



MGVCL/DSM/RE Project/HTMC/ 493

Dtd: 15.09.2025

The Superintending Engineer (O&M)
Madhya Gujarat Vij Co. Ltd., Circle Office
Baroda (O&M)/Baroda (City)/Anand/Godhra/Nadiad

Sub: Approval for installation of 11KV HT Metering Cubicle (HTMC) at Generation end and Consumer end for the RE Project registered at 11KV Level.

Ref: (1) MGC0V/0812/11/2024 Dtd: - 26.11.2024

(2) MGC0V/SCH/e-file/2784/2025/5209/DSM Cell Dtd: - 05.07.2025

With reference to the above subject, vide letter at sr. no. 1 MGVCL has already conveyed of technical Specifications for 11KV HT Metering Cubicle - HTMC for HT connection.

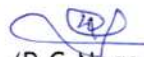
In line with letter at sr. no.1 under reference, As approved by the competent authority, vide note at sr. no.2 under reference, approval is here by accorded to give permission to install HTMC under option-II, In case of RE Projects registered at 11KV Level with MGVCL and wanting to install HTMC on 11KV line erected for RE Project at generation end. Concern circle office / division office of MGVCL may approve HTMC installation, subject to

- A. Consumer/applicant has to register their application under option-II for Supply, installation, commissioning and testing of HTMC in place of outdoor type DODP & CTPT at respective division.
- B. Consumer/applicant has to submit Bills of Material, Technical specification and Guaranteed Technical particulars (GTP) of VCB/LBS with drawing.
- C. HTMC should be purchased through approved Vendor. Right now the same vendors registered at UGVCL are considered till new registered vendors are added in our and other DISCOMs. Present vendor List are as under,
 1. M/s National Power Industries, Ahmedabad.
 2. M/s S & P Enterprise, Ahmedabad.
 3. M/s Expert Engineers, Ahmedabad.
 4. M/s Good luck power solution, Ahmedabad.
- D. The approval for installation of HTMC at consumer end shall be accorded on receipt of application by respective consumer as per existing procedure & DOP for HT Consumer.
- E. After completion of HTMC installation work, Applicant should obtain necessary approval to be taken from Electrical Inspector prior to make it operational.
- F. The HTMC unit shall be installed pilfer proof and sealed properly.
- G. The HTMC unit shall be easily visible from outside and nearer to operating main gate.
- H. The energy meter (ABT Meters) installed with HTMC shall be with AMR facility and parameters of the meter shall be monitored 24/7.

15% Supervision charge is to be applicable for installation and commissioning of HTMC as per MGVCL Cost -Data for 11KV HT Metering Cubical with HT Circuit Breaker.

Technical Specification and drawing are enclosed here with.

Further action to be taken as per norms of Company.


(R G Nagariya)
Chief Engineer (Project)
MGVCL, Corporate Office

Copy F.W.Cs to:

1. ETA to MD, MGVCL, Corporate Office, Vadodara
2. The C.E. (T&O), MGVCL, Corporate Office, Vadodara

**DRAFT TECHNICAL SPECIFICATION
FOR
SUPPLY, ERECTION, COMMISSIONING AND TESTING
OF
11 KV OUTDOOR HT METERING CUBICLE WITH LBS/VCB.**

Sr. No	Technical Specification No./Revision	Date of revision
1.	GUVNL/CPRD/TS/HTMC/P-015/R0	19/4/2017
2.	GUVNL/GPRD/TS/HTMC/RP015/R1	23/04/2019
3.	GUVNL/GPRD/TS/HTMC/RP015/R2	27/04/2022
4	GUVNL/GPRD/TS/HTMC/RP015/R3	30/11/2023
5	GUVNL/GPRD/TS/HTMC/RP015/R4	16/02/2024

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1.0 GENERAL:

- 1.1. All equipment and material shall be designed, manufactured and tested in accordance with the latest applicable IEC/IS standards.
- 1.2. Equipment and material conforming to any other standard, which ensures equal or better quality, may be accepted. In such case copies of English version of the standard adopted shall be submitted.
- 1.3. The electrical installation shall meet the requirement of CEA safety Regulation 2023 as amended up to date; relevant IS code of practice and Indian Electricity Act-1910/IE Act-2003 In addition other rules and regulations applicable to the work shall be followed. In case any discrepancy, the most stringent and restrictive one shall be binding.
- 1.4. The high-tension switchgear offered shall in general comply with the latest issues including amendments of the following standards but not restricted to them.

2.0 SCOPE:

- 2.1. This specification covers the design, fabrication, assembling, testing, and supply of metal enclosure consisting of HT switchgear, auxiliary components, wiring, and supply on a destination basis as decided by DISCOM, and performance testing of 11 KV self-equipped metering cubicle. HT Trivector meter & HT CTPT Unit are not in the scope of supply. The metering cubicle shall be suitable for outdoor application.
- 2.2. There are two different types of 11 KV HTMC configurations based on type of HT switchgears used, shall be as follows,
 - 2.2.1. 11 KV HTMC-LBS Type (For Up to 500 KVA HT Consumer): This type of HTMC shall consist 11 KV, 630 A Load break switch (LBS) in HT compartment.
 - 2.2.2. 11 KV HTMC-VCB Type (For Above 500 KVA HT Consumer):: This type of HTMC shall consist 11 KV, 630 A drawout type vacuum circuit breaker (VCB) with its accessories in HT compartment.
- 2.3. The 11KV HTMC with LBS OR VCB as per the above types shall fully meet the technical, climatic, isoceraunic, and system conditions given in this specification, for outdoor installation.
- 2.4. The Switchgear panel should be complete in all respects with insulators, interrupting chamber, operating mechanisms, control cabinet, interlocks, auxiliary switches indicating devices, supporting structures, and allied accessories briefly listed in the schedule of requirements.
- 2.5. The 11 KV HTMC offered shall be compact, maintenance-free, easy to install and operate, reliable, safe, and supplied with all accessories and parts required for their effective and trouble-free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.
- 2.6. The bidder shall furnish in his offer a list of recommended spares with unit rates for each set of equipment that may be necessary for satisfactory operation and maintenance of circuit breakers /Load Break Switch . The purchaser reserves the right to selection of items and quantities of these spares to be ordered. The cost of such spares shall not be considered for tender evaluation.
- 2.7. The bidder shall submit a list and unit rates of all the special tools, equipment, and instruments required for erection, testing, commissioning, and maintenance of the

equipment. The purchaser shall decide the quantity of tools to be ordered. Prices of these tools shall not be considered for tender evaluation. However, the list of necessary tools/equipment which will be supplied free of cost with each HTMC unit may be furnished separately.

- 2.8. Moreover, the 3 Nos. of 11 KV Non telescopic discharge rods along with earthing clamps of standard make as per relevant standard shall be required to supply with the each HTMC unit irrespective of its type, and there shall be the provision inside the HTMC for housing the same considering all electrical safety. This discharge rod shall be used for discharge the electrical circuit of HTMC before commencement of work by DISCOM operational staff.

3.0 SPECIAL INSTRUCTION TO BIDDER:

Please read the following instructions carefully before submitting your Bid.

- 3.1. All the drawings, i.e. elevation, side views, plan, cross-sectional view, etc., in AutoCAD format and manuals in PDF format, for the offered item shall be submitted. Also, the hard copies as per specification shall be submitted.
- 3.2. The bidder shall submit a Quality Assurance Plan for the manufacturing process and a Field Quality plan with the Technical Bid.
- 3.3. The bidder shall have to submit all the required Type Test reports for the offered items. However, in the event of partial submission or reports older than the specified limit, the bidder must submit his confirmation for that Type Test report/s to be submitted in the event of Order, without affecting the delivery schedule before the commencement of supply. In absence of this confirmation, the evaluation shall be carried out accordingly as non-submission of Type Test reports.
- 3.4. The Bidder must fill up all the points of GTP for offered item/s. Instead of indicating "refer Drawing or as per IS/IEC" the exact value/s must be filled in.
- 3.5. All the other points other than GTP, which are asked to confirm in technical specifications must be submitted separately with the bid.
- 3.6. The Bidder shall bring out all the technical deviation/s only at the specified annexure.
- 3.7. The Bidder should indicate manufacturing capacity by submitting the latest updated Certificate of a Chartered Engineer (CE).
- 3.8. The Tenderer/supplier shall bind himself to abide by these considerations to the entire satisfaction of the purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.
- 3.9. Tolerances on all the dimensions shall be in accordance with provisions made in the relevant Indian/IEC standards amended up to date and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with the required quality of the product.
- 3.10. It shall also encompass all necessary project management, data engineering, acceptance testing, documentation, and guarantee services. In the event of an order, the 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 HTMC, etc.

4.0 SERVICE CONDITIONS

4.1. **SYSTEM PARTICULARS/DISTRIBUTION NETWORK PARAMETERS:** 11KV switchgear equipment and accessories shall comply with the following system conditions:

Sr. no	Particulars		Specification
1	Nominal system voltage (KV-rms)		11
2	Highest system voltage (KV-rms)		12
3	System earthing		Effectively Earthed
4	Number of phases		3
5	Rated Frequency (Hz)		50±3%
6	Fault Level(KA)		21 for 3 sec.
7	Basic Insulation level	1.2 x 50 microseconds impulse with stand voltage (in KV peak)	75
		One minute power frequency withstand voltage (KV RMS)	28

4.2. **ATMOSPHERIC PARTICULARS:-** The climatic conditions at site under which the equipment should be operated satisfactorily for its working life; are as follows:

Sr. no	Particulars	Values
1	Maximum ambient temperature of the air in shade (°C)	50
2	Minimum ambient temperature of the air in shade (°C)	5
3	Maximum daily average ambient temperature (°C)	40
4	Minimum yearly average ambient temperature (°C)	30
5	Maximum relative humidity (%)	95
6	Average number of thunder-storm days per annum	15
7	Average annual rainfall (cm)	115

8	Maximum wind pressure (Kg/m ²)	200
9	Earthquake acceleration (g)	0.08 x 2 g.
10	Height above Mean Sea Level (MSL)	Not exceeding 1000

NOTE:

1. The equipment offered shall be suitable for continuous operation at the full rated capacity under the above conditions.
2. The HT Consumers are to be located at various places including near the seashore or in an industrial area, the equipment offered shall be suitable, for a heavily polluted atmosphere without rusting of enclosure and its parts.

5.0 APPLICABLE STANDARDS:

Unless otherwise specified elsewhere in this Specification, the HTMC, Switchboard (Switchgear), Load break switch/VCB, Instrument Transformers, and other associated accessories shall conform to the latest revisions and amendments thereof to the following standards.

Sr No	Applicable IEC/IS	Description
1	IEC 62271- 200:2021/ IS 12729 :2004	General requirement for Metal Enclosed Switchgear
2	IEC 62271 – 102:2018/ IS 9921-2	Alternating the Current disconnectors (Load Break isolators) and earthing switch
3	IS/ IEC 62271-1:2007	Common specifications for high voltage alternating current switchgear and control gear
4	IS:9385-1:1979/ IEC 60282-1:2009	High Voltage Fuses
5	IEC 62271-100:2008/ IS 13118 : 1991	Specification for alternating current breakers
6	IEC 16227-1 &2 / IS 2705:1992 (Part1 &3)	Current Transformers
7	IS 8686:1977/IEC 60255	Specifications of Static protective relay
8	IEC 62271-103:2011/IS 9920 : 2002 (Part 1,3,4)	High voltage switches & Control gear
9	IEC 60273:1990/ IS : 2099	Dimension of Indoor & Outdoor post insulators with voltage > 1000 V
10	IS/IEC 60529	Classification of degrees of protection provided by enclosures of electrical equipment

11	CEA regulation 2023	For Safety
All Indian Electricity Rules/ Bills amended up to date applicable for clearances, safety and operation of the equipment		

NOTE: In the event of offered equipment conforming to Standards other than the above, The salient points of comparison between the Standard(s) adopted and the relevant IS/IEC shall be indicated in the technical offer to bring out clearly how the chosen standard is equal to or better than the ones stipulated in this specification. Copies of the Standard(s) adopted shall be furnished.

6.0 GENERAL REQUIREMENTS OF THE HT METERING CUBICLE (HTMC):

- 6.1. The HT metering cubicle shall be installed electrically in between the incoming supply point and the distribution transformer of HT consumers' installation as per the prevailing practice of the DISCOM. The general arrangement of the cabinet shall be as per the enclosed schematic drawing and the Supplier shall require to avail final drawing approval from the respective DISCOM.
- 6.2. The HTMC shall be used for outdoor applications only and its design and components shall be sturdy enough to work satisfactorily under all severe climatic and system conditions parameters as mentioned above.
- 6.3. The switchgear constructions shall be such that the operating personnel shall not be endangered by breaker operation and internal explosions, and the front of the panel shall be specially designed to withstand such abnormal situations. Pressure relief flaps shall be provided for safely venting out gases produced inside the HTMC during the fault conditions. These flaps shall be vented upwards and cannot be opened from outside. These relief flaps shall be of such construction as not to permit ingress of dust/water in harmful quantities under normal working conditions.
- 6.4. The enclosure shall be constructed with a CRCA sheet of minimum 2.0 mm thickness. The purchaser-DISCOM shall have to specify the requirement of HTMC with the G.I sheet of minimum 2.0 mm thickness for their different areas having high corrosive atmosphere. The final HTMC enclosure shall have a rigid, smooth, leveled, flawless finish.
- 6.5. The complete HTMC shall be mounted on the civil plinth as per the detailed drawing attached in Annexure.
- 6.6. The CTPT compartment/Chamber shall be provided with the facilities for sealing the chamber as per the prevailing practice of the DISCOM, padlock arrangement. The CTPT door and opposite side wall shall have the provision for toughened glass fitted inspection window as per drawing. The arrangement of these windows shall be described later in these specifications.
- 6.7. All doors shall have the capability to open upto 180 degrees, and they should be equipped with a stopper arrangement to secure them in the open position for ease of working for the operational staff of the DISCOMs. HTMC unit will be exposed to high winds, dust, and rain. The top cover of the kiosk shall have the necessary slope to avoid stagnation of rainwater. The base frame shall be of sufficient thickness and tar painted to give corrosion resistance even if the site is with water accumulation.
- 6.8. Safety shutters to cover the live part to prevent accidental contact and explosion vents to

release the gases during fault occurrences shall be provided. Additionally, a non corrosive painted mesh frame of the bolted fitting type as per the indicative drawings of this specifications shall be provided in the CTPT compartment of the HTMC, such that in the event of door open of the CTPT compartment, accidental contact with live parts to be prevented after the opening of the compartment door.

- 6.9. The Ingress protection degree of the Enclosure shall be minimum IP54 for HT switchgear compartment and the CTPT compartment. Proper/adequate ventilation aperture shall be provided for natural ventilation by way of Louvers etc. Equipment shall be suitable to put in service in the outdoor area.
- 6.10. To protect from dust, the doors of the enclosure shall be fitted with gaskets that increase the degree of protection. Neoprene gaskets of high quality shall be used.
- 6.11. All bolts, nuts, and washers exposed to the atmosphere and of the relevant size shall be made from stainless steel grade 304, in strict accordance with ISO 3506-1&2/ISO 4762 or other applicable standards.
- 6.12. The control cable hole shall be equipped with a proper vermin-proof arrangement, and a PVC flexi gland shall be provided in accordance with the attached drawing for proper installation of the control cable for HT metering. Additionally the control cable hole shall be provided with canopy arrangement to prevent ingress of water.
- 6.13. Incoming supply termination must be carried out within the HT compartment. It is to confirm in the design that there shall not be any electrically live parts in the CTPT compartment When the LBS/VCB is switched off,
- 6.14. Incoming and outgoing HT cable Holding clamps shall be provided to prevent any mechanical stress on terminations. Incoming and outgoing cables shall have the bottom entries and it should be confirmed that at cable entry and exit points, the compartment must be fitted with removable gland plates, preferably of two parts of adequate size to accommodate cable glands and easy entry and exit of the HT cables with cable boxes. It is further to ensure that complete arrangement shall be vermin proof during the operation.
- 6.15. Three nos of VDI (Voltage detection indicator) shall be provided for incoming supply, CTPT incoming supply and CTPT outgoing supply.
- 6.16. The HTMC shall have inbuilt electrical components viz. Load break switch(LBS) with HRC fuse of appropriate rating OR vacuum circuit breaker(VCB) with protection as per the rating of the HTMC, Bus bar(main & earth), earth switch, cable termination, CTPT unit compartment, metering compartment, auxiliary components, and wiring, etc.

7.0 Load break switch (LBS):

- 7.0** The 11 KV LBS shall comply with the requirements of the latest edition of IEC 62271 – 102:2018/ IS 9921-2 except where specified, in the specification. It shall consist phase-wise HT HRC fuse to protect from overload and short circuits. The necessary padlocking arrangements and essential mechanical interlocks shall be provided as per the IEC/IS provisions or as required by the DISCOM.
- 7.1** The LBS shall be capable of rapid and smooth interruption of load currents under all conditions, completely suppressing all undesirable phenomena of the power system or may happen during capacitor switching operations. There shall be no re-striking, no

abnormal voltage, and no arcing upon switching of the capacitor banks. The details of any devices incorporated to limit or control the rate of rising of re-striking voltage across the LBS contacts shall be stated. The overvoltage caused by the switch while switching inductive or capacitive loads shall not exceed 2.5 times the highest phase to neutral voltage. The actual make and break times of the switch throughout the range of their operating duties shall be stated in the tender and guaranteed.

- 7.2** The LBS shall be robust in construction, to meet all the climatic and incidental occurrences.
- 7.3** The symmetrical load-breaking capacity of the switch shall be 10 MVA, which shall remain constant within the limits of the rated voltages specified in this specification. For voltages lower than the rated voltage, the breaking current shall remain constant.
- 7.4** The temperature rise and maximum temperature on any part of the panel, while in service under continuous full load conditions shall not exceed the permissible limits of temperature rise as specified in the IEC 62271 – 102:2018/ IS 9921.
- 7.5** Gaskets shall be of a material that will not deteriorate under any service conditions. Metallic compression steps shall be provided for the compressible gasket.
- 7.6** Main contacts shall have ample area and contact pressure for carrying the rated current and the short time short circuit current of the switch without excessive temperature rise which may cause pitting or welding. Contacts shall be adjustable to allow for wear and shall be easily replaceable and shall have a minimum of moveable parts.
- 7.7** The switch shall be suitable for rapid closing and opening. The Load Break Switch opening and closing operations shall be done by a manual mechanism. However, the opening of the LBS is an auto mechanism in case of fusing any of the HRC fuses. The mechanism shall be designed to withstand a number of sequential ON and OFF operations of the Load Break Switch.
- 7.8** Working parts of the operating mechanism shall be of corrosion resisting material, bearing which requires grease, shall be equipped with pressure type grease fittings. Bearings pins, bolts, nuts, and other parts shall be adequately pinned or locked to prevent loosening or changing adjustment with repeated operation of Load Break Switch.
- 7.9** Mechanical indicators to show the close/open/earth position of the contacts shall be provided on the front panel of the HTMC at visible height. It is also required that if any HRC fuse is blown off, then LBS must be switched to the “OFF” position immediately and automatically with mechanical interlocks and specific indication to be displayed, Hence the system abnormality can be identified.
- 7.10** All MS parts of Load Break Switch 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.

- 7.11 The Load Break Switch along with the operating mechanism shall be mounted properly.
- 7.12 The manual operating device to be provided should be at a convenient height so that it can easily be operated.
- 7.13 The Load Break Switch shall comprise three independent poles, fitted with a common operating mechanism.
- 7.14 The Load Break Switch along with its operating mechanism shall be mounted inside the compartment of a weatherproof sheet steel cabinet suitable for outdoor conditions of HTMC.
- 7.15 Each pole of the Load Break Switch shall be mounted on a common chassis and connected together for operation by a common operating mechanism.
- 7.16 The Load break and Earth Switch shall be manually operated however, the arrangement of manual operation should be as per the relevant IS and the minimum force for the manual operation to be considered as per reference given in the relevant IS.
- 7.17 The phase-wise LED indicators shall be provided for the status of “Live incoming and outgoing Cables” through Capacitor Voltage Dividers mounted on the bushings of the cable.
- 7.18 The LBS shall be having specific Mechanical ON/OFF/EARTH Indication. Additionally, ON/OFF/Earth and AC ON LED indication shall be provided on front panel.
- 7.19 The LBS shall be provided with Anti-reflex operating handle
- 7.20 Cable Testing facility without disconnecting the cable terminations, cable joints and terminal protectors on the bushings.
- 7.21 Cable terminations Cable boxes suitable for 3C x 185/300 sq mm XLPE Cable with right angle Cable Termination Protectors.

7.22 Interlocking mechanism:

The following interlocks as per the relevant provisions of IS/IEC and specific requirements of DISCOMs; between the Load Break Switch and cubicle shall be provided.

- a. The LBS chamber door can only be opened when the Load Break Switch is in “OFF” and the earth switch is in “ON” condition & vice versa i.e. the earth switch can only be “OFF” and LBS can only be “ON” when the door is closed.
- b. The earthing switch cannot be opened when the door of the LBS chamber is open.
- c. There shall be a strong mechanical interlock between LBS and Earth switch in the form that the LBS cannot be closed when the earth switch is ON and vice versa.

- d. The important LBS operating instructions in the Local language (Gujarati) shall be displayed on the doors of the HTMC.
 - I. The Load Break Switch must not be operated when the doors of the LBS chamber are in OPEN position.
 - II. Operational instructions for CTPT Replacement or any kind of trouble shooting, maintenance activities in the CTPT compartment.
 - 1. Turn off power supply of HT Consumer from consumer side
 - 2. Switch off LBS and verify the indicator
 - 3. Earth the LBS with Earth Switch and verify the indicators
 - 4. Open CTPT Door Chamber for replacement
- e. The details and ratings of the arc extinguisher shall be indicated in GTP and on the Nameplate of the cubicle panel.

7.23 EARTHING SWITCH:

- a. The LBS shall be equipped with an inbuilt integrated earth switch.
- b. The earthing switch with a making capacity of 50 KA must be integrated into a comprehensive interrogator interlocking system and must be equipped with an ON snap action drive (The closing action of the earthing switch is of snap-action type).
- c. The Earth switch shall be Rated peak withstand current 21 KA for 3 sec.
- d. The proper mechanical interlocking of the earth switch with LBS shall be provided (i) Between LBS 'ON' and Earthing and (ii) Between earthing switch and Cubicle opening doors.
- e. Earth switch contacts must be closed with proper pressure to avoid any loose contacts.
- f. Each pole of Earth Switch shall be mounted on a common chassis and connected together for operation by common operating mechanism.
- g. One end of the earth switch shall be connected to bus bar and second end shall be brought out of the cubicle for proper earthing with 2 nos holes suitable for ½" size galvanized bolts. 2"x ½" size 2 nos hot dip galvanized bolts and plain and spring washers shall be provided for earthing connections.
- h. The 11 KV LBS shall meet following minimum guarantee technical particulars (GTP):

sr no	Particulars	Specifications
1	Type	Indoor fix type

2	Insulating Medium		Air
3	Load Breaking capacity		630 Amp.
4	Rated normal current of LBS		630 Amp.
5	Bus-bar Rating (Amp)		630 Amp.
6	LBS	Minimum Rated short time current (KA RMS)	21
		Rated time (Sec.)	3
7	Method of closing	Normal	Manual
		In case of Emergency	Manual
8	Method of	Normal	Manual

8.0 Vacuum Circuit breaker (VCB):

- 8.0** The circuit breakers shall comply with the requirements of the latest edition of IS 13118: 1991 or IEC-62271-100 & 200 except where specified, otherwise in the specification.
- 8.1** VCB Panelboard shall be enclosed, Single Bus Bar, Floor mounted Metal Clad, Indoor type Flush Front, Horizontal Draw out & Horizontal Isolation Vacuum Circuit Breaker suitable having 'M2 Class type Tested mechanism' for installation in 3 Phase, 50Hz, 11KV, 21KA for 3 Sec. effectively Earthed supply system comprising of housing for Breakers, mechanical interlocks, safety shutters, 06 Nos Isolating Plugs and a VCB Trolley with three vacuum interrupters & epoxy supports insulators and self-aligning finger type isolating contacts, Trucks having integral locking-in Device for insertion and withdrawal of VCB complete with necessary interlocks.
- 8.2** The Circuit Breaker shall have the Manual charged, independent spring closed/spring tripping, trip-free operating mechanism with manual closing and tripping push button.
- 8.3** Mechanical indication as per relevant IS/IEC viz. Breaker Closed/Open, Spring Charged/Discharged Mechanical Operation Counter, Electrical Release Coil, Breaker operated auxiliary Switch with 6NO+6NC and spare Contacts Manual Hand Operated mechanism.
- 8.4** The manual operation of the circuit breaker shall not have any effect on the trip spring. This should only be discharged under a fault (electrical) trip; the following manual reset operation should recharge the trip spring and reset the circuit breaker mechanism in the main off position.
- 8.5** The circuit breaker shall be fitted with a mechanical flag, which shall operate in the event of a fault (electrical) trip occurring. The "tripped" flag should be an unambiguous color differing from any other flag or mimic.

- 8.6** The circuit breaker shall have an Anti-reflex operating handle. Anti-reflex handles - these must be fitted to ensure that the equipment can only be operated fully in one direction (open or close), before the handle is re-oriented to allow operation in the other direction.
- 8.7** The circuit breaker front door shall be fitted with a “Live Cable” LED Indicators through Capacitor Voltage Dividers mounted on the incoming and outgoing cable bushings, the indicator should be visible from outside without opening the doors.
- 8.8** Emergency trip push button shall be provided.
- 8.9** Necessary boots shall be provided on bushings as per design.
- 8.10** The bimetallic washer for connection between Copper bushing stud and Aluminum Lug shall be provided. Necessary spring and flat washers to be provided on each terminal.
- 8.11** Following LED indication shall be Provided on VCB front Panel
- 8.11.1 ON, OFF, Trip
 - 8.11.2 Trip circuit healthy
 - 8.11.3 Spring Charged
 - 8.11.4 AC supply Failed
 - 8.11.5 DC Failed
 - 8.11.6 VCB Test Position
 - 8.11.7 VCB service Position
- 8.12** Circuit Breakers shall be provided with the following accessories.
- 8.12.1 Auxiliary Switch with minimum 6 NO + 6 NC auxiliary contacts.
 - 8.12.2 Tripping Coil
 - 8.12.3 Mechanical Operation Counter
 - 8.12.4 Spring Charging Handle
- 8.13** Protection and Tripping Arrangement:-The protection on the circuit breaker shall comprise the following components.
- 8.13.1 The phase-wise protection Current Transformer shall be of Epoxy resin cast and shall be used for indoor for each phase of the system, having rating 250/1 Amp and accuracy class 5P10 as per relevant IS 2705-Part III 1992.
 - 8.13.2 Auxiliary/dual powered non-directional IDMT (Inverse Definite Minimum Time) protection relays (Numeric/Microprocessor based) 3x over current and earth fault element shall be definite type time relay.

- 8.13.3 IDMT trip current settings shall be 5 or 10-200% in steps of 1% for phase overcurrent and 10-80% in steps of 1% for earth fault. Instantaneous trip current settings shall be 100-3000% in steps of 100% for phase over-current and 100-1200% in steps of 100% for earth fault. The wider protection setting band also accepted.
- 8.13.4 Numerical relay shall be communicable over IEC 103 Modbus RTU protocol/ RS 485 for SCADA interface. Relay shall have separate trip contacts for O/C and E/F. It shall have facility for Remote Reset through Modbus protocol.
- 8.13.5 Relay shall have built-in IEC or ANSI time current characteristics. It shall be possible to select IEC or ANSI time current characteristics. The IDMT stage shall have a user programmable reset characteristic.
- 8.13.6 Internal Relay Failure : The Relay shall have self-diagnostic function to indicate Internal Relay Failure. Same shall be indicated via LED or on LCD display
- 8.13.7 Inrush Blocking : Relay should be able to identify and block tripping due to magnetizing inrush currents generated during switching of loads.
- 8.13.8 Fault Diagnosis Functions : Relay shall have the facility to store and retrieve at least 5 last fault records with information.
- 8.13.9 Relay setting: Relay shall have front key pad. It shall also have hand-reset button on relay front. Relay to be self-reset or hand reset shall be software selectable. Relay settings shall be provided with adequate password protection.
- 8.13.10 Key board: A double function keypad shall be provided to configure Relay for configuration and testing. Protection setting change capability shall be password protected.
- 8.13.11 Relay offered should have a real time clock based on a quartz crystal with a battery totally independent of power supply.
- 8.13.12 Relay shall have a built-in Liquid Crystal Display (LCD) of adequate size for display of parameters and legends.

8.14 The 11 KV VCB shall meet following minimum guarantee technical particulars (GTP):

Sr no	Particulars	Unit	Values
1	Rated voltage	KV	12
2	Power frequency withstand voltage	KV	28
3	Impulse withstand voltage	KVp	95
4	Rated frequency	Hz	50

5	Type	---	Indoor draw out
6	Rated current (bus bars)	A	630
7	Rated current (T-off)	A	630
8	Breaking capacities:		
9	Active load	A	630
10	Rated Breaking Capacity	KA	21
11	Rated making capacity (Minimum)	KA	52.5
12	Rated short time current 3 sec. (Minimum)	KA	21
13	Operating Method	----	Manual & Relay tripped
14	Rated Operated Sequence	-----	0-3 min-CO-3 min-CO

8.15 Battery :

8.15.1 The DC batteries shall be VRLA (Valve regulated Lead Acid) type & shall be Normal Discharge type and shall conform to IS 15549:2004/ IEC 60896-21 & 22:2004 standard. The batteries shall be factory-filled, charged & shall be suitable for a long life under continuous float operations & occasional discharges. The battery shall be compact and shall require no maintenance.

8.15.2 The battery bank of two numbers of batteries having rating of 12V, min 7 Ah each.

8.15.3 Battery terminal shall be provided with covers & suitable carrying handle.

8.15.4 The batteries shall be of sealed lead acid VRLA and shall have a minimum life of five (5) years at 25°C.

8.16 BATTERY CHARGER:

8.16.1 Battery Charger shall have MCB for input protection of battery charger followed by fuse.

8.16.2 Battery Charger shall have MCB at Output of battery charger followed by fuse for Supply distribution.

8.16.3 Battery charger shall have INPUT of P, N and E to the terminals at INPUT 230V AC connector and have output to Load & Battery with +ve &-ve to the terminals on OUTPUT 24V DC connector.

8.16.4 In the normal operation, mains input range 150 to 300V AC along with battery, the output voltage is set at 24 VDC.

8.16.5 There shall be facility to monitor diagnostic signals of Battery charger at local and Remote in SCADA. For that Potential free contact signal shall be available in charger in case of failure of charger, Charger Aux supply failed and Low battery supply voltage

8.16.6 Potential free contact signal shall be available in case of failure of charger, Battery charger supply (230V SC) fail and Battery charger low.

8.16.7 The battery charger shall be an integral component in the control, allowing the battery to be remotely monitored. The battery condition shall be monitored continuously and a suitable alarm shall be generated in case of the following conditions.

- a) Low battery voltage (below 21V)
- b) High Battery Voltage
- c) Battery Failed
- d) Grounded battery/battery charger
- e) AC Supply Failed
- f) Battery Charger Failed
- g) Other conditions as per manufacturer design

8.16.8 Battery charger shall have following protections:

8.16.9 Input Over-Voltage Transients / Surges protection with the help of MOV (Metal Oxide Varistor).

8.16.10 Input Over Current - FUSE on the Front-Panel. When input fuse blows, Fuse fail indication shall glow.

8.16.11 Battery Reverse Protection when battery is connected with reverse polarity. Battery reverse indication shall become ON and battery shall get disconnected. If main supply is available then load shall be feed by charger and battery shall be remain disconnected to load & charge from battery charger.

8.16.12 Battery charger current output shall have minimum 8 amps at 24V.

8.16.13 Charger Over-Voltage is provided with closed loop by sensing output voltage.

8.16.14 MCB shall be provided to isolate the Battery.

9.0 CUBICLE EARTHING :

- 9.1. All metal parts of the cubicle which do not belong to the main circuit and which can collect electric charge causing dangerous effect shall be connected to 50*6 mm, G.I earth bus using earthing conductor made of copper having a cross-section area not less than 95 sq. mm. Each end of the conductor shall be terminated by M10/equivalent quality and type of

terminal for connection to earth system installation. There shall be continuity between the metallic parts of the switchboard and cables so that there is no electric field present in the surrounding air, thereby ensuring the safety of people.

- 9.2. Earth conductor location shall not obstruct access to cable terminations. Minimum two numbers of earth terminals shall be brought out of the cubicle. Inside the cubicle, an G.I bus bar with size 50X6 mm and length as per the requirement shall be provided.
- 9.3. The following items are to be connected to the main earth bus by rigid or copper conductors having a minimum cross-section of 95 mm² (a) earthing switches (b) Cable sheath or screen (c) CTPT unit trolley & enclosure (d) other control devices, if any.
- 9.4. The metallic cases of the relays, instruments and other panel mounted Equipments shall be connected to the earth bus by independent copper wires of size shall be made as per the provision of IEC/IS standards. The colour code of earthing wire shall be green. Earthing wires shall be connected on the terminals with suitable clamp connectors and soldering shall not be permitted.
- 9.5. The HT compartment and CTPT compartment shall be equipped with two distinct earth terminals, dedicated to the metal screen earthing requirements of both incoming and outgoing cables and for body earthing, respectively.

10.0 HRC FUSE:

- 10.1. HRC fuse base having same capacity of Load Break switch shall be provided in the chamber of LBS in series of it.
- 10.2. All the devices shall be connected in series as under:
- 10.3. Incoming cable from UTILITY to LBS to HRC fuse to P1 of CTPT unit and P2 of CTPT unit to outgoing to consumer LBS cubicle/overhead structure through a cable.
- 10.4. The HRC fuses used in the Load break switch-fuse combination shall have a striker pin that ensures tripping of the three-pole load break switch in case of any HRC fuse is blown off.
- 10.5. The 11 KV HRC fuse shall comply with the requirements of the latest edition of IS:9385-1:1979/ IEC 60282-1:2009.
- 10.6. The rating of HRC Fuse for different rated CTPT unit as follows,

Sr. No	11 KV CTPT unit current ratio	HRC Fuse Rating
1	10/5	20 A
2	15/5	30 A
3	20/5	40 A
4	30/5	50 A

11.0 11 KV CTPT UNIT COMPARTMENT:

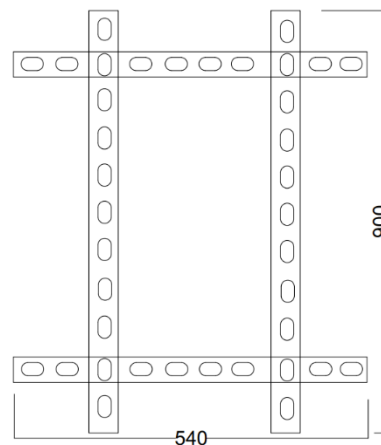
- 11.1. As per the prevailing practice, the consumer metering combined CTPT unit shall be provided and under the scope of DISCOM. The Combine outdoor type CTPT metering unit shall be provided and installed by DISCOM at the site after the installation of the cubicle.
- 11.2. A separate compartment for the CTPT chamber is designed to accommodate the appropriate size of 11 KV Oil cooled CTPT unit, to have required clearance from chamber body to CTPT live bare terminals as per relevant standard. The size of the CTPT chamber shall be such that for future augmentation of CTPT units for load extension requirement by

the consumer can be managed with the same HTMC unit.

- 11.3. There shall be the provision of inspection window provided with toughen glass on the each door of the CTPT chamber. The window shall be of such dimensions that 11 KV Bushings, metering cable and terminal box of the CTPT unit shall be visible from outside. The fixing of the glass shall be from inside to make the provision pilfer proof i.e Hardware used for fixing window glass, hinges, and particle board shall be concealed and non-removable from outside. The limit switch with auxiliary contact shall be provided on each CTPT door to sense the its opening from remotely.
- 11.4. Proper illumination arrangement shall be provided inside the CTPT chamber for the periodic inspection of CTPT unit from outside through inspection window. The control switch shall be provided on the front side of HT switchgear panel.
- 11.5. The 11KV insulated terminal boots shall be provided on the metal parts of the CTPT bushings such that no metal parts of the CTPT unit shall be accessible.
- 11.6. A draw out type trolley shall be provided in such a way that for installation of the CTPT unit it can be drawn out, CTPT shall be mounted on it, CTPT bottom channel shall be locked with trolley to avoid unnecessary movements of CTPT unit. In normal operating conditions of the HTMC, the CTPT trolley shall not cause unnecessary vibrations. The height of trolley shall be at least 155 mm from base plate and height of CTPT from trolley shall be at least 120 mm so users can do control cable terminations at terminal box of CTPT unit very easily . A locking mechanism shall be incorporated into the trolley to secure its position once it has been pulled outside. Flap type angle/rail shall be provided at the base of the trolley for ease of CTPT loading /un loading of CTPT unit.
- 11.7. For easy laying of multicore control cable from the terminal box of the CTPT unit to the HT TVM SMC Box, a necessary cable support clamp shall be provided on the side wall of the CTPT compartment. There shall be provision of sealing as per the prevailing practice of the DISCOM and there shall be also provision to provide an enclosure cover over the sealing with padlocking arrangement for the protection of the seal.
- 11.8. Natural ventilation is provided by means of ventilation louvers for air intake in the lower part of the CTPT compartment doors. The air is extracted at the top of the roof. Natural air circulation ensures sufficient cooling of the CTPT compartment. The ventilation louvers are of the labyrinth type.
- 11.9. Heater with thermostate shall be provided for maintaining the temperature during monsoon when humidity is high. The auxiliary AC voltage for heater shall be taken from external source of the HT consumer installation with proper MCB protection.
- 11.10. The six nos of Copper Flexible jumper of 32*6 mm of following length shall be provided with each HTMC unit for electrical connections with CTPT unit and incoming and outgoing circuit.
 - 11.10.1. R & B phase-660 mm
 - 11.10.2. Y Phase -490 mm
- 11.11. In case of type of HTMC with LBS, The CTPT chamber shall be equipped with mechanical/electrical interlock with Earth switch of the LBS compartment for the safety of the DISCOM operating staff. The interlock shall be such that the doors of the CTPT chamber can only be opened and have the access to the CTPT only if the earth switched is "ON" and earthed solidly.

12.0 ENERGY METER MOUNTING FRAME: (HT-TVM & SMC Box shall be provided and installed by DISCOM)

- 12.1. A separate HT TVM SMC Box installation provision shall be provided by using the galvanized M.S strips having a minimum thickness of 2.0 mm; having dimensions 900*540 (in mm) and capsule holes shall be provided on the strip as per following drawing. The metering arrangement shall be provided beside the CTPT compartment as per the drawing. Appropriate sized of access hole with the matching gland size shall be provided. The metering compartment shall have proper height so as to bring meter window at normal eye level.



- 12.2. A mild steel rain hood of 450 (W)*300 (D) mm shall be provided to shelter via a sloped roof and to protect installed HT TVM SMC Box from accumulated/direct water dripping.
- 12.3. HT TVM with SMC box shall be Mounted on above metal frame by DISCOM.

13.0 HTMC ENCLOSER:

- 13.1. The panel shall be supplied and installed as per attached drawings. The 11 KV panel with accessories and fittings shall be outdoor, plinth mounting, cubicle type switchboards for protection and controlling 11 KV side of CTPT unit at consumer installation. The panel board shall be so constructed as to form independent 11KV outdoor panel. The panel shall be completely dust and vermin proof. The panels shall remain vermin proof, even when the CTPT is taken out for maintenance/replacement. Overall dimensions of the panel shall be furnished along with drawing. The exterior as well as interior of panel shall be painted with two coats of stove enamel paint, with zinc phosphate treatment, after application of single coat of anti-rusting paint. The exterior shall be painted with light gray paint shade 631 of IS: 5. The interior shall be painted with glossy white paint shade. The manufacturer shall have in-house painting facility. Suitable barriers for the bus-bars and Load Break Switches shall be provided. Lifting arrangement shall be provided for the panel. Load Break Switch, Bus bar, cable/CTPT chamber shall be individual. The door of CTPT chamber shall have Wire mesh provided behind it, so that the person opening the door shall not have direct access to live parts of the panel.

- 13.2. The paint should have chemical resistance and UV resistance properties, a uniform thickness of at least 80 microns, and has been tropicalized for Indian conditions. The paint shall not scale off or crinkle or be removed by abrasion during normal handling.
- 13.3. Instructions in Local language (Gujarati) & English shall be provided using engraving/stickers on the switchgear panel, on the LBS/VCB/CTPT compartments describing in simple steps how to carry out standard and safe isolation, operation, racking-in and racking-out switching operations on the circuit breaker and CTPT unit. Similar details should be provided for the operation of the earth switch.
- 13.4. Single Line diagram of electrical and control wiring shall be provided inside of LBS/VCB and CTPT Compartment.
- 13.5. Danger plates as per relevant standard shall be provided on the HT compartment & CTPT compartment side mentioning the Corresponding Voltages.
- 13.6. The drawing and Dimensions of cubicle is for reference only, the manufacturer may design to meet the requirements of tender.
- 14.0 **Bus– Bar :** A set of 3-phase bus-bars of 630 A current rating, having size of preferably 65x10mm, suitably insulated with HT grade heat shrinkable tube sleeve. The bus-bars shall be made of electrolytic high grade aluminium and shall be rectangular bars of sufficient current rating. PVC sleeves/tap of suitable thickness shall be provided on bus-bars and jumpers except at the joints. The joints shall be separately taped with paraplast compound sleeves or PVC tapping. Suitable shutters shall be provided in addition and separate from interlocks, with padlocking arrangements, so that bus- bars become inaccessible, when the Load Break Switch is open for maintenance. Interphase barriers shall be of FRP/UL994 material.
- 15.0 **EARTH QUAKE AND WIND DESIGN LOADS:** Equipment shall be designed to withstand repeated earth quake accelerations of $0.08 \times 2g$. And wind loads of 150 kg/m² on the project area (non simultaneous) without damage to component parts and without impairment of operation.
- 16.0 **AUXILIARY POWER SUPPLY:** 11 KV HTMC-LBS type: Power supply for auxiliaries shall be arranged from the electrical installation of the concern HT consumer end at 240 V (+/- 20%), single phase for LED indicators, heaters and lighting lamps. Provision of 10 A MCB, Plug sockets for connection of external auxiliary LT supply shall be made with necessary electrical protection in the HT cubicle. However in VCB type HTMC unit all LED indicators shall be powered up by local battery supply.
- 17.0 **OPERATION AND CONTROL:**
- The HT Metering Cubicle shall be provided with single line diagram and mimic diagram showing integrated position indicator for all switching devices at the front side of the cubicle.
- The following performances must be possible while front panel is closed.
- Switching
 - Mechanical position indicator
 - Mechanical operation
 - Auxiliary voltage indicator.(External source voltage)

18.0 **MOUNTING of HTMC:** Two numbers of base channels along the length having minimum size of 100x50mm shall have to be welded with two numbers of holes suitable for 5/8" dia foundation bolts in each channel at a centre to centre distance 2500 along the length and mm to fix the same with grouted foundation bolts on plinth. Its shall be corrosion free.

19.0 **NAME PLATE:** The name plate / rating plate shall be provided and shall also indicate Supply voltage, frequency, no of phases, all required details of Load Break Switch/VCB , rated current, rated voltage, auxiliary voltage, HRC fuse rating , protection CT ratio, name of supplier, PO No & date, serial no of HTMC and any other required details as confirmed by the DISCOM. The name plate shall be approved by concern DISCOM.

19.1. Additionally Name plate with Following detail shall be provided for mentioning details by DISCOM. The Following detailed shall be filled by DISCOM during the commissioning of HTMC.

- a) Consumer Name-
- b) Consumer No-
- c) Consumer contracted Load-
- d) CTPT ratio-

20.0 TYPE AND ROUTINE TESTS FOR HTMC AND ITS COMPONENTS:-

20.1. **TYPE TEST for HTMC Panel:**-The outdoor type HTMC panel shall be of proven design for outdoor installation and should have been type tested as per relevant IS/IEC for the following type tests, carried out in Government approved NABL laboratory, within last seven years prior to date of bid opening. The Type test reports shall be submitted with the offer. In case of non-submission of some of the type test reports with the offer, the bidder shall have to confirm for submission of the same before commencement of supply without affecting delivery schedule.

Sr. No.	Testes to be conducted	Value required
1.	insulation Resistance test	Min. 1000 MΩ with 5KV Tester.
2.	Temperature Rise test	As per IEC 62271-200
3.	Measurement of resistance of main circuit.	As per IEC 62271-200
4.	Short time withstand current	21 KA for 3 Sec
5.	Power frequency withstand test at 28 KV rms	As per IEC 62271-100/200
6.	Internal Arcing test	As per IEC 62271-200
7.	Lightning Impulse With stand test	As per IEC 62271-200
8.	Degree of Protection	IP54
9.	Paint Adhesion Test	

20.2. **Routine tests/acceptance test for HTMC:** - As per the latest edition of IS/IEC for complete HTMC panel shall be performed on the each HTMC manufactured to ensure the quality of the supplied material. Following listed routine/acceptance tests to be performed.

Sr. No.	Testes to be conducted
1.	Mechanical Operation test
2.	Test of electrical and mechanical interlocks and indicators
3.	Functional test -5 Nos of Operation test of LBS & earth switch / VCB -Verification off mechanical and electrical indications during operations -Heater and aux supply working verifications
4.	Power frequency withstand at 28 KV rms
6.	Over all dimensions , verification of complete electrical wiring and complete BoQ.
7.	Measurement of resistance of main circuit
8.	Verification of paint thickness

20.3. The test reports for type tests and routine tests in respect of other equipments used in the manufacturing of HTMC as per the latest edition of the relevant IS/IEC shall be supplied by the bidder.

Sr. No.	Component to be tested	Testes to be conducted	Applicable IS/IEC
1.	Vacuum Circuit Breaker	a)Dielectric test b)Temperature Rise test c) Measurement of resistance ofmain circuit. d) Short time current and peak withstand current test e) Mechanical endurance test f) Eletrical Duty cycle test g)Short circuit breaking capacity and making capacity h)Type tests reports for numerical relays and major bought out items as per relevant IS/IEC.	As per IS 13118 / IEC 62271-100

2.	Load Break Switch(LBS)/ Isolator	a) Lightning Impulse Voltage withstand test b) Power Frequency Voltage (Wet) withstand test on main circuit. c) Temperature rise test on main isolator d) Short Time Current & peak withstand current test on isolator and earthing switch. e) Short Circuit making performance test of earthing switch. f) Operating and mechanical endurance test on isolator and earthing switch	IEC 60129/ IEC 62271 – 102/ IS 9921
3.	Protective current transformer(CT)	a) As per the standard	As per IS 2705-part-3:1992
4	HT HRC Fuse	a) As per the standard	As per the latest edition of IS:9385-1:1979/ IEC 60282-1:2009.

20.4. All tests reports for acceptance / routine tests shall be submitted and got approved from the purchaser before dispatching the Cubicle.

21.0 **INSPECTION:** The inspection may be carried out by the purchaser at any stage of manufacture. The successful bidder 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.

22.0 DOCUMENTS AND DRAWINGS:

22.1. The bidder shall furnish two sets of following drawings and documents with dimensions along with their offer.

- i) Complete assembly drawings of the both types metering cubicle showing plan, elevation and typical sectional views and locations of cable boxes, bus bars,

metering frame and Lifting arrangement.

- ii) Single line diagrams of electrical and Control wiring
 - iii) Foundation plan showing location of foundation channels, anchor bolts and anchors, floor plan and openings for cables etc.
 - iv) Type test certificates for type testing of bought out items, if already carried out.
 - v) Descriptive pamphlets and literature of bought out items including CT characteristic curves , relay setting sheet, relay manual, etc.
 - vi) Operation manual and compartmentwise instruction sheet for approval in local (Gujarati) and English language.
 - vii) Name plate drawing
 - viii) Complete BoQ with GTP
- 22.2. All drawings and data shall be annotated in English
- 22.3. Successful tenderer shall be required to furnish four sets of final versions of all the above said drawings and documents within 15 days after Proto type inspection, for purchaser's approval.
- 22.4. Approval of drawings/work by purchaser shall not relieve supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirement of the latest revision of applicable standards, rules and codes for practices. The equipment shall conform in all respects to high standards of engineering, design, workmanship and latest revisions of relevant standards at the time of ordering and purchaser shall have power to reject any work or materials which, in his judgment, is not in full accordance therewith.
- 22.5. Instrumentation Manual The successful bidder shall submit three copies of manual of complete instructions for the installations, operation, maintenance and repair and circuit diagrams.

23.0 TRAINING :

The successful bidder shall arrange one/two days training for the DISCOM engineer and maintenance staff considering various aspects of HTMC. The training contains proper understanding of operation and construction of the HTMC, normal trouble shooting, replacement of HRC fuses, safety precautions, interlocks understanding etc.

24.0 PACKING AND DISPATCHING:

- 24.1. The equipments shall be packed in crates suitable for vertical/horizontal transport, as the case may be, and suitable to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with appropriate caution symbols. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by supplier without any extra cost.

24.2. Name of the consignee each consignment shall be accompanied by a detailed packing list containing the following information.

- a. Details of consignment
- b. Destination
- c. Sign showing upper/lower side of the crate
- d. Handling and unpacking instructions
- e. Bill of material indicating contents of each package.

25.0 PROTO TYPE SAMPLE:

The successful tenderers shall be required to provide One prototype unit for each offered HTMC (11KV HTMC- LBS Type/ 11KV HTMC- VCB Type) for carrying out the inspection and Acceptance tests mentioned in clause No. 20.2 either at the firm's works or at any Government recognized/ NABL laboratory, if no adequate testing facilities are available at firm works, in presence of company's representatives. In case of bought out item like LBS, VCB, CT, HRC Fuse, etc., the same have to be either tested at the firm's works or at the works of the original manufacturer or at Government recognized/ NABL laboratory in case adequate testing facilities are not available at the firm's works or at the works of the original manufacturer. However, all the testing expenses for prototype sample shall have to be borne by the firm only. Only after successful passing of the prototype unit in all the tests and after obtaining the written approval from the Competent authority of the company for the prototype unit and drawings, the firm can Commence bulk manufacturing of the ordered HTMC units.

26.0 SCHEDULE – A:

- 26.1. The prospective bidder shall submit with their bid the following GTPs for the individual equipments being the indigenous components of the supplied HTMC.
- 26.2. Unless otherwise brought out separately by the bidder, the equipment offered shall be claimed to conform to the specification, scrupulously. The discrepancies between the specification and the catalogues or literature submitted as part of the offer shall not be considered as valid unless specifically brought out.

ANNEXURE-A
GUARANTEED TECHNICAL PARTICULARS
(To be filled in and signed by the bidder)

Sr.No.	Particulars/Units	To be specified by Bidder
LOAD BREAK SWITCH (LBS)/VACUUM CIRCUIT BREAKER (VCB):		
1	Maker's name and country of manufacturer	
2	Manufacturer's type designation	
3	Applicable technical standards	
4	Rated voltage (KV)	
5	Service voltage (KV)	
6	Type of LBS/VCB	
6.a	Operation mechanism of LBS/VCB	
7	Ambient temperatures used for design	
	i Maximum (°C)	
	ii Maximum daily average (°C)	
8	Continuous current	
	i Under site condition (Amp)	
	ii Rated (Amp)	
9	Rated short time current (KA rms)	
9.1	Rated time (Sec)	
10	Maximum rise of temperature over ambient for rated current (°C)	
11	Rated operating duty cycle	
12	Interrupting capacity based on duty cycle in clause 28 above	

	i Symmetrical at rated voltage in KA and MVA	
	ii Asymmetrical at rated voltage (KA)	
	iii Symmetrical at service voltage (KA)	
13	Rated re striking voltage	
	i Amplitude factor	
	ii Rate of rise of natural frequency	
	iii Type devices, if any used to limit the rate of rise of restricting voltage	
14	Rated continuous voltage for rated MVA (KV)	
15	Making capacity (KA peak)	
	i At higher rated voltage	
	ii At lower rated voltage	
16	Type of devices, if any used to obtain uniform voltage distribution between breaks	
17	Recovery voltage distribution between breaks in percentage of rated voltage	
	i Switching off capacitor banks	
	ii Switching OFF on an unloaded transformer	
18	Details of main contacts	
	i Material	
	ii Whether contacts are silver plated	
	iii Thickness of silver coating	
	iv Contact pressure (kg/mm ²)	
19	Insulation level of the LBS/VCB	
	i One minute dry withstand voltage (KV rms)	
	ii One minute wet withstand voltage (KV rms)	
	iii Impulse withstand test voltage (KV peak)	

20	Minimum Clearance In Air	
	iii Between phase (live parts) (mm)	
	iv Between live part and earth (mm)	
	v Centre distance between phases (mm) for arc	
21	Extinguisher Standard to which the LBS confirms Details of extinguisher Indicate (make/Type/Rating)	
22	Weight of LBS/VCB (kg)	
23	Method of closing	
	i.Normal:	
	ii.Emergency	
24	Nos. of operations, the LBS is capable of performing at rated capacity	
HRC FUSE		
1	Applicable Standard	
2	Make & Type	
3	Voltage rating	
4	Current Rating	

ANNEXURE-B (GTP to be Filled By Bidder)

Current Transformer –for VCB type HTMC unit		
1	Make & Type	
2	Reference standard	
3	Voltage/frequency	
4	Current Ratio and Accuracy Class	
5	Class of Insulation	
6	Insulation Level (Peak / rms)	
7	Short time current rating for 1 sec. (KA	
8	Accuracy limit factor	
9	Instrument security factor	
10	Rated Burden	

ANNEXURE-C (GTP to be Filled By Bidder)

HTMC Unit			
Sr. No	Particulars	HTMC-LBS Type	HTMC-VCB Type
1	Make		
2	Overall dimensions of panel		
2.a	Breadth (mm)		
2.b	Width (mm)		
2.c	Length (mm)		
3	Dimension of Each compartment		
3.a	LBS/VCB Compartment		
3.b	CTPT Compartment		
3.c	Metering Frame		
4	Earthing Bus bar size and material		
5	Main Bus bar size & Material		
6	Nos of Earthing Terminal Provided on Enclosure		
7	Lifting Hook /Provision dimensions (safety factor shall be 2.5)		
8	Type of metal for HTMC Enclosure CRCA/GI		
8.a	Thickness of enclosure sheet (mm)		
8.b	Paint thickness (mm)		
9	Bus Support Insulator Type & Voltage Class		
9.a	i) Type & Voltage Class ii) Dry withstand Voltage for 1 min. KV rms iii) Wet withstand Voltage for 1 min. KV rms iv) Impulse withstand Voltage KV v) Minimum Creepage distance mm. vi) Calculation of Short Circuit Force withstand capability		
10	Busbars provided with Insulating Sleeve or Insulating Barriers		
11	Approximate Total Weight (Kg)		
12	Describe LBS/VCB Interlocking mechanism		
13	List of LED Indicators on front Panel		
14	"Live Cable" LED Indicators Provided?		
15	Dimension of CTPT Inspection window		
16	IP rating of HTMC unit		
17	Explosion Vent Provided?		
18	Nos of Heater Provided		

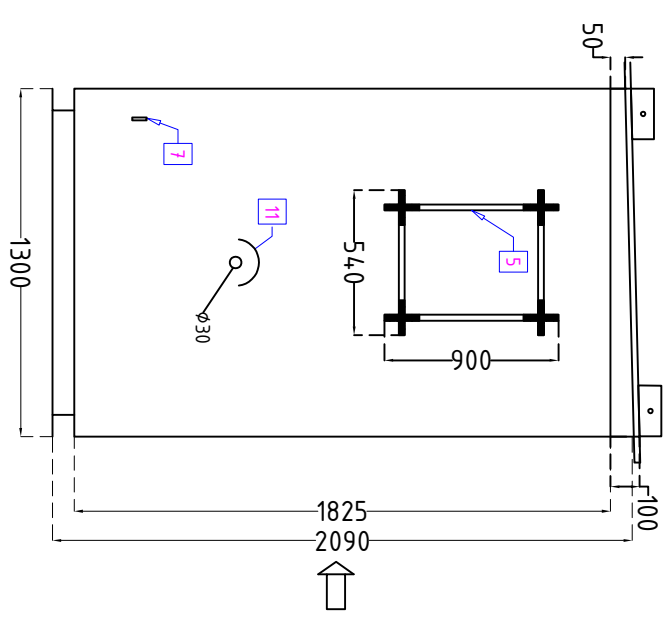
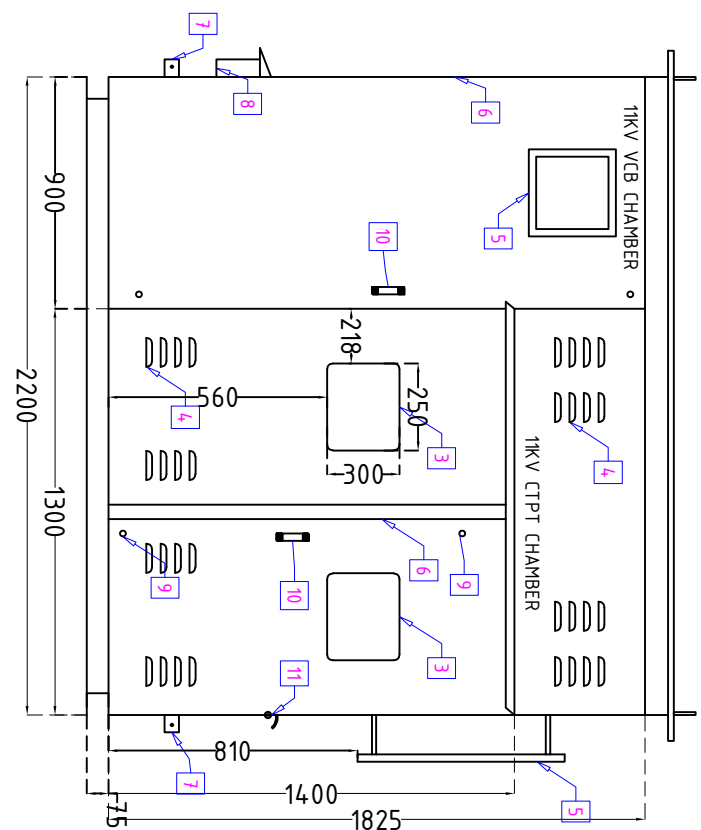
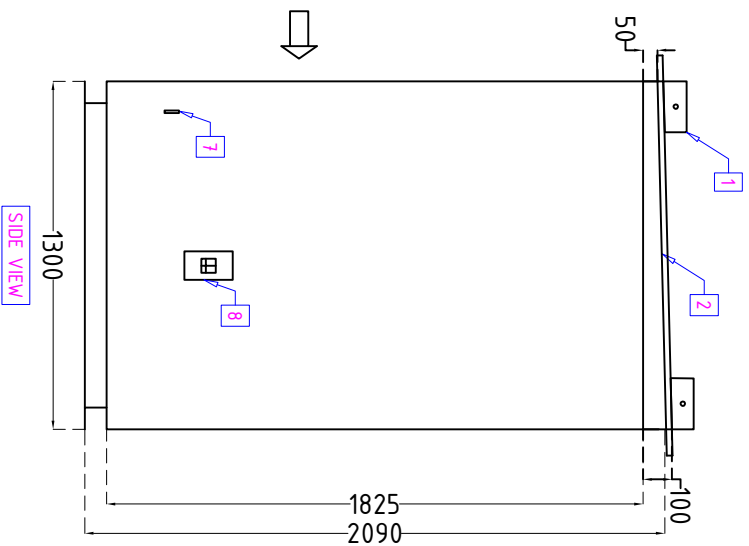
18.a	vi Make		
18.b	vii Type		
18.c	viii Rating in KW		
18.d	ix Rated Voltage		
19	Nos of VDI Provided		
20	Is Illumination lamp provided in both compartment? (Yes/No)		
21	Rated current of LBS/VCB		
22	Rating of HRC Fuse (A) For LBS type HTMC Unit		
23	INDICATING LAMP suitable for 240 V		
	i Make		
	ii Type		
	iii Operating voltage		
	iv Lamp wattages		
24	SWITCHBOARD WIRING :		
1	Insulation of wire		
2	Size of wire (mm2)		
3	Grade of wire (Volt)		
4	Whether conductor is of		
	Copper		
	Stranded		
5	Whether wire ends provided with lug type arrangements		
6	Make and voltage grade of terminal blocks used		

ANNEXURE-D (GTP to be Filled By Bidder)

Sr No.	11 KV VCB (VACUUM CIRCUIT BREAKER)	Bidder Response
1	Make & Type (Vacuum & Draw out type) & Model No.	
2	Reference Standard	
3	Rated Voltage (in KV)	
4	Rated Frequency (in Hz)	
5	No. of Poles	
6	Rated Current in Ampere at 40 Deg Ambient Temp	
8	Rupturing capacity at rated voltage (in MVA)	
9	Rated Operating Duty	
10	Breaking Capacity at rated voltage	
	a) Symmetrical (KA rms)	
	b) Asymmetrical (KA rms)	
11	Rated short time withstand current (KA/ sec)	
12	Rated Making current (KA peak)	
	a) Short time current for 1 Sec.(KA rms)	
	b) Short time current for 3 Sec.(KA rms)	
13	Transient Recovery Voltage	
	a) Rate of rise (KV/ms)	
	b) Peak Voltage (KV)	
14	Insulation Level	
	a) Impulse Voltage with stand on 1/50 full wave	
	b) 1 minute 50Hz voltage withstand	
15	Opening time Maximum No load condition (ms)	
16	Opening and closing time (ms) At 100% Breaking capacity-Vacuum Loss	
	a) Opening time – max (ms)	
	b) Arcing time – max (ms)	
	c) Total break time (ms)	
17	Number of breaks per pole	
18	No of breaker operations permissible without requiring inspection replacement of contacts and other main parts.	
	a) At 100% rated current	
	b) At 100% rated breaking current	

19	Electricla Duty of Breaker (E2 required)	
	Mechanical duty (M2 Required)	
20	Material and Type of contacts	
	a) Main	
	b) Arcing	
	c) Whether contacts silver plated (Yes/No)	
	d) Thickness of silver plating	
21	Operating mechanism- closing	
	a) Type	
	b) No of breaker operations stored	
	c) Trip free or fixed trip	
	d) Anti pumping features provided	
	e) Earthing for operating mechanism and metal parts furnished	
	f) Earth terminal size and material	
22	Operating mechanism- tripping	
	a) Type	
	b) No of breaker operations stored	
	c) Trip free or fixed trip (V)	
	d) Anti pumping features provided (%)	
	e) Earthing for operating mechanism and metal parts furnished	
	f) Earth terminal size and material	
23	Spring charging mechanism	
24	Rated operating duty	
25	Breaker /Accessories such as control switch indication Lamps etc. furnished as specified : (please attach separate sheet giving details of all accessories, inter locks and safety shutters)	
26	a) Mechanical safety Interlock (Yes/No)	
27	b) Automatic Safety Interlock (Yes/No)	
28	c) Operational Interlock (Yes/No)	
29	d) Emergency manual trip (Yes/No)	
30	e) Operation counter (Yes/No)	
31	f) Charge /discharge indicator (Yes/No)	
32	g) Manual spring charging facility (Yes/No)	
33	h) Nos of auxilary contacts	

Note: Instead of giving reference of drawing nos./IS/literatures etc. actual values/figures must be furnished, where ever required, otherwise the said details in G.T.P. of the Technical Bid,



SYSTEM:-
A.

SIDE VIEW

FRONT VIEW

SIDE VIEW

1. LIFTING HOOK
2. CANOPY
3. INSPECTION WINDOW
4. AIR-VENT
5. HT METER BOX MOUNTING FRAME
6. FRONT DOOR
7. EARTHING BUSBAR
8. AUX SUPPLY TERMINATION MCB BOX
9. DOOR LOCKING STUD WITH SEALING FACILITY 10mm SIZE
10. DOOR HANDEL
11. CONTROL CABLE HOLE WITH CANOPY

Note : IN CASE OF ANY DISCREPANCY BETWEEN GPRD CELL-GUVNL, GOG AND OTHER DRGS, DISCREPANCY SHOULD BE BROUGHT TO THE NOTICE OF THE GPRD BEFORE COMMENCEMENT OF THE WORK.

EARTHING METHODOLOGY SHALL BE AS PER IS 3043 LATEST AMENDED. REFER THE LATEST REVISED DRAWING.

PANEL SHOULD BE KEPT ON FINISHED FLOOR LEVEL. GENERAL TOLERANCES AS PER IS 2768-V.

ALL DIMENSIONS ARE IN MM

Project Name:
11kV HT METERING CUBICLE
(HTMC)-VCB TYPE

Drawing Title:
G/A OF 11 KV HTMC-VCB TYPE

Prepared by:
S.P.RATHOD (JE)

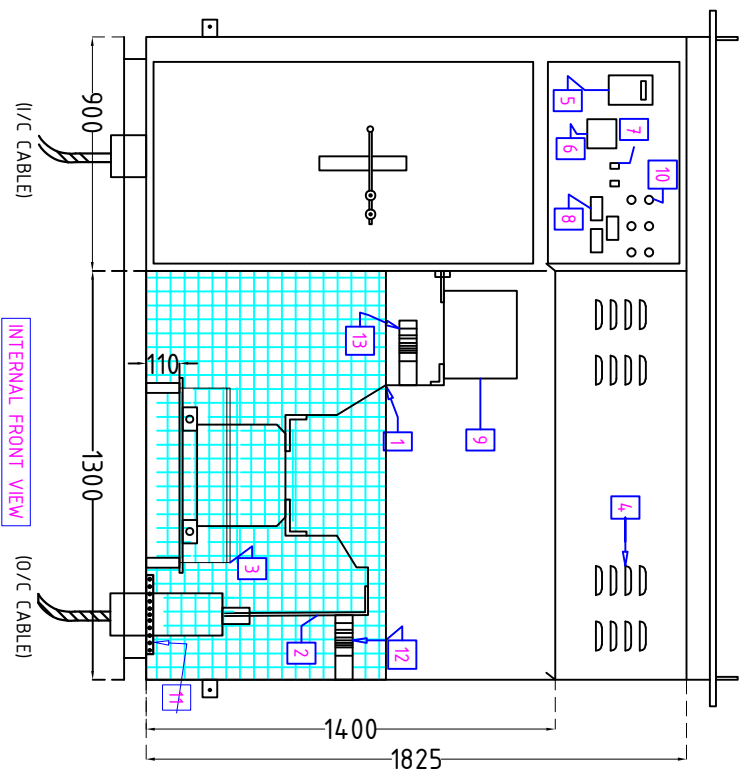
Checked & Approved by:
J.B. Upadhyay (I/C SE)

Project No/ Date:
RP 015

Drawing No: 93
Revision
No : 1

GPRD/DRG/HTMC/
Gujarat Power Research and
Development Cell, GUVNL,
Research Park, IIT
Gandhinagar, Palaj,
Gandhinagar, Gujarat





1. FLEXIBLE JUMPER CT/PT
2. OUTGOING CABLE BUSBAR
3. 11 KV CT/PT TROLLY
4. LOUVERS
5. O/C & E/F RELAY
6. TNC SWITCH
7. TOGGLE SWITCH
8. 3 NOS VDI INDICATIONS
9. 11 KV CT ,3*250/1 A
10. LED INDICATORS AS PER SPECIFICATIONS
11. CABLE SUPPORT CLAMP
12. CTPT O/G VDI
13. CTPT I/C VDI

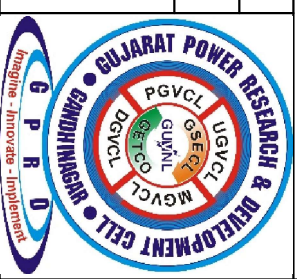
Note : IN CASE OF ANY DISCREPANCY BETWEEN GPRD CELL-GUVNL, GOG AND OTHER DRGS. DISCREPANCY SHOULD BE BROUGHT TO THE NOTICE OF THE GPRD BEFORE COMMENCEMENT OF THE WORK.

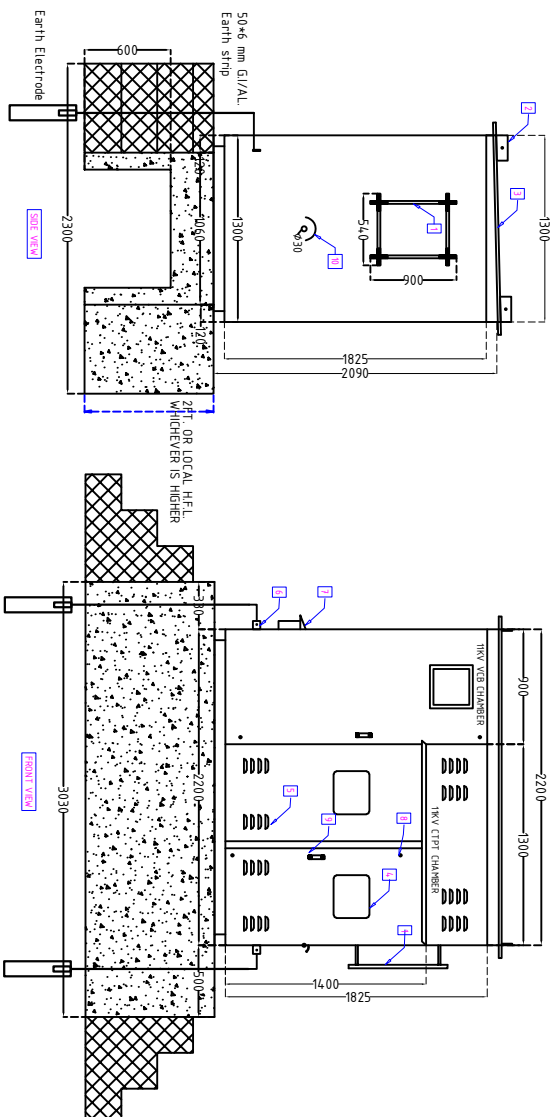
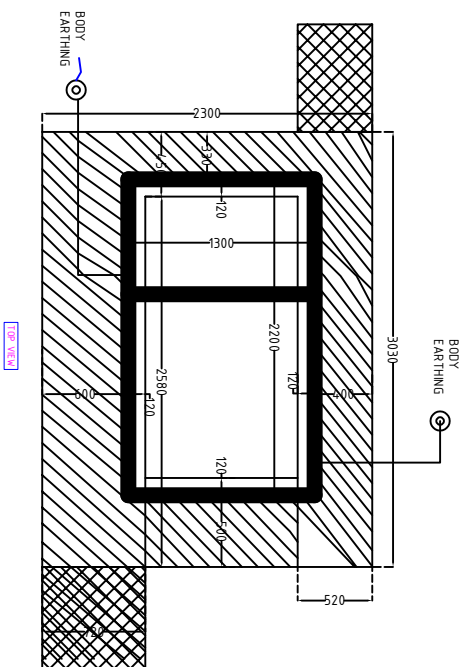
EARTHING METHODOLOGY SHALL BE AS PER IS 3043 LATEST AMENDED. REFER THE LATEST REVISED DRAWING.

PANEL SHOULD BE KEPT ON FINISHED FLOOR LEVEL. GENERAL TOLERANCES AS PER IS 2768-V.

ALL DIMENSIONS ARE IN MM

Project Name:		Prepared by:		Project No/ Date:	
11KV HT METERING CUBICLE (HTMC)-VCB TYPE		S.P.RATHOD (JE)		Drawing No: 94	
Drawing Title		Checked & Approved by:		Revision	
GA OF 11 KV HTMC-VCB TYPE(DOOR OPEN)		J.B. Upadhyay (I/C SE)		No : 1	
				Gujarat Power Research and Development Cell, GUVNL, Research Park, IIT Gandhinagar, Palaj, Gandhinagar, Gujarat	





1. HT METER BOX MOUNTING FRAME
2. LIFTING HOOK
3. CANOPY
4. CTPT UNIT INSPECTION WINDOW
5. AIR-VENT/LOUVERS
6. EARTHING BUSBAR
7. AUX SUPPLY TERMINATION MCB BOX
8. DOOR LOCKING STUD WITH SEALING FACILITY
9. DOOR HANDEL
10. CONTROL CABLE HOLE WITH CANOPY

Note : IN CASE OF ANY DISCREPANCY BETWEEN GPRD CELL-GUVNL, GOG AND OTHER DRGS. DISCREPANCY SHOULD BE BROUGHT TO THE NOTICE OF THE GPRD BEFORE COMMENCEMENT OF THE WORK.

IT IS MUST TO INFORM AND TO HAVE PRIOR PERMISSION OF GPRD BEFORE MAKING ANY CHANGES ON SITE.

EARTHING METHODOLOGY SHALL BE AS PER IS 3043 LATEST AMENDED. REFER THE LATEST REVISED DRAWING.

ALL DIMENSIONS ARE IN MM

Project Name:
11KV HT METERING CUBICLE
(HTMC)-VCB TYPE

Prepared by:
S.P.RATHOD (JE)

Checked & Approved by:
J.B. Upadhyay (I/C SE)

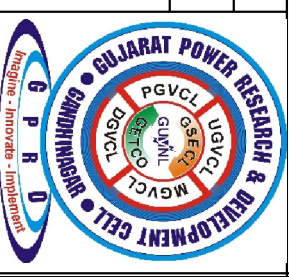
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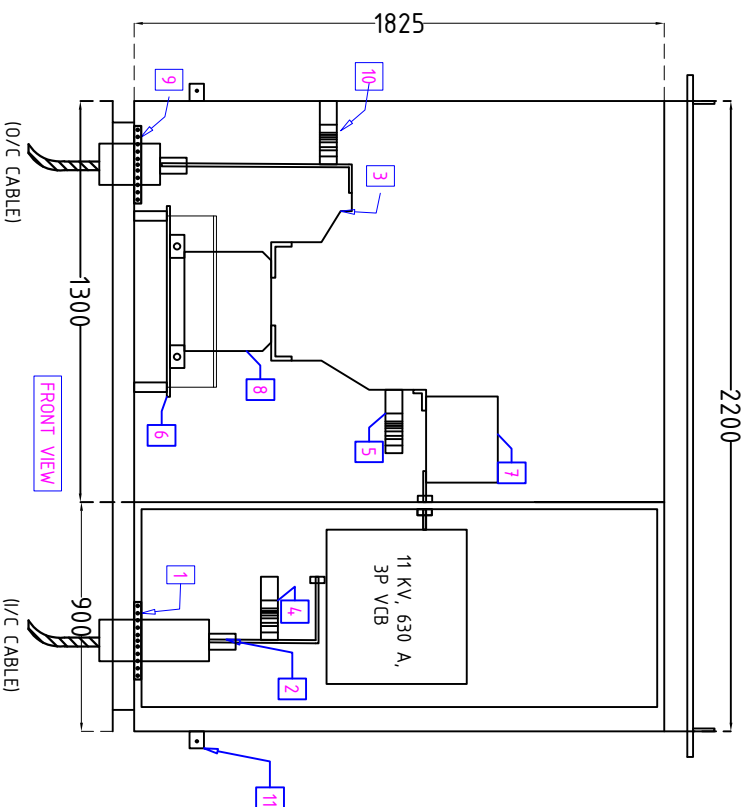
Project No/ Date:
RP 015

Drawing No: **97**

Revision
No : **1**

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Gandhinagar, Palaj,
Gandhinagar, Gujarat





1. I/C CABLE SUPPORT
2. INCOMING SUPPLY BUSBAR
3. OUTGOING SUPPLY BUSBAR
4. I/C SUPPLY VDI
5. CPT O/G VDI
6. CT/PT TROLLEY
7. 11 KV CURRENT TRANSFORMER
3*250A/1
8. 11 KV OIL COOLED COMBINED CPT
9. O/G CABLE SUPPORT
10. CPT OUTGOING VDI
11. EARTH TERMINAL

Note : IN CASE OF ANY DISCREPANCY BETWEEN GPRD CELL-GUVNL, GOG AND OTHER DRGS. DISCREPANCY SHOULD BE BROUGHT TO THE NOTICE OF THE GPRD BEFORE COMMENCEMENT OF THE WORK.

IT IS MUST TO INFORM AND TO HAVE PRIOR PERMISSION OF GPRD BEFORE MAKING ANY CHANGES ON SITE.

EARTHING METHODOLOGY SHALL BE AS PER IS 3043 LATEST AMENDED. REFER THE LATEST REVISED DRAWING.

ALL DIMENSIONS ARE IN MM

Note : IN CASE OF ANY DISCREPANCY BETWEEN GPRD CELL-GUVNL, GOG AND OTHER DRGS, DISCREPANCY SHOULD BE BROUGHT TO THE NOTICE OF THE GPRD BEFORE COMMENCEMENT OF THE WORK. IT IS MUST TO INFORM AND TO HAVE PRIOR PERMISSION OF GPRD BEFORE MAKING ANY CHANGES ON SITE. EARTHING METHODOLOGY SHALL BE AS PER IS 3043 LATEST AMENDED. REFER THE LATEST REVISED DRAWING. ALL DIMENSIONS ARE IN MM		Project Name: 11KV HT METERING CUBICLE (HTMC)-VCB TYPE		Prepared by: S.P.RATHOD (JE)		Project No./ Date: RP 015	
Drawing Title: SLD OF 11 KV HTMC-VCB TYPE		Checked & Approved by: J.B. Upadhyay (I/C SE)		Drawing No: 95		Revision No : 1	
				GPRD/DRG/HTMC/		Gujarat Power Research and Development Cell, GUVNL, Research Park, IIT Gandhinagar, Palaj, Gandhinagar, Gujarat	

