a detailed packing list containing the following information.
1. Details of consignment
 2. Destination
 3. Handling and unpacking instructions
 4. Bill of material indicating the contents of each package.

21. Quality assurance plan:

- 21.1. The manufacturer shall have a well-organized Quality Assurance Plan (QAP) based on ISO 9000 Series to assure that items and services comply with this specification.
- 21.2. The bidder shall submit a 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 components and equipment after finishing.
- 21.3. As part of the plan, a schedule for the stage and final inspection within the parameters of the delivery schedule shall be furnished. Bidder shall have adequate in-house testing facilities for carrying out all routine tests, and acceptance tests as per Indian /International standards.
- 21.4. The Bidder shall invariably furnish following information along with his bid.
- 21.4.1. Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested.
 - 21.4.2. List of tests normally carried out on raw materials in the presence of bidder's representative.
 - 21.4.3. Information and copies of test certificates in respect of bought out accessories.
 - 21.4.4. List of manufacturing facilities available.
 - 21.4.5. Level of automation achieved and list of areas where manual processing exists.
 - 21.4.6. List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspection.
 - 21.4.7. List of testing equipment available with the bidder for final testing of equipment along with valid calibration reports shall be furnished with the bid.

22. Drawings & Documentation:

- 22.1. Following documents shall be provided in soft and hard copies.
- 22.1.1. GA and dimensional drawings of the L.T Feeder Pillar showing plan, elevation, and typical sectional views and locations of ACB, bus bars, Cable termination and Indicating Devices
 - 22.1.2. Single-line diagrams of electrical and control wiring
 - 22.1.3. Installation and commissioning instruction manual

- 22.1.4. Operation and maintenance Instruction as well as troubleshooting charts/ manuals
- 22.1.5. Type test certificates for type testing of bought-out items, if already carried out
- 22.1.6. Descriptive catalogs/Datasheet/pamphlets and literature of bought-out items such as ACB, HRC Fuse etc.
- 22.1.7. Bill of Material of complete L.T Feeder Pillar
- 22.1.8. Recommended spare parts and consumable items for five years of operation and spare parts catalog with price list
- 22.1.9. Drawing details of Nameplates and danger plates
- 22.2. All drawings and data shall be annotated in English
- 22.3. The successful tenderer shall be required to furnish four sets of final versions of all the above-said drawings and documents in hard copy and one set of soft copy within 15 days after Prototype inspection, for the purchaser's approval.
- 22.4. Duly signed & stamped copies of the all drawings / documentation are required to be submitted for approval.

23. Training:

- 23.1. The successful bidder is required to impart primary training free of cost considering manufacture, assembly, erection, safety aspects, operation, all kinds of interlocks, and maintenance for the offered item at his works to the person/s identified by the DISCOMs. In the training session, the bidder shall confirm that he has to impart all the aspects of design, operations, the objective of the individual components, possible defects, and corrections, logical design for the operation of the LT Feeder Pillar, etc.

Annexure-A

Bidder to submit hard copy duly filled and signed along with techno commercial offer. Bidder to submit separate GTP for each type of feeder pillar panel

(GUARANTEED TECHNICAL PARTICULARS FOR EACH RATED L.T FEEDER PILLAR)

S. No	Particulars	Bidders Response		
		5-Way	7-Way	8-Way
1.	Manufacturer Name			
2.	Type of Panel Offered			
3.	Continuous rated operating voltage			
4.	Overall dimensions (mm) (HxWxD)			
5.	Total weight (Kg.)			
6.	No of Incoming Feeder			
7.	Incomer Feeder ACB rating (A)			
8.	Nos of Outgoing Feeder			
9.	Rating of HRC Fuse Base			
10.	HRC Fuse Base make and Material			
11.	Rating of HRC Fuse Link			
12.	HRC fuse type & make			
13.	Grade and specification of material of spring steel round			
14.	Dimensions of spring steel round			
15.	Pedestal Details a) Height b) Cover Material c) Cover material thickness d) ISA size			
16.	Hinges: e) Nos /door f) Type g) Length h) Thickness i) Pin Dia			

17.	Door type for front & rear access			
18.	Separate door provided for ACB & Meter compartment ? (Yes/No)			
19.	Number and size of ventilating louvers with wire mesh			
20.	Type of locking arrangements (As per specifications)			
21.	L- drop type locking arrangement at door (Nos)			
22.	External steel hardware			
23.	Phase & neutral bus bar Material and grade			
24.	Incomer Phase & neutral bus bar size and Amp rating			
25.	Outgoing Feeder Phase bus bar size Amp rating			
26.	Bus bar color coding for R, Y , B & neural.			
27.	Bus bar insulation type for R, Y , B & neural.			
28.	Earth bus size			
29.	Main bus bar short circuit withstand capacity (In KA for 1sec)			
30.	Main bus bar maximum temperature rise (above ambient of 45 deg C)			
31.	Bus bar support insulators (material and voltage grade)			
32.	Terminals with nut bolt, Plain washers + spring washers and spacers suitable for cables size provided (Yes/No)			
33.	Z shape terminals provided (Yes/No)			

34.	Nos and Z Strips dimensions			
35.	Gland plate at panel bottom			
36.	Cable termination clearance from gland plate			
37.	Earth studs on both side of panel bottom			
38.	Holder for 230V Incandescent Lamp Controlled through 2amp SPMCB Provided ?(Yes/No)			
39.	5/ 15 amp 3pin socket power socket Controlled through 10 amp SPMCB provided (Yes/no)			
40.	HRC fuse pullers provided - 1no/ Panel (Suitable for 315 A HRC Fuse. (Yes/No)			
41.	Clearance between live parts (Phase- phase)			
42.	Clearance between live parts (Phase- Earth)			
43.	Labels & name plates			
44.	Surface preparation for painting (Sand blasting or 7 tank process)			
45.	Painting a) Paint thickness b) Paint shade			
46.	Foundation Bolts Provided (yes/No)			
47.	Canopy Projection (mm)			
48.	Lifting Lug/bolt size and no's			
49.	Nos of TBs provided in Metering compartment			
50.	Size of Metering compartment			
51.	Details of fluorescent paint or sticker provided on panel			

Annexure-B
GUARANTEED TECHNICAL PARTICULARS FOR EACH RATED ACB

Sr No	Description	Bidder's response
1.	Name of Manufacturer	
2.	Location and Country of manufacture	
3.	Applicable Standards	
4.	Model Number / Catalog Reference Number	
5.	Type 1. Motorized/Non-Motorized 2. Fixed/Draw out type	
6.	Rated current	
7.	Number of poles (Nos.)	
8.	Tripping mechanism / releases with true RMS based sensing	
9.	Rated operational voltage	
10.	Rated insulation voltage (Volts)	
11.	Rated impulse withstand voltage	
12.	Rated continuous operating current (Amps)	
13.	Power loss (Watts)	
14.	Milivolt Drop (mV)	
15.	Type of mechanism	
16.	Does the equipment have "push-to-trip" feature?	
17.	Utilization Category A/B	
18.	Standard/ Current limiting :	

19.	Duty (uninterrupted/ 8h)	
20.	Rated Short Circuit making capacity (kA)	
21.	Ultimate Short Circuit breaking capacity at 0.25 powerfactor, 415Volts AC (kA)	
22.	Service Short Circuit breaking capacity at 0.25 power factor415 Volt AC (kA)	
23.	Rated short time withstand current for 1 Sec (kA)	
24.	Total fault clearing time (millisecond)	
25.	Number of ele. operating cycles at rated current (open + close) without changing arching contacts	
26.	Number of mech. operating cycles at rated current (open + close) without changing arching contacts	
27.	Protection characteristic	
A	Overcurrent setting range	
B	Over current delay	
C	S/C setting range	
D	S/C current delay	
E	Instantaneous setting range	
F	E/F setting range	
G	E/F current delay	
28.	ACB Dimension	
29.	ACB weight	
30.	NCT provided (Yes/No)	
31.	Separate fault indication provided for each fault type (Yes/No)	
32.	Release details	

	a) Measurement facility and List of parameters b) Fault storage capacity c) Consist backlit display (Yes/No) d) Communicable over Modbus with DI and electrical parameters information (Yes/No)	
33.	List of accessories provided with ACB	

Annexure-C

GUARANTEED TECHNICAL PARTICULARS FOR METERING CTs

Sr. No	Particular	Value
LV CT		
1.	CT Make	
2.	Applicable standard	
3.	Nos of CT / CSS	
4.	CT ratio	
5.	CT Voltage rating	
6.	CT Accuracy Class	
7.	CT insulation material	
8.	CT shape (round/rectangular)	
9.	CT burden	
10.	CT ISF	
11.	Power Freq. withstand voltage	
12.	Impulse withstand voltage	
13.	Short time withstand current / duration	
14.	CT mounting arrangement	

Annexure-D (Indicative drawing for 8 way feeder Pillar)

