

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM



GUJARAT ENERGY TRANSMISSION CORPORATION **LTD.**

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TECHNICAL SPECIFICATIONS

FOR

**FLOAT CHARGER (25A) & BOOST CHARGER (15A)
FOR
NO BREAK POWER SUPPLY SYSTEM**

GETCO/E/TS-50V BCHR 03206/R0, Dt: 03.10.2011

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

(I) GENERAL:

The No Break Power Supply System is meant for communication system. It comprises of Float Charger, Boost Charger and Battery. The Float charger and boost charger shall be totally separate but shall be housed in single cabinet. The transformer; rectifier circuit as well as control circuit etc. required for satisfactory operation of Float charger and Boost charger shall be separate, and they shall be housed in single cabinet. The equipment offered shall be highly reliable and of proven design.

CONSTRUCTION :

The cubicle shall be constructed from 2 mm steel sheets for load bearing sides and 1.6mm minimum for other sides and reinforced by angle iron frame. It will be indoor, freestanding, floor mounting and natural air-cooled type, designed for continuous operation in ambient temperature of 50°C, with mechanically strong construction. It will be spacious so that maintenance is easy. Good ventilation shall be made through side louvers and top louvers. All louvers shall be provided with inside wire mesh for vermin proofing. Vermin proofing shall be given due importance to avoid entry of lizards etc. It should meet the requirement of IP 55. Necessary phosphate treatment shall be given to the cubicle and shall be painted with two coats of red oxide primer followed by a coat of grey synthetic enamel paint, SH No.631 IS: 05 on external side and on internal side with white paint.

The cubicle shall have minimum Height x Breadth x Width 1700mm x 1350mm x 550mm spacious. It will be provided with front and rear doors and shall have handle key lockable. There shall be separate compartment for float, boost and common cubicle. All the components for float section, boost section and common section shall be approachable and replaceable easily after opening the door. The electrical lay out, mounting arrangement and interconnection shall be such that all control boards, components, wiring etc. are easily accessible, approachable and replaceable from the front & back side of the cubicle. The removable side covers shall be provided, but it should be specifically seen that there is no need for opening of side covers for replacing components, testing etc. The Cubicle shall be mounted on 'C' type channel with opening for cable entry on rear side.

Sufficient numbers of connectors of adequate capacity shall be used for interconnecting main parts of the circuits for ease of testing and replacement.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

A 2-foot fluorescent tube light for internal lighting with ON/OFF switch shall be provided. All the meters and indicators shall be generally mounted at eye level. All control switches; fuses shall be mounted in front.

All switches and other components shall be mounted in front. Switch ON/OFF knob and other knobs of switches shall be approachable while front Door is in close position. Switches, wiring, knob, etc. should not cause any obstruction in opening the door.

The three phase 4-wire AC input shall be at safe place and properly covered so that while working on the charger, there is no chance of accident & it will be safe to work with AC ON.

Solid tinned copper bus bars (for +ve and -ve) shall be provided in the cubicle. The wiring and bus bars shall be of electrolytic copper confirming to the relevant IS. The thickness and width of bus bar shall not be less than 7.5 mm. and 50 mm. respectively. The +ve and -ve bus bars shall be insulated to avoid the chance of fault. The insulation on the bus bar should not create any resistive path for flow of current. The bus bars shall be so designed that there is no temperature rise. Bus bars should remain cool. The bus bar shall be of sufficient length so that a 40 mm clearance is available between each two terminations on bus bar.

All bus bars, links and connecting strips as well as chokes, coils, transformers, etc. shall be of electrolytic copper confirming to the relevant IS. Aluminium metal shall not be used. The meters, contactors, switches, fuses used etc. shall be of very good quality & shall be reputed make.

The wiring of Float as well as and Boost Charger shall be carried out in a scientific manner. It shall be given mechanical support and tied up to avoid damage due to transit vibrations. Each terminal of meters, transformer, contractors, rectifiers, etc., shall carry only one conductor. If more than one conductor is to be terminated on a terminal, it will be avoided by using terminal block. All terminal blocks; control cards; transformers; rectifiers, switches, filters shall be given code numbers and written by paint inside the charger.

The Float and Boost section shall be protected against any single phasing occurred due to loss of any AC input phase. It shall not trip the charger whenever there is switching or change over of battery from float to boost or any other normal operations.

The Float & Boost section shall have potential free alarm contacts for over voltage, over load, DC fail etc., for various remote alarms & indications.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

(II) FLOAT SECTION:

Its capacity shall be 25A DC in addition to trickle charging of 25 Cells of 100/150AH Battery cells. This will be liberally rated. All the components of float charger shall be mounted in the cubicle such that sufficient working space is available.

The float charger shall operate from 415 V $\pm 15\%$ 3 Phase 4 wire, 50 Hz A C line with frequency variation $\pm 3\%$. The voltage and frequency variation may occur simultaneously. It will have its own separate three phase, 4 wire transformer, rectifier, controls, filters, etc.

The float section will give stabilised D.C. output with 1% accuracy. It should be possible to set output voltage between 50V and 58V with control card potentiometer. Once the output is set, it will not change beyond $\pm 1\%$ of set value. The ripple content of the charger shall not exceed 2 mV psophometric without battery connected.

The voltage stabilisation shall be achieved by servo motor controller triple pole Dimmerstat, boost transformer, etc. coupled with associated electronic control unit, voltage sensing and correcting device.

It will be explained technically as to how wear and tear of carbon brushes of variac can be minimised. The **Variac** shall be of **Automatic OR Voltamp OR ARGO** Make. The size of **Variac** shall be indicated. It shall be vertically mounted. If variac is used for primary side the rating shall be minimum 2.5 to 3 Amps and for secondary side the rating shall be 5 Amp. The variac gear assembly shall be Teflon made only.

The float charger shall be fully automatic and no manual control shall be needed during operation on Auto Mode. However, provision for manual operation for increasing or decreasing D. C. output shall also be made to ensure uninterrupted service in the event of failure of Electronic Control Unit. An Auto/Manual selector switch on front panel with necessary electronic circuit shall be provided together with raise and lower push button and LED indications. The electronic control module of Auto-control of Float Section shall be provided with the facility to adjust DC output voltage between 50V and 58V. The set DC output voltage should not change, beyond $\pm 1\%$ of set value irrespective of the changes in the input voltage.

DUTY OF FLOAT SECTION :

- (1) The Float section shall deliver 25A D C current and simultaneously trickle charge 100/150AH, 25 Nos. of lead acid battery cells. The load current may vary from 0 to 25A.
- (2) It should be possible to set D C Voltage output to constant value between 50V and 58V load may vary from 0 to 25A. This voltage shall remain constant at set voltage under above condition of load from 0 to 25A.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

- (3) During emergency when A. C. supply fails, the battery shall meet the DC Load. Battery will be discharged after catering this load and will require boost charging after the supply is resumed. However, it will temporarily draw heavy current from Float Charger till boost charger is made ON. This heavy current drawl may be very high depending upon condition of battery. Therefore, to limit excessive drawl of current & to avoid component failure, blowing of fuses and ultimately system failure, it is necessary to provide overload protection in float charger. Therefore, float section shall be provided with overload protection as well as current control system i.e. with **Drooping Characteristics** so that current drawl is limited to the required capacity only. The **Drooping Characteristics** of the Float charger shall be explained in detail.

The individual float charger shall be provided with following in addition to above: -

- (1) Three phase; four wire AC input terminals with AC MCB switch make Protec/Havell's/Simenes Triple Pole ON/OFF fully wired.
- (2) AC input HRC fuse on each phase with pilot lamp to indicate AC input condition of each phase.
- (3) Overload protection shall be provided with relay make CGL/TC of suitable rating.
- (4) Separate double wound main transformer with necessary tapings & rating minimum 2.0 KVA.
- (5) Automatic and manual control described as above.
- (6) AC Voltmeter makes Mecco/AE with selector switch to measure line voltage with range 0-500 volts scale.
- (7) Rectifier diodes with rating 40A/600 PIV make Ruttonsha/Universal, the reverse blocking diode rating 40A/600 PIV and Filter circuit having bank of capacitor make ALCON/KELTRON 5 nos each of rating 2200 μ F/100 Volt DC and DC choke rating 3.3 mh 40 Amp with necessary protection.
- (8) DC Ampere meter make MECO/AE to measure DC output load of float charger with linear scale 0 to 50 Amps.
- (9) DC MCB Make Protec/Havell's/Simenes with rating 40 Amp switch to ON/OFF DC output of float charger with HRC fuse for +ve and -ve line with LED indication. Overload protection shall be provided to switch off the float section in case of over load. The float charger shall be liberally rated.
- (10) DC Voltmeter makes Mecco/AE with selector switch to measure Float/Battery/Boost voltage with linear scale 0 to 75 volts.
- (11) HRC fuse with ON/OFF rotary switch to control DC output from common bus to D.C.D.B.
- (12) HRC fuse on +ve and -ve line of the battery.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

- (13) Centre Zero Ammeter makes Mec/AE for measuring charge and discharge current of the battery with linear scale 50-0-30 Amp.
- (14) An under voltage relay shall be provided to sense the bus voltage and shall operate at 44V DC with audiovisual indication and shall be adjustable between 40 & 46 volts. A pair of heavy-duty spare contacts shall be provided to extend this indication to control room. Similarly over voltage indication shall be provided & shall operate at 60 Volts and shall be adjustable between 54 & 60 volts.
- (15) Any other item not specifically mentioned but which is needed for efficient working of the equipment shall be provided.
- (16) The battery isolation switch of adequate capacity shall be provided inside the cubicle.
- (17) The relay used for control circuit shall be mounted on socket only for easy replacement for maintenance purpose.
- (18) The D. C. contactor shall be connected across float D. C. output.

(III) BOOST SECTION:

The Boost charger shall operate on 415 V $\pm 15\%$ 3 phases, 4 wire 50 Hz. A C line with frequency variation of $\pm 3\%$. The voltage and frequency variation may occur simultaneously. Boost section shall be housed in the same cubicle. It will have separate transformer, rectifier and controls etc.

The Boost Section having the capacity of 15 Amp, shall be utilised for initial and Boost Charging (quick charging) of discharged 25 Nos. of 100/150AH battery cells. The boost charging shall be carried out at voltage between 2V/Cell to 2.75V/Cell. The boost charger shall be capable to maintain terminal voltage between 50V to 72V when connected to the battery bank of 25 Cells each Cell having 100/150 AH rating. The boost charger shall be liberally rated.

During Boost charging the output voltage shall be high. The same high voltage should not pass on to the load. An arrangement shall be provided so that the high voltage shall not directly pass on to the load. Normally a tapping from the battery set comprising lesser cells is directly connected to the load during Boost charging.

Over load protection shall be provided in order to switch off the boost section in case of over load. Suitable device shall be provided to take care of input voltage fluctuation and charging current on boost side.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

While boost charging the battery, the boost voltage shall be isolated from float voltage. However, it will be ensured that while boost charging if AC supply fails there shall not be any break in DC supply to load. Since this is a No Break Power Supply System.

The Boost Section shall have minimum 4 steps each coarse and fine adjustment facility for changing AC output voltage to the rectifier in steps; to change DC output voltage of boost section. The gradual change of voltage in more nos. of steps is preferred. A D. C. Voltmeter with selector switch shall also be provided on boost side to measure.

- (i) Own Voltage.
- (ii) Battery Voltage.

The boost section shall be equipped with the following in addition to the above:

- 1) Three phase; four wire AC input terminals with AC MCB switch make Protec/Havell's/Simenes Triple Pole ON/OFF fully wired.
- 2) Overload protection shall be provided with relay make CGL/TC of suitable rating.
- 3) Separate double wound main transformer with necessary tapings and rating minimum 2KVA.
- 4) Manual control described as above.
- 5) AC Voltmeter make Meco/AE with selector switch to measure voltage of each phase with range 0-500 volts scale.
- 6) Rectifier diodes with rating 40A/600 PIV make Ruttonsha/Universal, the reverse blocking diode rating 40A/600 PIV and Filter circuit having bank of capacitor make ALCON/KELTRON 5 nos each of rating 2200 μ F/100 Volt DC and DC choke rating 3.3 mh 35 Amp with necessary protection.
- 7) DC Ampere meter make MECO/AE to measure DC output load of boost charger with linear scale 0 to 25 Amps.
- 8) DC MCB Make Protec/Havell's/Simenes with rating 32 Amp switch to ON/OFF DC output of Boost charger with HRC fuse for +ve and -ve line with LED indication. Overload protection shall be provided to switch off the boost section in case of over load.
- 9) DC Voltmeter make Meco/AE with selector switch to measure Boost voltage with linear scale 0 to 75 volts.
- 10) HRC fuse on +ve and -ve line of the battery.
- 11) Centre Zero Ammeter make Meco/AE for measuring charge and discharge current of the battery with linear scale 50-0-30 Amp.
- 12) Any other item not specifically mentioned but which is needed for efficient working of the equipment shall be provided.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

- 13) Bus bar design; and size shall be similar to float charger. Bus bar shall be of electrolytic copper.

All other switches' make Kaycee/Switron, contactor both AC and DC make CGL/TC/SIEMENS and fuses make English Electric/S&S/C&S shall be preferable. All indicators shall be LEDs only. There shall not be humming and temperature rise at full load for float and boost section. All transformers and chokes shall be properly varnished.

SCOPE OF SUPPLY :

- (i) Design, Manufacture & supply float and Boost Charger as per requirement.
- (ii) Two 25 Sq. mm. Copper Lugs for Main cable (One each for + Ve & - Ve D.C supply) with nuts and bolts required for connecting cable on BUS. Also glands for necessary fixing arrangement of cable at entry point shall be in the scope of the supplier.
- (iii) The bus bars shall have facility to cater two nos. (+ve and -ve) extra load cables if required in future. For these two standby cables (One each for + Ve & - Ve D.C supply) two 25 Sq. mm. Copper Lugs with nuts and bolts required for connecting cable on BUS and glands for necessary fixing arrangement of cable at entry point shall also be in the scope of supplier.
- (iv) Float section's output shall be connected to +ve and -ve bus bars. Similarly boost sections output shall be connected to +ve and -ve bus bars. The cable size used for these purpose shall not be less than 25 Sq. mm. Copper.
- (v) There shall be arrangement of Battery connection for +Ve, -Ve and tap cell for 50 Volt D.C Supply with three Nos. of 25 Sq. mm. Copper lugs with nuts and bolts to connect with the bus bars. (Supply of nuts bolts and 25 Sq. mm. Copper cable lugs in the scope of the supplier). Glands for necessary fixing arrangement of cables at entry point shall also be in the scope of supplier.
- (vi) The chargers shall be supplied with single phase preventer make Minilec, type VSPD2
- (vii) 4 Nos. 25 Sq. mm. Copper lugs for cable with nuts and bolts shall be supplied extra.
- (viii) All labels shall be riveted, stickers shall not be accepted.
- (ix) Arrangement for 5 Nos. DC outputs feeders shall be provided with HRC fuse/link of 6 Amp capacity each. Also for fixing arrangement of 2.5 mm² / 2 Core Feeder outgoing cable at entry point, total 5 Nos. of glands shall also be in the scope of the supplier. The LED-indicating lamp shall be provided for indicating healthiness of HRC Fuse of each outgoing feeder on the front panel of common cubical.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

Type Tests:

The bidder shall have to submit valid type test reports of NABL Accredited Lab / Govt. recognised testing house not more than Five (5) years old for following Type tests carried out.

1. Voltage regulation test at No Load & 100% rated load condition for Float charger.
2. Measurement of ripple content on Float & Boost Charger.
3. Efficiency test on Float & Boost charger at 20%, 50% & 100% of rated Load.
4. Power Frequency Voltage test @ 2 KV for 1 min (Between AC Circuit & E, DC Circuit & E and AC Circuit & DC Circuit)
5. Insulation resistance Test (Between AC Circuit & E, DC Circuit & E and AC Circuit & DC Circuit)
6. Temperature rise test (40A adjusted for Float & 35A for boost simultaneously).
7. IP 55

In the event of non submission of valid Type test reports by the bidder, the offer will be evaluated accordingly.

BIDDERS :

1. The bidder shall be manufacturer of the product offered. The equipment shall not be accepted as bought out item. The offers from traders, authorised dealers are not accepted.
2. The bidder shall provide detailed electrical line diagram of Float and Boost Section with explanatory note.
3. The dimensional and outline diagram of cubicle shall also be enclosed together with unpriced copy of price bid without which offer shall no be considered.
4. The bidder shall quote for a list of recommended spare parts with individual price as optional item, which may or may not be ordered. The unpriced copy of the spares with quantity and description shall be enclosed with technical bid.
5. The bidder shall submit the bill of materials including the make & type of meters, contactors, and switches, fuses etc. used.
6. The bidder shall have at least 10 years of experience in manufacture & supply of such equipments.
7. The bidder shall submit the list of orders executed for supply of the equipments offered with full details.
8. The bidder shall elaborate how the After Sales Service shall be provided.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

9. The bidder shall furnish the Technical details of the charger offered in guaranteed technical particulars enclosed with the specification.
10. The supplier shall have to get the prototype model of charger approved from Chief Engr. (Engineering), GETCO, Co, Vadodara prior to manufacturing bulk Quantity.
11. The GETCO reserves right to increase or decrease the quantity at the time of placing the order.
14. The GETCO reserve right either to accept or reject any of the offers Without assigning the reason.

FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R NO BREAK POWER SUPPLY SYSTEM

Guaranteed Technical Particular 50Volt Float (25A) and Boost (15A) Charger

Sr.No.	Description	Particular
1.	Name & Address of manufacturer	
2.	Model No. & Type	
3.	A C input range	
4.	A.C I/P Current (No Load) (1) Float (2) Boost	
5.	A.C I/P Current (Full Load) (1) Float (2) Boost	
6.	D C output range (1) Float (2) Boost	
7.	Regulation (1) Float (a) Line (b) Load (2) Boost (a) Line (b) Load	
8.	% Efficiency (1) Float (2) Boost	
9.	Method of adjusting output voltage (1) Float (2) Boost	
10.	Over Load Protection (1) Float (2) Boost	
11.	Ripple Content	
12.	Working Condition (1) Operating Temperature (2) Humidity	
13.	Size H W D	
12.	Weight	

**FLOAT CHARGER (25A) & BOOST CHARGER (15A) F O R
NO BREAK POWER SUPPLY SYSTEM**

SCHEDULE OF REQUIREMENT

Sr. No.	Description	Quantity
1.	50 Volt 25A/15A Float & Boost Charger	



Dated: 08.09.2020

TTR validity amendment-1

(Addendum to Technical Specification for validity of type test reports for major electrical equipments)

Sr. No.	Name of test/ Equipment	Type test reports validity (In Years)
i.	On Line Tap Changer (OLTC)	10
ii.	Power Transf. Bushing/ Reactor Bushing	7
iii.	Transformer/reactor fittings and accessories.	10
iv.	Circuit Breaker	10
v.	Isolators	10
vi.	Lightning Arrestors	10
vii.	Wave Trap	10
viii.	Instrument Transformer	7
ix.	Low Voltage (LV) & Medium Voltage (MV) Switchgear	10
x.	Cable & associated joints	10
xi.	Capacitors	10
xii.	Energy Meters [including smart meters & Availability Based Tariff (ABT) meters]	5
xiii.	Conductors & earth wire	10
xiv.	Insulators(Porcelain/ Glass)	10
xv.	Composite Insulators	5
xvi.	Power Line Carrier Communication (PLCC)/Fibre Optic (FO) cable/Optical Ground Wire (OPGW)	5
xvii.	Terminal connectors of all major equipments including transformers	10

Note: Type test reports shall be valid as on the last date of submission of bid.



Dated: 08.09.2020

TTR validity amendment-2

(Addendum to Technical Specification for validity of type test reports of *all the equipments*)

The validity of type test reports to be submitted with technical bid shall be considered as per following:

“Type test reports shall be valid as on the last date of submission of bid”