Revised on 29.03.2014

TECHNICAL SPECIFICATION

220V 80 AH FCBC & FC BATTERY CHARGERS with DCDB

1. SCOPE :

This specification covers the design, manufacture; testing before dispatch, supply and delivery of 220V 80 AH FC & FCBC with separate DC distribution board suitable for indoor application.

The charger units are intended to be used for operating 33 KV,11 KV SF6/Vacuum Circuit Breakers with auto reclosing feature. The rating of closing and opening coils is 400 Watts (Operating time is 100ms.) and the rated operating sequence is 3 Min. Co-3 Min. – Co or 0-0.3 Sec. – Co-3. Min – Co.

2. CLIMATIC CONDITIONS:

The climate conditions under which the equipment shall operate satisfactorily are as indicated in Clause No. 22.1 of General terms and conditions for supply of materials.

3.1 RATINGS : (BATTERY CHARGER)

3.1.1	TYPE	:	Constant Voltage and Current limiting Charger
3.1.2	INPUT VOLTAGE	:	415V, 50HZ, 3 phase shall work satisfactorily for voltage range of -20% to +30 % with a frequency variation+/-5%
3.1.3	CHARGER OUTPUT	:	
	3.1.3.1 FLOAT VOLTAGE	:	248V + or –5%
	3.1.3.2 BOOST VOLTAGE	:	264V + or – 5%
	3.1.3.2 REGULATION	:	+ or – 1%
	3.1.3.4 CHARGER CURRENT	:	10 Amps.
	3.1.3.5 RIPPLE:	:	Less than 2% rms
3.1.3.6	EFFICIENCY	:	Not less than 75% full rated load
3.1.3.7	CURRENT LIMIT	:	105% of rated load.
3.1.4	INSULATION	:	Not less than 5 M ohms in any of the following cases.

i) Between DC output terminals and AC input terminals.

ii) Between AC input terminals and earth

GENERAL REQUIREMENTS :

4.1 BATTERY CHARGING EQUIPMENT AND D.C. DISTRIBUTION BOARD

4.1.1.0 SCOPE:

This covers design, engineering, manufacture, stage testing, inspection and testing before supply and delivery, at site of following battery charging equipment with FCBC of 16 A and FC of 10 A with separate DC Distribution Boards suitable for the **Conventional** indoor type sealed maintenance free Lead Acid Battery Sets.

220V, 80AH Battery charging equipment comprises boost charger and float charger suitable for 220 Volts 80AH and **Conventional** Indoor type sealed maintenance free lead acid batteries with DC Distribution boards.

The charger and DC distribution board shall be in separate panels.

4.1.1.1 It is not the intent to specify completely herein all the details of the design and construction of material, However the material shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation up to the Bidder's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith.

The offered material shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and /or in the commercial order or not.

4.1.2.0 STANDARDS :

4.1.2.1.: The material shall conform in all respects to the relevant Indian Standard Specifications with latest amendments thereto

Indian Standard	Title	International &Internationally Recognized standard
ISS – 7204/1980		Stabilized Power Supplies DC output
ISS – 2208/1962		H.R.C. Catridge fuse links For Voltage above 650V.

Equipment conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above, would also be acceptable. In case the Bidders who wish to offer material conforming to the other standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Two copies of such standards with authentic English translations shall be furnished along with the offer.

4.1.3.0: The battery charger and DC Distribution Boards shall be for use in moderately hot and humid tropical climate, non conducive to rust and fungus growth.

4.1.4.0.: PRINCIPAL PARAMETERS :

4.1.4.1. : The equipment shall conform to the following specific parameters:

S.No	Item	Specification
1.	Type of Installation	In door
2.	AC Voltage	415V +30% to -20%
3.	No. of Phases	Three
4.	Frequency	50 Hz +/ -5%

4.1.5.0 TECHNICAL REQUIREMENTS :

General Requirements

4.1.5.1 The technical requirements of battery charger is as detailed below.

a) The Battery charging equipment shall comprise of a float charger and a boost charger and shall consists of
    a) Float charger(FC) capable of supplying load and Battery float charging requirements
    b) Float cum Boost Charger(FCBC)] capable of Boost charging and float charging the battery.
    c) Each charger shall be independent and shall work on 3-phase AC input power supply and gives required DC voltage as output, delivering certain amount of power as demanded by the application.
    d) Controlling of the rectifier shall be with micro charger preferably with microcontroller. The input to the rectifier unit shall be from a transformer to bring the input voltage to a required level and also to provide isolation between input and output.

e) The secondary of the isolation transformer is to be fed to SCR bridge.

f) Care shall be taken for firing the SCRs slowly initially for DC soft start and the phase angle shall be controlled depending upon the output voltage of the charger.

g) The rectified DC shall be connected to filter section such that the output DC output voltage shall be free from harmonics and shall be with low ripple content.

h) Charger mode of operation can be selected preferably through LCD and the charger shall work in AUTO and MANUAL mode with a facility to select FLOAT, BOOST duly monitoring and controlling preferably through micro board.

i) Feedback signals from the charger shall be fed to micro board which shall generate reference signals.

j) Facility to display charger parameters, load parameters and battery parameters in LCD shall be provided.

k) Facility for indicating the different operating conditions including the audio alarm shall be provided with

- float ON ,
- Boost ON ,
- Charger ON ,
- Mains ON ,
- charger over voltage ,
- charger under voltage ,
- battery fuse fail ,
- SCR fuse fail ,
- load under voltage ,
- load over voltage etc.

l) As per the the voltage and current reference signals firing signals shall be generated duly firing the SCR's duly sensing the faulty conditions like rectifier fuse fail , Earth fault etc. and shall have potential free contacts for alarm conditions.

m) The battery chargers shall be housed in a single cabinet of free standing sheet steel construction.

n) The DC charger and DCDB shall have separate cabinets is provided with front & rear doors for easy accessibility for easy accessibility and maintenance.

o) Cable entry shall be from the front bottom of the cabinet.

PRINCIPLE OF OPERATION

- During normal operation the Load current as well as Float charging current of battery shall be fed from FC
- If battery demands for Boost charging it shall be fed from FCBC duly separating the , load path & battery path by an Interlocking contactor.

4.1.5.2 FLOAT CHARGER :

- The float charger is to operate on three phase AC Supply of 415 Volts with + 30% or -20% variation, 50Hz +/- 5% The float charger shall be capable of floating the Battery i.e. trickle charge the battery comprising of 110 Nos. 2 Volts 80 AH Sealed Maintenance Free Lead Acid cells at about 2.15 V per cell simultaneously supplying a constant load of 10 Amperes in an average ambient temperature of 50 Deg. C. The charger shall be provided with a regulator to facilitate controlling of the cell voltage and to stabilize the output voltage within + or – 1 % of the set DC value for AC supply voltage variation of -15% or +20% and frequency variation of + or – 5%and DC Load variation of 0- 100% and also when all the three variations occur simultaneously.
- The float charger shall be provided with an automatic current limiting facility such that when float charger output current exceeds 10% above the rated set current, the float charger voltage should be brought down automatically so that the float charger output current does not exceed the set value. The float charger shall be of 3-phase full wave semi controlled thyristor bridge rectifier type with automatic voltage regulator unit and with necessary printed circuit boards, transformers and relays etc.,
- Bottom panel for fixing of control Transformer shall be reinforced with MS stiffeners as the Transformer is being dislocated while transporting the chargers
- The company has to provide auto cut-off facility when the AC input voltage is more than the reference voltage value, the battery charger should automatically cut-off and provision also shall be made for manual mode.

4.1.6 BOOST CHARGER :

- The Boost charger is to operate on a three phase AC supply of 415 Volts with -20% or +30% variation, 50 Hz. The boost charger shall be capable of boost charging the battery comprising of 110Nos. 2V 80AH Lead acid cells up to a maximum cell voltage of 2.50V Per cell at a maximum charging current of 16A in maximum ambient temperature 50 C. The boost charger shall be capable of boost charging the battery comprising of 110Nos. 2volts, 80 Ah Sealed Maintenance Free Lead acid cell from fully discharged condition to fully charged condition with in 14hours.

4.1.7 The Battery charging equipment shall be complete with all parts that are necessary for their efficient operation, Such parts shall be deemed to be within the scope of this specification whether specifically mentioned or not.

4.2 The float charger for 220Volts, 80Ah Sealed Maintenance Free batteries shall comprise the following components but not limited to them.

i.	AC 3-Pole miniature circuit breaker of suitable capacity	1No.
ii.	Pilot lamps to indicate AC Mains supply position	3Nos.
iii	A.C.Contactor with ON/OFF Push button	1Nos.
iv	3 Phase full wave semi- controlled thyristor bridge rectifier with fuses	1Nos
v	Automatic Voltage regulator unit with necessary printed circuit boards Transformer of suitable rating.	1set
vi	Filter choke and filter condenser	1set
vii	Double wound impregnated natural air cooled three phase mains Transformer of suitable rating.	1Nos.
viii	D.C. Rotary switch /2 pole MCB.	1Nos.
ix	HRC Fuses with fittings, if it is rotary switch.	2Nos.
x	Moving coil ammeter of suitable range and size to measure the D.C. Output current of float charger.	1Nos.

The logic of Boost and float charger shall be as detailed.

System condition	**Battery status**	**Charger Mode**	**FC**	**FCBC**	**K1**	**Battery**	**Load**
Mains Avail	Battery full charged	FCBC on AUTO	ON	OFF	ON	Supplied by FC	To be Supplied by FC
Mains Avail	Battery required boost	FCBC on AUTO	ON	ON	OFF	Supplied by FCBC in boost mode	To be Supplied by FC
Mains Avail	Battery required boost	FCBC on AUTO	FAIL or OFF	ON	ON	Supplied by FCBC in FLOAT mode	To be Supplied by FCBC
Mains Avail	Irrespective of battery condition	FCBC on Manual Float	ON	OFF	ON	Supplied by FC	To be Supplied by FC
Mains Avail	Irrespective of battery condition	FCBC on Manual Float	FAIL or OFF	ON	ON	Supplied by FCBC in FLOAT mode	To be Supplied by FCBC
Mains Avail	Irrespective of battery condition	FCBC on Manual Boost	ON	ON	OFF	Boost charged by FCBC	To be Supplied by FC
Mains Avail	Irrespective of battery condition	FCBC on Manual Boost	FAIL or OFF	ON	ON	Supplied by FCBC in FLOAT mode	To be Supplied by FCBC
Mains Avail	----------	FCBC on any mode	OFF	OFF	ON	On discharge	The Battery will supply to load

Though not specifically included in the above list, the supplier of the battery chargers shall supply all the required control equipment for trouble free operations of the chargers.

4.3 The boost charger for 220Volts 80Ah Maintenance Free batteries shall comprise of the following components but not limited to them. The boost charger shall be turned on only when both coarse and fine switches are at a minimum position.

i.	AC 3- Pole miniature circuit breaker of suitable capacity	1No.
ii.	Pilot lamps to indicate AC Mains supply position	3Nos.
iii.	A.C. Contactor with ON/OFF Push button & over load protection	1No.
iv.	Ballast Chokes to give tapered charge	3Nos.
v.	Double wound impregnated natural air cooled 3 phase mains transformers With OFF load taps at +5% and+10 % with tap changing links on the primary Side and suitable number of steps on the secondary.	1No.
vi.	Coarse and fine control triple pole, 4 position rotary switch to give step Control for the D.C. Output Voltage.	1No. each
vii.	3 phase full wave bridge connected silicon rectifier stack	1No.
viii.	Moving coil ammeter of suitable range and size to measure the D.C. Out put current of float charger.	1No.
ix.	Double pole rotary ON/OFF switch/2 pole MCB	1No.
x.	HRC Fuses with fittings, if it is rotary switch.	2Nos.

4.4. The battery chargers shall also comprise the following equipment.

i) 1No. moving coil voltmeter of suitable range and size, with selector switch to measure the following voltages.

a) Battery Voltage
b) Boost Charger output Voltage.
c) Float Charger output Voltage.

ii) 1No. Silicon blocking diode connected to 84^{th} cell and D.C. positive bus to maintain continuity of D.C. supply to the D.C. bus in the event of A.C. Failure while boost charger in service and to avoid short circuit of 110^{th} cell positive and the 84^{th} cell positive.

iii) SCR and Semi controlled failure protection shall be fool proof.

iv) Contactor of suitable rating for connecting 110th cell to the positive D.C. bus, inter-locked with AC contractor provided in the boost charger.

v) Ripple filtering devices.

vi) One triple pole moulded case circuit breaker of 100 Amps capacity for connecting to 110th cell positive and 1st cell negative and 84th cell.

a) Suitable HRC fuses for the above with fittings.

b) One suitable moving coil center zero milli ammeter for earth leakage circuit.

c) A suitable voltmeter with selector switch shall be provided on the panel to indicate phase to phase and phase to ground voltage of the incoming supply.

d) One center zero D.C. ammeter to be provided in the negative terminal of the battery for reading charge / discharge current of the battery. The ammeter range shall be 60-0-60 A.

e) Internal light, operated on 230Volts single phase, 50 C/s, AC system with door opening /closing ON/OFF Switch.

f) Suitable earthing lugs suitable for receiving 120 Sq. mm copper conductors.

g) Space heaters suitable for operation AC 230V,1 Amp, 50C/c.

h) Heater ON/OFF Switch.

i) Cable glands for all the external cables.

j) Single phase preventer

4.5 The chargers shall have built- in automatic voltage control and load limiting features. The voltage regulator shall automatically sense, monitor and regulate the D.C. Voltage to within +

1% of the set value from No load to full load and under AC input supply voltage and frequency fluctuations. Load. limiting features shall automatically reduce the output voltage of the charger on loads more than the rated load.

4.6 The ripple content of the charger D.C. output shall not exceed 2% when the battery is not connected.

4.7 Alarm and fault indicating lamps shall be arranged in the following faults.

a) Main incoming AC supply "ON"
b) DC supply "ON"
c) AC input fuse failure for boost charger.
d) AC input fuse failure for float charger.
e) DC output fuse failure for boost charger.
f) DC output fuse failure float charger.
g) DC output over voltage.
h) DC output under voltage.
i) Mains failure, Phase failure.
j) Rectifier fuse failure after float charger.
k) Rectifier control supply failure.
l) Filter condenser fuse failure.
m) Battery earth leakage.
n) Earth leakage detection for individual feeders shall be provided.

The alarm panel shall be with micro alarm panel with text message and auto reset facility of the various parameters if they are in threshold value, shall be incorporated

4.8 Necessary relays for the above shall be provided wherever necessary.

4.9 A block diagram to indicate the general protection features provided and scheme diagram for the charger shall be furnished along with the tender.

4.10 The D.C. system shall be provided with continuous earth leakage indicating mili-Ammeter, suitable for operation with an earth fault on either pole together with a relay to give alarm and visual indication for an earth fault on the D.C. system.

4.11 Necessary relays for annunciation for faults mentioned in 5.8 shall be provided, They shall be suitable for operation of 220 V D.C. supply with + or – 10% variation. Necessary circuitry for canceling alarm shall be provided. On canceling the alarm. the sound only should go and lamp should continue till the fault is rectified/ cleared.

4.12 In the event of AC supply failure, when the battery is on boost charge, the available battery capacity shall be automatically connected to the D.C. bus.

4.13 All fuses shall be HRC non- deteriorating type. Unless otherwise specified, the fuses shall be of class – 4 (80KA prospective breaking current) for AC circuits and class –2 (33 KA prospective D.C. current) for D.C. circuits.

4.14 The indicating instruments shall be of flush mounting type with dust-tight covers. The instruments shall be approximately 96mm square with 270 Deg. C scale or alternatively 144 mm square with 90 Deg.C scale. Dials shall be white with black numbers and lettering.

4.15 The internal wiring of the charger shall be carried out with PVC insulated 650V grade Stranded copper conductor. The control wiring shall be carried out with 2.5 sq.mm copper conductors. All wiring for external connections shall be brought to 650V grade single piece mounted terminal blocks with batteries. Suitable vertical terminal blocks shall be provided. Terminal connectors provided for wiring shall be stud type and not screw type.

4.16 All the external cables to be connected to the charger shall be arranged for bottom entry.

4.17 The float charging equipment and boost charging equipment shall be mounted in a metal enclosed, sheet steel cubicle, indoor floor mounting, and freestanding type. It shall be totally enclosed, completely dust tight, weather and vermin proof. The cubicle shall be adequately ventilated with louvers to facilitate the cooling of transformers and rectifiers. . The panel shall be made out of suitable angles and MS Sheet of 16 SWG for the front, 18 SWG for the back, top and sides, and 14 SWG for the bottom. The height of the panel shall be1800mm and depth 600 mm and panel shall have suitable width to accommodate the charging equipment i.e. adequate clearance/space should be provided between item to item in the charger, to facilitate

easy handing at the time of attending on repairs. The charger shall be provided with hinged type rear doors.

4.18 **D.C. DISTRIBUTION BOARD** :

4.18.1 The DC Distribution boards shall be provided with 2 Nos. bus- bars made out of electrolytic copper of adequate capacity duly tinned supported by bus-bar supporters.

4.18.2 These bus bars will be connected to 220V D.C 2 wire system consisting of 220V,80AH Sealed Maintenance Free batteries or battery charger rated for 220V D.C output.

4.18.3. The DC Distribution boards required under this specification are to feed control circuits, and other auxiliary DC equipment of the Substations. And shall work satisfactorily under the severest operating and climatic conditions and shall confirm to the relevant ISS/BSS of latest issue.

4.18.4 The D.C distribution board shall comprise the following components .

a.	Double Pole rotary switch for incoming DC Supply	1No. (63 A)
b.	Suitable HRC fuses for the above with fittings	2Nos.
c.	Double pole 10 A ON/OFF Rotary Switches (10A)	18 Nos.
d.	Suitable HRC fuses for the above with fittings	36 Nos.
e.	Double pole ON/OFF Rotary Switches (20A)	06 Nos.
f.	Suitable HRC fuses for the above	

4.18.5 All the D.C Circuit breakers, rotary switches and HRC fuses shall be mounted on the front of the panel. All the rotary switch interiors shall be inside the front panel and operating handle alone shall protrude out of the panel.

4.18.6 The D.C. Distribution Board shall be of simplex type, sheet steel cubicle, indoor type, floor mounted and self-supporting. It shall be totally enclosed, completely dust tight, weather and vermin proof.

4.18.7 The D.C distribution Board shall be made out of suitable angles and MS Sheet of 16SWG for the front, 18SWG for the back, top and sides, and 14 SWG for bottom. The Height shall be 1800mm, depth shall be 600mm and suitable width to accommodate all components i.e., adequate clearance/space should be provided between item to item to facilitate easy handling at the time of attending on repairs. The D.C distribution Board shall be provided with hinged type rear doors.

4.18.8 All the fuses shall be of HRC non- deteriorating type. Unless otherwise specified the fuses shall be of Class-2 (33 KA, prospective breaking DC current).

4.18.9 The internal wiring of the D.C. distribution board shall be carried out with PVC Insulated 650V grade copper conductor, The control wiring shall be carried out with 2.5Sq.mm copper conductors. All wiring for external connections shall be brought to 650V grade single piece molded terminal blocks with barriers. Suitable terminal blocks with stud type terminals shall be provided. The cables used shall have ISI marking on them.

4.18.10 The DC distribution boards shall be provided with indicating lamps to indicate DC supply ON position, for all circuits.

4.18.11 The DC distribution boards shall be complete in all respects with all internal wiring incoming and out- going terminals, labels, Earthling connection and required cable glands.

4.18.12 The battery chargers shall be tested for its ratings before dispatch.

4.18.13 PAINTING: Regarding painting of the panel, Tenderer may please note that outside visible portion of the panel (when doors are closed) must be painted with light Grey shade No. 631 of IS-5 and inside of the panel with Brilliant white and Base channel with black paint after necessary primary coats of red –oxide. All external surfaces shall receive a minimum of 3 coats of Paint. Anticorrosive Acid resistant paint is to be provided for interior side of the System Box, The paint shall be guaranteed for 5 year from the date of receipt of material.

5.0. **TESTS:**

5.1 ACCEPTANCE AND ROUTINE TESTS

All acceptance and routine tests as stipulated in the relevant standards shall be carried out by the bidder in presence of purchaser's representatives.

5.2 Type Tests :-

The equipment offered shall be fully type tested in recognized laboratory (NABL) as per the relevant standards, The bidder shall furnish 2 sets of the type test reports along with the bid. The bids received without type test reports shall be treated as non- responsive. The type tests as specified in the IS should be carried out not later than 5 years from the date of opening of bid.

5.3 **Acceptance Tests :**

Acceptance tests shall be done as per Sampling Scheme given in IS-8320/1982 of the offered quantity.

The following shall constitute the acceptance tests as per relevant standards.

5.3.1 Marking.

5.3.2 Verification of dimensions

5.3.3 Regulation test Ripple test

5.3.4 Megger values and HV Test.

5.4 Type Tests:

5.4.1 Insulation resistance

5.4.2 High voltage test at 1.5KV for 1 minute

5.4.3 Regulation (Load & Line)

5.4.4 Ripple

5.4.5 Dry heat test at 50°C for 16 hrs with full load on as per IS:9000 part 3/Sec5/1977

5.4.6 Damp heat test at 50°C and at 95% RH for two cycles as per IS:9000 part 5/Sec1/1981

5.4.7 Cold test at 0°C for 2 hrs as per IS:9000 part 3/Sec4/1977

After each environmental test the parameters as per 5.4.1 to 5.4.3 shall be checked after recovery period of 1 hour and test results shall be satisfactory.

6.0 INSPECTION :

The inspection may be carried out by the purchaser at any stage of manufacture. The successful Bidder shall grant free access to the purchaser's representative at a Reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser, shall not relieve the Bidder of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective. The Bidder shall keep the purchaser informed in advance, about the manufacturing program so that arrangement can be made for inspection. The purchaser reserves the right to insist for witnessing the acceptance/routine testing of the bought out items. The Bidder shall give 15 days advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests.

7.0 QUALITY ASSURANCE PLAN :

7.1. The Bidder shall invariably furnish following information along with his bid, failing which his bid shall be liable for rejection. Information shall be separately given for individual type of equipment offered.

i) Statement giving list of important raw material, names of sub- suppliers for the raw materials, list of standards according to which the raw materials are tested. List of test normally carried out on raw material in presence of the Bidder's representative, copies of test certificates.

ii) Information and copies of test certificates as in (i) above in respect of bought out accessories.

iii) List of manufacturing facilities available.

iv) Level of automation achieved and list of areas where manual processing exists.

v) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.

vi) List of testing equipment available with the Bidder for jesting of equipment specified and test plant limitation. If any, Vis-a- vis the type special acceptance and routine tests specified in the relevant standards. The limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

7.2 The successful Bidder shall within 30 days of placement of order submit following information to the purchaser.

i) List of raw materials as well as bought out accessories and the names of sub suppliers selected from those furnished along with offer.

ii) Type test certificates of the raw materials and bought out accessories.

iii) Quality assurance plan (QAP) WITH HOLD POINTS FOR PURCHASER'S INSPECTION. The quality assurance plan and purchasers hold points shall be discussed between the purchaser and Bidder before the QAP is finalized.

7.3 The successful Bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing of the batteries,

8.0 DOCUMENTATION

8.1 All drawings shall conform to International standards organization (ISO) 'A' series of drawings, as per IS.656, All drawings shall be in ink and suitable for micro filming. All dimensions and data shall be in S.I Units.

8.2 LIST OF DRAWINGS AND DOCUMENTS :

The Bidder shall furnish four sets of the following along with his Bid.

a. General outline and assembly drawings.
b. Graphs showing the performance of material.
c. General constructional features.
d. Type test reports in case the material has been type tested.
e. Test reports literature, pamphlets of the bought out items & raw materials.

8.3 The successful Bidder shall, within 2 weeks of placement of order, submit three sets of final versions of all the above said drawings for purchaser's approval. The purchaser shall communicate his comments/approval on the drawings to the Bidder within four weeks. The Bidder shall, if necessary, modify the drawings and resubmit three copies of the modified

drawings for their approval. The Bidder shall within two weeks submit the prints and two good quality report copies of the approved drawings for purchaser's use.

8.4 Two sets of the type test reports duly approved by the purchaser, shall be submitted by the Bidder for distribution before commencement of supply. Adequate copies of acceptance and routine test certificates, duly approved by the purchase, shall accompany the dispatch consignment.

8.5 The manufacturing of the materials shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the Bidder's risk.

8.6 One set of nicely printed bond volumes of operation, maintenance and reaction manuals and approved drawings in English Language shall be supplied along with each unit supplied in addition to the two sets to be sent directly to the purchaser.

8.7 Approval of drawings/ work by purchase shall not relieve the Bidder of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirement of the latest revision of application standards, rules and codes of practices. The equipment shall conform in all respects to high standards of Engineering design, workmanship and Latest revision of relevant standards at the time of ordering and purchaser shall have the power to reject any work or materials which, in his judgment is not in full accordance therewith.

9. PACKING AND FORWARDING:

9.1 The packing shall be done as per the manufactures standard practice. However, he should ensure the packing such that, the materials should not get damaged during transit by Rail/Road.

10. Guaranteed Technical particulars: The guaranteed Technical particulars shall be furnished by bidder as per Section-V

11. The Schedule of materials, Desired Delivery and prices.

11.1 The schedule of materials and desired deliveries are indicated in section IV.

11.2 The schedule of price shall be On-line only**.**

12 GUARANTEE

The chargers supplied shall be guaranteed for a period of 18 months from date of supply.

GUARANTEED TECHNICAL PARTICULARS

CHARGER : 220V (CONVENTIONAL)

S.No	Description	Requirement as per CPDCL	As per Bidder
1	Type of rectifier	3-phase full wave semi controlled thyristor bridge rectifier type with automatic voltage regulator unit	
2	No. of Units	Float Charger–1 No.& Boost Charger-1 No.	
3	Manufacturer's type designation	220V/10A FC & 16A FCBC with DCDB	
4	AC Supply		
	a) Voltage (Volts)	415 C + 30% to -20%	
	b) Current (amps)	15 Amps (Aprox.)	
	c) No. of phases	3 Phase, 4 Wire	
	d) Frequency, cycles/See	50 Hz	
	e) Power Factor	0.8 @ full load	
5	Percentage taps provided on transformer	_	
6	Rated D.C.output for		
	a) Boost Charger (kW)	4.0 KW	
	b) Float Charger (kW)	2.475 KW	
7	Rated D.C. output Voltage for		
	a) Boost Charger (kW)	264.0 V DC	
	b) Float Charger (kW)	247.5 V DC	
8	Rated D.C. out put Current for		
	a) Boost Charger (Amps)	16 Amps	
	b) Float Charger (Amps)	10 Amps	
9	D.C. output Voltage regulation from No load to full load volts	+/- 1%	
10	Maximum ripple content %	<2% (RMS)	
11	Maximum permissible	105 deg. C (class F)	

	temperature rise Over an ambient temperature of 50 Deg. C		
12	Overall efficiently	85% at rated full load @ nominal AC input	
13	Unit dimension Width x Height x Depth mm	_	
14	Unit shipping weights Kgs.	_	
15	Load limiting feature (please attach Characteristics showing variation Of voltage with increase in load	_	
16	Recommended settings for thermostat		
	a) Operation temperature Deg.C	0 – 85 Deg. C	
	b) Reset temperature Deg. C.	85 Deg. C	
17	List of Major Accessories Provided to be shown in Bill of material	_	
18	Recommended Spares to be shown in Bill of material	_	
19	Change over from boost to trickle(Automatic/manual)	_	
20	Protection, over voltage, under voltage protection with alarm to be provided	_	
21	Reverse polarity protection etc., To be provided	_	
22	AC Input Protection MCB is provided for both FC&FCBC	_	
23	Charger over load protection	_	

	To be Provided for both FC&FCBC		
24	Battery input protection Suitable rating MCB to be Provided	_	
25	Earth leakage protection to be provided	_	
26	Panel Dimensions	1800(H)X600(D)	
27	Panel painting	As per specification	
28	Panel thickness	Front door:16SWG Side door:18SWG Bottom:14SWG	

DISTRIBUTION BOARD :

a) Double Pole Rotary Switch for Incoming D.C. Supply : 1 No. (63A) Make & Type :	Should be reputed make as per the requirement of CPDCL
b) HRC Fuses for the Above : 2 Nos. Make & Type:	
c) Double Pole 10 A ON /OFF Rotary Switches : 18 Nos Make & Type :	
d) HRC Fuses for the above : 36 Nos. Make & Type:	
e) Double Pole ON/OFF Rotary Switches (20 A) : 6 Nos. Make & Type:	
f) Suitable HRC Fuses for the above : 12 Nos. Make	
g) Indication	DC Incomer ON&DC out going feeder ON indication for all feeders to be is provided.

ACRONYMS

Reference Abbreviation Name and Address----------

I.E.C. International Electro Technical Commission

Bureau Central de la Commission Electro

Technique International, Rue de Vermeer

Geneva, Switzerland.ISO International Organization for Standardization,

Danish Board of Standardization

Aurchoegyej- 12 DK – 2900, Heel prop,

DK – 2900. Heel prup.

DENMARKISS Indian Standard Bureau of Indian Standards

Nanak Bhavan Bahadur Shah Zafar Marg,

NEW DELHI – 110 002, INDIAAC

Alternate CurrentDC Direct CurrentV

VoltVAC AC VoltsA

AmpsHZ Hertzm V

milli VoltsM.Ohms Mega Ohms.