

**TECHNICAL SPECIFICATION OF BATTERY CHARGERS SUITABLE  
FOR 110V-120 AH CAPACITY BATTERY SETS AGAINST TN-2586**

**1.0 SCOPE :**

The specification covers design, manufacture/fabrication, shop test and offer for inspection, testing and checking before delivery of battery chargers duly packed suitable for indoor installation at various Grid sub stations in Jaipur Discom. These equipments are to be completed in very respect/details to the functions designated and to the entire satisfaction of the purchaser.

It is required that the supplier in accepting the contract agrees to furnish all apparatus, appliances and material whether specifically mentioned or not, but which may be found necessary to complete to perform & testing any of the herein specified equipment, for compliance with the requirements implied without extra charges.

Consideration may be given by the purchaser to alternatives which the supplier considers advisable by reason of his own manufacturing requirements and experience, provided descriptive matter is submitted pointing out the recommended device or arrangements equal to or superior to that required by the accompanying specification with full justification.

**2.0 CLIMATIC CONDITIONS:**

i) Peak ambient temperature in shade.	50 Degree C
ii) Maximum average ambient temperature in a 24 hours period in shade.	40 Degree C
iii) Maximum yearly weighted average ambient temperature	35 Degree C
iiii) Maximum temperature attainable by an object exposed to sun.	60 degree C
iv) Maximum relative humidity.	100%
v) Average number of thunder storm days per annum.	40
vi) Average number of rainy days per annum.	100
vii) Average annual rainfall	10-100 cm
viii) Number of months of tropical monsoon conditions.	4 months
ix) Maximum wind pressure.	100 Kg/Sq.m
x) Altitudes	Not exceeding 1000 mtrs.

**3.0 STANDARD :**

The Battery Chargers shall conform to the latest edition of IS:3136/1965 & IS:4540/1968. Alternatively all materials and components shall be designed and manufactured in accordance with the standards of the International

Electro-technical Commission (IEC) or the American Standards specification or the appropriate German or Swiss Standards. Where a certain equipment is stated not to comply with the Indian Standard or in the absence of requisite Indian Standards to the relevant International Standards the salient points of difference, merits and demerits between standards adopted and the Indian Standards or the British Standards shall be clearly brought out in the bid making at the same time, due correction for operation under the climatic conditions specified herein. A set of standards adopted translated in English, if it is in a language other than English, shall also be enclosed with the tender, to enable due comparison, where ever a standard is specifically mentioned in these specifications. it is understood that the corresponding standards or standard from amongst the sources mentioned above shall also apply.

Equipment meeting the requirements of any other authoritative standards which ensures a quality equal to or better than that as per the standards mentioned above, shall also be acceptable. Where the equipment conforms to any other standards, salient points of difference between the standards adopted and the specified standards shall be clearly brought out in the tender.

#### **4.0 PRINCIPAL PARAMETERS:**

The battery chargers to be supplied by the supplier shall meet the requirements of relevant ISS if comes later on for battery chargers at the time of supply or any other international standards and shall be suitable for continuous operation for the climatic conditions specified in the specification. Battery chargers shall be of sufficient capacity to suit battery sets of 110V, 120 AH Capacity. The battery chargers suitable for 110V-120AH battery sets shall be operative from single phase, 50 Hz, 230 Volts AC supply. The battery charger shall be operative on Thyristor based Silicon Controlled Rectifier (SCR) both for float & boost section.

#### **4.1 SPARES :**

The suppliers shall include in his tender item wise price list of special tools which will facilitate installation, operation and maintenance of the equipment called for herein.

The tenderers shall also state in his tender the spares, required for normal operation for a period of five years.

Each spare shall be individually packed and marked both the part number (where applicable) as well as the subscription of item.

Itemwise price of spares be listed in the tender. The

quantity of spare part recommended for procurement for 5 years of normal operation shall be stated in the tender.

All electrical and mechanical equipment shall be designed and manufactured & packed so that no damage will result in transportation installation and operation of the equipment under the specified climatic conditions to which it will be subjected.

#### **5.0 TECHNICAL DESCRIPTION OF CHARGER :**

The equipment shall be suitable for float charging , as well as quick charging of associated battery sets of 110 V 120 AH ratings. The bus bar voltage shall be maintained at all times even during quick charging.

Suitably constant potential controller shall be provided for maintaining constant voltage across float charger. The Battery Charger should be of automatic float/boost type and should have constant voltage and constant current characteristics.

During normal working conditions, the float charger shall supply the load current and also keep the batteries on 'Float'. The boost charger will remain off under these conditions. During failure of mains supply, the load be automatically fed by the batteries (time delay not permitted).

On resumption of supply, the batteries may need to be boost charged. Since the voltage across the cells may fall upto 1.8 Volts/Cell after discharge, therefore, the boost charger should be capable of charging these cells from 1.8 Volts/Cell to 2.35 Volts/Cell. Under such conditions, voltage across the load should not increase the rated value and only part of the battery should be connected across the load. Even during boost charging normal load will be supplied by float charger.

The float and boost charger should also have provision for change over to the manual mode, in case the electronic circuit stabilising the DC output fails. For this purpose, suitable arrangement should be made. Also Facility should be provided to prevent the excessive in-rush current into the battery, when the discharged battery suddenly comes across the float charger after an emergency period. The ripple content of the out put across load (in float section) shall be less than 1% in case of battery chargers suitable for 110V-120AH batteries.

The rectifier used in the battery charger shall be of robust construction and shall be of silicon type. The tenderers shall supply the characteristics of the rectifier used in the construction of the charger indicating the capacity of the rectifier to suit the temperature conditions.

The float section of the charger suitable for 120 AH batteries shall be capable of delivering a continuous load of 12 Amps. Also the boost section of charger suitable for 120 AH batteries shall be capable of delivering a continuous load of 18 Amps.

5.1 Battery charging equipment causing unbalance in charging current of various cells of the battery shall not be acceptable. All cells will receive adequate and permissible value of charging current. There should not be any discontinuity of DC supply to the bus bar during any transition period and battery power should be available for tripping circuit, if necessary, even during quick charging.

5.2 The float as well as boost section of the battery charger should be able to stabilise the DC output voltage within plus/ minus 1% and with the variation of plus minus 10% in the AC supply with simultaneous load variation from 0 to 100% of rated current.

5.3 The DC voltmeter and ammeters will be provided with class of accuracy 1.5 to indicate voltage and the rate of charge/discharge current. The charger shall be completed with the necessary transformer, chokes, capacitors, input output switches etc. An A.C. voltmeter of class of accuracy 1.5 with selector switch should also be provided at AC incoming supply. An ammeter of class of accuracy 1.5 is also to be provided in boost charger. Weak links such as fuses, relays etc. shall not be provided between the chargers, batteries and load to ensure continuity of DC supply. However suitable AC/DC switches/contactors of appropriate rating shall be provided to cut off AC/DC supply for repair and maintenance if considered so necessary. In that case the battery would directly feed the load.

5.4 All the electronic components shall be of high MTBF or heavy duty type and liberally rated. These shall be housed in a well ventilated sheet steel cubicle complete with input and output terminals. The charger shall be assembled in a sheet steel cubicle with suitable angle iron structure Louvres will be provided for ventilation backed up by fine wire mesh. Thickness of the sheet steel used for cubicle shall be as follows:

S.No.	Battery charger suitable for.	Thickness of the sheet steel for			
		Front/Top/	Bottom	Sides	Rear
1.	110V-120AH BATTERIES	2mm		1.6	mm

5.5 The unit shall be provided with audio and visual alarm for the following faults :

- a) Input supply fuse failure float.

- b) Input supply fuse failure boost.
- c) Float charger rectifier fuse fail.
- d) Boost charger rectifier fuse fail.
- e) AC mains failure.
- f) Condenser fuse failure in float and boost.

The audio alarm shall ring under all fault conditions.

5.6 Soft start feature/ automatic run down circuit shall be provided so that at the incidence of power failure, the DC output voltage of the float and boost chargers reach the minimum position automatically and, therefore, when the power is resumed the voltage reaches a normal floating level from the minimum voltage slowly, by which the excessive in rush current into the discharged battery is minimised.

5.7 Current limiting circuit shall be provided to protect the float charger as well as boost charger also.

5.8 Keyed push button arrangement shall be provided by which the boost charger can be used as a float charger, whenever the float charger is down due to any defect or failure.

#### **6.0 FITTING & ACCESSORIES :**

All cabling and wiring shall be neatly secured in position and adequately supported. All cable and wires carrying A.C. main supply shall be kept separate from other cables. The colour scheme for the cabling and wiring shall be as per IS. All wiring shall be neatly laid down well.

The following colour scheme of the wiring shall be used

:

- (I) AC Single Phase Circuit :
  - a) Phase (L) - Red
- (II) Neutral Conductor. - Black
- (III) Connection to earth. - Green
- (IV) D.C. Circuits. - Grey

#### **6.1 SWITCH BOARD LIGHTING :**

The switch board interior shall be illuminated by incandescent lamps connected to a 230V single phase AC supply. The illumination of interior shall be free from hand shadows and shall be planned to avoid any strain or fatigue to the wire man, who may be called upon to do work.

#### **6.2 PAINTING :**

All CRCA sheet steel work shall be phosphated in accordance with IS:6005 code practice for phosphating iron

and steel. Rust and scale shall be removed by picking with dilute acid followed by washing with running water rinsing with slightly alkaline hot water and drying. The phosphate coating shall be sealed with application of two coats of ready mixed stored type zinc chromate primer. The first coat may be "Flash Dried" while second coat shall be stored. After application of primer two coats of finishing synthetic enamel paint shall be applied. Generally the exterior colour of paint shall be as per shade No. 631 of IS:5 and the interior colour of paint shall be white.

### 6.3 NAME PLATE

The battery chargers shall be provided with non-corrosive legible name plate indelibly marked with the following information:

1. Jaipur Vidyut Vitran Nigam Ltd.
2. Order No.
3. Manufacturer's name or trade mark & identification no. of charger being supplied.
4. Rating of charger (Float & Boost)
5. Input & Output Voltage.
6. Year of manufacture.

### 7.0 TESTS :

#### 7.1 Type tests:

The following tests shall constitute the type tests as per IS: 3136-1965 and IS:4540-1968 (latest amended):

- a) DC voltage current test.
- b) Automatic voltage regulator operation.
- c) Efficiency test.
- d) Ripple Voltage test.
- e) High Voltage test.
- f) Temperature rise test.

#### 7.2 ROUTINE/ ACCEPTANCE TESTS:-

The following tests shall be carried out :

- a) DC voltage current characteristics.
- b) High voltage test at 2 kV for one minute.
- c) Inspection.
- d) Auxiliary devices.
- e) Alternating Current measurement.
- f) No load test.
- g) Load test.
- h) Insulation resistance test.
- i) General performance test at various loads.
- j) Dimensional checking and sheet steel thickness measurements.
- k) Checks on annunciation circuits.

Efficiency test & temperature rise test shall also be carried out on one unit in the presence of purchaser's representative.

### 7.3 TYPE TEST CERTIFICATES TO BE FURNISHED WITH BID :

The equipment offered, shall be fully type tested as per the relevant standard. The bidder must furnish type test certificate in respect of type tests as indicated at clause No. 7.1 above for the type and design offered with the bid.

All these above type tests must have not been conducted earlier than five years from the date of opening of bid. The bids received without these type test certificates will be treated as non-responsive.

The tenderers will also submit following for Battery Chargers with their tenders without which the offers shall be rejected and treated as non-responsive.

- i) Circuit diagram of battery charger.
- ii) Dimensional drawing of battery charger.
- iii) List of components with ratings, makes and rates.

The purchaser reserves the right to demand repetition of some or all the type tests in presence of purchaser's representative. For this purpose, the bidder should indicate unit rates for carrying such type tests. These test charges shall not be taken into consideration for bid evaluation.

### 7.4 SAMPLING PLAN:

The samples, for routine inspection, testing and checking shall be selected by our inspecting officer at random from the offered lot as under:

Size of Lot	No. of Samples
1 to 10	6 Nos.
from 11 to 20	6+30% qty.exceeding 10 Nos.
from 21 to 40	9+25% qty.exceeding 20 Nos.
from 41 to 80	14+30% qty.exceeding 40 Nos.
from 80 & above	26+10% qty.exceeding 80 Nos.

### 7.5 TEST AT SITE :

The purchaser reserves the right to conduct all the test on the Battery charger after arrival at site and the contractor shall guarantee test certificate figures under actual service conditions.

### 7.6 GUARANTEED TECHNICAL PARTICULARS:

The guaranteed technical particulars for battery sets

as per Schedule-V attached, shall be furnished alongwith the tender.

#### **8.0 INSPECTION**

All the tests and Inspection shall be made at the place of manufacturer unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase. The bidder shall afford the inspection officer(s) representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification. The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

The Inspection may be carried out by the purchaser at any stage of manufacture/ before despatch as per relevant standard.

Inspection and acceptance of any material under the specification by the purchaser, shall not relieve the bidder of his obligation of furnishing material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective. The Bidder shall keep the purchaser informed in advance, about manufacturing programme so that arrangements can be made for inspection.

The purchaser reserves the right to insist for witnessing the acceptance/ routine testings of the bought out items.

#### **9. DOCUMENTATION:**

The bidder shall submit the detailed drawings indicating the dimensions for battery charger. The successful tenderer shall within 2 weeks of placement of order submit three sets of final version of all the drawings for purchaser's approval. The purchaser shall communicate his comments/ approval on the drawings to the supplier within four weeks. The supplier shall if necessary modify the drawings and resubmit the three copies of modified drawings for purchaser's approval within two weeks from the date of purchaser's comments.

The manufacturing of equipments shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of purchaser.

The approval of drawing by purchaser shall not relieve the supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirements of the latest revision of applicable standards, rules and code of practices. The equipment shall confirm in all respect to high standards of engineering,



design, workmanship and latest revisions of relevant standards at the time of ordering and purchaser shall have the power to reject any work of materials which in his judgment is not in full accordance therewith.

#### **10. PACKING & FORWARDING**

10.1 The equipment shall be packed in crates suitable for vertical/horizontal transport as the case may be, and suitable to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbol. Wherever necessary proper arrangement for lifting, such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by the supplier without any extra cost.

10.2 Each consignment shall be accompanied by a detailed packing list containing the following information:

- a) Name of the consignment
- b) Details of consignment
- c) Destination
- d) Total weight of consignment
- e) Signs showing upper/lower side of the crate.
- f) Handling and unpacking instructions.
- g) Bill of material indicating contents of each package.

10.3 The supplier shall ensure that the packing list and bill of material are approved by the purchaser before despatch.

#### **11.0 GUARANTEE PERIOD OF BATTERY CHARGERS :**

The guarantee period of each Battery Charger along with all accessories shall be for the period of **5 years** from the date of receipt of equipment along with all accessories.

If the supplier fails to attend the complaint **within 15 days** from the date of receipt of complaint intimated first time by the field officer/ purchaser etc. (the date of receipt of complaint shall be treated as the date of email/ 3 days from the date of despatch of complaint by the field officer/ stores/ Purchaser etc.), then penalty @1/4% per week or part thereof for first 4 weeks in case delay is exceeds more than 4

weeks then @1/2% per week or part thereof shall be charged for entire delay, subject to a maximum of 5% . This penalty will be in addition to the penalty leviable due to Delay in Delivery of material as per GCC clause No. 1.24.

Further to this, in case of emergency, equipment can be get rectified by the sub-divisional officers/ M&P officers (as authorized by Nigam) at the risk & cost of the supplier firm.

The rectification of equipment means satisfactory performance report duly signed by the sub-divisional officers/ M&P officers (as authorized by Nigam) i.e. in charge of 33/11 KV Sub-Station.

## 12. **MAKES OF BROUGHT OUT ITEMS:-**

Makes of following items are only acceptable to Nigam:-

S.No.	Item	Make
1.	Blocking Diodes	RIR/HIRECT/ NSL/ USHA
2.	Thyristors	RIR/HIRECT/ NSL/ USHA
3.	HRC Fuses	As per IS/IEC
4.	Filter Capacitors	ALCON/ SARDA/ RESCON
5.	AC Contactor	TC/ SCHNEIDER/ L&T/ GE/ BCH/ HUNDAI
6.	DC Ammeter	AE/MECO/ RISHLINE/ IMP
7.	DC Voltmeter	AE/MECO/ RISHLINE/ IMP
8.	AC Ammeter	AE/MECO/ RISHLINE/ IMP
9.	AC Voltmeter	AE/MECO/ RISHLINE/ IMP

## 13.0 **PAYMENT:-**

### **A) FOR NEW SUPPLIERS:**

100% (Hundred percent) payment of each consignment shall be made along with taxes & duties by the Sr. Accounts Officer (CPC), Jaipur Discom, Jaipur subject to furnishing of PBG in terms of relevant clause of GCC. In absence of furnishing of Performance Bank Guarantee, 88% payment of the cost of each consignment along with 100% taxes, duties and freight and insurance charges shall be made on production of receipted challan duly verified by the consignee. **No payment shall be released without furnishing of complete type test reports.**

### **B) For old & established suppliers:-**

85% (Eighty Five Percent) Payment of each consignment with taxes & duties shall be payable on

supply of equipment in absence of type tests and 15% payment will be released after successful type test reports.

In absence of furnishing of Performance Bank Guarantee, 88% payment of the cost of each consignment along with 100% taxes, duties and freight and insurance charges shall be made on production of receipted challan duly verified by the consignee. In case of failure of any of the type test reports, the 15% payment shall be forfeited for the used material and remaining unused material will be lifted back by the supplier"

#### **14. ADDITIONAL ORDER**

Repeat orders for additional quantities, upto 50% of original ordered quantities, may be placed by the Nigam, on the same rates, terms and conditions given in the contract.

#### **15. QUALITY ASSURANCE PLAN :**

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

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

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

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) Special features provided in the equipment to make it maintenance free.

vii) The bidder should have adequate facilities to carryout accurately all required tests during manufacturing and routine/acceptance tests as per relevant ISS/IEC standards at the final end routine/acceptance. The supplier will ensure that all testing/measuring instruments/apparatus are calibrated at

regular periodicity from reputed test house as per relevant standards and a certificate of testing authority is made available to purchaser's inspector at the time of inspection. Such calibration certificates, in any case shall not be older than one year on the date of such tests".

viii) List of testing instruments and apparatus along with their last date of calibration, available with the Bidder for testing of equipment specified and test plant limitation, if any, vis-a-vis the type, special, acceptance and routine tests testing during manufacture specified in the relevant standards. These limitations shall be very clearly brought out in "Schedule of Deviations".

2) The Supplier shall also submit the following information to the Purchaser, along with drawings/GTPs/BOM of ordered material, within 15 days of placement of order for purchaser's approval:-

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

ii) Type test certificates of the raw material and bought out accessories/items.

iii) Quality Assurance Plan (QAP) withhold points for Purchaser's inspection. The QAP and Purchaser's hold points shall be discussed between the Purchaser and the Supplier before the QAP is finalized.

3) The Supplier shall submit the routine test certificates of bought out items and raw material at the time of routine testing of the fully assembled equipment.

**15. Purchasing on the Risk & cost of supplier, in case of non-execution of order/delay in delivery.**

As per field requirement, as it is, material (s) / equipment (s) is /are urgently required to Nigam and for which final notice has been given to supplier but supplier is being breach of agreement against stipulated delivery schedule, if at any time during the currency of the contract, the performance in whole or in part be prevented or delayed by more than the three months of the delivery schedule, the purchaser reserves the right to procure the material/equipment on order or part thereof from any other source at the risk and cost of the contractor/ supplier.

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