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**POWER TRANSMISSION CORPORATION OF UTTARAKHAND LTD.
OFFICE OF THE CHIEF ENGINEER (OPERATION & MAINTENANCE)
GARHWAL ZONE, 26-CIVIL LINES, ROORKEE
E-TENDER NOTICE**

On line, e-tenders against specification No. CE/GZR-13/2020-21 for supply & erection of 220Volt, 500AH Battery Charger and Battery Set at 400KV Substation Rishikesh are hereby invited. The last date & time of submission of offline & online bid is upto 15.00 Hours on 15.02.2021 which shall be opened on 16.02.2020 at 15.00Hrs. Details of E-tender can be obtained from E-tender website www.uktenders.gov.in (Tender ID: 2021_PTCUX_28916_2) and information of E-tender can be seen from PTCUL website www.ptcul.org. For any assistance on e-tendering, please contact on Mobile No. +91-8899890000.

CHIEF ENGINEER (O&M)

“SAVE ELECTRICITY IN THE INTEREST OF NATION”

POWER TRANSMISSION CORPORATION OF UTTARAKHAND LTD.
(A Govt. of Uttarakhand Enterprise)
CHIEF ENGINEER, OPERATION & MAINTENANCE
GARHWAL ZONE, PTCUL
26 - CIVIL LINES, ROORKEE - 247667

E- Tender for "Supply & Erection of 220Volt, 500AH Battery Charger and Battery Set at 400KV Substation, Rishikesh".

DOWNLOADED BY: -

M/s / Shri _____

Sr. No.	DESCRIPTION	
1.	Tender No.	CE/GZR-13/2020-21
2.	Name of Work	"Supply & Erection of 220Volt, 500AH Battery Charger and Battery Set at 400KV Substation, Rishikesh".
3.	Completion Time	03 Months
4.	Route Length in Kms.	--
5.	Tender issuing office	Office of Chief Engineer (O&M) Garhwal Zone, Power Transmission Corporation of Uttarakhand Ltd. " 26-Civil Lines, Roorkee-247667
6.	Tender Fees	Rs. 1,000.00+ 180.00 (GST@18%) =Rs. 1,180.00 (Non refundable)
7.	EMD/Bid Security	Rs. 40,000.00
8.	Starting date of issue of Bid documents. The tender document is to be downloaded through website- www.uktenders.gov.in against payment of tender fees as above. The non refundable tender fees as specified above should be sent along with the bids as specified in the bid documents.	15.01.2021
9.	Last date of Request of Bid Documents.	As per tender notice / corrigendum if any
10.	Last date of issue of Bid Documents.	As per tender notice / corrigendum if any
11.	Closing Date of receipt of Bid through E-tendering	As per tender notice / corrigendum if any
12.	Address & Place of Submission of Bid supporting documents.	Chief Engineer (O&M), Garhwal Zone, PTCUL, 26-Civil Lines Roorkee-247667.
13.	Date and Time of Opening of Technical Bid	As per tender notice / corrigendum if any
14.	Address & place of Technical bid(Part-1) opening	Chief Engineer (O&M), Garhwal Zone, PTCUL, 26-Civil Lines Roorkee-247667.
15.	Type of Tender	Open Tender
16.	Validity of Bid	180 days after the date of opening of technical bid (Part-I)
17.	Contact & Telephone No. of the Tender issuing office	Phone No.:- 01332-272256 Fax No. : 01332-2722315
18.	E-mail address of the tender issuing office	ce_oandmg@ptcul.org chiefengineergarhwal@gmail.com

CHIEF ENGINEER (O&M) GARHWAL ZONE, ROORKEE

Pre Qualifying Criteria

(A) Technical Qualifying Requirement

1. The bidder should have successfully completed similar nature of work i.e. "Supply of 220 Volt or 110 Volt battery set and charger including erection and testing & commissioning" within last Seven (07) years as on the originally scheduled date of Bid opening.
2. The bidder must comply the Technical Specifications and GTP of Battery Set and Charger along with vendor name for supply of items from the approved vendor in PGCIL/ PTCUL and an undertaking to this effect must be submitted with the bid.
3. Experience certificate should be issued by an officer not below the rank of Executive Engineer mentioning nature of work, Agreement No., Amount of work, Scheduled time of completion of work and Actual time of completion etc. Contractor shall enclose completion certificate from officer.
4. Experience of having successfully completed similar works during last 7 years ending last day of month previous to the one in which applications are invited should be either of the following;
 - (a) Three similar completed works costing not less than the amount equal to Rs.5.38 Lakh.
OR
 - (b) Two similar completed works costing not less than the amount equal to Rs. 6.73 Lakh.
OR
 - (c) One similar completed work costing not less than the amount equal to Rs. 10.76 Lakh.

(B) FINANCIAL-QUALIFYING REQUIREMENTS

5. **Minimum Average Annual Turnover (MAAT):-** The minimum annual average turnover of the Contractor shall not be less than Rs. 20.18 Lac for the preceding best three years (36 months) out of last five financial years. The following documents must be submitted in support.

a) If audit for the contractor/firm is compulsory and audited accounts are available: the contractor must submit Audited Accounts (P/L accounts, balance sheets etc) which must be UDIN verified.

b) If audit for the contractor/firm is not compulsory and audited accounts are not available: The contractor must submit certificate of tern-over from Chartered Accountant. A provisional account must also be submitted. In addition, it shall be mandatory for contractor so submit and certificate from same C.A. clearly certifying the fact that "*Accounts are not required to be audited under statute*" which should be UDIN verified.

NOTE: The Balance sheet and other financial documents attested/certified by CAs to substantiate fulfillment of FQR should be with UDIN failing which the tender will be summarily rejected without any further reference.

c) Access to Finance: - The bidder must demonstrate access to or availability of financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advances payment to meet the following cash flow requirements Rs. 4.04 Lac supported by documents in form access to credit facilities.

d) For Financial Qualification Criteria, lead partner of JV Firms should meet minimum 50% of Financial Qualification Requirement (FQR) and collectively meet total FQR. All partners of JV Firms should have the experience for activities of construction/ manufacturing of items or equipments/supply of items or equipments or products, meant for transmission utilities only.

6. The bidder have to submit affidavit of all ongoing projects which are not completed and Net worth of the ongoing project which are not completed at the time of bidding.
(Not completed project means project in Government, Government undertaking or Private sector also include the LOA/Agreement which are allotted/ executed but work has not started at the time of bidding)

(C) Additional Documents

- (a)** Copy of PAN no. of the firm/ Company or PAN no. of all its partner's in case of partnership firm or PAN no. of the individual, in case of proprietorship.
- (b)** The Tenderer should have submitted copy of Goods & Service Tax (GST) Registration.
- (c)** The Employee Provident Fund (EPF) Registration Number shall be a mandatory PQR for award of Annual Maintenance Contracts. Contractor must have at least 20 labours during each of last 12 months. (Documentary proof of the same shall be enclosed with tender document).
- (d)** RTGS/ NEFT Details of the bidder is to be submitted.
- (e)** Latest Solvency certificate not more than 3 months old issued by bank (20% of bid value) should be submitted.
- (f)** The balance sheet and all other financial documents attested/certified by CAs to substantiate fulfillment of FQR should be with UDIN, failing which the tender will be summarily rejected without any further reference.
- (g)** GST Registration/Issuing authority.
- (h)** EPF Registration Certificate.
- (i)** Registration. No. under Shops & Estt. Act/issuing authority.
- (j)** Details of Partners/Directors of the Firm/Company.
- (k)** Experience record and details of orders pending/executed for various utilities.
- (l)** Last five years Audited Accounts.
- (m)** Detail of Manufacturing/Fabrication facilities.
- (n)** Factory Registration/license details.
- (o)** Valid 'A' Class Electrical Contractor License.
- (p)** Declaration regarding MSME is to be submitted by contractor in the prescribed format. MSME shall be applicable as per Govt. Rules.

SECTION: BATTERY CHARGER

Technical Specification of 220 Volt Battery Charger at 400KV Substation, Rishikesh the scope of work as under:

1. The DC system for 220 V DC is unearthed. The battery charger as well as their automatic regulators shall be of static type and shall be compatible with offered Lead-Acid batteries. The battery charger will be capable of continuous operation at the respective rated load in float charging mode, i.e. float charging the associated lead-Acid batteries at 2.13 to 2.27 Volts per cell while supplying the DC load. The Charger will also be capable of Boost charging the associated DC Battery at 2.28 to 2.32 Volts per cell at the desired rate. Charger will be regulating the float/boost voltage in case of prescribed temperature rise of battery as per manufacturer's recommendation to avoid thermal runaway. Necessary temperature sensors shall be provided in mid location of battery banks and shall be wired up to the respective charger for feedback control. The manufacturer shall demonstrate this feature during testing of charger.
2. The battery charger will be provided with facility for both automatic and manual control of output voltage and current. A selector switch shall be provided for selecting the mode of output voltage/ current control, whether automatic or manual. When on automatic control mode during Float charging, the charger output voltage will be remain within $\pm 1\%$ of the set value, for AC input voltage variation of $\pm 10\%$, frequency variation of $\pm 5\%$, a combined voltage and frequency variation of $\pm 10\%$, and a DC load variation from zero to full load.
3. The battery charger will have a constant voltage characteristics throughout the range (from zero to full load) at the floating value of the voltage so as to keep the battery fully charged but without harmful overcharge.
4. The battery charger will have load limiters having drooping characteristic, which will cause, when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the load limiter setting of the Charger. The load-limiter characteristics shall be such that any sustained overload or short circuit in DC system shall not damage the Charger, nor shall it cause bowing of any of the charger fuse, the charger shall not trip on overload or external short circuit.
5. Uniform and step less adjustments of voltage setting shall be provided on the front of the charger panel covering the entire float charging output range specified. Step less adjustments of the load limiter setting shall also be possible from 80% to 100% of the rated output current for charging mode.
6. During Boost Charging, the battery charger will be operated on constant current mode. It will be possible to adjust the boost charging current continuously over a range of 50% to 100% of the rated output current for Boost charging mode.
7. The charger output voltage will be automatically go on rising, when it is operating on Boost mode, as the Battery Charges up. For limiting the output voltage of the chargers, a potentiometer will be provided on the front of the panel, whereby it shall be possible to set the upper limit of this voltage anywhere in the output range specified for Boost charging mode.
8. The Charger manufacturer may offer an arrangement in which the voltage setting device for float charging mode is also used as output voltage limit setting device for boost charging mode and the load limiter of float charging mode is used as current setting device in boost charging mode.
9. Suitable filter circuits shall be provided in the charger to limit the ripple content (peak to peak) in the output voltage to 1%, irrespective of the DC load level, when they are not connected to a battery.
10. **MCCB:** The battery charger will have 2 Nos. MCCB's on the input side to receive cables from two sources. Mechanical interlock should be provided such that only one shall be closed at a time. It shall be of P2 duty and suitable for continuous duty. MCCB's should have auxiliary contacts for annunciation.
11. **Rectifier Transformer:** The rectifier Transformer will be continuously rated dry air cooled and of class F insulation type. The rating of the rectifier T/F shall have 10% overload capacity.

12. **Rectifier Assembly:** The rectifier assembly will be fully/half controlled bridge type and will be designed to meet the duty as required by the respective charger. The rectifier will be provided with heat sink having their own heat dissipation arrangements with natural air cooling. Necessary surge protection devices and rectifier type fast acting HRC fuses shall be provided in each arm of the rectifier connections.
13. **Instructions:** One AC voltmeter and one AC ammeter along with selector switches shall be provided for all chargers. One DC voltmeter and DC ammeter (with shunt) shall be provided for all chargers. The instruments shall be flush type, dust proof and moisture resistant. The instruments shall have easily accessible means for zero adjustment. The instrument will be of 1.5 accuracy class. In addition to the above a centre zero voltmeter with selector switch shall also be provided for 220V Chargers for testing purpose.
14. **Air Break Switches:** one DC output switch shall be provided in all chargers. They shall be air break type suitable for 500 Volts AC/ 250 DC. The contacts of the switch shall be open and close with a snap action. The operating handle of the switch shall be fully insulated from circuit. 'ON' and 'OFF' position on the switch shall be clearly indicated. Rating of switches shall be suitable for their continuous load. Alternatively, MCCB's of suitable shall also acceptable in place of Air Break Switch.
15. **Fuses:** All fuses shall be HRC Link type. Fuses shall be mounted on fuse carriers which are in turn mounted on fuse bases. Wherever it is not possible to must fuses on carriers, fuses shall be directly mounted on plug-n type base. In such case one insulated fuse pulling handle shall be supplied for each charger. Fuse rating shall be chosen by the Bidder depending on the circuit requirement. All fuses in the chargers shall be monitored. Fuse failure annunciation shall be provided on the failure of any fuse.
16. **Blocking Diode:** Blocking diode will be provided in the positive pose of the output circuit of charger to prevent current flow from the DC battery into the charger.
17. **Annunciation system:** Audio-visula indications through bright LED's shall be provided in all chargers for the following abnormalities:
 - a. AC power failure.
 - b. Rectifier/ chargers fuse blown.
 - c. Over voltage across the battery when boost charging.
 - d. Abnormal voltage (high/low)
 - e. Any other annunciation if required.Potential free NO contacts of above abnormal conditions shall also be provide for common remote indication " CHARGER TROUBLE" owner's control board. Indication for charger in float mode and boost mode through indication lamps shall be provided for chargers. A potential free contact for float/ boost mode shall be provided for external interlocks.
18. **Name plates and Marking:** The name plates shall be white with engraved letters. On top of Charger, on front as well as rear sides, larger and bold name plates shall be provided to identify the Charger. Name plates with full and clear inscriptions shall also be provided and inside of the panels for identification of the various equipment's and easy operation and maintenance.
19. **Charger Construction:** The charger will be indoor, floor-mounted, self-supporting sheet metal enclosed cubicle type. The contractor will supply all necessary base frames, anchor bolts and hardware. The charger will be fabricated from 2mm cold rolled sheet steel and shall have folded type of construction. Removable gland plates for all cable and lugs for power cables shall be supplied by the contractor. The lugs for power cables shall be made of electrolytic copper with tin coat. Power cables sized shall be advised to the contractor at a later date for provision of suitable lugs and drilling of gland plates. The charger will be tropical and vermin proof. Ventilation louvers, if provided shall be backed with screens. All doors and cover shall befit with synthetic rubber gaskets. The chargers shall have hinged double leaf doors provided on front and on backside for adequate access to the charger's internals.

All indicating instructions, control switches and indicating lamps shall be mounted on the front side of the chargers.

The charger will be furnished completely wired upto power cable lugs and terminal blocks a ready for external connections. The control wiring shall be carried out with PVC insulated 1.5Sq mm stranded copper wires. Control terminals shall be suitable for connecting two wires, with 2.5sqmm stranded copper conductors. All terminals shall be numbered for

ease of connections and identification. Each wire shall bear a ferrule or tag on each end for identification. At least 20% spare terminals shall be provided for control circuits.

The insulation of all circuits, except the low voltage electronic circuits shall withstand test voltage of 2KV AC for one minute.

20. **Painting:** All sheet steel work shall be pre-treated, in tanks, in accordance with IS: 6005. Degreasing shall be done by alkaline cleaning. Rust and scale shall be removed by pickling with acid. After pickling, the parts shall be washed in running water. Then these shall be rinsed in slightly alkaline hot water and dried. The phosphating surfaces shall be rinsed and passivated prior to application of stoved lead oxide primer coating.

21. **Tests:** Battery chargers shall conform to all type tests as per relevant Indian standard. Performance test on the chargers as per specification shall also be carried out on each chargers as per specification. Following type tests shall be carried out for compliance of specification requirements:

- a. Voltage regulations test.
- b. Load limiter characteristics test.
- c. Efficiency tests
- d. High voltage tests.
- e. Temp. rise test.
- f. Short circuit test at no load and full load at rated voltage for sustained short circuit.
- g. Degree of protection test.
- h. Measurement of ripple by oscilloscope.
- i. Temp. compensation feature demonstration.

The contractor may be required to demonstrate to the owner that the charger conform to the specification particularly regarding continuous rating, ripple free output, voltage regulation and load limiting characteristic. At the site following tests shall be carried out:

- a. Insulation resistance test.
- b. Checking of proper annunciation system operation.

If a charger fails to meet the specified requirement, the contractor shall replace the same with appropriate charger without affecting the commissioning schedule of the substation, and without any extra cost to the department.

The Contractor shall present for inspection, the type and routine test certificates for the following components whenever required by the department.

- a. Switches,
- b. Relays/MCCBs
- c. Instruments.
- d. DC fuses,
- e. SCR
- f. Diodes.
- g. Condensers.
- h. Potentiometers.
- i. Semiconductor
- j. Annunciator.
- k. Control wiring
- l. Push buttons and contactors.

Makes of above equipment shall be subject to owner's approval.

SECTION: BATTERY SET

1 GENERAL TECHNICAL REQUIREMENTS

All materials / components used in battery chargers and batteries shall be free from flaws and defects and shall conform to the relevant Indian / IEC Standards and good engineering practice.

DC system shall consist of Float cum Boost charger and battery set.

Bidder shall select number of cells, float and Boost voltage to achieve following system requirement:

System Voltage	Maximum Voltage during Float operation	Minimum voltage available when no charger working and battery fully discharged upto 1.85V per cell.	Minimum Nos of cell
220 Volt	242 Volt	198 Volt	110

Battery

Type

The DC Batteries shall be Lead-Acid type and shall be Normal Discharge type. These shall be suitable for a long life under continuous float operations and occasional discharges. The 220/110V DC system is unearthen.

Constructional Requirements

The design of battery shall be as per field proven practices. Partial plating of cells is not permitted. Paralleling of cells externally for enhancement of capacity is not permitted. Protective transparent front covers with each module shall be provided to prevent accidental contact with live module/electrical connections.

Containers

The container material shall have chemical and electro-chemical compatibility and shall be acid resistant. The material shall meet all the requirements of Lead-Acid batteries and be consistent with the life of battery. The container shall be fire retardant and shall have an Oxygen Index of at least 28 %. The porosity of the container shall be such as not to allow any gases to escape except from the regulation valve. The tensile strength of the material of the container shall be such as to handle the internal cell pressure of the cells in the worst working condition. Cell shall not show any deformity or bulge on the sides under all working conditions. The container shall be capable of withstanding the rigours of transport, storage and handling. The containers shall be enclosed in a steel tray.

Cell Covers

The cell covers shall be made of suitable material compatible with the container material and permanently fixed with the container. It shall be capable to withstand internal pressure without bulging or cracking. It shall also be fire retardant. Fixing of Pressure Regulation Valve & terminal posts in the cover shall be such that the seepage of electrolyte, gas escapes and entry of electro-static spark are prevented.

Separators

The separators used in manufacturing of battery cells, shall be of glass mat or synthetic material having high acid absorption capability, resistant to sulphuric acid and good insulating properties. The design of separators shall ensure that there is no misalignment during normal operation and handling.

Pressure Regulation Valve

Each cell shall be provided with a pressure regulation valve. The valve shall be self re-sealable and flame retardant. The valve unit shall be such that it cannot be opened without a proper tool. The valve shall be capable to withstand the internal cell pressure specified by the manufacturer.

Terminal Posts

Both the +ve and -ve terminals of the cells shall be capable of proper termination and shall ensure its consistency with the life of the battery. The surface of the terminal post extending above the cell cover including bolt hole shall be coated with an acid resistant and corrosion retarding material. Terminal posts or any other metal part which is in contact with the electrolyte shall be made of the same alloy as that of the plates or of a proven material that does not have any harmful effect on cell performance. Both +ve and -ve posts shall be clearly and unambiguously identifiable.

Connectors, Nuts & Bolts, Heat Shrinkable Sleeves

Where it is not possible to bolt the cell terminals directly to assemble a battery, separate non-corroding lead or copper connectors of suitable size shall be provided to enable connection of the cells. Copper connections shall be suitably lead coated to withstand corrosion due to sulphuric acid at a very high rate of charge or discharge.

Nuts and bolts for connecting the cells shall be made of copper, brass or stainless steel. Copper or brass nuts and bolts shall be effectively lead coated to prevent corrosion. Stainless steel bolts and nuts can be used without lead coating.

All inter cell connectors shall be protected with heat shrinkable silicon sleeves for reducing the environmental impact including a corrosive environment.

Flame Arrestors

Each cell shall be equipped with a Flame Arrestor to defuse the Hydrogen gas escaped during charge and discharge. Material of the flame arrestor shall not affect the performance of the cell.

Battery Bank Stand

All batteries shall be mounted in a suitable metallic stand/frame. The frame shall be properly painted with the acid resistant paint. The suitable insulation shall be provided between stand/frame and floor to avoid the grounding of the frame/stand.

Capacity Requirements

When the battery is discharged at 10 hour rate, it shall deliver 80% of C (rated capacity, corrected at 27° Celsius) before any of the cells in the battery bank reaches 1.85V/cell.

The battery shall be capable of being recharged from the fully exhausted condition (1.75V/cell) within 10 hrs up to 90% state of charge. All the cells in a battery shall be designed for continuous float operation at the specified float voltage throughout the life.

The capacity (corrected at 27°C) shall also not be less than C and not more than 120% of C before any cell in the battery bank reaches 1.75V/cell. The battery voltage shall not be less than the following values, when a fully charged battery is put to discharge at C/10 rate:

- (a) After Six minutes of discharge : 1.98V/cell
- (b) After Six hours of discharge : 1.92V/cell
- (c) After 8 hours of discharge : 1.85V/cell
- (d) After 10 hours of discharge : 1.75V/cell

Loss in capacity during storage at an average ambient temperature of 35° Celcius for a period of 6 months shall not be more than 60% and the cell/battery shall achieve 85% of its rated capacity within 3 charge/discharge cycles and full rated capacity within 5 cycles, after the storage period of 6 months. Voltage of each cell in the battery set shall be within 0.05V of the average voltage throughout the storage period. Ampere hour efficiency shall be better than 90% and watt hour efficiency shall be better than 80%.

Expected Battery Life

The battery shall be capable of giving 1200 or more charge/discharge cycles at 80% Depth of discharge (DOD) at an average temperature of 27° Celsius. DOD (Depth of Discharge) is defined as the ratio of the quantity of electricity (in Ampere-hour) removed from a cell or battery on discharge to its rated capacity. The battery sets shall have a minimum expected life of 20 years at float operation.

Routine Maintenance of Battery system

For routine maintenance of battery system, the contractor shall supply 1 set of following tools:

- a) Torque wrench.
- b) Cell test voltmeter (-3 – 0 - +3) volts with least count of 0.01Volt.

Type Test of Battery

Contractor shall submit type test reports of following tests as per IEC 60896-21 & IEC 60896-22, 2004. The type tests should have been conducted during last five years.

List of Factory & Site Tests for Battery

Sl. No	Test	Factory Tests	Site Tests
1.	Physical Verification		√
2.	C/10 Capacity test on the cell	√	
3.	8 Hrs. Charge and 15 minutes discharge test at full rated load		√

Installation and commissioning

Manufacturer of Battery shall supervise the installation and commissioning and perform commissioning tests as recommended in O&M manual / or relevant standards. All necessary instruments, material, tools and tackles required for installation, testing at site and commissioning are to be arranged by Battery manufacturer/ Contractor.

Contractor shall be submitted following documents for approval:

- a) Data sheet of battery
- b) GA of cell and layout drawing of battery bank.
- c) Discharge Data for 10 Hour, 8 Hour, 3 Hour, 2 Hour, 1 Hour, 15 Minutes and One Minute indicating capacity factors for end cell voltage of 1.75 V &

- d) 1.85 V.
Temperature correction factors
- e) Installation and commissioning Instructions
- f) O & M Manual