



TRANSMISSION CORPORATION OF TELANGANA LIMITED

Website: transco.telangana.gov.in. CIN No. U40102TG20148SGC094248

From
The Chief Engineer /P&MM,
Room No.-207, B-Block,
TSTRANSCO,
Vidyut Soudha,
Hyderabad – 500 082.

To
M/s. Amara Raja Power Systems Ltd.,
Renigunta, Cudapa Road,
Karakambadi, Chittoor,
Andhra Pradesh – 517 520

P.O.No.218 PMM/2018/CE/P&MM/SE/P&MM/DE31/F. TSPMM31-43/2017(Battery Battery
Chargers) /D.No.256/18, dt.22-10-2018.

Sirs,

Sub:- TSTRANSCO - P&MM – Telecom - Specn.no.TSPMM31-43/2017 – Supply,
Erection & Commissioning of 48V Battery and Battery Chargers – Detailed
Purchase Order - Issued - Reg.

Ref:- 1. Tender Specification No.TSPMM31-43/2017

2. Your offer on e- platform against Specification No. TSPMM31-43/2017.

3. Your Letter No. RLN/ARPSL/48V B&BC/TSPMM31-43/2017-18/Rev.05

Dt: 05.07.2018.

4. LOI.No.CE/P&MM /SE/P&MM/DE-31/F.TSPMM31-43/2017/D.No.134/18,

Dt.31-07-2018.

5. Your LOI acknowledgement vide Lr. RLN/ARPSL/TSTRANSCO/TSPMM31-
43/17/OA/18-19/Rev.0, Dt:07.08.2018.

I, acting for and on behalf of and by the order and direction of TRANSMISSION CORPORATION OF TELANGANA LTD., (herein after called the "TSTRANSCO" or "the purchaser") accept your offer submitted vide ref. 2nd cited, read with your offer to match L1 prices vide ref (3), against Tender Specification, vide ref. 1st cited, for Supply, Erection & Commissioning of 48V Battery and Battery Chargers at total package cost of **Rs. 1,06,65,630.00** (Rupees One Crore Six Lakhs Sixty Five Thousand and Six Hundred and Thirty only) as indicated below and the details are in Annexure – 1(Schedule of prices).

1) SCOPE OF CONTRACT:

This contract relates to the Supply, Erection & Commissioning of 48V Battery and Battery Chargers detailed under clause (2) below and covers Design, manufacture, testing before dispatch, delivery F.O.R. destination.

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- 2) **SCHEDULE OF MATERIALS AND PRICES:** Supply, Erection & Commissioning of 48V Battery and Battery Chargers (inclusive of Freight, Insurance, Packing & Forwarding and GST) detailed in annexure.

Sl. No.	Description	Total Amount (in Rs.)
1	Supply, Erection & Commissioning of 48V Battery and Battery Chargers including all Taxes.	1,06,65,630.00
	Total Package value:	1,06,65,630.00
(Rupees One Crore Six Lakhs Sixty Five Thousand and Six Hundred and Thirty only)		

- 2.1 The Prices accepted above are FIRM during the process of the contract and until the warranty period is completed.
- 2.2 The prices accepted are inclusive of Freight, Insurance, Packing & Forwarding and GST.
- 2.3 The above prices are inclusive of unloading charges at destination stores.
- 2.4 M/s. Amara Raja Power Systems Ltd., is responsible for all the Taxes applicable on this contract.
- 2.5 Income Tax, other taxes if any, will only be towards the supplier's account and would be recovered from the supplier bills for arranging payment as directed by the concerned department.
- 2.6 **STATUTORY VARIATION:** It is responsibility of bidder to consider the correct rates of the duties and taxes leviable on the equipment/material/work at the time of bidding. After considering the correct rates of duties and taxes only the bidder shall quote the prices.

Any variation up or down in statutory levy or new levies introduced after tender calling date under this specification will be to the account of TSTransco, provided in cases where delivery schedule is not adhered to by the contractor/manufacturer and there are upward variation/revision after the agreed delivered date, the contractor/manufacturer will bear the impact of such levies and if there is downward variation/revision, the TSTransco will be given credit to the effect.

In case of bought out items statutory variation shall not be applicable on that taxes and duties. For this purpose, bought out items means the material/equipment not manufactured by the bidder i.e. statutory variation will be applicable on taxes and duties involving direct transaction between bidder and TSTransco only and not for the taxes and duties between the bidder and his sub vendors.

- 2.7 The purchaser reserves the right to vary the order quantity by ± 50 % during execution of the contract.

- 3) **DELIVERY:** The Supplies shall be completed within 2 months from the date of issue of LOI. Erection and Commissioning of equipment shall be completed within 1 month for the substations which are ready from the date of intimation from TSTRANSCO.
- 4) **FREIGHT & TRANSIT INSURANCE:** Insurance shall be arranged by the supplier to cover transit risks and 45 days storage cover at site. The insurance will be in an amount equal to 100% FADS value of equipment on all-risks basis. The policy shall have a provision for extension to cover further storage if necessary at destination stores/site at TSTransco cost.
- 5) **DESPATCH INSTRUCTIONS:** The Dispatch instructions for the equipment will be issued separately after inspection.

The details of consignee, paying officer and other officers will be furnished along with dispatch instructions, while approving the Inspection/Test Certificates.

6) **PERFORMANCE SECURITY:**

- 6.1 The supplier shall furnish to the purchaser the performance security in the name of **The Chief Engineer/P&MM, TSTransco, VidyutSoudha, Hyderabad-82**, for an amount equal to 10% of the total contract value i.e. for an amount of **Rs. 10,66,563/-** for proper fulfillment of the contract, shall include the warranty period and completion of performance obligations including warranty obligations. The performance security shall cover 60 days beyond the date of completion of performance obligations including warranty obligations.
- 6.2 The performance security shall be executed in accordance with the clause (6) shall be furnished on a stamp paper of value Rs.100/-. The B.G shall be extended if required suitably, in accordance with the provisions of Clause (38) of specification.
- 6.3 In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected / replaced material will have to be extended to a further period of 12 months and the Performance Bank Guarantee for proportionate value shall have to be extended 60 days over and above the extended warranty period.

The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to fulfill its obligations under the Contract.

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7) TERMS OF PAYMENT:-

- i) a) 80% payment towards the equipment cost will be arranged within 45 days for the material/equipment supplied in complete shape subject to their delivery as per the schedule of work and on its receipt in good condition at the destination / stores (i.e., from check measurement date in Form-13), on prorate basis against the submission of the following documents.

- i) Form 13
- ii) Contractor's detailed invoice
- iii) Detailed Challan Acknowledged by Consignee
- iv) Manufacturer's/Supplier's Warranty Certificates
- v) Approved Test Certificates
- vi) Copy of Insurance Policy Certificate
- vii) Copy of Acceptance Letter of Performance Security issued by Purchaser

One additional copy each of the above and delivery challan shall be sent to the consignees. Copies of the above documents shall be sent to the Chief Engineer/ P&MM/TSTransco, VidyutSoudha, Hyderabad-82 immediately after delivering the materials at the destination stores.

- b) 10% payment towards equipment cost will be made after erection of equipment/ material on prorate basis against the submission of invoice.
- c) Balance 10% payment towards equipment cost will be made along with the total erection & commissioning charges after commissioning of equipment / material duly certified by concerned Divisional Engineer/Telecom on prorate basis against the submission of invoice.
- ii) The Supplier Bank details are as detailed below for RTGS payment (Real Time Gross Settlement).

1	Vendor Name	M/s. Amara Raja Power Systems Ltd.
2	Complete Address	M/s.Amara Raja Power Systems Ltd., Renigunta, Cudapa Road, Karakambadi, Chittoor, Andhra Pradesh – 517 520
3	Name of the Bank	State Bank of India
4	Branch Address	SME BRANCH, Tirupathi
5	Branch Code	016292
6	City	Tirupathi
7	Account No.	10306769135
8	MICR Code	517002018
9	IFSC No.	SBIN0016292
10	Income Tax PAN No.	AABCA9265F

The Bank details as above are final and shall not be revoked under any circumstances. The Bank Charges if any will be made to the account of M/s. Amara Raja Power Systems Ltd., and will be recovered from the bill amount per each disbursement on LOA raised by unit officers.

No interest will be payable in case the payment is delayed for whatever reason.

The Banker charges involved if any in establishing and operating the Cheque / Bills shall be to your account.

- iii) If the supplier has received any over-payments by mistake or if any amounts are due to the TSTransco due to any other reason, when it is not possible to recover such amounts under this contract, the TSTransco reserves the right to collect the same from any other amounts and / or Bank guarantees given by you due to or with the TSTransco.
 - iv) The supplier should invariably submit Inspection/test certificates and other documents that the purchaser specifies, before dispatch is made so that they can be checked and approved well before it is dispatched and due for payment.
 - v) When the supplier does not at any time, fulfill his obligations in replacing / rectifying etc. of the damaged / defective materials in part or whole, promptly to the satisfaction of the TSTransco Officers, the TSTransco reserves the right not to accept the bills against subsequent dispatches made by the supplier and only the supplier will be responsible for any demurrages, wharfages or damage occurring to the consignments so dispatched.
- 8) **CURRENCY OF PAYMENT:** All payments will be made in non-convertible Indian Rupees.
- 9) **WARRANTY:** The equipment shall be guaranteed for satisfactory performance for a period of 36 months from the date of check measurement in form-13 i.e., receipt of goods in the departmental store/site in good condition.

During this period, if the equipment is found defective it shall be replaced or repaired by you free of all costs to the TSTRANSCO within 30 days, which shall in no circumstances be more than the delivery period indicated in this order.

In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected / replaced material shall be extended to a further period of 12 months and the Performance Bank Guarantee for proportionate value shall be extended 60 days over and above the extended warranty period.

The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to fulfill its obligations under the Contract.

- 10) **RESPONSIBILITY OF THE SUPPLIER FOR LOSS OR DAMAGE:** The supplier is responsible for the safe delivery of the goods in good condition at the destination stores. He should acquaint himself of the conditions prevailing for handling and transport of the goods to the destination and shall include and provide for security and protective packing of the goods so as to avoid damage in transit.
- 11) **PACKING:** The supplier will provide such packing of the Materials / equipment as is required to prevent their damage or deterioration during transit to their final destination, as indicated technical specification. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Materials / equipment final destination and the absence of heavy handling facilities at all points in transit.
- 12) **INSPECTION:**
- (i). The accredited representative of the TSTRANSCO have access to you or your sub-contractor's works at any time during the working hours for the purpose of inspecting the materials during manufacture of the plant and equipment and testing, and may select samples from the materials going into the plant and equipment. You shall on such occasions provide proper and adequate facilities for testing the selected samples at any time. The final acceptance tests and routine tests shall be conducted in the presence of TSTransco's representative who will be deputed for the purpose.
- The program of inspection is to be intimated to the TSTRANSCO with 30 days prior notice for acceptance tests. The goods shall not be dispatched until such inspection is conducted or waived in writing and followed by dispatch clearance communicated by the purchaser in writing.
- ii) The acceptance of any quantity of materials will in no way relieve the supplier of its responsibility for meeting all the requirements of this specification and will not prevent subsequent rejection if such materials are later found to be defective.
- iii) Should any inspected or tested materials / equipment fail to conform to the specification, the Purchaser may reject the materials and supplier will either replace the rejected materials or make alterations necessary to meet specifications requirements free of cost to the Purchaser.
- iv) Inspection will be conducted on 20% of the quantities offered for inspection. Samples will be collected at random to establish that the guaranteed technical parameters are as per the submitted bid by the supplier. In the case of non-adherence, the purchaser may take suitable action on the supplier including cancellation of vendor registration and banning further dealings, depending on the gravity of the deviation.

- 13) **TESTS AND CERTIFICATES:** Three copies of the test certificates containing the results of all the tests including acceptance and routine tests carried out shall be forwarded to Chief Engineer/P&MM and got approved before the presentation of the bills for payment.

The manufacturer's test certificates shall be submitted immediately after the acceptance tests are conducted and got approved before the equipment is dispatched.

- 14) **GUANTED TECHNIAL PARTICULARS:** The Guaranteed Technical Particulars are indicated in Annexure-2.

- 15) **DRAWINGS:** Drawings of 48V/35A(1+1) Battery Chargers and 48V/200Ah, 48V/300Ah, 48V/425Ah (1+1) Battery sets were approved vide Lr.No.CE/ P&MM/ SE/P&MM/DE-31/F.TSPMM31-43/2017(batteries)/D.No.185/18, Dt.05-09-2018. The Revised Drawings of 48V/100A(1+1) & 48V/50A(1+1) Battery Chargers were approved vide Lr.No.CE / P&MM/ SE/P&MM/ DE-31/ F.TSPMM31-43/2017 (batteries) / D.No.242 / 18, Dt.11-10-2018.

- 16) **GENERAL CONDITIONS OF CONTRACT:** Except in so far as it is provided otherwise in this contract, you shall abide by the terms and conditions indicated in the Tender Specification No. TSPMM31-43/2017 which includes the TSTransco's General Terms and Conditions of contract' enclosed to the ref (1). "Except as specifically accepted in this order, the terms and conditions mentioned in your quotation under reference are not accepted".

- 17) **RISK:** The risk in the property is entirely yours till the goods are received in good condition at destination stores as certified by the consignee.

- 18) **PENALTY FOR DELAY IN SUPPLIES:** The time for and the dates for delivery mentioned in the contract will be deemed to be the essence of the contract. Subject to force majeure clause No.18, if the supplier fails to deliver any or all of the Materials / equipment or fails to perform the services within the period (s) specified in the Contract, the purchaser will, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to 0.5% per week on the undelivered portion subject to a maximum of 5% of the total value of the contract. Once the maximum is reached the Purchaser may consider termination of the contract.

The check measurement date in form-13 i.e., date of receipt of materials at destination stores in good condition will be taken as the date of delivery. Materials / Equipment which are not of acceptable quality or are not conforming to the specification would be deemed to be not delivered. For penalty, the number of days would be rounded off to the nearest week and penalty calculated accordingly.

The penalty specified above will be levied and would be adjusted against subsequent pending bills.

- 19) **FORCE MAJEURE:** The Supplier will not be liable for forfeiture of its performance security, penalty for late delivery, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

For purposes of this clause, "Force Majeure" means an event beyond the control of the supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not restricted to, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

If a Force Majeure situation arises, the supplier will promptly notify the Purchaser in writing of such condition and the cause thereof. Unless or otherwise directed by the Purchaser in writing, the Supplier will continue to perform its obligations under the Contract as far as is reasonable in practice, and will seek all reasonable alternative means for performance not prevented by the Force Majeure event.

No price variance will be allowed during the period of force majeure.

- 20) **CORRESPONDANCE:** Your acknowledgement to this order and any correspondence, general or technical in nature shall be addressed to the Chief Engineer/P&MM, TSTransco, VidyutSoudha, Hyderabad-500082.

All correspondence regarding dispatch and payment shall be addressed to the consignee under intimation to the Chief Engineer/P&MM, VidyutSoudha, Hyderabad-82.

- 21) **COMPLETENESS OF CONTRACT:** All minor accessories that are normally necessary for satisfactory and efficient operation of the equipment shall be supplied by you free of cost to the TSTransco, whether these are specifically mentioned or not in the specification, your tender schedules or in this Purchase Order and the equipment shall be complete in itself.

- 22) **OPERATION AND MAINTENANCE MANUALS:** One set of Manuals consisting of operating instructions and programming schedules and approved drawings for each of the equipment shall be supplied in the package along with respective equipment's at the time of dispatch. They shall contain clear instructions on erection, commissioning and maintenance for the guidance of operating staff. Any items requiring the special attention of the Operation Engineer shall be highlighted.

- 23) **CONTRACT AMENDMENTS:** No variation in or modification of the terms of the contract will be made except by written amendment by the Purchaser and accepted by the supplier

24) TERMINATION FOR DEFAULT:

24.1 The purchaser, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, may terminate this Contract in whole or in part:

- i. If the supplier fails to deliver any or all of the Materials / equipment within the period(s) specified in the Contract, or within any extension thereof granted by the Purchaser.
- ii. If the supplier fails to perform any other obligations under the contract.
- iii. If the supplier, in the judgment of the purchaser has engaged in corrupt or fraudulent practices in competing for or in executing the contract.

24.2 In the event the purchaser terminates the contract in whole or in part, the purchaser may procure, upon such terms and in such manner, as it deems appropriate, materials/ equipment or services similar to those undelivered, and the supplier will be liable to the purchaser for any excess costs for such similar materials/equipment or services. However, the supplier will continue performance of the contract to the extent not terminated.

25) TERMINATION FOR INSOLVENCY:

The Purchaser may at any time terminate the contract by giving written notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the supplier, provided that such termination will not prejudice or not affect any right of action or remedy, which was accrued or will accrue thereafter to the Purchaser.

26) TERMINATION FOR CONVENIENCE:

- (a) The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination will specify the termination is for the Purchaser's convenience, the extent to which performance of the supplier under the Contract is terminated and date upon which termination becomes effective.
- (b) However the materials/equipment those are complete and ready for shipment within Thirty (30) days after the supplier's receipt of notice of termination will be accepted by the purchaser at the contract terms and prices.

27) JURISDICTION: All and any dispute or differences arising out of or touching this order will be decided by the courts or tribunals situated in Hyderabad or Secunderabad only. No suit or other legal proceedings will be instituted elsewhere.

- 28) ACKNOWLEDGEMENT:** Please acknowledge this order soon on its receipt by returning the extra copy of the order enclosed, duly signing it with date in token of acceptance.

Yours faithfully,

Sd/-

Encl.: 1. Annexures –1(Schedule of Prices)
2. Annexures –2 (GTPs)

Chief Engineer/P&MM
(Acting for and on behalf of TSTRANSCO)

"WE ACCEPT THE TERMS AND CONDITIONS STIPULATED IN THIS P.O."

Signature of the Contractor with seal

Copy to:

The Executive Director/Finance/ TSTransco/Vidyut Soudha/Hyderabad.
The Pay Officer/TS TRANSCO/Vidyut Soudha/ Hyderabad
The SAO/ P&A/ TSTransco/Vidyut Soudha/Hyderabad.
The FA&CCA/ACCOUNTS/TSTransco/Vidyut Soudha/Hyderabad.
The Chief Engineer/Telecom/Vidyuth Soudha/Hyderabad.
The SE/OMC/Metro-Central /Hyderabad /TSTransco/NIMS GIS/Erramanjil/Hyderabad.
The Superintending Engineer/Telecom/TSTransco /132/33KVSS Opp. to Court Jagityala road, Karimnagar-500501.
The Superintending Engineer/Telecom/Metro/ TSTransco /132KVSS Chilakalaguda/ Hyderabad
The Superintending Engineer/Telecom/ TSTransco / 220KV SS/ Mulugu Road / Warangal
The Superintending Engineer/Telecom/Rural/ TSTransco / GTS Colony/ Erragadda/Hyderabad
The Superintending Engineer/OMC/Sangareddy ----- (Through e-mail)
The Superintending Engineer/OMC/Mahaboobnagar ----- (Through e-mail)

The Superintending Engineer/OMC/Nalgonda ----- (Through e-mail)
The Superintending Engineer/400 KV/Construction/Metro/Hyderabad ----- (Through e-mail)
The Superintending Engineer/OMC/Metro-West/Hyderabad ----- (Through e-mail)
The Superintending Engineer/OMC/Karimnagar ----- (Through e-mail)
The Superintending Engineer/OMC/Nizamabad ----- (Through e-mail)
The Superintending Engineer/OMC/Warangal ----- (Through e-mail)
The Superintending Engineer/OMC/Khammam ----- (Through e-mail)
The Divisional Engineer/Telecom/220KVSS/Mulugu Road/Warangal --- (Through e-mail)
The Divisional Engineer/ Telecom/132KVSS/Karim Nagar --- (Through e-mail)
The Divisional Engineer/ Telecom/132KVSS/Mettuguda/Mahaboobnagar--- (Through e-mail)
The Divisional Engineer/ Telecom/ 132KVSS /Nizamabad --- (Through e-mail)
The Divisional Engineer/ Telecom/ 132KVSS /Adilabad--- (Through e-mail)
The Divisional Engineer/ Telecom/ 132KVSS Nalgonda --- (Through e-mail)
The Divisional Engineer/ Telecom/132KVSS /Ellandu Road/Khammam --- (Through e-mail)
The Divisional Engineer/ Telecom/ Sangareddy/Mint Compound/First Floor Stone Building / Hyderabad-500063 --- (Through e-mail)
The Divisional Engi./ Telecom/400KVSS/Mamidipalli/Pahad-e-Sharif/Hyd--- (Through e-mail)
The Divisional Engineer/ Telecom/ Metro/Narayanaguda GIS/Hyderabad --- (Through e-mail)
The Divisional Engineer/Transmission Stores/ Metro-Central/Erragadda/GTS Colony/ Hyd.
The Asst. Executive Engineer/Transmission Stores/220KVSS Shapurnagar/Hyd.

Tender Specification No.: TSPMM31-43/2017

Annexure -1 (Schedule of Prices) to P.O.No.218 /18,Dt.22.10.2018

(All figures are in Indian Rupees)

Sl No.	Description of the equipment	UOM	Total Tende red Qty	Units Ex-work price	Unit Freight charges	Unit Insura nce charges	Packing and Forward ing	Unit Erection & Commis sioning charges	Unit landed Price	GST@18 % on Unit Ex- works+F +I+ P&F+E &C	GST@28 % on Unit Ex- works+F +I+ P&F+E &C	Unit landed Price with taxes	Total landed price inclusive of all taxes
48V Battery Chargers													
1	Supply, Erection & Commissioning of 48V/35A(1+1) Float cum boost Charger	Nos.	14	134441.00	2000.00	200.00	1000.00	5000.00	142641.00	25675.38		168316.38	2356429.32
2	Supply, Erection & Commissioning of 48V/50A(1+1) Float cum boost Charger	Nos.	13	146441.00	2000.00	200.00	1000.00	5000.00	154641.00	27835.38		182476.38	2372192.94
3	Supply, Erection & Commissioning of 48V/100A(1+1) Float cum boost Charger	Nos.	2	178441.00	2000.00	200.00	1000.00	5000.00	186641.00	33595.38		220236.38	440472.76
48 V Batteries													
4	Supply, Erection & Commissioning of 48V/200 AH SMF VRLA Battery Set	Nos.	28	73140.00	0	0	0	0	73140.00		20479.20	93619.20	2621337.60
5	Supply, Erection & Commissioning of 48V/ 300 AH SMF VRLA Battery Set	Nos.	9	89700.00	0	0	0	0	89700.00		25116.00	114816.00	1033344.00
6	Supply, Erection & Commissioning of 48V/ 425AH (1+1) SMF VRLA Battery Set	Nos.	3	281520.00	0	0	0	0	281520.00		78825.60	360345.60	1081036.80
Battery Cable													
7	Supply of 25 Sq.mm. Battery cable	mtrs.	2985	210.00	5	1	0	0	216.00	38.88		254.88	760816.80
	Total in Rs.												10665630.22
	Or say in Rs.												1,06,65,630.00

(Rupees One Crore Six Lakhs Sixty Five Thousand and Six Hundred and Thirty only)

Sd/-
Chief Engineer/P&MM

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Annexure-2

Guaranteed Technical Particulars to P.O.No.218/18,dt.22.10.2018

A) Guaranteed Technical Particulars for 48V/100A (1+1) Float Cum Boost Chargers with DCDB		
S.No	Description	Parameters to be complied
1	AC Input	
a	Voltage	160V - 270V AC (230V AC +18%, -31%)
b	Frequency	50HZ \pm 5%
c	Phase, Wire	Single Phase
2	DC Output	
a	Float Cum Boost Chargers- 1 &2 for VRLA Battery	
i.	Float Voltage	48V to 54V DC adjustable
ii.	Boost Voltage	50V to 56V DC adjustable
iii	Regulation	Better than \pm 1% of set value for line variation of 230V AC \pm 10%
iv	Ripple	Less than 5mV Psophometric without Battery
v	Current	100A
b	Float Cum Boost Chargers 1 &2 for NVRLA Battery	
i.	Float Voltage	48V to 52V DC adjustable
ii.	Boost Voltage	50V to 58V DC adjustable
iii	Equalize Voltage	56V to 65V DC adjustable
iv	Regulation	Better than \pm 1% of set value for line variation of 230V AC \pm 10%
v	Ripple	Less than 5mV Psophometric without Battery
vi	Current	100A
c	System output Voltage	Max. 52V (VRLA)/54V(NVRLA) DC+1% at load terminals after Dropper Diode Circuit
d	Efficiency	Not less than 75% at full load at nominal AC Input
3	METERS	Following analog type meters of 96x96 with 90° deflection and \pm 1.5% accuracy class will be provided in the system for measuring the respective parameters: i. DC Voltmeter with Selector switch ii. DC Ammeter with Selector switch iii. Battery charge/Discharge Ammeter
4	Indications	Clustered LED lamps will be provided at AC Input for mains ON condition. LED Indicators will be provided for the following conditions with audio alarm for abnormal conditions: In FCBC-1&2 a. Rectifier Fuse Blown b. DC Over load c. Charger Fail d. Filter Capacitor Fuse Blown COMMON a. DC Over Voltage b. DC Under Voltage/Battery Low c. AC Mains Fail

5	Protections	Following protections will be provided in the system:
		a. AC Input Circuit Breaker (MCB) for both FCBC-1&2
		b. Fast acting semiconductor fuses for the rectifier bridge for both FCBC-1&2
		c. DC OV Cutback protection for both FCBC-1&2
		d. Charger DC output fuses for both FCBC-1&2
		e. Under Voltage Protection (i.e. Isolation of Battery from Load)
		f. Battery Path Current Limit with Potentiometer
		g. DC Over Load for both FCBC-1&2
6	Controls and Switches	h. Filter Circuit Fuses
		a. AC Input MCB for both FCBC-1&2
		b. Float/Boost Selector Switch for both FCBC-1&2
		c. Float, Boost and Equalize Voltage Variable POTs
		d. Battery Current limit adjustment POT
		e. Battery Current Limiting ON /OFF Selector Switch.
		f. Battery Input ON/OFF Rotary Switch
		g. DC Over Voltage Reset Push Buttons
		h. Lamp Test Push Button
		i. Door Lamp Push Button for both FCBC-1&2
7	Special Features	j. Alarm Silence Push Button
		a. Soft start on DC side
		b. Class-F Insulation for all magnetics
		c. Automatic Voltage Regulation using digital controlled logic
		d. Filter circuit to limit ripple
		e. Separate Battery path current limiting
8	DC Distribution Board	f. Automatic change over from float to boost and vice versa based on current drawn by the battery for VRLA Battery
	Outgoing feeders:	6A-1P-MCB - 30 Nos.
9	AC Distribution Board	
		Outgoing feeders: 6A-SPN-MCB - 6 Nos.
10	General	
a.	Cabinet:	Free standing, Floor Mounting Type, Sheet Steel Construction, Easy Access for Installation and Maintenance, Cable Entry at Bottom.
b	Colour:	Silver, Ash
c	Protection:	IP-30
d	Temperature range of Operation	0 to 50°C
e	Relative Humidity:	0% to 95% non-condensing

Sd/-
Chief Engineer/P&MM

B) Guaranteed Technical Particulars for 48V/50A (1+1) Float Cum Boost Chargers with DCDB		
S.No	Description	Parameters to be complied
1	AC Input	
a	Voltage	160V - 270V AC (230V AC +18%, -31%)
b	Frequency	50HZ \pm 5%
c	Phase, Wire	Single Phase
2	DC Output	
a	Float Cum Boost Chargers- 1 &2 for VRLA Battery	
i.	Float Voltage	48V to 54V DC adjustable
ii.	Boost Voltage	50V to 56V DC adjustable
iii	Regulation	Better than \pm 1% of set of value for line variation of 230V AC \pm 10%
iv	Ripple	Less than 5mV Psophometric without Battery
v	Current	50A
b	Float Cum Boost Chargers 1 &2 for NVRLA Battery	
i.	Float Voltage	48V to 52V DC adjustable
ii.	Boost Voltage	50V to 58V DC adjustable
iii	Equalize Voltage	56V to 65V DC adjustable
iv	Regulation	Better than \pm 1% of set value for line variation of 230V AC \pm 10%
v	Ripple	Less than 5mV Psophometric without Battery
vi	Current	50A
c	System output Voltage	Max. 52V (VRLA)/54V(NVRLA) DC+1% at load terminals after Dropper Diode Circuit
d	Efficiency	Not less than 75% at full load at nominal AC Input
3	METERS	Following analog type meters of 96x96 with 90° deflection and \pm 1.5% accuracy class will be provided in the system for measuring the respective parameters:
		i. DC Voltmeter with Selector switch
		ii. DC Ammeter with Selector switch
		iii. Battery charge/Discharge Ammeter
4	Indications	Clustered LED lamps will be provided at AC Input for mains ON condition. LED Indicators will be provided for the following conditions with audio alarm for abnormal conditions:
		In FCBC-1&2
		a. Rectifier Fuse Blown
		b. DC Over load
		c. Charger Fail
		d. Filter Capacitor Fuse Blown
		COMMON
		a. DC Over Voltage
		b. DC Under Voltage/Battery Low
		c. AC Mains Fail

5	Protections	Following protections will be provided in the system:
		a. AC Input Circuit Breaker (MCB) for both FCBC-1&2
		b. Fast acting semiconductor fuses for the rectifier bridge for both FCBC-1&2
		c. DC OV Cutback protection for both FCBC-1&2
		d. Charger DC output fuses for both FCBC-1&2
		e. Under Voltage Protection (i.e. Isolation of Battery from Load)
		f. Battery Path Current Limit with Potentiometer
		g. DC Over Load for both FCBC-1&2
		h. Filter Circuit Fuses
6	Controls and Switches	a. AC Input MCB for both FCBC-1&2
		b. Float/Boost Selector Switch for both FCBC-1&2
		c. Float, Boost and Equalize Voltage Variable POTs
		d. Battery Current limit adjustment POT
		e. Battery Current Limiting ON /OFF Selector Switch.
		f. Battery Input ON/OFF Rotary Switch
		g. DC Over Voltage Reset Push Buttons
		h. Lamp Test Push Button
		i. Door Lamp Push Button for both FCBC-1&2
		j. Alarm Silence Push Button
7	Special Features	a. Soft start on DC side
		b. Class-F Insulation for all magnetics
		c. Automatic Voltage Regulation using digital controlled logic
		d. Filter circuit to limit ripple
		e. Separate Battery path current limiting
		f. Automatic change over from float to boost and vice versa based on current drawn by the battery for VRLA Battery
8	DC Distribution Board	
	Outgoing feeders:	6A-1P-MCB - 24 Nos.
9	AC Distribution Board	
	Outgoing feeders:	6A-SPN-MCB - 6 Nos.
10	General	
a.	Cabinet:	Free standing, Floor Mounting Type, Sheet Steel Construction, Easy Access for Installation and Maintenance, Cable Entry at Bottom.
b.	Colour:	Silver, Ash
c.	Protection:	IP-30
d.	Temperature range of Operation	0 to 50°C
e.	Relative Humidity:	0% to 95% non-condensing

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C) Guaranteed Technical Particulars for 48V/35A (1+1) Float Cum Boost Chargers with DCDB		
S.No	Description	Parameters to be complied
1	AC Input	
a	Voltage	160V - 270V AC (230V AC +18%, -31%)
b	Frequency	50HZ \pm 5%
c	Phase, Wire	Single Phase
2	DC Output	
a	Float Cum Boost Chargers- 1 &2 for VRLA Battery	
i.	Float Voltage	48V to 54V DC adjustable
ii.	Boost Voltage	50V to 56V DC adjustable
iii	Regulation	Better than \pm 1% of set value for line variation of 230V AC \pm 10%
iv	Ripple	Less than 5mV Psophometric without Battery
v	Current	35A
b	Float Cum Boost Chargers 1 &2 for NVRLA Battery	
i.	Float Voltage	48V to 52V DC adjustable
ii.	Boost Voltage	50V to 58V DC adjustable
iii	Equalize Voltage	56V to 65V DC adjustable
iv	Regulation	Better than \pm 1% of set value for line variation of 230V AC \pm 10%
v	Ripple	Less than 5mV Psophometric without Battery
vi	Current	35A
c	System output Voltage	Max. 52V (VRLA)/54V(NVRLA) DC+1% at load terminals after Dropper Diode Circuit
d	Efficiency	Not less than 75% at full load at nominal AC Input
3	METERS	Following analog type meters of 96x96 with 90° deflection and \pm 1.5% accuracy class will be provided in the system for measuring the respective parameters:
		i. DC Voltmeter with Selector switch
		ii. DC Ammeter with Selector switch
		iii. Battery charge/Discharge Ammeter
4	Indications	Clustered LED lamps will be provided at AC Input for mains ON condition. LED Indicators will be provided for the following conditions with audio alarm for abnormal conditions:
		In FCBC-1&2
		a. Rectifier Fuse Blown
		b. DC Over load
		c. Charger Fail
		d. Filter Capacitor Fuse Blown
		COMMON
		a. DC Over Voltage
		b. DC Under Voltage/Battery Low
		c. AC Mains Fail

5	Protections	Following protections will be provided in the system:
		a. AC Input Circuit Breaker (MCB) for both FCBC-1&2
		b. Fast acting semiconductor fuses for the rectifier bridge for both FCBC-1&2
		c. DC OV Cutback protection for both FCBC-1&2
		d. Charger DC output fuses for both FCBC-1&2
		e. Under Voltage Protection (i.e. Isolation of Battery from Load)
		f. Battery Path Current Limit with Potentiometer
		g. DC Over Load for both FCBC-1&2
		h. Filter Circuit Fuses
6	Controls and Switches	a. AC Input MCB for both FCBC-1&2
		b. Float/Boost Selector Switch for both FCBC-1&2
		c. Float, Boost and Equalize Voltage Variable POTs
		d. Battery Current limit adjustment POT
		e. Battery Current Limiting ON /OFF Selector Switch.
		f. Battery Input ON/OFF Rotary Switch
		g. DC Over Voltage Reset Push Buttons
		h. Lamp Test Push Button
		i. Door Lamp Push Button for both FCBC-1&2
		j. Alarm Silence Push Button
7	Special Features	a. Soft start on DC side
		b. Class-F Insulation for all magnetics
		c. Automatic Voltage Regulation using digital controlled logic
		d. Filter circuit to limit ripple
		e. Separate Battery path current limiting
		f. Automatic change over from float to boost and vice versa based on current drawn by the battery for VRLA Battery
8	DC Distribution Board	
	Outgoing feeders:	6A-1P-MCB - 18 Nos.
9	AC Distribution Board	
	Outgoing feeders:	6A-SPN-MCB - 6 Nos.
10	General	
a.	Cabinet:	Free standing, Floor Mounting Type, Sheet Steel Construction, Easy Access for Installation and Maintenance, Cable Entry at Bottom.
b.	Colour:	Silver, Ash
c.	Protection:	IP-30
d.	Temperature range of Operation	0 to 50°C
e.	Relative Humidity:	0% to 95% non-condensing

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D) GUARANTEED AND OTHER TECHNICAL PARTICULARS FOR SEALED MAINTENANCE FREE VRLA BATTERIES 48V/425AH(1+1)		
Sl. No.	Description	Parameters to be complied
1	Battery type	Maintenance Free Valve Regulated Lead Acid (MF-VRLA)
2	Battery rating	48V / 425 AH (1+1)to 1.75 ECV @C10 at 27°C
3	Governing Standard	IS15549:2005, IEEE 1188 & 1189, BS-6290, PART-IV and IEC 60896 21 & 22:2004, PART-II
4	Cells designation	IP2011
5	No. of cells	24 nos
6	Cell dimensions	(198.5 x 532 x 92.8)mm Approx.
7	Single cell weight	25.7 kg Approx.
8	Battery bank dimensions	(696x614x998) mm Approx.
9	Battery bank weight	697 kg Approx.
10	Charge Regime	Batteries shall be charged in constant potential mode with current limit
i.	Float charging voltage	2.23 – 2.25 volts per cell@27°C
ii	Boost charging voltage	2.30 – 2.32 volts per cell@27°C
iii	Current limit	42.5 Amps min to 85 Amps max
iv	Recommended Voltage Compensation	For every 1°C raise in temperature reduce the float voltage by 0.003VPC & vice versa, ensure the extension of temperature sensor up to battery.
	Product details	
	i) AH efficiency (%)	Above 95%
	ii) WH efficiency	Above 85%
12	Self Discharge/ week	<1% of rated capacity
13	Max allowable ambient temp at Which cell can safely operate	60°C continuous and 70°C short time
	Recommended Maxi. Period of storage	6 months from date of dispatch before first use and battery should be stored in a covered area at 27°C.
14	Material of the container	Poly propylene co-polymer
15	Type of separator	Highly absorbent Micro porous spun glass matrix (AGM)
16	Type of +ve and –ve plates	Flat pasted
17	Material of tray & colour	Mild steel coated with acid resistant powder coating
18	Method connection between cells	Bolted
19	Voltage ripple allowable	<2% of the RMS value
20	Type of connectors	Lead coated Heavy duty copper strips
21	Cycle life of battery at 27°C	4000 cycles at 20% depth of discharge(DOD) or 2000 cycles at 50% DOD (or) 1200 cycles at 80% DOD
22	Time required for boost charge from fully discharged condition at 27°C	8Hrs for 90% state of charge(SOC) (or) 16 hrs for 100% SOC

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E) GUARANTEED AND OTHER TECHNICAL PARTICULARS FOR SEALED MAINTENANCE FREE VRLA BATTERIES 48V/300AH		
Sl. No.	Description	Parameters to be complied
1	Battery type	Maintenance Free Valve Regulated Lead Acid (MF-VRLA)
2	Battery rating	48V / 300 AH to 1.75 ECV @C10 at 27°C
3	Governing Standard	IS15549:2005, IEEE 1188 & 1189, BS-6290, PART-IV and IEC 60896 21 & 22:2004, PART-II
4	Cells designation	IP7011
5	No. of cells	24 nos
6	Cell dimensions	(198.5 x 369.6 x 92.8)mm Approx.
7	Single cell weight	17.2 kg Approx.
8	Battery bank dimensions	(689 x 453 x 986) mm Approx.
9	Battery bank weight	471 kg Approx.
10	Charge Regime	Batteries shall be charged in constant potential mode with current limit
i.	Float charging voltage	2.23 – 2.25 volts per cell @ 27°C
ii	Boost charging voltage	2.30 – 2.32 volts per cell @ 27°C
iii	Current limit	30 Amps min to 60 Amps max
iv	Recommended Voltage Compensation	For every 1°C raise in temperature reduce the float voltage by 0.003VPC & vice versa, ensure the extension of temperature sensor up to battery.
11	Product details	
	i) AH efficiency (%)	Above 95%
	ii) WH efficiency	Above 85%
12	Self Discharge/ week	<1% of rated capacity
13	Max allowable ambient temp at Which cell can safely operate	60°C continuous and 70°C short time
	Recommended Maxi. Period of storage	6 months from date of dispatch before first use and battery should be stored in a covered area at 27°C.
14	Material of the container	Poly propylene co-polymer
15	Type of separator	Highly absorbent Micro porous spun glass matrix (AGM)
16	Type of +ve and –ve plates	Flat pasted
17	Material of tray & colour	Mild steel coated with acid resistant powder coating
18	Method connection between cells	Bolted
19	Voltage ripple allowable	<2% of the RMS value
20	Type of connectors	Lead coated Heavy duty copper strips
21	Cycle life of battery at 27°C	4000 cycles at 20% depth of discharge(DOD) or 2000 cycles at 50% DOD (or) 1200 cycles at 80% DOD
22	Time required for boost charge from fully discharged condition at 27°C	8Hrs for 90% state of charge(SOC) (or) 16 hrs for 100% SOC

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F) GUARANTEED AND OTHER TECHNICAL PARTICULARS FOR SEALED MAINTENANCE FREE VRLA BATTERIES 48V/200AH		
Sl. No.	Description	Parameters to be complied
1	Battery type	Maintenance Free Valve Regulated Lead Acid (MF-VRLA)
2	Battery rating	48V / 200 AH to 1.75 ECV @C10 at 27°C
3	Governing Standard	IS15549:2005, IEEE 1188 & 1189, BS-6290, PART-IV and IEC 60896 21 & 22:2004, PART-II
4	Cells designation	IP6009
5	No. of cells	24 nos
6	Cell dimensions	(198.4 x 318 x 76.8)mm Approx.
7	Single cell weight	12.8 kg Approx.
8	Battery bank dimensions	(696 x 397 x 760) mm Approx.
9	Battery bank weight	335 kg Approx.
10	Charge Regime	Batteries shall be charged in constant potential mode with current limit
i.	Float charging voltage	2.23 – 2.25 volts per cell @ 27°C
ii	Boost charging voltage	2.30 – 2.32 volts per cell @ 27°C
iii	Current limit	20 Amps min to 40 Amps max
iv	Recommended Voltage Compensation	For every 1°C raise in temperature reduce the float voltage by 0.003VPC & vice versa, ensure the extension of temperature sensor up to battery.
11	Product details	
	i) AH efficiency (%)	Above 95%
	ii) WH efficiency	Above 85%
12	Self Discharge/ week	<1% of rated capacity
13	Max allowable ambient temp at Which cell can safely operate	60°C continuous and 70°C short time
	Recommended Maxi. Period of storage	6 months from date of dispatch before first use and battery should be stored in a covered area at 27°C.
14	Material of the container	Poly propylene co-polymer
15	Type of separator	Highly absorbent Micro porous spun glass matrix (AGM)
16	Type of +ve and –ve plates	Flat pasted
17	Material of tray & colour	Mild steel coated with acid resistant powder coating
18	Method connection between cells	Bolted
19	Voltage ripple allowable	<2% of the RMS value
20	Type of connectors	Lead coated Heavy duty copper strips
21	Cycle life of battery at 27°C	4000 cycles at 20% depth of discharge(DOD) or 2000 cycles at 50% DOD (or) 1200 cycles at 80% DOD
22	Time required for boost charge from fully discharged condition at 27°C	8Hrs for 90% state of charge(SOC) (or) 16 hrs for 100% SOC

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G) GUARANTEED TECHNICAL PARTICULARS for 25 sq.mm BATTERY CABLE		
Sl. no	Description	Parameters to be complied
1	Manufacturer name & address	-----
2	Suppliers name & address	M/s.Amararaja Power Systems Ltd
3	Governing standards	IS 1554 (part 1)
4	Type of cable	25 sq.mm FRLS type category C1 conforming to IS 1554(Part1) Battery Cable
5	RLS Type	Category C1
a	Oxygen index	Ass per ASTM D 2963
b	Temperature index	Not less than 25°C
6	No. of cores	Single
7	Voltage rating	1100 volt grade
8	Conductors/ Strands	
a	Material	Multi strand annealed high conductivity base copper as per IS:8130/84
b	Diameter	0.40 mm (Nominal)
c	No. of strands	209
9	Insulation	
a	Material	PVC type A as per IS:5831:1984
b	Thickness	1.20mm(Nominal)
c	Colour of core	Red/Black
10	Approx. cable outer dia	11.00 mm (Nominal)
11	Electrical test	
a	Max. cr at 20 ⁰ C	0.95 ohms/ km
b	Volume resistivity at 27 ⁰ C	1x10 ¹² Ohms-cm at 20 ⁰ C
c	High voltage	3.0kv rms for 5 minutes between conductor and ground
12	Packing length	100 mtrs ± 5%

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