ଓଡ଼ିଶା ବିଦ୍ୟୁତ ଶକ୍ତି ସଂଚାରଣ ନିଗମ ଲିଃ.

ODISHA POWER TRANSMISSION CORPORATION LTD.

OFFICE OF THE GENERAL MANAGER: ELECT.

EHT (O&M) CIRCLE: BURLA

AT/PO – BURLA, DIST.: SAMBALPUR – 768017
TELE/FAX: (0663) 2430160, e-mail: ehtm.cle.brl@optcl.co.in
CIN: U40102OR2004SGC007553

OPEN TENDER SPECIFICATION NO. BRL-51/ 2025-26
(TWO PART BIDDING SYSTEM)
FOR

"SUPPLY OF NEW 645AH FLOAT AND FLOAT-CUM-BOOST BATTERY CHARGER AT 400/220/132/33KV GRID SUB-STATION, LAPANGA UNDER EHT (O&M) DIVISION, LAPANGA"

SALE OF TENDER SPECIFICATION	:	DT. 26.12.2025 (During office hour)
LAST DATE SALE OF TENDER SPECIFICATION	:	DT. 12.01.2026 (By- 17.00 Hrs.)
LAST DATE OF SUBMISSION OF TENDER	:	DT. 13.01.2026 (By- 13:30 Hrs)
DATE OF OPPENING OF TECHNICAL BID ONLY	:	DT. 13.01.2026 (On- 16:30 Hrs)
COST OF TENDER PAPER	:	RS 4,000.00+18% GST (Rs 4,720.00)

ISSUED TO,

BIDDER NAME:- .....
ADDRESS:- .....
.....
DISTRICT:- .....
PIN No.:- .....

CONTENTS

SECTION-1

ଓଡ଼ିଶା ବିଦ୍ୟୁତ ଶକ୍ତି ସଂଚାରଣ ନିଗମ ଲିଃ.

ODISHA POWER TRANSMISSION CORPORATION LTD.

(A Government of Odisha under taking)

Regd. Office: Tech Tower, Janpath, Bhubaneswar-751022, Odisha

OFFICE OF THE GENERAL MANAGER (ELECT.)

EHT (O&M) CIRCLE: BURLA,

AT/PO – BURLA, DIST.: SAMBALPUR – 768017

TELE/FAX: (0663) 2430160, e-mail: ehtm.cle.brl@optcl.co.in

CIN: U40102OR2004SGC007553

OPEN TENDER CALL NOTICE NO. BRL-51/ 2025-26

Sealed tenders are invited by the undersigned in Two part system from reputed manufactures/ distributors/ Dealer, PAN., GSTIN for **"Supply of new 645AH Float and Float-cum-Boost Battery charger at 400/220/132/33KV Grid Sub-Station, Lapanga under EHT (O&M) Division, Lapanga".**

Sl. No.	Tender Call Notice No.	Description of Materials	Cost of Tender Paper	EMD
1	BRL-51/2025-26	**645AH Float and Float-cum-Boost Battery charger (As per Tender specification)**	Rs. 4000/- + GST @ 18%= Rs. 4,720/-	Rs.8,672.00

SALE OF TENDER SPECIFICATION	**:**	**DT. 26.12.2025 (From- 10:00 AM)**
LAST DATE SALE OF TENDER SPECIFICATION	**:**	**DT. 12.01.2026 (To- 05:00 PM)**
LAST DATE OF SUBMISSION OF TENDER	**:**	**DT. 13.01.2026 (By- 01:30 PM)**
DATE OF OPPENING OF TECHNICAL BID	**:**	**DT. 13.01.2026 (On- 4:30 PM)**
DATE OF OPENING OF PRICE BI	**:**	**Intimated later those who qualify in Technical bid only.**

The tender documents can be made available and received in the office of the undersigned on written request towards cost of tender documents by cash/ pay order/ D.D. in favour of **"E.H.T. (O&M) Circle, OPTC Ltd., Burla" payable at Burla**. Additional amount of Rs. **100/-** (Rupees one hundred) only may be paid for the postal delivery of the tender documents. The undersigned shall not be responsible for any postal delay at any stage.

The tender must be accompanied with requisite EMD amounting to Rs.8,672.00 for in shape of Cash/ DD/Pay order in favour of **"E.H.T. (O&M) Circle, OPTC Ltd., Burla" payable at Burla**". The tender documents will be opened in the office of the undersigned in the presence of the tenderer or their authorized representatives if any. Incomplete tender, tender without EMD and the tender received after the due date and time shall be liable for rejection. If the date of tender opening falls on holiday, the same will be opened on the next working day.

The tender document must be accompanied by the following documents failing which the offer will be out-rightly rejected.

(1) Requisite EMD in shape of cash deposited in this office/D.D/Pay order.
(2) Original cash receipt towards procurement of tender specification.
(3) Copy of Valid manufactures/ distributors/ dealer.
(4) Copy of PAN card.
(5) Copy of GSTIN.

The undersigned reserves the right to vary any quantity/accept or reject any or all the tenders without assigning any reason thereof.

General Manager (Elect.)
E.H.T. (O&M) Circle, Burla.

SECTION-II
INSTRUCTIONS TO BIDDER

1. The contract shall be valid only for a period of 06 (Six) months from the date of opening of tender. The department reserves the right also to terminate the contract at any time during the contract period without assigning the reasons thereof.

2. The authority reserves the right to award the contract among any responsive bidders against this tender. Besides this, the authority reserves the right to accept or reject any or all tenders without assigning any reason thereof.

3. The bidder has to submit all the documents as mentioned in Clause No.11 of SECTION-III. Also the documents must valid on the date of opening of tender should be submitted along with tenders, failing which the tender will be rejected. The bidder or their authorized representatives should produce the original documents mentioned in Clause No.11 of SECTION-III for verification at the time of opening of the tender. Those who fail to produce the same and found not to be valid on the date of opening of tender not matching with the Xerox copy submitted by the bidder; their tenders will be out rightly rejected. In case if only one bidder participate in the tender process or nature of urgency of work (decided by this office), then undersigned may consider the case (*but not mandatory) & he will be given a chance to produce original documents in this office within one week from the date of opening of the tender.

4. In case of any dispute arising either in supply of material or any clause of agreement/ work order, the decision of the Unit Head, will be final and binding on the Bidder.

5. Tender with over writing, erased, illegible rates or rates not shown in figures and words in English will be liable for rejection. In case of discrepancy between words and figures noted against each item of the tender and between unit rates and total amount, the decision of the Competent Authority (Committee or Unit Head) accepting the tender will be final and binding on the bidders. Total of item and grand total of whole tender be clearly written. Correction in the tender, if un-avoidable, should be made by re-writing with dated initial of the bidder after scoring out wrong entries, clerical and arithmetical mistakes may result in the rejection of the tender.

6. The bidders shall sign on all pages of the tender document as a token of acceptance of all terms and conditions thereof and submit his quotations therein.

7. The schedule of prices should be filled up fully to indicate the break-up of the prices including taxes and duties. Incomplete submission of this schedule will make the tender liable for rejection.

8. Request from the bidder in respect of additions alternations, modifications, corrections of either terms or conditions or rates after opening of the tender will not be considered.

9. All correspondence relating to the tender shall be made with General Manager (El.), E.H.T. (O&M) Circle, OPTCL, Burla.

SECTION-III

GENERAL TERMS & CONDITIONS OF CONTRACT

Sealed tenders are invited in Two part bidding system from authorized Suppliers/ Dealers/ Manufacturer having PAN, GST Registration Certificate holder having PAN, GST Registration Certificate holder for Supply of new 645AH Float and Float-cum-Boost Battery charger at 400/220/132/33KV Grid Sub-Station, Lapanga under EHT (O&M) Division, Lapanga.

1) **SUBMISSION & OPENING OF TENDER:-** Tender shall be submitted with other documents in duly sealed envelope super scribed on the body of envelope "Supply of new 645AH Float and Float-cum-Boost Battery charger at 400/220/132/33KV Grid Sub-Station, Lapanga under EHT (O&M) Division, Lapanga. The bidder should write only Tender Specification No, the name of work and date of opening of the tender on the body of the sealed envelope. Bidder should not write their name or Agency name on the body of the sealed envelope which may make the offer liable for rejection.
2) **RIGHT & AUTHORITY FOR REJECTION:-** Tenders received after due date and time will be summarily rejected. The General Manager (Electrical), E.H.T. (O&M) Circle, Burla reserves the right to reject any or all of the tenders without assigning any reason thereof.
3) **VALIDITY OF OFFER:-** The offer should be firm and valid for a period of at least 120 days from the date of opening of tenders, Unless the tender will be rejected.
4) **EARNEST MONEY DEPOSIT:-** The tender should be accompanied with amount Rs.8,672.00 towards Earnest Money Deposit (EMD) in shape of **Cash/ Bank Draft** in favour of "EHT (O&M) CIRCLE, OPTC Ltd., Burla payable at Union Bank, Burla otherwise tender will be out rightly rejected. The bidders have to deposit the collection fee (Bank transaction fee) along with the EMD. The collection fee is Nonrefundable & It can't be taken into account of EMD deposit. The EMD of the unsuccessful bidders will be returned after finalization of tender. The EMD of the successful bidders will be returned only after the Security money deposited as per the clause No.(6) in Section (III). In case of successful bidder fails to execute the order satisfying all terms & conditions or also fails to commencement of work within stipulated date mentioned in the date of order, the Earnest Money Deposit will be forfeited. No interest will be paid on the EMD to any participator. No other mode than above for EMD Deposit will be accepted & bidder will be out rightly rejected.
5) **PRICE:-** The bidders are advised to quote their rate as per the price schedule in Section-IV with break up prices including of all Taxes & Duties and shall remain up to the validity of tenders.
6) **SECURITY DEPOSIT CUM ACCEPTANCE OF ORDER:-** The bidders whose offer qualifies for acceptance will be awarded purchase order for supply of materials, the bidder shall have to deposit security amount equal to 10% (ten percent) of contract value in shape of cash/ bank draft drawn in favour of paying officer, of OPTCL within 15days for acceptance of Order. The security deposit shall be released after expire of guarantee period as stated under clause-10 of SECTION-III on receipt of application for this purpose. No Interest shall be paid to the bidder towards the security deposit so deposited by the Bidder. The security deposit shall be deposited with the respective paying officer of OPTCL prior to execution of contract. In case of Non fulfillment of contractual obligation by the bidder, the same so deposited shall be forfeited.
7) **DELIVERY OF MATERIALS:-** The materials should be delivered within 45 days of placing order. If the delivery could not be completed within scheduled date due to any valid reason, then Schedule period may be extended on written request by the Bidder. Else the penalty should be imposed as per clause No. 08 of SECTION-III.
8) **PENALTY: -** Penalty @ ½%(half per cent) per week up to a maximum of 5% of the total value of the Contract will be imposed and recovered from dues admissible if the delivery of material will not

completed within the specified date in SECTION –III, clasue-7. However imposition of penalty clause is subject to force majeure condition.

9) **TERMS OF PAYMENT: - 100 %** (one hundred percent) **[Against Security Deposit Only]** payment along-with full taxes and duties (if any) shall be made after successful completion of the contract in all respect and verification reports based on actual quantity or JMC (if required) thereof by respective consignee and Paying Officer and on receipt of funds from Head Office in this regard. After completion of the contract, the bidder shall have to produce the printed bills to the respective consignee/ Paying Officer for effecting payment.

10) **GUARANTEE PERIOD: -** The Supply by the contractor as per contract specification should be guaranteed for satisfactory, trouble free operation and against any defects, in materials & the workmanship for a period of 36 (Thirty-Six) months from the date of completion of the contract. The above guarantee certificate shall be furnished in triplicate to the undersigned for approval along with contract completion certificate of consignee. Any defects noticed during the period shall be rectified/ replaced by the bidders at its own cost, without any financial burden to OPTCL.

11) **DOCUMENTS & QUALIFICATION:-** The following Xerox copy should be submitted with the tender paper & the same will be verified with original documents at the time of opening of tender. Also the below qualification is required, (Relaxation may be given in experience in situation like unavailability of experienced Firm).
    i) GST Regd. Certificate.
    ii) Valid PAN Card.
    iii) Experience Certificate (if any)
    iv) Original EMD in shape of cash deposited in this office / D.D. / Pay order.

12) **ADDITION OR DELETION OF CONTRACT:-** The Contract may be altered in quantum as per exigencies of requirement. The bidder shall accordingly provide services as may be required by the Officer- in -Charge on being given a notice of 15 days.

13) **ARBITRATION:-** In the event of any dispute arising out his contract. The same shall be referred for arbitration to the Director (HRD) OPTCL, Bhubaneswar or any arbitrator appointed by the Chairman-Cum- Managing Director, OPTCL after due notice of claim and such appointment and the award of the arbitrator shall be final and binding arbitration and conciliation Act. 1996 shall apply. The venue of arbitration will be Bhubaneswar.

14) **DESPATCH INSTRUCTIONS:-** The materials shall be securely packed and dispatched BY Rail/Road transport/door delivery basis. In case of dispatch by road transport it should be done only through reputed and licensed carrier agencies.

15) **INSURANCE:-**Transit Insurance of materials shall be arranged by you at your cost. The responsibility of the delivery of the materials at destination in good condition conditions rests with the supplier. Any claim with the insurance company. Railway authority/Road transport authorities arising due to loss or damage in transit has to be settled by the supplier. The supplier shall undertake free replacement of materials damaged or lost which will be reported by the consignee within 30 (thirty) days of the receipt of the materials at destination without waiting for the settlement of the claims with the carriers and under writers.

16) **FREE REPLACEMENT:-** free replacement of materials lost/damaged due to transit shall be made immediately on receipt of the intimation from the consignee/paying officer without waiting for settlement of the claim of bidders with Railway/Lorry/ Insurance Company.

17) **CONSIGNEE:-** The S.D.O. 400/220/132/33KV Grid S/S, Lapanga is the consignee for the contract.

18) **PAYING OFFICER:-** D.D.O., EHT (O&M) Circle, OPTCL, Burla is the paying officer for contract.

19) **ENGINEER-IN-CHARGE:** The D.G.M., E.H.T. (O&M) Division, Lapanga is the Engineer-in-charge for contract.

20) **JURISDICTION OF COURT:-** Suits if any, arising against the work order to be issued to the Bidder shall be filled by either party in any court of law to which the jurisdiction of Sambalpur Court extends.

21) **SAFETY PRACTICE:-** The Bidder must be followed the OPTCL safety Rule while performing the Installation work (if required). The workmen must provided Safety equipment by the contractor while performing the works .No deviation will be allowed and the Divisional head has got any power to stop the work at any time on the breach of safety practice after getting intimation from consignee.

22) **EMPLOYMENT / LIABILITY:-** The Bidder shall be solely and exclusively responsible for engaging the workmen. All workmen engaged by the bidder shall be on his pay roll and paid by him. The company will have no liability what so ever concerning the workmen of the bidder. The Bidder shall indemnify OPTCL against all loss or damage arising out of or in the course of his employing persons or out of his relations with his employees. The Bidder shall make regular and full payment of all wages and allowances to its workers/ employees. The bidder shall be directly responsible for any disputes arising between him and his employees and keep the officer-in-charge (OPTCL) indemnified against losses, damages or claims arising thereof including any workmen compensation etc.

23) **TAXES & DUTIES:-**The income tax and any other statutory taxes if any shall be deducted at the prevailing rates. Any other Tax as applicable GST and IT Act.

24) Inspection and Testing:

[i] The purchaser's representative shall be entitled at all reasonable times during manufacture to inspect, examine and test at the supplier's premises, the materials and workmanship of all equipment/materials to be supplied under this contract and if part of the said equipment/material is being manufactured in other premises, the supplier shall obtain for the purchaser's representative permission to inspect, examine and test as if the equipment/material were being manufactured in the contractor's premises. Such inspection, examination and testing shall not relieve the supplier from his obligations under the contract.

[ii] The Supplier shall give to the purchaser adequate time/notice (at least clear 15 days for inside the state suppliers and 20 days for outside the state suppliers) in writing for inspection of materials indicating the place at which the equipment/material is ready for testing and inspection and shall also furnish the shop Routine Test Certificate, Calibration certificates of Testing instruments, calibrated in Govt. approved laboratory with authenticity letter of that laboratory along with the offer for inspection. A packing list along with the offer, indicating the quantity which can be delivered in full truck load/Mini truck load to facilitate issue of dispatch instruction shall also be furnished.

[iii] Where the contract provides for test at the Premises of the supplier or any of his sub-vendors, the supplier shall provide such assistance, labour, materials, electricity, fuel and instruments, as may be required or as may be reasonably demanded by the Purchaser's representative to carryout such tests efficiently. The supplier is required to produce shop routine test Certificate, calibration certificates of Testing Instruments before offering their materials/equipment for inspection & testing. The test house/laboratory where tests are to be carried out must be approved by the Govt. A letter pertaining to Govt. approved laboratory must be furnished to the purchaser along with the offer for inspection.

[iv] After completion of the tests, the Purchaser's representative shall forward the test results to the Purchaser. If the test results conform to the specific standard and specification, the Purchaser shall approve the test results and communicate the same to the supplier in writing. The supplier shall provide at least five copies of the test certificates to the Purchaser.

[v] The Purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is dispute regarding the quality of supply.

[vi] If the firm fails to present the offered items for inspection/testing as per their inspection call due to any reason(s) during the visit of inspecting officer at the testing site ,the firm shall have to bear all expenses towards repetition of inspection and testing of the total offered quantity or part thereof.

25) **Training facilities:** The supplier shall provide all possible facilities for training of Purchaser's Technical personnel, when deputed by the Purchaser for acquiring firsthand knowledge in assembly of the equipment, its erection, commissioning and for its proper operation & maintenance in service, wherein it is thought necessary by the purchaser.

26) **Rejection of Materials:** In the event any of the equipments/ material supplied by the manufacturer is found defective due to faulty design, bad workmanship, bad materials used or otherwise not in conformity with the requirements of the Specification, the Purchaser shall either reject the equipment/material or ask the supplier in writing to rectify or replace the defective equipment/material free of cost to the purchaser. The Supplier on receipt of such notification shall either rectify or replace the defective equipment/material free of cost to the purchaser within 15 days from the date of issue of such notification by the purchaser. If the supplier fails to do so, the Purchaser may:-

[a] At its option replace or rectify such defective equipment/materials and recover the extra costs so involved from the supplier plus fifteen percent and/or.

[b] Terminate the contract for balance work/supplies, with enforcement of penalty Clause as per contract for the un-delivered goods and with forfeiture of Performance Guarantee/ Composite Bank guarantee.

[c] Acquire the defective equipment/materials at reduced price, considered equitable under the circumstances.

27) **Supplier's Responsibility**: Notwithstanding anything mentioned in the Specification or subsequent approval or acceptance by the Purchaser, the ultimate responsibility for design, manufacture, materials used and satisfactory performance shall rest with the Tenderers. The Supplier(s) shall be responsible for any discrepancy noticed in the documents, submitted by them along with the bid(s).

General Manager (Elect.)
EHT (O&M) Circle, Burla

SECTION-IV
TECHNICAL SPECIFICATION

1. IMPORTANT INSTRUCTION:

Please read the following instructions carefully before submitting your bid:

1.1 All the drawings, i.e. dimension, elevation, side view, front view, plan, cross sectional view, isometric view, important component drawing etc., in PDF along with AutoCAD format and manuals (Technical/Installation/Operation) in PDF format, for offered item shall be submitted. The hard copies as per specification also shall be submitted.

1.2 The acceptability of Type Test reports submitted by any bidder/EPC shall be strictly in adherence to the broad guidelines mentioned in clause no. 2 of "CEA guidelines for the validity period of Type Tests conducted on major electrical equipment of power transmission system" published in May 2020.

1.3 The Bidder/EPC shall have to submit all the required type test reports for the offered item along with the accessories. In case of submission of soft copy of type test report, high resolution colour scan of the original test report must be submitted. Scanned copy of Xerox of type test reports shall not be entertained. If required, the firm has to show the original type test report for the purpose of verification. In absence of this, the evaluation shall be carried out accordingly as non-submission of type test reports. The type test report of Battery Charger submitted by the manufacturer shall be considered valid if the date of type test does not exceed 07 years as on the last date of submission of bid; provided:-

There is no major changes introduced in the basic design / technology /material /mechanical /construction /functionalities /performance characteristics/ manufacturing process of the equipment.

OR

Until the relevant IS/IEC / statutory guidelines is revised which warrants fresh type tests because of introduction of new type tests even though there is no change in material/basic design of the equipment.

1.4 The Bidder/EPC must fill up all the point of GTP for offered item/s. Instead of indicating "refer drawing, or as per IS/IEC", the exact value/s must be filled in. All the points other than GTP, which are asked to confirm in technical specifications must be submitted separately with the bid.

1.5 The Bidder/EPC is required to impart training in view of manufacture, assembly, erection, operation and maintenance for offered item, at his works, to the person/s identified by OPTCL, in the event of an order, free of cost. The cost of logistics will be borne as per the clauses of respective purchase orders/work orders.

1.6 The discrepancies between the specification and the catalogues or literature, submitted as part of the offer OR with prevalent standards/Govt. guidelines shall not be considered as valid deviations unless otherwise the same deviations related to TS is brought out separately by the Bidder/EPC in the pre-bid queries or in form of clarification. If any modification felt necessary to improve performance, efficiency and utility of equipment, the same must be submitted along with Pre-Bid Queries with reasons duly supported by documentary evidences and such modifications, not mentioned in Pre-bid queries, will not be considered.

1.7 For purpose of Agreement, the firm shall provide warranty as specified in the purchase order / tender document. Notwithstanding the foregoing, Supplier agrees to waive the expiration of the Warranty Period in the event where in a pattern of defect/trend of failure is observed after the Warranty Period in a significant portion of the supplied quantity, or any critical defect discovered

which, in Purchaser's opinion, constitutes a threat of damage to property or to the health and safety of any person.

1.8 Warranty certificate for purchase of any material, whether directly procured by OPTCL or EPC agency, shall be issued directly in favour of OPTCL.

2. SCOPE:

2.1 This Specification covers design, manufacture, inspection and testing before dispatch, packing and delivery F.O.R. (destinations) and installation of Battery Chargers with provision of Float and Boost charging for 220V 645AH batteries consisting of 110 Nos., 2.0 Volts Lead Acid battery set, supply of spares and other accessories as specified here in. **This scope includes SCADA compatibility of Battery chargers to be supplied.**

2.2 Following is the list of documents constituting this Specification. :

(i)	Technical Specification (TS)	-
(ii)	Technical Requirements	Appendix-I
(iii)	Type test procedure for battery charger	Appendix-II
(iv)	Guaranteed Technical Particulars	Annexure-A
(v)	Delivery schedule	Annexure-B
(vi)	Calibration Status of testing equipment and meters/Instruments.	Annexure-C
(vii)	Check-list towards Type Test Reports.	Annexure-D
Note: Annexure-A, B, C & D are to be filled up by the Bidder/EPC.		

2.3 All the above along with amendments thereof shall be read and interpreted together. However, in case of a contradiction between the Technical Specification and any other volume, the provisions of this volume will prevail.

2.4 The Battery Charger shall conform in all respects to high standards of engineering, design, workmanship and latest revisions of relevant standards at the time of offer and purchaser shall have the power to reject any work or materials, which in his judgment is not in full accordance therewith.

3. STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, constructed and tested in accordance with the applicable sections of the latest Indian Standard specification and Indian Electricity Rules.

	Standard Ref. No.	**Title.**
1.	IEC-60146	Specification for rectifier equipment in general
2.	IEC-60269	Specification for HRC fuses.
3.	IS-1248	Specification for Indicating Instruments.
4.	IEC-60529	Degree of protection
5.	IS-6619	Safety code for semi-conductor rectifier equipment.
6.	IS-2026	Transformers
7.	IEC-60947	A.C contactor for voltages not exceeding 1000V
8.	IEC-61810	Elementary Relays for voltages not exceeding 1000V

9.	IS-5	Colour for Ready Mix paint

4. CONSTRUCTION:

4.1 It will be indoor, freestanding, floor mounting and naturally air cooled type, designed for continuous operation in the ambient temperature of 50ºC. Good cross ventilation shall be made through side louvers to avoid any undue temperature rise in the panel.

4.2 Each charging equipment offered shall be housed in a sheet steel cubicle reinforced by angle iron frame and shall be mechanically strong. The cubicle shall be dust and vermin proof.

4.3 The rear and front door cover of the cubicle shall be hinged and shall have locking arrangement. Thickness of sheet steel shall be ***3*** **mm** for load bearing members and ***2 mm*** for other sides.

4.4 Gland plate of **3 mm** thickness for incoming / outgoing cables shall be provided. Body earthing with two separate earthing terminals shall also be provided. Doors shall also be earthed with minimum **4sqmm** insulated copper wire.

4.5 All the door mounted equipment as well as equipment mounted inside the cabinet shall be provided with individual riveted /life lasting adhered labels with equipment description engraved.

4.6 Electrical indicating instruments shall be flush mounted on the panel with only flange projecting. The dial shall be white with black numbers and lettering.

4.7 The control electronics shall be built on plug in type glass epoxy printed circuit boards of modular design. The electronic control circuitry should have built in feature of soft start so that whenever the charger is switched on, the output voltage should increase gradually.

4.8 Battery Charger shall be provided with earth bus bar of tinned copper flat, having minimum cross section 20 x 3 Sq. mm flat securely fixed along with base and provision on both the sides of earth bus for connecting purchaser's earthing grid.

4.9 Each cubicle will undergo a thorough process of de-rusting, cleaning, application of red oxide primer paint followed by the two coats of light grey synthetic enamel paint shade 631 of IS: 5. Paint thickness shall be **minimum 80 microns**.

4.10 Power wiring for the chargers shall be done with 1.1KV grade, heavy duty, single core, stranded copper conductor PVC insulated cables or suitable sized PVC sleeved copper bus bars. Control wiring for the charger shall be done with 1.1 KV grade PVC insulated copper wires of cross section 2.5 sq. mm for all control connection. Wire of 2.5 sq. mm cross section shall be used for control bus. All control wiring shall be ferruled.

4.11 All equipment's and wiring used in the panel shall be tropicalised dust proof and vermin-proof.

5. DESIGN DETAILS AND DUTY REQUIREMENTS:

5.1 The charger shall be suitable for charging the battery and supplying the load simultaneously. The entire charger scheme shall be divided in two sections, "**float charger section"** and **"float-cum-boost charger section"**. The float-cum-booster charger shall be suitably operated either in float mode or in boost-cum-standby float charger mode.

5.2 The float and float –cum-boost sections of the charger shall be compatible to operate in auto (fully automatic) as well as manual mode with a provision of selection through Auto/Manual switch and all related components & scheme.

5.3 Under normal operating condition, with the input AC supply present, the float charger section shall supply the DC load and also float the battery by trickle charging and the "float cum boost charger section" shall be kept off.

5.4 In the event of main AC supply failure, the battery shall supply DC power to the Sub-station DC Load. The battery thus discharged shall be charged after resumption of A.C supply by the FCBC charger at the specified current needed for the battery depending on the extent of discharge. During this operation, `the float charger section' shall continue to supply the load current only while float cum boost charger shall recharge the battery and the load supply shall be disconnected from the battery through a contact of a contactor. If the `float charger' fails during this period, the battery shall maintain load through tap cell diode, connected at **84th cell(not exceeding a voltage more than 231 volt**) instantaneously without any interruption of the DC load supply. If the incoming AC supply or the boost charger fails during boost charging, all the cells shall be connected to the load bus through the contact of the same contactor mentioned above. In boost mode the charger shall be capable of quick charging the battery up to **2.75 Volts** per cell and also capable of restoring fully discharged battery to a state of full charge in eight hours.

5.5 If there is any trouble in " float charger section ",the float mode of float cum boost charger section ", through Float-Boost selector switch shall supply the D.C. load as well as trickle charge the battery and thus serve as a spare float charger.

5.6 The complete logic of operation for battery charger is tabulated below:

CASE	FC	FCBC	CONTACTOR	BATTERY	LOAD	DROPPER DIODE
1	FLOAT	STANDBY	CLOSE	FC-FLOAT	FC-FLOAT	ACTIVE
2	FLOAT	BOOST	OPEN	FCBC-BOOST	FC-FLOAT	ACTIVE
3	OFF	FLOAT	CLOSE	FCBC-FLOAT	FCBC-FLOAT	ACTIVE
4	OFF	BOOST	OPEN	FCBC-BOOST	FROM TAP CELL OF BATTERY	NOT IN CIRCUIT
5	OFF	OFF	CLOSE	DISCHARGE	BATTERY	BYPASS

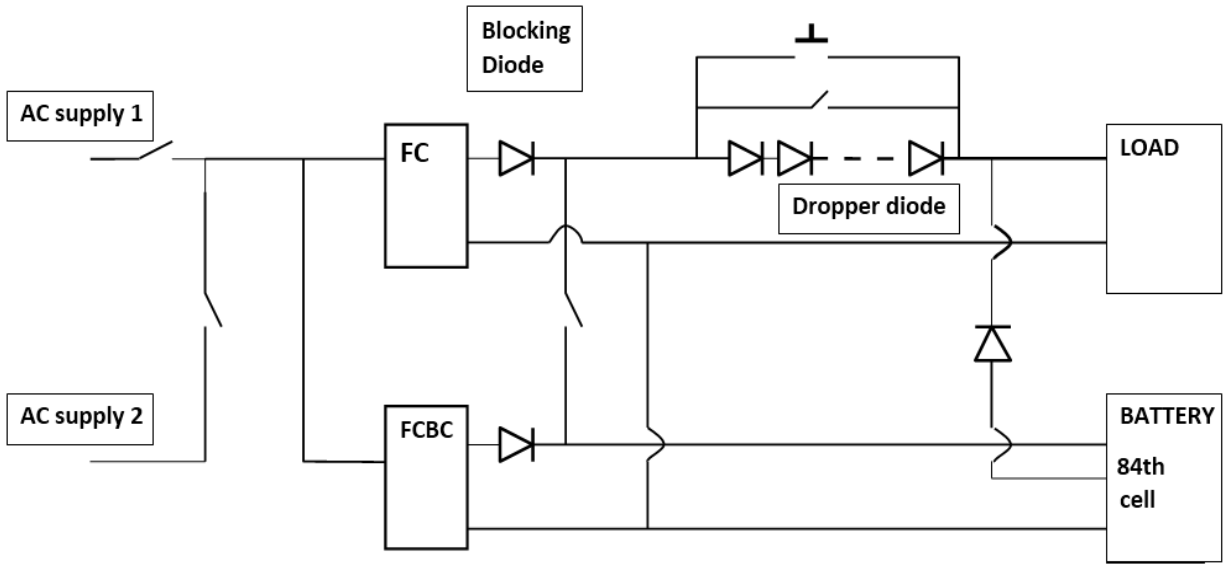

Diagram - Schematic diagram of Battery Charger

5.7 The 'FC ' charger and 'FCBC' charger shall be complete with silicon controlled rectifier units, dry type air-cooled transformers, control electronics, smoothing filters etc. suitable for operation from 415V + 10%, 50 HZ + 5%, 3 phase A.C. supply. There shall be a provision for redundant A.C supply. In case of failure of one AC supply both FC and FCBC charger shall be able to avail power from redundant supply.

5.8 The charger output shall be stabilized to ± 1% of set value for -15% to + 10% input voltage variations and 0-100% load variation.

5.9 The battery charger shall have full-wave, Half-controlled thyristor controlled bridge rectifier circuit. The charger output voltage shall suit the battery offered. Ripple voltage shall be less than 3% RMS voltage.

5.10 Each charger panel shall incorporate all the necessary controls, Indications, interlocks, protective devices and timing features to ensure any operation.

5.11 Provision shall be made with necessary contact / relays for annunciation in the event of alternating current power failures to the charger and automatic shutdown of the charger by over-voltage / current devices. Annunciation shall however be prevented when the charger is manually shutdown or when A.C. power supply is momentarily interrupted for adjustable period of 1 to 5 seconds.

5.12 Each charger shall be protected against any damage from over voltage/ load currents and shall be so designed that it can continuously deliver at least rated current output without operation of the protective over-load device for abnormal conditions of low battery voltage down to 175V (80%) of the rated voltage). But the chargers shall be disconnected from A.C. input supply through an over-voltage relay, if the input voltage exceeds 10% of the rated voltage of the equipment.

5.13 Necessary selector switches for 'Trickle Charging' and 'Quick charging' shall be provided. There shall be 'make before break' type blocking Diodes and other equipment to be shown in

the drawing or otherwise found necessary for charging the battery without increasing the voltage beyond safe value across the load shall also be supplied by the Bidder.

5.14 The Float voltage shall have the provision for user selectable output voltage setting from 200 Volt to 253 volt DC while the Boost voltage shall have the provision of output voltage variation from 200 volt to 302 volt DC both in AUTO and MANUAL Mode. In case of AUTO mode, once the voltage adjustment is set by the user, there shall be no fluctuation of output voltage from the set value thereof. A dedicated potentiometer /Voltage Adjustment port shall be provided by the manufacturer for use of purchaser and the same shall be clearly indicated in the drawings pertaining to the battery charger.

5.15 The rectifier units of the chargers shall be capable of supplying an impulse load of 6/7 times its rated capacity. The trickle charger in conjunction with automatic voltage regulators shall have drooping characteristics, So as to transfer the load beyond its capacity to the battery.

5.16 The incoming and outgoing circuits shall be provided with MCCBs with static releases for overload, short circuit and earth fault protections. The incoming power supply to the chargers will be from two sources with a facility of changeover switch. The change over facility shall be provided in the charger itself.

5.17 Adequately rated HRC fuse protection over and above a rated load break isolator switch shall be provided for isolating the charger output form battery source.

5.18 Input volt meter and ammeter shall be of moving iron type and shall be 96 x 96 mm. Square. These meters shall be of accuracy class not less than 1.0 and shall be of flush mounting type with required PTs and CTs and selector switches. Output voltmeter and ammeter shall be moving iron type and shall be 96 x 96 mm square. The meter shall be of accuracy class not less than 1.0 and shall be flush mounting type. The ammeter shall be center zero type for measurement of charging and discharging current from the battery.

6. ANNUNCIATION AND INDICATION CIRCUITS:

Following Cluster LED lamps shall be provided in the charger panels:

- 'Input supply On' condition
- 'Output Supply on' condition
- Float Mode on / off
- Boost Mode on / off.

Annunciation with audiovisual alarms shall be provided for the following.

- Input mains failure.
- Input phase failure.
- Input fuse failure.
- Rectifier fuse failure.
- Filter fuse failure
- DC over voltage
- DC under voltage
- Output fuse failure
- Charger over-load
- Earth leakage

- Alarm supply fuse failure
- Charger trip
- Output MCCB tripped
- AC under voltage
- Battery low condition
- Dropper Diode Ckt Open /Bypass Contactor Failure

ACCEPT, TEST AND RESET push buttons shall be provided. 20% spare annunciation windows shall be provided.

7. DROPPER DIODE CIRCUIT:

The Dropper Diode Circuit will include Dropper Diodes & Contactors associated with Voltage Sensing Relay PCBs. The Charger Output Voltage will be sensed by the Voltage Sensing Circuit Board which is set at required voltage level. Whenever the System Output Voltage is higher than the set Voltage level, then that particular sensing Circuit will turn ON, activating the relay of the Relay Board which in turn opens the Contactor & the Dropper Diode will drop the excess voltage so that the Output Voltage is maintained as required. If the Output Voltage is less than the Set Value, the Contactor will be made ON automatically & the Dropper Diodes will get bypassed. **There should be a provision to have a switch/MCB with minimum 25 Amp continuous make and break capacity (The switch terminals must be wired across the dropper diode and bypass contactor) so that in the event of dropper diode open circuit or bypass contactor failure, the switch can be made ON for catering system D.C load without significant interruption. An alarm with Hooter must be provided to convey the information that "DIODE CKT OPEN OR BYPASS CONTACTOR FAILURE" so that manual intervention can be swiftly made to restore the loss of D.C supply to the system.**

The above arrangement shall preferably be customized with in the same battery charger cabinet instead of a separate cabinet so as to avoid space consumption.

8. SCADA COMPATIBILITY:

The Battery Charger shall be fully SCADA compatible. It shall have sufficient nos of potential free contacts & transducers (4-20mA output (min. 2 nos. output port)) for digital and analogue signals respectively. It shall also be possible to control various functionality of Battery Charger from SCADA system through hard wire connection. Typical input status requirement is tabulated here under. However exact number and description shall be as per detailed engineering.

PARAMETERS	DIGITAL INPUTS	ANALOGUE INPUTS (4-20mA)
AC mains fail	√	

DC Over Voltage	√	
DC Under Voltage	√	
Float Charger fail	√	
Earth Leakage	√	
Dropper Ckt. Open/Bypass Contactor Failure	√	
Float Charger On	√	
Float Charger Off	√	
Float Charger on Auto mode	√	
Float Charger on Manual mode	√	
FCBC Charger On	√	
FCBC Charger Off	√	
FCBC charger on Float Mode	√	
FCBC charger on Boost Mode	√	
Battery Voltage		√
Boost Voltage		√
Float Voltage		√
Load Voltage		√
Battery Current		√
Boost Current		√
Float Current		√
Load Current		√
Battery Room Temperature		√

Note: Any other item(s), not stipulated in this specification, but required for installation, operation and maintenance of the battery charger is / are included in the scope of supply without any extra charge on OPTCL.

9. TESTS:

A. TYPE TESTS:-

The following type test reports from NABL accredited laboratory as per *applicable* standard *for* Battery chargers shall *be submitted with technical bid*. Rectifier transformers shall conform to all type tests specified in IEC - 60146 and short circuit test as per IS: 2026. The type test reports shall ***not be older than seven years from the expiry of the validity of the offer. Tests shall be carried out as per procedures specified in Appendix-II.***

1. Voltage regulation test
2. Load limiter characteristics test
3. Measurement of Efficiency and power Factor
4. High voltage test
5. Temperature rise test
6. Short circuit test at no load and full load at rated voltage for sustained short circuit.
7. Degree of protection test – **IP 42**
8. Measurement of ripple by Oscilloscope
9. Temperature compensation feature demonstration

10. Type test reports of Rectifier Transformers - all tests as specified in IEC -60146 and short circuit test as per IS : 2026

Important Note:

In case of non-submission of some the type test reports, the bidder shall confirm the submission of same before commencement of supply, without affecting delivery schedule, from NABL accredited laboratory, free of cost. In absence of this confirmation, the offer will be evaluated as non-submission of type test report.

B. ACCEPTANCE TESTS:

Followings shall constitute the acceptance tests which shall be tested by the purchaser's representative at the works of the manufacturer at the cost of the supplier (both for FC & FCBC) for each charger. No sampling is allowed.

(a) Visual inspection and dimension check
(b) Measurement of voltage regulation / AVR Regulation
(c) Efficiency and power factor measurement
(d) Temperature rise test so as to determine the temperature rise of SCR, Transformer primary, secondary and core, diode, capacitor, choke and cabinet etc.
(e) Measurement of insulation resistance.
    (1) AC input to earth
    (2) AC input to DC output
    (3) DC output to earth
(f) Test for rectifier transformer (all relevant tests as per corresponding ISS)
(g) High voltage tests.
(h) Measurement of ripple
(i) Operational test for protection, Alarm & indication and Auto/Manual operation etc.
(j) Tests for indicating instruments.
(k) Determination of system set points.
(l) Soft start test

N.B.: The supplier shall provide arrangements for monitoring the temperature across the elements, as stipulated above, continuously during the temperature rise test without disconnection of any of the temperature measuring devices across the hottest spot of each of the above elements.

All other tests, as may be necessary to ensure that all equipment's are satisfactory shall also be carried out. In addition to the above tests, manufacturer's test certificates, vendor's test certificates for different equipment's, accessories, instruments etc. shall be submitted, whenever required by the purchaser.

10. DRAWINGS / DOCUMENTS:

The bidder shall submit the following drawings / documents along with his offer failing which the offer is liable for rejection.

(a) OGA of the battery chargers.

(b) General layout with overall dimensions.
(c) Electrical schematic diagram showing connections and controls.
(d) Leaflets and technical literature giving detailed information of the panels offered.

The manufacturer shall submit the following drawings / documents in 3 (three) copies within 15 (fifteen) days from the date of issue of the purchase order for purchaser's approval.

(a) OGA of the battery chargers.
(b) General layout with overall dimensions marked along with sectional views showing cable entry position etc.
(c) Rating calculations for transformer, rectifiers, diode, capacitor, inductor and characteristic of DC curve etc.
(d) Detailed schematic and connection and control wiring diagram for all the equipment.
(e) Complete bill of materials.
(f) Technical excerpts on operation.
(g) The circuit diagram of charger including circuit diagrams of all cards to facilitate the maintenance of chargers
(h) Charger Operation Logic
(i) Manufacturing Quality plan of Battery Charger.
(j) Raw Material and critical components (SCR, Diode, Filter and contactors etc.) test certificates.

11. SPECIAL TOOLS, PLANTS AND SPARES

The tender shall quote for recommended special tools, plants and spares, considered necessary for installation and maintenance of batteries and charges for a minimum period of 5 (five years.)

The following mandatory spares are to be quoted by the bidder in the price bid:-

(a) Voltage regulator cards- 1 No/Charger.
(b) Protection card (if any)- l No/ Charger.
(c) Thyristor (SCR)- 2 Nos. for F.C.+ 2 Nos. for B.C./ Charger.
(d) Blocking Diode- 1 No. for F.C. + 1 No. for B.C./ Charger.
(e) Filter Capacitor- 1 Set/Charger.
(f) Auto-manual switch- 1 No. for F. C. + 1 No. for B.C./ Charger.
(g) Indicating LED- 10 Nos./Charger
(h) Indicating fuse (if any)- 10 Nos./Charger
(i) Input A.C. contactor- 1 No. for F.C,. + l No. for B.C./ Charger
(j) Rectifier H.R.C. fuses- 4 Nos. for F.C. + 4 Nos. for B.C./Charger.
(k) DC Voltage Transducer (4-20 mA): 1Nos.
(l) DC Current Transducer (4-20mA): 1 Nos.

12. TRANSPORT:

The equipment shall be dispatched securely packed in wooden crates suitable for handling during transit by rail / road, so as to avoid any loss or damage during transit. The crate should be marked with the legible details like Make, Sr. No. , Type of Charger and A/T (purchase order) no. etc.

Three sets of each of the detailed dimensional drawings, commissioning and operating instructions manual, literature, write up and test certificates of bought items shall be supplied with each of the battery charger.

APPENDIX-I

GENERAL TECHNICAL REQUIREMENTS FOR BATTERY CHARGER SUITABLE FOR 220 V 645AH VENTED LEAD ACID BATTERY

1	Type	Float & Float cum boost charger, full wave, half controlled type/full control.	
2.	RATINGS	220V/64.5A/100A Float & Float cum Boost Charger (Suitable for Plante Battery)	
3.	AC INPUT (a) Voltage (b) Frequency (c) Phase	415VAC ± 10% 50Hz ± 5% 3-phase-4 wire	
4.	D.C.OUTPUT VOLTAGE SELECTION SETTINGS(IN BOTH AUTO AND MANUAL MODE) **Adjustable Range**	FC **(voltage variation adjustable from 200 volt to 253 volt)**	BC **(voltage variation adjustable from 200 volt to 302 volt)**
5.	OUTPUT CURRENT LIMIT 350AH/645AH	64.5A	100A
6.	POWER CONVERSION	AC to DC by means of three phase full wave, Half controlled bridge rectifier consisting of thyristors and diodes.	
7.	VOLTAGE REGULATION AT BRIDGE OUTPUT.	$\pm$ 1% of set value for $\pm$ 10% Input Voltage Variations, 0-100% Load variation.	
8.	RIPPLE VOLTAGE	Less than 3% RMS without battery connected.	
9.	EFFICIENCY	More than 75% at full load	
10.	PROTECTIONS		
	(a) Input side	AC input MCCB with input ON/OFF switch and fuses, contactor (for source-1&2 with interlocking)	
	(b) Output side	DC output MCCB with output ON/OFF switch and fuses contactor.	
	(c) Protection	Current limit protection, soft start feature, surge suppressor. Fast semiconductor fuses for rectifier bridge.	
	(d) control circuit	Fuses	
	(e) Capacitor circuit	Rectifier HRC fuses.	
	(f)	Over-voltage cut-back	
	(g)	Charger over load / short circuit	
	(h)	Blocking diode	
11.	CONTROLS AND SWITCHES	Followings controls and switches are provided in the system a) AC input source MCCBs with interlocking b) DC output MCCB c) Auto/Manual, float/boost mode selector switch. **d) Float and boost voltage variable potentiometers (for**	

		both auto and manual mode). e) Manual voltage adjustment Potentiometer f) Test push button g) Reset push button h) Battery current adjustment potentiometers i) Heater's power supply switch j) Socket power supply switch	
12.	FEATURES	The following features are provided in the systems: a) Soft start on DC side b) Class-F insulation for all magnetic material. c) Automatic voltage regulation. d) Automatic changeover from float to boost and vice versa based on current, drawn by battery. e) Filter circuit to eliminate ripple. f) Charger current limit g) Separate battery path current limit. h) Built-in auto phase reversal of operation.	
13.	Meters	(i)Input Voltmeter (ii) Input Ammeter (iii) Output Voltmeter (iv) Output Ammeter	(i) Common (ii) Input Ammeter (iii) Output Voltmeter (iv) Output Ammeter.
		Battery volt meter Battery ammeter Earth leakage ammeter	
14.	Indications	(i) R,Y,B Phase 'ON' lamps (ii) Output 'ON' lamp	(i) R.Y.B. phase 'ON' lamps (ii) Output 'ON' lamp. (iii) Charger 'ON' float LED (iv)Charger 'ON' boost LED.
15.	Annunciation with audiovisual alarms.	(i) AC input mains failure (ii) Input phase failure (iii) AC under voltage (iv) Input phase failure (i) Rectifier fuse failure (ii) Output fuse failure (iii) Filter fuse failure (iv) DC under voltage (v) DC over voltage (vi) Charger trip (vii) Capacitor fuse fail (viii) Output MCCB tripped (ix) Charger over load (x) Earth leakage (xi) DC earth fault	v) Rectifier fuse failure vi) Output fuse failure vii) Filter fuse failure viii) DC under voltage ix) DC over Voltage x) Charger trip xi) Capacitor fuse fail xii) Output MCCB tripped.

		(xii) Alarm supply fuse failure (xiii) Battery low condition.	
Note : All the alarms shall be provided through electronic display cards. Audio alarm through buzzer, visual indication through 10 mm LEDS & alarm ackn. / reset and LED provision is through push buttons.			
16.	Operating ambient temperature surrounding the panel	0^0 to 50^0C	
17.	Surrounding the panel Relative humidity.	0-95% non-condensing	
18.	PANEL (a) Protective grade (b) Cooling (c) Paint	(a) IP – 42 (b) Natural air-cooled (c) Smoke Grey of ISS-692 shade	
19.	MAGNETICS : (a) Average winding temperature rise over ambient temperature	45^o Cover an ambient temperature of 50^o C.	
	(b) Insulation class	'F'	
	(c) Insulation breakdown voltage.	3 KV for 1 min withstand.	
20.	CABLES	1100 V grade PVC insulated copper. Ferrules shall be provided for identification of connection.	
21	Dropper Diodes to be connected in series	Agency shall submit Design calculation to justify the no. of Dropper diodes.	
22	SCADA Compatibility	As per Clause No.8	

N.B. : - Besides the above general technical requirements, all other stipulations, as enumerated in this technical specification shall be followed. Any deviation should be clearly brought out with clear explanation.

Any extra feature/ equipment / instrument as necessary for operation and performance of the battery charger for the 220V battery set as per this specification shall be provided without any extra cost to OPTCL.

ANNEXURE-A

GUARANTEED TECHNICAL PARTICULARS FOR

BATTERY CHARGER (220 V D.C. SYSTEM) SUITABLE FOR 220V, 350AH

VENTED LEAD ACID STORAGE BATTERY (Plante type)

(To be filled in by the Bidder)

SL.NO.	DETAILS	VALUES & OTHERS
1.	Manufacturer's Name	
2.	**Rated output of the charger**	
3.1	Voltage (volts)	
2.2	Current (amps)	
2.3	Power factor	
3.	Short time rating	
4.	Type of cooling	
5.	Hottest stack temperature (^{0}C)	
6.	**Charger dimensions**	
6.1	Height (mm)	
6.2	Depth (mm)	
6.3	Width (mm)	
6.4	Sheet thickness (mm)	
7.	Charger weight	
8.	**Charger rated output current**	
8.1	Float charging mode	
8.2	Boost charging mode	
9.	Load limiter current setting range (Trickle mode)	
10	**RECTIFIER TRANSFORMER** Float Charger Boost Charger	
10.1	Make	
10.2	Type	
10.3	Rated KVA	
10.4	Over current impedance (ohms)	
10.5	Input line winding connection	

	in vector representation	
10.6	Rated primary voltage (volts)	
10.7	Rated secondary voltage (volts)	
10.8	Rated frequency (Hertz.)	
10.9	Rated output (amps)	
10.10	Turn ratio	
10.11	Insulation level	
10.12	Impulse withstand test voltage (KVP)	
10.13	One minute power frequency over voltage.	
	(a) Primary winding (KV-rms).	
	(b) Secondary winding (KV-rms)	
10.14	Material of primary winding conductor	
10.15	Material of secondary winding conductor	
10.16	Size, Cross-sectional area and current density of primary winding conductor.	
10.17	Size, cross-sectional area and current density of secondary winding conductor	
10.18	No. of turns of primary / phase	
10.19	No. of turns of secondary / phase	
10.20	Name of the insulating materials used and class	
10.21	Core	
10.21.1	Name of the core material	
10.21.2	Grade of the core	
10.21.3	Thickness of core material (mm)	
10.22	Maximum temperature rise over an ambient temperature of 50^0C	
	(a) Primary Winding (^{0}C)	
	(b) Secondary Winding (^{0}C)	
	(c) Core (^{0}C)	
10.3	standards applicable	
11.0	**RECTIFIER ASSEMBLY :**	
11.1	11.1Make	
11.2	Type of semi-conductor material	
11.3	Rated direct current per cell (A)	
11.4	Rated direct voltage (V)	

11.5	Rated input voltage (V)	
11.6	Type of connections of rectifier elements.	
11.7	Forward power loss and reverse power loss (watts).	
11.8	Forward voltage drop and reverse voltage drop (volts)	
11.9	Conversion efficiency (%)	
11.10	Rated DC output voltage (V)	
11.11	Rated AC input voltage (V)	
11.12	Rated output current (A)	
11.13	Ripple factor	
11.14	Voltage factor	
11.15	Current factor	
11.16	Maximum temperature rise over an ambient temperature of 50^0C (^{0}C)	
11.17	Maximum permissible ambient temperature for guaranteed rating (^{0}C)	
11.18	Maximum and minimum permissible humidity rating (%)	
11.19	Life expectancy (years)	
11.20	Standard(s) applicable	
11.21	Characteristic curve of DC output plotted against output current (Whether submitted?) Yes / No.	
12.	**AUTOMATIC VOLTAGE REGULATOR**	
12.1	manufacturer's name	
12.2	Manufacturer's type	
12.3	Percentage 26tabilization of the rectifier with the help of AVR when	
	(a) Input voltage changes with ± of its nominal value.	
	(b) DC output of the rectifier varies from no-load to full load.	
12.4	Rated output voltage	
12.5	Allowable AC frequency fluctuations	
12.6	Voltage setting range	
12.7	Response time of automatic voltage regulator	
13.0	**User Selectable voltage regular (in both FC and FCBC))**	
13.1	Voltage Regulator(for Manual Mode)(Provided or Not)	
13.1.1	Type	
13.1.2	Voltage setting range	
13.2	Voltage Regulator(for Auto Mode)(Provided or Not)	

13.2.1	Type	
13.2.2	Voltage setting range	
14.0	Boost charging current setting range	
15.0	Boost charging limit setting range	
16.0	**DIODES**	
16.1	Manufacturer's name	
16.2	Type of circuit	
16.3	Method of construction	
16.4	Continuous current rating (Amps.)	
16.5	Short time current rating (Amps)	
16.6	Type of cooling	
16.7	Forward power loss and reverse power less (W)	
16.8	Life expectancy	
16.9	Forward voltage drop on rated current	
16.10	Resistance offered for reverse current flow	
16.11	Maximum temperature rise over an ambient temperature of 50^0 C.	
17.0	**CONTACTORS / MOULDED CASE CIRCUIT BREAKERS**	
17.1	Type	
17.2	Make	
17.3	Rated voltage (V)	
17.4	Rated continuous currents (A)	
17.5	Contact material	
17.6	Operating coil	
17.6.1	Voltage (V)	
17.6.2	Voltage range and power for closing and holding	
17.6.3	Voltage range and power for drop off.	
17.7	Thermal trip rating	
17.8	Thermal trip time	
17.9	Details of CT if any	
17.10	Auxiliary contacts	
17.10.1	Number	
17.10.2	Current rating	
17.11	Characteristics of back-up HRC fuse	

18.0	**RELAYS :**	
18.1	18.1 Make and type of protective and alarm relays	
	(a) Thermal overload relay	
	(b) Input under voltage relay	
	(c) Single phasing alarm relay	
	(d) Phase reversal relay	
	(e) D.C. output over-voltage relay	
	(f) D.C. output under voltage relay	
	(g) Charger failure relay	
	(h) Battery earth fault relay	
	(i) A.C. input failure relay (for connecting the D.C. load)	
	(j) Fuse failure relay	
	(k) Alarm accept relay	
18.2	Rated voltage of each of the above	
	(a) AC/DC	
	(b) Permissible variation	
	(c) Frequency	
18.3	VA burden of each of the above	
18.4	Operating time of each of the above	
18.5	Time vs current curves of each of the above (to be enclosed along with the offer)	
18.6	Reset time	
18.7	Accuracy	
18.8	Setting range	
18.9	Reset factor	
18.10	Number of contacts	
	(a) Normally open	
	(b) Normally closed	
18.11	Rating of contacts	
	(a) Rated Voltage (V)	
	(b) Rated making and breaking	
	(c) Continuous rating	
18.12	No. of operations	

18.13	Operation indicator	
19.0	**INDICATING LAMPS**	
19.1	Manufacturer's name	
19.2	Type and designation	
19.3	Permissible voltage variation	
19.4	Rated power consumption (watts).	
19.5	Series resistance, if any	
20.0	**SWITCHES:**	
20.1	Manufacturer's name	
20.2	Ratings	
	(a) Continuous current	
	(b) Short circuit – making capacity	
	(c) Breaking capacity	
	(d) Voltage	
20.3	Operating mechanism details	
20.4	Type of visual indication	
	(a) OFF and ON position	
	(b) Fuse blow out	
21.0	**FUSES**	
	(a) Make	
	(b) Type	
	(c) Rating (Amps)	
	(d) Interrupting rating (KA)	
22.0	**INSTRUMENTS**	
22.1	Manufacturer's Name	
	(a) Ammeter	
	(b) Voltmeter	
22.2	Type	
	(a) Ammeter	
	(b) Voltmeter	
22.3	Standard	
	(a) Ammeter	
	(b) Voltmeter	

22.4	Scale range.	
22.4.1	Ammeter	
	(a) Float charger	
	(b) Boost charger	
	(c) Battery float	
	(d) Battery boost	
22.4.2	Volt meter	
	(a) Input supply	
	(b) Charger output	
	(c) Load	
22.5	Size of dial	
	(a) Volt meter	
	(b) Ammeter	
22.6	Accuracy Class	
	(a) Volt meter	
	(b) Ammeter	
22.7	Temperature at which calibrated	
22.8	Limit of errors	
22.10	Out line dimensions	
22.10	Type of mounting	
22.11	Selector switch for volt meter (AC & DC)	
	(a) Make	
	(b) Rating	
23.0	**CAPACITOR**	
23.1	Manufacturer's name	
23.2	Type	
23.3	Capacitance (Farad)	
23.4	Maximum temperature rise over an ambient temperature of 50^0C.	
24.0	Reference float voltage at ambient temperature of 27^0C	
25.0	Whether protection is given for float voltage to Avoid low battery voltage due to sensor or circuit Malfunction. (Yes/ No)	
26.0	Whether the Battery Charger is SCADA Compliant as per Clause No.8(Yes/ No)	
27.0	Whether Temperature Sensor provided in the charger panel for SCADA. (Yes/ No)	

28.0	Whether 20Nos. Dropper Diodes along with its accessories/Associated circuits as per Clause No. 7 provided or not (Yes/No)	

APPENDIX-II

Type test procedure for Battery Charger

Sr. No	Test description
1	**Voltage regulation test:** **A) Float charger** **B) Float mode of boost charger:** **Test condition: -** ▪ The adjustment of output voltage at no load is verified by front panel Potentiometer. ▪ Output voltage of charger is set at maximum voltage setting and input voltage is varied from -15% & +10% of nominal volts; Variation in output voltage is verified. ▪ The unit is loaded up to 100% rated load and output voltage is observed. Under this condition, the input voltage is varied as specified above and variation in output voltage is verified. Regulation should be limited to or less than ±1% of rated output voltage of the charger.
2	**Load limiter characteristics test: -** **A) Float charger** **B) Float mode of boost charger:** **Test Condition: -** ▪ The current limit potentiometer is adjusted such that current limit starts beyond 100% load i.e. current beyond rated current. Now Load resistance is reduced and drooping characteristic of output voltage is verified.
3	**Efficiency test:** **To be carried out on Float Charger & Boost Charger separately at max. Power rating.** **Test condition: -** ▪ Float charger: - Efficiency test is carried out at nominal AC input voltage , DC output voltage adjusted to maximum voltage setting, by loading only the Float charger at 20%, 50%, & 100% load of rated current at Feeder Terminals & keeping the Boost charger ▪ "OFF". AC input power is measured by Digital/Analog Power Meter and DC output is measured by calibrated Voltmeter and Ammeter other than the provided in the Float charger. ▪ Boost Charger: - Efficiency test is carried out as per above procedure for Boost Charger keeping float charger "OFF" & adjusting maximum voltage setting at Battery Terminals with Boost Charger constant current setting at 20% 50% & 100% load of rated current with the help of suitable resistors at Battery Terminals. ▪ Efficiency should be better than 75% at 20% load & better than 80% at 50 % & 100%

	load as per GTP.
4	**<u>High voltage test:</u>** **Test condition: -** ▪ The power frequency voltage of 2 KV shall be applied between AC circuit & Earth, DC circuit & Earth and AC circuit & DC circuit for 1 Minute. During High Voltage Test, all low voltage circuits (Electronics circuit, Lamps etc.) are isolated and gate – cathode, anode – cathode terminals are shorted. Charger should withstand it and there shall not be any mal function or deformation and it should work satisfactory after the test.
5	**<u>Temperature rise test: - Test Condition: -</u>** ▪ Rated mains supply is to be applied to charger. Float charger DC Output voltage to be set to maximum voltage setting & load current is to be adjusted to 100% rated load of float charger at feeder terminals & simultaneously Boost charger DC Output current is to be set to 100% rated load of boost charger by variation of set boost current potentiometer on front panel. Battery terminal voltage is to be adjusted to maximum voltage setting of Boost Charger by varying the resistive load connected to "Battery Terminals". Temperature readings of ambient temperature, Float & Boost Rectifier Stack heat sink, windings & cores of Float & Boost Rectifier Transformer & filter choke, & to be noted for every hour, till temperature rise is stable. After completion of this test Normal functioning of the battery Charger to be verified by carrying out the following tests: 1) High voltage. 2) Voltage regulation test. 3) Short circuit Test.
6	**<u>Short circuit test at no load and full load at rated voltage for sustained short circuit at load Terminals:</u>** **A) Float charger (Auto mode).** **B) Float mode of Boost charger (Auto Float)Test condition: -** ▪ This test is carried out on LOAD TERMINALS with Float charger & Float mode of Boost Charger. The output DC voltage at load terminal is adjusted maximum voltage setting with rated AC input volts. The load terminals are shorted with following test conditions. 1) No load at load terminals 2) Full load of rated current at Load Terminals. ▪ In no load condition, the load terminals are shorted first and then charger is switched ON. Moreover, in full load condition, increase the load from rated current100% to till short circuit at LOAD TERMINALS. The Battery Charger should sustain this short circuit with mains variation from -15% & +10% of nominal input volts and the Battery charger shouldfunction normal after removal of short circuit at load

	terminals.
7.	**<u>Temperature Compensation Feature Demonstration test:</u>** **<u>Auto Float Charger Test condition: -</u>** ▪ To observe that DC output of Battery Charger changes proportional to 4-20 mA input signal available from temperature transducer. The required change in output voltage is 3mV per 1ºC per cell of 2volts of L. A. Battery. The temperature transducer produces 1mA signal per 2.5º C change in ambient temperature. ▪ Therefore for 55 Cells (110V Battery Set), it will be 7.5mV x 55 Cells = 0.4125V per mA. The charger output voltage should decrease by 0.4125V for increase of 1 mA and vice-verse. The reference temperature is 27º C at which 11mA signal will be available from transducer. ▪ The charger output should be set to 121V (i.e. rated output) at 11mA signal. The input signal should be changed from 4 mA to 20mA & DC output should be observed. The DC output should vary @ 0.4125Volts per mA. ▪ Similarly, for 110 Cells (220V Battery Set), it will be 7.5mV x 110 Cells = 0.8250V per mA. The charger output voltage should decrease by 0.8250V for increase of 1 mA and vice- verse. The charger output should be set to 242V (i.e. rated output) at 11mA signal. The input signal should be changed from 4 mA to 20mA & DC output should be observed. The DC output should vary @ 0.8250Volts per mA.
8	**<u>Degree of protection test: -</u>** ▪ Degree of protection shall be IP 42.
9	**<u>Measurement of ripple by Oscilloscope: -</u>** ▪ AC supply with variation (± 15 %) & Frequency variation (± 3 %) shall be supplied to the charger and ripple in the output voltage at 0, 50 & 100 % load shall be measured with the oscilloscope. It shall be within ± 3 %.
10	**<u>Type tests of Rectifier Transformers</u>** ▪ All tests as specified in IEC 60146 and short circuit test as per IS: 2026.

SECTION-V
DECLARATION BY THE BIDDER

1. Name of the bidder with …….
   Detailed postal address with …….
   Contact Number. ……..

2. Earnest money deposited vide Cash receipt/ Bank Draft No…….Dated……
   Amount in Rs……(Rupees……..) only.

3. Tender Paper Purchased vide Cash receipt/ Bank Draft No…….Dated……
   Amount in Rs……(Rupees……..) only.

4. Xerox copy of PAN : Furnished/ not furnished

5. Xerox copy of GST Registration No.: Furnished/ not furnished

6. Xerox copy of Manufacturer/ distributer/ Dealership certificate: Furnished/ not furnished

7. Agreed to furnish & accept Contract Security deposit clause: Yes/ No.

8. Agreed to accept payment terms as per Tender Specification. Yes/ No.

9. Agreed to adhere time period as per the contract: Yes/ No.

10. Agreed to accept penalty clause as per the tender: Yes/ No.

11. Attach past experience certificate (if any)for the similar jobs in OSEB/ OPTCL/ GRIDCO or any other agencies. Yes/ No.

12. Agreed to keep validity of the offer for one year from the Date of tender opening without any variations in tender clause: Yes/ No.

Date:
Place:

Signature of the Bidder
with seal

PRICE BID

Sl. No.	Item Category	Item Description	Quantity	UOM	Unit Price (Taxable Value at Destination), in Rs.	% GST applicable	Unit GST in Rs.	Unit Landing Cost Supply in Rs	Total Landing Cost of Supply in Rs
1	Battery Charger	Battery charger (thyristor controlled) with Dropper Diode & spares as per specifications suitable for 220 V, 645AH Vented Lead Acid Storage Battery-Plante type	1	set					
2		Supervision of erection, testing and commissioning charges, if any.	1	set					
TOTAL									-

In words: (……

..……..……) Only.

Date:
Place:

Signature of the Bidder
with seal