TECHNICAL SPECIFICATION

FOR

220V BATTERY CHARGERS WITH BATTERIES

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1.0 INTRODUCTION

This technical specification provides BHEL's requirement for Design, Engineering, Manufacture, Supply and I&C support of 220V DC Power supply system consisting of Battery chargers along with batteries of various ratings and DCDBs. This system is meant for providing DC supply to various power plant equipment e.g. switchgear panels consisting of VCB spring charging motors, trip and close coils, protection relays, indicating lamps etc.

2.0 SCOPE OF SUPPLY

Sl. No.	ITEM DESCRIPTION	QUANTITY
1	220V, 25A FC+FCBC Battery Charger	As per BHEL tender requirement
2	220V, 20A FC+FCBC Battery Charger	
3	220V, 10A FC+FCBC Battery Charger	
4	220V, 5A FC+FCBC Battery Charger	
5	220V, 100AH VRLA Battery Bank	
6	220V, 75AH VRLA Battery Bank	
7	220V, 40AH VRLA Battery Bank	
8	220V, 20AH VRLA Battery Bank	
9	Spares for 220V Battery Charger: One Set of spares shall consist of following items: a) Measuring instruments/ display of each type used - 1 No b) Shunt Resistor of each type used - 1 No c) Complete Thyristor Bridge/Module of each type used- 1 No d) Printed Circuit Cards of each type used - 1 No e) Semi Conducting Type Fast Fuse of each type - 5 Nos f) Auxiliary Fuse of each type used - 5 Nos g) Indicating lamps of each colour used - 5 Nos g) Auto Transformer of each type used - 1 No h) Control transformer of each type and rating - 1 No	
10	Installation and Commissioning support. Note : 1 AU = I&C support for 1 set of Charger and Battery	

3.0 APPLICABLE STANDARDS AND CODES:

Standard/Code	Description
IEC 60896-22:2004	Stationary lead-acid batteries - Part 22: Valve regulated types - Requirements
IEC 60896-21:2004	Stationary lead-acid batteries - Part 21: Valve regulated types - Methods of test
IS 1652	Specification for stationary cells and batteries, lead acid type (with plante positive plates)
IS 8320	General requirements and methods of tests for lead acid storage batteries.
IS 15549	Stationary Regulated Lead Acid Batteries

4.0 Technical Specification of FC+FCBC TYPE Battery Charger:

a. The Float Charger (FC) shall be used to supply normal DC loads and float charging current of charged battery. The Float cum Boost charger (FCBC) shall be designed to supply boost charging current requirement of the associated battery as well as to supply normal DC load. After full discharge of battery bank, the Float Cum boost charger shall be capable of charging the battery to its full capacity in 8 hours duration while supplying normal DC load.

b. The charger shall have both auto and manual voltage regulation arrangements with provision of selector switch.

c. Digital Outputs shall be configured for connection to the SCADA to monitor the outputs like charger output current, output voltage, float/boost mode, etc.

#	Parameter	Specification
1	Type of Battery Charger	Float Charger + Float cum Boost Charger (FC+FCBC)
2	Input voltage	230 V AC +/- 10%, 1 phase, 2 wire, 50Hz Or 415 V AC+/- 10 % 3 phase, 4 wire, 50 Hz
3	Output voltage	220 V DC nominal
4	Charging mode	Float & Boost
5	Charging current continuous	Charger rating: 25A / 20A / 10A / 5A Float mode (min.): 12.5A / 10A / 5A / 2.5A Boost mode (min.): 25A / 20A / 10A / 5A
7	Float Voltage	**Vendor to indicate as per Battery requirement**
8	Boost voltage	**Vendor to indicate as per Battery requirement**
9	Ripple content in DC Output voltage	2% max. (peak to peak), filter circuits to be provided accordingly
10	Ripple content in DC Output current	5% max. (peak to peak), filter circuits to be provided accordingly
11	DC Load regulation	+/- 1%, for +/-10% of supply voltage fluctuation and 0-100% load variation measured at battery terminal.
12	Rectifier circuit	1 or 3-phase full wave full-controlled thyristorized & diode bridge
13	Control circuit	Proven solid state / µP based
14	Blocking diode	To be provided at output
15	Type of operation	Auto / Manual
16	Change-over provision upon AC failure	Automatic change-over from boost to float mode
17	Minimum Efficiency at: - 25% load - 50% load - 75% load - 100% load	 55% 65% 70% 80%
18	LED indication with alarm annunciation on the panel	**<u>For the following:</u>** Mains ON, Float charger AC ON, Float charger DC ON, Boost charger AC ON, Boost charger DC ON, AC Mains Fail, Float charger DC fail, Boost charger DC fail, DC earth fault, SCR fuse fail, Filter fuse fail, Blocking diode fail, Battery under-voltage, Battery over-voltage, Charger DC overload

19	Meters on the panel	**All meters shall be 96 sq-mm 90-deg scale Class 1.5** 0-300V AC input voltmeter 0-10A DC float output ammeter 0-20A DC load current ammeter 20-0-20A DC boost charger ammeter Battery charge/discharge ammeter 0-200V DC output voltmeter 100-0-100mA battery leakage ammeter
20	Push button features	For various accept, reset and test options, as applicable
21	Protection on input side	Suitably rated MCB/ MCCB to be provided on input side
25	DC Distribution board (DCDB)	DCDB shall form integral part of charger panel. DCDB shall have outgoing feeders with double pole, 220V DC MCBs. Quantity of feeders are as mentioned below:

Charger rating	No. of outgoing feeders
25A	5 Nos. 16A and 5 Nos. 6A
20A	5 Nos. 16A and 5 Nos. 6A
10A	5 Nos. 10A
5A	5 Nos. 6A

23	Selector switches on the panel	Float Auto / Manual, Boost Auto/ Manual, Float / Boost / Autoboost selector switches. Also, Voltmeter / Ammeter selector switches as applicable.
24	Panel construction details	(a) Charger shall be housed in a free standing, floor mounted compartmentalized panels. (b) Degree of protection: IP42 (c) CRCA sheet steel of 2mm (min.) thick for load bearing section (frames) and 1.6mm (min.) thick non-load bearing members (doors and covers) (d) Front door hinged and locked (e) Rear door hinged and bolted (f) Side covers bolted (g) Louvers to be provided on the doors / side covers for ventilation (h) The instruments, switches and indicating lamps shall be flush mounted on the front panel. (i) Cable sizing and colour codes: AC / DC cable size as per circuit requirement. AC side colour : Grey DC side colour : Red for positive, Black for negative Electronic control circuits: 0.75 sq-mm (min.) grey / red / black, as appropriate. Earth circuit: 0.75 sq-mm (min.), green (j) External cable termination provisions to be provided suitably in front of panel with suitably sized brass bolts. (2) AC input terminals (3) Battery connection terminals (4) Feeder terminals for the four feeders (a) Earthing terminals using 25x3 mm aluminium earth bus, with M6 bolt provisions on both sides of panel (b) Base channel: ISMC 75x40x6 mm (min.) black. (c) Cable entry: Bottom; base channel shall be sufficiently

		elevated to facilitate cable entry / exit below the panel. (d) Panel shall be provided with removable undrilled cable gland plate of 3.0 mm thickness (min.). (e) All doors and covers shall be provided with neoprene gaskets to prevent entry of vermin and dust. Also, doors shall be provided with lock and key arrangement to prevent unauthorized access to the board. (f) Slots shall be covered by fine wire mesh. (g) Paint shade: RAL 7032, shall be finalized during drawing approval

5.0 Technical Specification of VRLA Battery bank:

#	Parameter	Specification
1	Battery Type	Sealed maintenance free VRLA battery
2	Nominal voltage of battery bank	220V minimum
3	Nominal voltage of each battery cell	2V or 12V
4	Number of cells	~~55~~ **110** Nos. for 2V / 19 Nos. for 12V
5	Nominal Ah Capacity (min.) of Battery Bank at 27°C, ~~C10~~	Charger rating: 25A / 20A / 10A / 5A Ah Capacity (min.): 100 Ah / 75 Ah / 40 Ah / 20 Ah
6	Mounting stand / rack	Stand / rack to mount battery cells shall be supplied as per applicable standard
7	Accessories for battery	All items required for interconnection of battery cells to form battery bank such as inter cell connecting links/ cables, lugs, nuts, bolts, washers, insulated spanner, petroleum jelly etc. shall be supplied along with each set of batteries.

6.0 Documents to be submitted along with offer without which offer shall be liable for rejection:

1. Technical Data sheets of all equipment
2. Drawings – GA, SLD, BOM, Mounting arrangement etc. of all equipment
3. Catalog with Discharge characteristics chart of Batteries (K-factor)
4. Type Test certificates for all equipment as applicable
5. Credentials of manufacturers- details previously made supplies
6. Filled in values/details wherever the same is asked for in BHEL technical specifications.
7. Vendor has to enclose the deviation sheet clause wise separately in case any deviations are sought by the vendor. Absence of any deviation sheet shall be taken as compliance of BHEL specification in total without any deviation.

7.0 Documents to be submitted for BHEL approval within 1 week after receipt of Purchase order

1. Technical Data sheets of all equipment
2. Drawings – GA, SLD, BOM, Mounting arrangement etc. of all equipment
3. Type test certificates and reports of all equipment

4. Manufacturing Quality Plan (MQP) of all equipment indicating all tests/checks per relevant IS/IEC standards, as called in this document and any other relevant standards shall be submitted to BHEL for approval.
5. Operation and maintenance manual of all equipment

8.0 Inspection and testing of equipment at vendor works:

BHEL and/ or BHEL customer shall witness the testing of Battery charger and Batteries as per relevant IS/ IEC standards. All routine tests and acceptance tests on final products shall be done as per MQP approved by the BHEL.

9.0 Installation & Commissioning (I&C) Support:

Vendor shall depute their service engineer during installation and commissioning stage for required checks and assist BHEL in commissioning of Battery Charger and Battery. A single lump-sum price per set of Charger and Battery shall be offered for installation and commissioning support. The lump-sum price shall include all the costs that will be incurred by the vendor towards the above activities including travel, boarding, lodging and any other contingency expenses.

10.0 Service during Warranty period:

During the warranty period, whenever a technical problem is encountered with supplied equipment, BHEL will report the same to the vendor.

1. All failed material replacements during warranty period shall be in scope of the vendor.
2. Vendor shall ensure that the problem is attended to by their service engineer within two days from the date of reporting.