GUJARAT ENERGY TRANSMISSION CORPORATION LTD.
SARADAR PATEL VIDYUT BHAVAN,
RACE COURSE, BARODA – 390 007.

TECHNICAL SPECIFICATIONS
FOR

110 V BATTERY CHARGER

GETCO / E / TS- BCHR 3201 / R2 Dt. 14-07-10
SPECIAL INSTRUCTIONS TO BIDDER

Please read following instructions carefully before submitting your bid.

1. All the drawings, i.e. elevation, side view, plan, cross sectional view etc., in AutoCAD format and manuals in PDF format, for offered item shall be submitted. Also the hard copies as per specification shall be submitted.

2. The bidder shall submit Quality Assurance Plan for manufacturing process and Field Quality Plan with the technical bid.

3. The bidder shall have to submit all the required type test reports for the offered item. In case of non-submission of the type test reports with the offer, the bid shall be liable to be rejected.

4. The bidder 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.

5. All the points other than GTP, which are asked to confirm in technical specifications must be submitted separately with the bid.

6. The bidder 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 GETCO, in the event of an order, free of cost. The cost of logistics will be bear by GETCO.

7. Please note that the evaluation will be carried out on the strength of content of bid only. No further correspondence will be made.

8. The bidder shall bring out all the technical deviation/s only at the specified annexure.

9. The bidder should indicate manufacturing capacity by submitting latest updated certificate of a Chartered Engineer (CE).
QUALIFYING REQUIREMENT DATA

(For Supply)

Bidder to satisfy all the following requirements.

1) The bidder shall be Original Equipment Manufacturer (OEM). The offered equipment have to be designed, manufactured and tested as per relevant IS/IEC with latest amendments.

2) The minimum requirement of manufacturing capacity of offered type, size and rating of equipment shall be 7 times tender / bid quantity. The bidder should indicate manufacturing capacity by submitting latest updated certificate of a Chartered Engineer (CE).

3) Equipment proposed shall be of similar or higher rating and in service for a minimum period of THREE (3) years and satisfactory performance certificate in respect of this is to be available and submitted.

4) The bidder should clearly indicate the quantity and Single Value Contract executed during last FIVE (5) years, for the offered equipment. Bidder should have executed one single contract during last five years for the quantity equivalent to tender / bid. The details are to be submitted in following format,

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>ITEMS SUPPLIED TO</th>
<th>ORDER REFERENCE No. &amp; DATE</th>
<th>ITEMS</th>
<th>QUANTITY</th>
<th>ORDER FULLY EXECUTED, YES/NO</th>
<th>STATUS, IF ORDER UNDER EXECUTION</th>
<th>REMARK</th>
</tr>
</thead>
</table>

5) Equipment offered shall have Type Test Certificates from accredited laboratory (accredited based on ISO/IEC Guide 25 / 17025 or EN 45001 by the National accreditation body of the country where laboratory is located), as per IEC / IS / technical specification, valid for a period of FIVE years from the expiry date of validity of technical bid.
TECHNICAL SPECIFICATION OF BATTERY CHARGER FOR 110V, 100AH / 250 AH LEAD ACID TYPE BATTERY SETS

1.0. SCOPE:

1.1 This specification covers design, manufacture, testing at works and supply of the complete battery chargers for (i) Single phase charger for 110 Volts 100 AH batteries (ii) Three Phase charger for 110 Volts 250 AH Batteries.

2.0. APPLICABLE STANDARDS:

2.1 The design, manufacturer, and performance of the charger shall comply with all currently applicable statutes, regulations and safety codes. NOTHING IN THESE specifications shall be construed to relieve the bidder of his responsibility.

2.2. Unless otherwise specified, the battery charger shall conform to the latest applicable Indian/IEC, standards, and in particulars, to the followings standards.

a) IS: 3895 : Specification for Rectifier equipment in general.
b) IS: 2208 : Specification for HRC fuses.
c) IS: 1248 : Indication instruments.
d) IS: 2147 : Degree of protection for cubicles.
f) IS: 4540 : Mono-crystalline semiconductor rectifier assemblies and equipment.
g) IS: 6619 : Safety code for semiconductor rectifier equipment.
h) IS: 2026 : Transformers:
i) IS: 2959 : AC contractors for voltage not exceeding 1000 V
2.3. The bidder shall clearly state the standards to which the charger & its part
tems offered by him – Confirmed.

3.0 CONSTRUCTION:

I) It will be indoor, free standing, floor mounting and naturally air
cooled type designed for continuous operation in a ambient
temperature of 50 Deg. C. A good ventilation shall be made through
side louvers.

ii) Each charging equipment offered shall be housed in a sheet steel
cubical reinforced by M.S. angle frame and shall be mechanically
strong. The cubical shall be dust and vermin proof. The degree of
protection IP - 42 shall be provided and stated in the offer. The rear
& front door cover of cubical shall be hinged and shall have locking
agreement. Thickness of sheet steel shall be 3.0 mm for load
bearing members and 2.0 mm for other sides.

iii) All the accessories and parts/items shall be adequate rating to suit
the above requirement.

iv) Dimensions of the charger shall be as near as possible for following:
   a) Width 1200 mm x Depth 450mm x Height 1400mm for 110V,
      100 AH battery charger (single phase)
   b) Width 1450mm x Depth 700mm x Height 1850mm for three
      phase 110V, 250 AH battery charger (three phase).

v) All door mounted parts/items as well as parts/items mounted inside
   the cabinet shall be provided with individual labels with their
designation engraved.
vi) Gland plate: Gland plate for incoming / outgoing cables shall be provided.

vii) Arrangement for two separate earthing shall be provided.

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

ix) The electronic control circuitry should have built in facture of soft start, so that whenever the charger is switched on, the output voltage should increase gradually.

Finish:

Each cubicle will undergo a thorough process of derusting cleaning, application of red oxide primer paint followed by two coats of light gray synthetic enamel paint of shade 631 of IS: 5.

Wiring

All chargers will be complete with internal wiring, input and output terminals. The components shall be liberally sated. Standard colour code practice shall be followed, with the use of ferrules for numbering and identification of wires. 1.1 KV grade FR & C1 type Copper conductor of suitable size shall be used. All hard wares such as screws, nuts, studs, washer etc. in electrical circuits control power circuit, shall be of brass and non ferrous parts.

4.0. RATINGS:

4.1 The charger for 110V batteries consisting of 55 Nos., 2.0 Volts Lead Acid battery set shall have following output ratings.

In case of Ni-Cad battery set (If specified in schedule-A) having equivalent nos. of 1.2 V Ni-Cad cells, the charger output ratings shall be in accordance to the requirement of Ni-Cad battery set.

a) 110 V, 100 AH Battery charger: (Single Phase).

i) Float charge & load current ratings:
10 Amps at 110 V to 126 V DC.

ii) Boost charging current rating:
20 Amps at 100V to 152 V D.C.

b) **110 V 250 AH battery charger (Three phase).**

(i) Float charge & load current rating:
30 Amps at 110 V to 126 V DC.

(ii) Boost charging current rating:
50 A at 100 V to 152 VDC.

5.0 **DUTY:**

5.1 The composite charger shall consist of two separate chargers namely the float charger and the Boost charger. The charger shall be suitable for the following requirements.

5.2 The float section of the charger shall be fully automatic type during operation on auto mode. However, necessary provision of manual operation control shall also be provided in addition to auto control with required auto/manual selector switch & circuit etc. in the event of failure of auto control.

5.2.1 Normally the float charger operating in parallel with the 110 V, Battery and the load, shall supply the DC load of the sub station and also provide the trickle charge for keeping the battery floating totaling up to full capacity. For this condition, the float charger shall be designed to float charge the 55 Cells of lead acid battery between 110 V to 126 V and supply DC load of the sub station, keeping the load bus bar voltage between 110 V to 126 V. Hence, the float charger shall have adequate capacity to meet the above demand at constant voltage.

5.2.2 The float charger shall supply the D.C. output voltage as specified under clause 5.1.1. With +/-1% stability of adjusted value for A.C. fluctuation as specified under clause 1.6.0 of the specification and for D.C. load variation from zero to 100% load.

5.3 During emergency, when the AC supply fails, the battery shall meet the DC load of the sub stations and in doing so, will get discharged gradually. The
battery will need boost charging. For this, a separate charger, called the boost charger shall be required.

5.3.1 Boost charger shall have adequate rating to quick charge the battery fully within 10 hrs. after an emergency during which the complete DC loads is met by the battery.

5.3.2 While boost charging the battery, the charger may also be called upon to supply the DC load of the sub station in case of float charges failure. Based on the condition of battery, it shall be possible to set the boost charging voltage between 100V to 152 V for 55 cells of lead acid battery sets with a total output current between zero to full load capacity of the charger with current stability of 2% of set value with voltage on the load bus bars not exceeding 126.0 volts. The required dropper diodes shall be provided to restrict load bus bar voltage not exceeding 126 volts DC.

5.3.3. Boost charger shall incorporate static components, comprising of silicon controlled rectifiers with necessary protection. Boost charger, apart from its normal constant current operation shall be also capable of constant voltage operation which shall enable it to operate as a float charger delivering stabilized DC output voltage within +/-1% from no load to full load in case of float charger failure. Suitable electrical circuitry shall be provided for this purpose. In the constant current mode it shall have a current stability of +2% of the set value. The constant current setting shall have step less range from 10% to 100% of full rated current. Further, the boost charger shall have a provision of manual mode of operation, over and above auto-mode of operation. Required circuitry arrangement with auto/manual selector switch etc. shall also be provided for the purpose.

5.3.4 The boost charger and the float charger shall be so interlocked electrically that during boost charging of the battery, the float charger will supply the DC constant load with out supplying to the battery, and at the same time will be in parallel with the battery through a reverse current blocking diode at a suitable tapping. One D.C. contactor may be incorporated which shall get energized through N/C contact of the contractor on A.C. side of the boost charger. In case of failure of A.C. supply, this contractor shall connect the entire battery supply to the load through one of its N/O contacts automatically without any interruption of D.C. supply even of a momentary nature. Under no circumstances the voltage across lower taped terminals shall exceed (+) 10% or fall below (-) 15% of the rated voltage.
5.4. LOAD LIMITING:

The charger shall be provided with load limiting feature for protection against overload. The load limiting curves shall be submitted with the offer. The SCRs / thyristors shall be protected against voltage surge by providing voltage suppressor devices.

6.0. INCOMING SUPPLY:

6.1. **110 V, 100AH Battery charger (Single Phase):**

Incoming AC supply of 240 volts 50 Hz single phase for float & boost charger shall be available.

6.2. **110 V 250 AH battery charger (three phases):**

Incoming AC supply of 415 V 50 Hz 3 Ph. 4 wire for float and boost charger shall be available.

6.3. The variation in coming AC supply shall be +10% and -15% for voltage and +/- 3 % in frequency, which may occur simultaneously.

7.0. CHARGER OUTPUT:

7.1. Suitable ripple filtering circuits shall be provided to give a smooth DC output. The ripple content, without connected, battery shall be limited to less then 5% on resistive load. The DC output shall be free from switching surges, transients etc.

8.0. SPECIFIC PROVISION:

8.1. As specified under clause-4, the composite charging equipment shall have a separate float charger and a boost charger. Each charger shall consist of the following components and components shall be of the best quality and bill of materials alongwith rating of the same shall be submitted invariably with the offer.

8.2. **Float charger (Single Phase):**

1) Single phase A.C. input ON/OFF main switch (Rotary type)

2) AC input HRC fuse of required capacity.

3) LED type Indicating lamp for AC supply ‘ON’ indication (After main AC fuse).
4) Double wound impregnated naturally air cooled single phase transformer with taps at normal-15% and 10% on primary side, for achieving required control of DC output voltage.

5) Full wave half controlled rectifier bridge comprising of silicon diodes and silicon controlled rectifiers (SCR) with R/C surge suppressor network and suitable heat sink along with free wheeling diodes and semiconductor fuse protection.

6) Ammeter (with external shunt) for measuring DC output current of float charger (0-15 Amps).

7) Auto/ manual mode selector switch.

8) Potentiometer for controlling DC output voltage in auto and manual modes.

9) Suitable filter circuit comprising filter choke, filter condenser with HRC fuse protection & bleeder resistor.

10) Blocking diode with suitable heat sink.

11) DC output ON/OFF switch.

12) DC output fuses (HRC)

13) DC ‘ON’ LED type indicating lamp

14) Any item no specifically mentioned but which is needed basically for efficient working of the equipment.

**8.3. Boost charger (Single Phase):**

1) Single phase A.C input ON/OFF main switch (Rotary type)

2) AC input HRC fuse of required capacity.

3) LED type indicating lamp for AC ‘ON’ indication (After main AC fuse).

4) Double wound impregnated naturally air cooled single phase transformer with taps at normal 15%, 10% on primary side with necessary secondary tapes for achieving required control of DC output voltage.
5) Full wave half controlled rectifier bridge comprising of silicon diodes and silicon controlled rectifiers (SCR) with R/C surge suppressor network and suitable heat sink along with free wheeling diodes and semiconductor fuse protection.

6) Ammeter (with external shunt) for measuring DC output current of boost charge (0.30 Amps).

7) Auto/ Manual mode selector switch.

8) Constant current/constant voltage mode selector switch.

9) Potentiometer for adjustment of constant current in boost mode.

10) Potentiometer for controlling DC output voltage in float mode (Manual and auto modes).

11) Suitable filter circuit comprising filter choke, filter condenser with HRC fuse protection & bleeder resistor.

12) Thermal relay for overload protection.

13) Blocking diode with suitable heat sink.

14) Double pole DC output On/OFF switch

15) DC output fuses (HRC).

16) DC ‘ON’ indication lamp with series resistor

17) Dropper diodes scheme ON/ Off switch.

18) Dropper diodes selector switch with minimum four positions

19) Diodes for diode- dropper scheme (minimum 28 Nos.)

20) Any item not specifically mentioned but which is needed basically for efficient working of the charger.

8.4 Float Charger (Three Phase):

1) Triple pole A.C. input ON/OFF main switch (Rotary type)

2) AC input HRC fuses of required capacity.

3) Fuse fail detector (Solid state type) for above.
4) LED type indicating lamps for 3 Phase AC supply ‘ON’ indication (After main AC fuses)

5) Double would impregnated naturally air cooled 3 Phase main transformer with tape at normal 15%, +10% on primary side with necessary secondary tapes for achieving required control DC output voltage.

6) 3- Phase, half controlled full wave rectifier bridges comprising of 3 nos. Silicon diodes & 3 Nos. silicon controlled rectifiers (SCR) with R/C surge suppressor net work and suitable heat sink along with free wheeling diodes and semiconductor fuses protection.

7) Fuse fail detector (Solid state type) for semiconductor fuses as above.

8) Ammeter (with external shunt) for measuring DC output current of float charger (0-40 Amps)

9) Auto/Manual mode selector switch.

10) Potentiometer for controlling DC output voltage in auto & manual control modes.

11) Suitable filter circuit comprising filter choke, filter condenser with HRC fuse protection & bleeder resistor.

   Bleeder resistor shall automatically isolated from the circuit when float charger current reaches to a value which is sufficient to keep the SCRs ON and it comes back into circuit when float charger current decreases to a value just above the hold ON current of the SCR.

12) Blocking diode with suitable heat sink.

13) D.C. output ON/OFF switch

14) D.C. output fuses (HRC)

15) D.C. ‘ON’ LED type indicating lamp

16) Any item not specifically mentioned, but which is needed basically for efficient working of the charger.
8.5. **Boost Charger (Three Phase):**

1) Triple pole A.C. input ON/OFF main switch (Rotary type)

2) AC input fuses of required capacity (HRC)

3) Fuse fail detector (Solid state type) for above.

4) LED type indicating lamps for 3 Phase AC supply ‘ON’ indication (After main AC fuses)

5) Double would impregnated naturally air cooled 3 Phase main transformer with tape at normal - 15%, +10% on primary side with necessary secondary tapes for achieving required D.C. voltage.

6) 3 Phase, half controlled full wave rectifier bridges comprising of 3 nos. Silicon diodes & 3 Nos. silicon controlled rectifiers (SCRs) with R/C surge suppressor network and suitable heat sink along with free wheeling diodes and semiconductor fuses protection.

7) Fuse fail detector (Solid state type) for semiconductor fuses as above).

8) Ammeter (with external shunt) for measuring D.C. output current of boost charger (0-50 A)

9) Auto/manual mode selector switch.

10) Constant current/ constant voltage mode selector switch.

11) Potentiometer for adjustment of constant current in boost mode.

12) Potentiometer for controlling D.C. output voltage in float mode (Manual and auto control modes).

13) Suitable filter circuit comprising filter choke, filter condenser with HRC fuse protection & bleeder resistor.

Bleeder resistor shall automatically isolated from the circuit when float charger current reaches to a value which is sufficient to keep the SCRs ON and it comes back into circuit when float charger current decreases to a value just above the hold ON current of the SCR.

14) Thermal relay for overload protection
15) Blocking diode with suitable heat sink.
16) Double pole D.C. output ON/OFF switch
17) D.C. output fuses (HRC)
18) D.C. 'ON' LED type indicating lamp
19) Dropper diodes scheme ON/ Off switch.
20) Dropper diodes selector switch with minimum four positions
21) Diodes for dropper diodes scheme (minimum 28 Nos.)
22) Any item no specifically mentioned but which is needed basically for efficient working of the charger.

8.6 **Common Components (Three Phase & Single Phase charger):**

1) D.C. voltmeter double pole 4 positions rotary type to measure DC voltage across float section, boost section, load and battery with HRC fuse protection.

2) AC voltmeter to measure the AC input voltage with suitable fuse, link and selector switch arrangement.
   a) Range 0-300 V for single phase charger.
   b) Range 0-500 V for three phase charger.

3) D.C. charge / discharge ammeter with suitable external shunt to read discharge / charge currents of the battery.
   a) Range 50-0-25 A for single phase charger.
   b). Range 100-0-50 A for three phase charger.

4) Ammeter (Range 100-0-100mA) showing the earth leakage current of the charger &outgoing ckt (load side).

5) Space heater with thermostat and lamp for internal lighting with ON/OFF switch for each separately and required fuse.

6) Detachable cable gland plate for cable entry from bottom.
7) DC contactor inter-locked with boost charger AC contactor.

8) Silicon blocker diode with suitable heat sink to be connected to a suitable tapping of battery to maintain DC continuity during power failure while batteries are on boost charge.

9) Three pin socket with switch and fuse.

8.7 SCADA Compatibility (If specified in schedule – A)

The Battery Charger shall be fully SCADA compatible. It shall have sufficient Nos of potential free contacts & transducers (4-20mA output) 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 I/O requirement is tabulated here under. The exact number and description shall be as per detailed engineering.

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>DIGITAL INPUTS</th>
<th>CONTROL OUTPUTS</th>
<th>ANALOGUE INPUTS (4-20mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC mains fail</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Bus Over Voltage</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Bus Under Voltage</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Float Charger fail</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Leakage</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Float Charger On</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Float Charger Off</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Float Charger on Auto mode</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Float Charger on Manual mode</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boost Charger On</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Boost Charger Off</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Boost Charger On CV mode</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Boost Charger On CC mode</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Charger on local mode</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charger on Remote mode</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery Voltage</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boost Voltage</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Float Voltage</td>
<td></td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>
9.0 OUTGOING CIRCUITS:

9.1 The following outgoing circuit comprising of a double pole ON-OFF rotary switch HRC fuses and LED type indicating lamps (The overall diameter of lamp shall be 30 mm while that of cut out shall be 22.5 mm) shall be provided.

a) Single Phase charger:
   i) 10 Amps feeder 5 Nos.
   ii) 15 Amps feeder 2 Nos.

b) Three phase charger:
   i) 20 Amps feeder 5 Nos.
   ii) 30 Amps feeder 3 nos.
   iii) 50 Amps feeder 2 Nos.

10.0 PROTECTION AND ANNUNCIATION:

Following protection with alarm indicating lamps and alarm accept push button and lamp test push button shall be included in the scope of supply.

a) Single phase Charger:
   i) Load under voltage relay
   ii) DC Earth leakage relay.
   iii) Float charger failure
iv) Boost Charger fail
v) AC mains failure
vi) DC over voltage relay for battery protection.
vii) Semiconductor Fuse fail - Float
viii) Semiconductor Fuse fail - Boost

b) Three phase Charger.
i) Load under voltage relay
ii) DC Earth leakage relay.

iii) Float charger failure
iv) AC mains failure

v) DC over voltage relay for battery protection.
vi) Boost charger failure.

vii) HV phase fail/phase sequence reversal protection.
iix) Semiconductor Fuse fail - Float

ix) Semiconductor Fuse fail - Boost

11.0 Looking to the detailed description of duty requirements of both the chargers and the battery, the manufacturer, shall design a circuit which shall be capable of providing complete protection to various components of the unit and automatic circuit with automatic voltage regulator in the float circuit operation of the unit without-interruptions.

12.0 Necessary product information, booklets, drawings circuit diagram operating and maintenance manuals, type test certificate experience certificates etc. should be submitted along with the offer.

13.0 TESTS:
13.1 TYPE TESTS

Battery chargers shall conform to all type tests as per relevant Indian Standard. Rectifier transformers shall conform to all type tests specified in IS : 4540 and short circuit test as per IS : 2026. The following type test reports from NABL approved laboratory shall be submitted with the offer. In case of non-submission of the type test reports with the offer, the bid shall be liable to be rejected.

1. Voltage regulation test
2. Load limiter characteristics test
3. Efficiency tests
4. High voltage tests
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
8. Measurement of ripple by Oscilloscope
9. Temperature compensation feature demonstration
10. Type test reports of Rectifier Transformers - all tests as specified in IS : 4540 and short circuit test as per IS : 2026

13.2 ACCEPTANCE / ROUTINE TESTS

The following test shall be carried out by the manufacturer on each battery charger.

1) Visual inspection and dimensions.
2) Checking of wiring & continuity of circuits
3) Insulation resistance.
4) HV test
5) Ripple content measurement
6) No load test
7) Load test
8) Efficiency tests
9) Operational tests for protection, alarm, indication.

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

15.0 PACKING / MARKING:

The charger 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.

16.0 UNPRICED SCHEDULE:

Unpriced schedule (without price) of offered items shall be submitted along with the Technical Bid.

Note:

If current rating of the Battery Charger is asked different than mentioned in this specification then all the components and equipments shall be as per asked current rating.

_________________________                        ________________
SEAL OF FIRM                    SIGNATURE OF BIDDER
## APPENDIX – I

### SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS

**FOR BATTERY CHARGER**

*(To be filled up along with offer of Battery Charger)*

<table>
<thead>
<tr>
<th></th>
<th>Single Phase Charger</th>
<th>Three Phase Charger</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Name of Manufacturer and Country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Type of charger.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Float</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Boost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) a) Dimension Width x Depth x Height)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Thickness of sheet steel of Cubicle (mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Weight (kg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) a) Rated AC Input supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Variation in AC voltage &amp; frequency.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Rated DC volts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Rated output (Ampere)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) Range of DC voltage variation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9) Range of current variation:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10) Maximum charging current that can be fed to battery:
   a) Float charging
   b) Boost charging

11) Float charging voltage: Volts

12) Whether DC output voltage of Float charger shall be strictly as Per Cl. 5.1.2. or not. Yes/No

13) Boost charging voltage after 10 Hrs. operations at rated load:

14) Whether automatic voltage Current regulator is offered: Yes/No.

15) Whether smoothing filter Offered: Yes./No.

16) Ripple content at rated load:
   i) With battery
   ii) Without Battery.

17) Guaranteed Efficiency
(For Float & Boost section individually):
   i) At 20% load (> 75%)
   ii) At 50% load (> 80%)
   iii) At rated load.

18) Control wiring:
   a) Voltage grade (1.1 KV)
   b) Insulation (FR & C1 type)
   c) Conductor material (Copper)
d) Minimum size of conductor : 

e) PF voltage withstand value (KV rms) : 

f) Colour code : 

19) Terminal blocks : 

a) Make & Category : 

b) Voltage grade (800 Volts) : 

c) Current rating (Amp) : 

d) PF voltage withstand capacity: 

e) Type of connector (stud type) : 

f) Whether stud type connector Provided : 

20) Whether bill of materials as per C 1.8.0 is submitted with the offer: Yes/No. 

21) Whether literature, GA Drawing and circuit diagram of the offered items are attached with the offer : Yes/No. 

22) Whether complete type test report of the offered items is attached with the offer. : Yes/No. 

23) Whether unpriced schedule is attached. : 

Note:- Over and above the GTP, The Bidder shall also fill up & submit the checklist for each of the offered battery charger, given separately ,with this specifications.

__________________            _________________________
SEAL OF THE FIRM       SIGNATURE OF BIDDER