Bid Number/बोली क्रमांक (बिड संख्या): GEM/2024/B/5076015
Dated/दिनांक : 21-06-2024

Bid Document/ बिड दस्तावेज़

Bid Details/बिड विवरण	
Bid End Date/Time/बिड बंद होने की तारीख/समय	01-07-2024 14:00:00
Bid Opening Date/Time/बिड खुलने की तारीख/समय	01-07-2024 14:30:00
Bid Offer Validity (From End Date)/बिड पेशकश वैधता (बंद होने की तारीख से)	180 (Days)
Ministry/State Name/मंत्रालय/राज्य का नाम	Ministry Of Heavy Industries And Public Enterprises
Department Name/विभाग का नाम	Department Of Heavy Industry
Organisation Name/संगठन का नाम	Bharat Heavy Electricals Limited (bhel)
Office Name/कार्यालय का नाम	10250020-pem, Noida
Total Quantity/कुल मात्रा	70
Item Category/मद केटेगरी	Float Cum Boost Charger Main Supply as per Technical Specification PE-TS-442-508-E002 , Battery Fuse Box Main Supply as per Technical Specification PE-TS-442-508-E002 , DISCHARGE RESISTOR Main Supply as per Technical Specification , Erection and commissioning SPARES FOR FLOAT CUM BOOST CHARGER , COST OF SUPERVISION OF Erection and Commissioning
BOQ Title/बीओक्यू शीर्षक	220 V DC Battery Charger for Barh I FGD Project
Years of Past Experience Required for same/similar service/उन्हीं/समान सेवाओं के लिए अपेक्षित विगत अनुभव के वर्ष	1 Year (s)
MSE Exemption for Years of Experience and Turnover/ अनुभव के वर्षों से एमएसई छूट	No
Startup Exemption for Years of Experience and Turnover/ अनुभव के वर्षों से स्टार्टअप छूट	No
Document required from seller/विक्रेता से मांगे गए दस्तावेज़	Experience Criteria,Past Performance,Certificate (Requested in ATC),Compliance of BoQ specification and supporting document *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Past Performance/विगत प्रदर्शन	10 %
Bid to RA enabled/बिड से रिवर्स नीलामी सक्रिय किया	Yes

Bid Details/बिड विवरण	
RA Qualification Rule	H1-Highest Priced Bid Elimination
Type of Bid/बिड का प्रकार	Two Packet Bid
Primary product category	Float Cum Boost Charger Main Supply as per Technical Specification PE-TS-442-508-E002
Time allowed for Technical Clarifications during technical evaluation/तकनीकी मूल्यांकन के दौरान तकनीकी स्पष्टीकरण हेतु अनुमत समय	7 Days
Inspection Required (By Empanelled Inspection Authority / Agencies pre-registered with GeM)	No
Payment Timelines	Payments shall be made to the Seller within **90** days of issue of consignee receipt-cum-acceptance certificate (CRAC) and on-line submission of bills (This is in supersession of 10 days time as provided in clause 12 of GeM GTC)
Evaluation Method/मूल्यांकन पद्धति	Total value wise evaluation

EMD Detail/ईएमडी विवरण

Required/आवश्यकता	No

ePBG Detail/ईपीबीजी विवरण

Required/आवश्यकता	No

Splitting/विभाजन

Bid splitting not applied/बोली विभाजन लागू नहीं किया गया.

Reserved for Make In India products

Reserved for Make In India products	Yes

MSE Purchase Preference/एमएसई खरीद वरीयता

MSE Purchase Preference/एमएसई खरीद वरीयता	Yes

1. Experience Criteria: In respect of the filter applied for experience criteria, the Bidder or its OEM {themselves or through reseller(s)} should have regularly, manufactured and supplied same or similar Category Products to any Central / State Govt Organization / PSU for number of Financial years as indicated above in the bid document before the bid opening date. Copies of relevant contracts to be submitted along with bid in support of having supplied some quantity during each of the Financial year. In case of bunch bids, the category of primary product

having highest value should meet this criterion.
2. Bid reserved for Make In India products: : Procurement under this bid is reserved for purchase from Class 1 local supplier as defined in public procurement (Preference to Make in India), Order 2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. However, eligible micro and small enterprises will be allowed to participate. The minimum local content to qualify as a class 1 local supplier is denoted in the bid document. All bidders must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which the bid is liable to be rejected. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in -India) order 2017 dated 04.06.2020 . In case Buyer has selected Purchase preference to Micro and Small Enterprises clause in the bid, the same will get precedence over this clause.
3. Purchase preference will be given to MSEs having valid Udyam Registration and whose credentials are validated online through Udyam Registration portal as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail themselves of the Purchase preference, the bidder must be the manufacturer / OEM of the offered product on GeM. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises and hence resellers offering products manufactured by some other OEM are not eligible for any purchase preference. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service and Buyer will decide eligibility for purchase preference based on documentary evidence submitted, while evaluating the bid. If L-1 is not an MSE and MSE Seller (s) has / have quoted price within L-1+ 15% (Selected by Buyer) of margin of purchase preference /price band defined in relevant policy, such MSE Seller shall be given opportunity to match L-1 price and contract will be awarded for 100% (selected by Buyer) percentage of total quantity. The buyers are advised to refer the OM No. F.1/4/2021-PPD dated 18.05.2023 OM_No.1_4_2021_PPD_dated_18.05.2023 for compliance of Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017. Benefits of MSE will be allowed only if seller is validated on-line in GeM profile as well as validated and approved by Buyer after evaluation of documents submitted.
4. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.
5. Past Performance: The Bidder or its OEM {themselves or through re-seller(s)} should have supplied same or similar Category Products for 10% of bid quantity, in at least one of the last three Financial years before the bid opening date to any Central / State Govt Organization / PSU. Copies of relevant contracts (proving supply of cumulative order quantity in any one financial year) to be submitted along with bid in support of quantity supplied in the relevant Financial year. In case of bunch bids, the category related to primary product having highest bid value should meet this criterion.

6. Reverse Auction would be conducted amongst all the technically qualified bidders except the Highest quoting bidder. The technically qualified Highest Quoting bidder will not be allowed to participate in RA. However, H-1 will also be allowed to participate in RA in following cases:

i. If number of technically qualified bidders are only 2 or 3.
ii. If Buyer has chosen to split the bid amongst N sellers, and H1 bid is coming within N.
iii. In case Primary product of only one OEM is left in contention for participation in RA on elimination of H-1.
iv. If L-1 is non-MSE and H-1 is eligible MSE and H-1 price is coming within price band of 15% of Non-MSE L-1
v. If L-1 is non-MII and H-1 is eligible MII and H-1 price is coming within price band of 20% of Non-MII L-1

Float Cum Boost Charger Main Supply As Per Technical Specification PE-TS-442-508-E002

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	2	545

Battery Fuse Box Main Supply As Per Technical Specification PE-TS-442-508-E002

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

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S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	2	545

DISCHARGE RESISTOR Main Supply As Per Technical Specification

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

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1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	1	545

Erection And Commissioning SPARES FOR FLOAT CUM BOOST CHARGER

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

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1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	6	545

Erection And Commissioning SPARES FOR FLOAT CUM BOOST CHARGER

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

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1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	6	545

Erection And Commissioning SPARES FOR FLOAT CUM BOOST CHARGER

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

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1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	6	545

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1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	6	545

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1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	6	545

Erection And Commissioning SPARES FOR FLOAT CUM BOOST CHARGER

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1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	6	545

COST OF SUPERVISION OF Erection And Commissioning

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

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1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	1	910

COST OF SUPERVISION OF Erection And Commissioning

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S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Sunil Kumar	803213,BHEL-PSER SITE OFFICE, NTPC BARH CAMPUS, DT-PATNA, BIHAR. PINCODE-803213	4	910

Buyer Added Bid Specific Terms and Conditions/क्रेता द्वारा जोड़ी गई बिड की विशेष शर्तें

1. **Generic**

   OPTION CLAUSE: The Purchaser reserves the right to increase or decrease the quantity to be ordered up to 25 percent of bid quantity at the time of placement of contract. The purchaser also reserves the right to increase the ordered quantity by up to 25% of the contracted quantity during the currency of the contract at the contracted rates. Bidders are bound to accept the orders accordingly.

2. **Certificates**

   Bidder's offer is liable to be rejected if they don't upload any of the certificates / documents sought in the Bid document, ATC and Corrigendum if any.

3. **Certificates**

   The bidder is required to upload, along with the bid, all relevant certificates such as BIS licence, type test certificate, approval certificates and other certificates as prescribed in the Product Specification given in the bid document.

4. **Inspection**

   Nominated Inspection Agency: On behalf of the Buyer organization, any one of the following Inspection Agency would be conducting inspection of stores before acceptance:
   Pre-dispatch Inspection at Seller Premises (applicable only if pre-dispatch inspection clause has been selected in ATC):

   At vendors works

   Post Receipt Inspection at consignee site before acceptance of stores:
   NA

5. **Generic**

   Bidders are advised to check applicable GST on their own before quoting. Buyer will not take any responsibility in this regards. GST reimbursement will be as per actuals or as per applicable rates (whichever is lower), subject to the maximum of quoted GST %.

6. **Buyer Added Bid Specific ATC**

   Buyer uploaded ATC document Click here to view the file.

Disclaimer/अस्वीकरण

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization, whereby Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and / or terms and conditions governing the bid. If any clause(s) is / are incorporated by the Buyer regarding following, the bid and resultant contracts shall be treated as null and void and such bids may be cancelled by GeM at any stage of bidding process without any notice:-

1. Definition of Class I and Class II suppliers in the bid not in line with the extant Order / Office Memorandum issued by DPIIT in this regard.
2. Seeking EMD submission from bidder(s), including via Additional Terms & Conditions, in contravention to exemption provided to such sellers under GeM GTC.
3. Publishing Custom / BOQ bids for items for which regular GeM categories are available without any Category item bunched with it.
4. Creating BoQ bid for single item.
5. Mentioning specific Brand or Make or Model or Manufacturer or Dealer name.
6. Mandating submission of documents in physical form as a pre-requisite to qualify bidders.

Index of Annexures

GeM Tender Enquiry for DC battery Charger for 3 x 660 MW NTPC BARH FGD Stage - I

Sl. No.	Description	Annexures
1.	BOQ	Annexure I
2.	Land border certificate	Annexure II
3.	Certificate for local Content	Annexure III
4.	Technical PQR	-
5.	Technical Specification	-
6.	PV Formula	-

3 x 660 MW NTPC BARH FGD ST-I **ANNEXURE-I**

BOQ CUM PRICE SCHEDULE FOR DC BATTERY CHARGER

S. No.	Item code	Item Description	Unit	Quantity	Unit Price	Total Price	Remarks
1	**508-12010-A**	220V FLOAT-CUM-BOOST CHARGER, 220V DC, 50A	NOS	2			NI-CD BATTERY OF RATING 90AH (SINGLE STRING)OR LEAD ACID BATTERY OF RATING 150AH (SINGLE STRING)
2	**508-12001-A**	**BATTERY FUSE BOX**					
2.1		BATTERY FUSE BOX WITH SHEET STEEL ENCLOSURE SUPPORT STRUCTURE	NOS	2			BATTERY FUSE BOX OF ADEQUATE RATINGAS PER LOAD DUTY CYCLE (ANNEXURE-II OF SPECIFICATION) . **MINIMUM RATING 32A.**
3	**508-12005-A**	**DISCHARGE RESISTOR**					
3.1		DISCHARGE RESISTOR (SUITABLE FOR 90AH NI-CD BATTERY OR 150AH LEAD ACID PLANTE TYPE BATTERY)	NOS	1			DISCHARGE RESISTOR SUITABLE FOR 90AH NI-CD BATTERY WITH SHUNT FOR 5HRS DISCHARGE RATE OR SUITABLE FOR 150AH LEAD ACID PLANTE TYPE BATTERY WITH SHUNT FOR 10HRS DISCHARGE RATE. MINIMUM DOP FOR LOAD BANK SHALL BE ATLEAST IP 20.
4	**508-12006-A**	**E & C SPARES**					
4.1		E & C SPARES FOR FLOAT CUM BOOST CHARGER	SET	1			
4.1.1		FUSE LINK WITHOUT HOLDER					
a		AC I/P HRC FUSE LINK	NOS	6			
b		GLASS FUSE	NOS	6			
c		CONTROL HRC FUSE LINK	NOS	6			
d		RECTIFIER FUSE LINK	NOS	6			
e		FILTER CAPACITOR FUSE LINK	NOS	6			
f		DC O/P FUSE LINK	NOS	6			
4.1.2		INDICATING LAMP					
a		AC I/P LAMP RED COLOR	NOS	6			
b		AC I/P LAMP YELLOW COLOR	NOS	6			
c		AC I/P LAMP BLUE COLOR	NOS	6			
d		DC O/P LAMP	NOS	6			
5	**508-12020-A**	**SUPV OF E&C**	**SET**	**1**			
5.1		LUMP SUM CHARGES PER VISIT FOR ENGINEER (EXCEPT DAILY CHARGES)	VISIT	1			REFER NOTE - 1, 2 & 3
5.2		LUMP SUM DAILY CHARGES FOR ENGINEER	DAYS	4			REFER NOTE - 1, 2 & 3

NOTES :

1) AMOUNT PAYABLE FOR ENGINEER PER VISIT TO SITE = VISIT CHARGES AS PER SL. NO. 5.1 ABOVE + (DAILY CHARGES AS PER SL. NO. 5.2 ABOVE X NO. OF DAYS AT SITE) (TO BE CERTIFIED BY BHEL SITE).

2) THE VISIT CHAGRES SHALL BE INCLUSIVE OF CHARGES OF AIR FARE/TRAIN FARE , BOARDING/LODGING, LOCAL CONVEYANCE, MEDICAL , INSURANCE ETC.

3) SITE VISIT CHARGES SHALL BE APPLICABLE FOR ANY VISIT MADE BY VENDOR AT SITE AFTER RECEIVING THE INSTRUCTION FROM BHEL FOR DEPUTATION OF VENDOR REPRESENTATIVE. THE VISIT CAN BE CALLED FOR SUPERVISION OF COMMISSIONING & TESTING ETC.

4) ALL CABLE GLANDS & LUGS AT CHARGER, FUSE BOX & DISCHARGE RESISTOR END ARE IN BIDDER'S SCOPE.

ANNEXURE II
3X660 MW NTPC BARH STAGE I FGD
DC Battery Charger
Letter head of Company

Ref……. Date……

To,
Bharat Heavy Electricals Limited
PEM, PPEI Building, Plot No 25,
Sector -16A, Noida (U.P) -201301

Subject: - Certification regarding local content

Reference: Tender Enquiry No-……

Package: - DC Battery Charger

Project: 3X660 MW NTPC BARH STAGE I FGD

Dear Sir,

We hereby certify that items offered by us of DC Battery Charger for 3X660 MW NTPC BARH STAGE I FGD ……..(minimum % of local content) meets the requirement of minimum local content in line with applicable clause of Make In India and the Public Procurement (Preference to Make in India), Order 2017 dated-15.06.2017, 28.05.2018 & 29.05.2019, 04.06.20, 16.09.20 and subsequent order dated 16.11.21.

We further confirm that details of location at which the local value addition is made will be our registered works at ……(address of the works)

Yours very truly

…… (authorized signatory of company)

…… (firm name)

authorized signatory
of company

Annexure III

An undertaking regarding Model Clauses on company letter head only

(To be provided along with bid)

Reference: NIT No.-

Package: - DC Battery Charger

Project: 3X660 MW NTPC BARH STAGE I FGD

TO WHOM SO IT MAY CONCERN

This is with reference to Ministry of Finance circular dated 23.02.23 reg. restriction under rule 144 (xi) of GFR.

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India. I hereby certify that M/s …….. …… (bidder name) is not from such a country and is eligible to be considered/participate in tender enquiry for against aforesaid tender enquiry.

Sign & Signature (Not below Director/owner of the company)

Date:

Place:

	PRE-QUALIFICATION REQUIRMENTS FOR DC BATTERY CHARGER 3 X 660 MW BARH-I FGD	PE-PQ-442-508-E008
		REVISION NO. 00 DATE 09/05/2024
		SHEET NO. 1 OF 1

ITEMS: SCR based full wave fully controlled 220 V DC Battery charger, Battery Fuse Box and Discharge Resistor. Rating 50A and above. **SCOPE**: Supply: YES; Erection & Commissioning: NO; Supervision of Erection & Commissioning: YES;	
1	Vendor should be designer & manufacturer of the applicable type of Battery charger.
2	Availability of type test certificates conducted at independent Lab or witnessed by third party as per IS/ International standards for the applicable type of Battery charger.
3	In-house capability to carry out all routine and acceptance tests as per IS/ International standards for the applicable type of Battery charger.
4	Option -1: Performance certificates for min. 2 years of trouble free operation at two (2) different installations/sites for the applicable type of battery Charger. Performance certificate should be from end user only. Performance certificates should not be more than ten (10) years old from date of techno- commercial bid opening. OR Option-2: Repeat order received from 2 different purchaser's / end users for the applicable type of battery chargers in last ten (10) years provided the gap between award of two PO's is minimum 2 years. OR Option-3: 1 no. performance certificate (as per Option-1) and 1 no. repeat order (as per Option-2).
5	Minimum two (2) nos. purchase orders for the applicable type of battery charger shall be submitted which should not be more than five(5) years old from the date of techno- commercial bid opening for establishing continuity in business.

Notes: -

1. Consideration of offer shall be subject to customer's approval of bidders, if applicable.
2. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.
3. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
4. After satisfactory fulfillment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

PREPARED BY	CHECKED BY	REVIEWED BY	APPROVED BY
Khushboo Yadav NAME: KHUSHBOO YADAV DESIGNATION: MGR(E)	10/05/24 NAME: ABHISHEK DESIGNATION: Sr.MGR(E)	10/5/24 NAME: PRAVEEN DUTTA DESIGNATION: AGM (E)	15/5/24 NAME: DEBASISA RATH DESIGNATION: GM(E)

3 x 660 MW BARH-I FGD

VOLUME – II

TECHNICAL SPECIFICATION FOR

220V DC BATTERY CHARGER

SPECIFICATION NO: PE-TS-442-508-E002

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UTTAR PRADESH, INDIA – 201301

	DOCUMENT TITLE	SPECIFICATION NO. PE-TS- 442 -508-E002	
	TECHNICAL SPECIFICATION FOR 220V DC BATTERY CHARGER	REVISION 0	DATE: 09.05.2024
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TOTAL NO. OF SHEETS= 43

(INCLUDING COVER/ SEPARATOR SHEETS)

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BHEL	**TECHNICAL SPECIFICATION FOR 220V DC BATTERY CHARGER**	REVISION 0	DATE: 09.05.2024
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1.0 SCOPE

1.1 Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing, delivery to site and Supervision of E&C of 220V DC BATTERY CHARGER conforming to this specification.

1.2 General technical requirements of the 220V DC BATTERY CHARGER are indicated in technical specification.

2.0 BILL OF QUANTITIES:

2.1 The bidder to quote for items as per price schedule attached with NIT.

3.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

3.1 Documents shall be submitted after placement of order for BHEL & customer's approval as per the schedule specified below:

BHEL Drawing No.	*Drawing Title*	*Vendor Sub (Days)**	*Bhel comment (Days)*	*Vendor Sub (Days)#*	*Bhel and Customer comment/approval (Days)*	*Total Engg Time (Days)*
Primary Documents						
PE-V0- 442 -508-E001	TDS FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E002	GA AND INTERNAL LAYOUT DRAWING FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E003	SCHEMATIC/ POWER CIRCUIT DIAGRAM FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E004	BOM WITH MAKE OF COMPONENTS FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E011	SIZING CALCULATION OF TRANSFORMER, RECTIFIER, THYRISTOR, FILTER AND FUSE FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E901	QUALITY PLAN FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E017	LIST OF MANDATORY SPARES FOR BATTERY CHARGER $$	21	9	7	18	55
PE-V0- 442 -508-E005	CIRCUIT DIAGRAM AND GA OF BATTERY FUSE BOX	21	9	7	18	55
PE-V0- 442 -508-E006	CIRCUIT DIAGRAM AND GA OF BATTERY DISCHARGE PANEL	21	9	7	18	55
Secondary Documents						
PE-V0- 442 -508-E018	TYPE TEST CERTIFICATES FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E015	LIST OF E & C SPARES FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E007	OPERATIONAL WRITE UP FOR BATTERY CHARGER	21	9	7	18	55
PE-V0- 442 -508-E019	O&M MANUAL FOR BATTERY CHARGER	within 30 days of issuance of MDCC				

NOTES:

a) * 1st submission within indicated days from date of purchase order

b) # Submission (within indicated days) after incorporating all BHEL comments

c) $$ Primary document for delivery of Mandatory Spares only and not to be linked with Main charger supply.

d) Primary documents shall be considered for Delay analysis and secondary documents shall be for engineering completion purpose.

3.2a) Successful bidder shall submit the reports of all the type tests as listed in this specification and carried out within last ten years from the date of 01.08.2018.

These reports should be for the test conducted on the equipment similar (same rating of battery charger) to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent lab or should have witnessed by a client.

3.2b) All routine & acceptance test to be performed as per QAP NO 0000-999-QOE-S-005.

3.2c) Charges for carrying out all type, routine & acceptance tests are deemed to be included in the charger price.

3.3 Documents shall be furnished through BHEL's document management system (wrench) portal.

Notes:

1. Vendor shall submit the dates for drawing/document submission/BHEL comments/ resubmission after approval of documents.

2. In BOM each of the item to be uniquely identified with item code no. or item Sl. No. Supplier to ensure that all the items which will find separate mention in the packing list are covered in detailed BOM. Supplier to give following undertaking in BOM: " The BOM provided here completes the scope (in content and intent) of material supply under PO no. ---- dtd ----- Any additional material which may become necessary for the intended application of supplied item/package will be supplied free of cost in most reasonable time."

3. Indicative Sub vendor list shall be as per Annexure-III. Final makes of equipment shall be subject to customer approval.

TECHNICAL DATASHEET

Sr. No.	PARAMETER	UNIT	VALUE
1.0	**Power Supply & fault level details**		
1.1	Rated AC voltage & variation	V, %	415 V, 3Ph, 3 Wire Systems, (-) 10% to (+) 10%
1.2	Frequency & variation	Hz, %	50 Hz, +3% to -5%
1.3	Rated DC voltage & variation	V, %	220 V, 187 V to 242V
1.4	Fault current of 415V system	kA	50 kA for 1 sec.
1.5	Fault current of DC system limited up to (max)	kA	The Charger shall be designed to restrict maximum fault level on DCDB limited to 25kA for 1 Sec.
1.6	Type/ Capacity of battery (min.)	AH	(i) 90 AH Ni-Cd battery (ii) 150 AH Lead acid battery * Refer Note 3 below
2.0	**Charger current rating**		
2.1	Float-cum-boost charger	A	(i) 50A (ii) 50A
3.0	**Type of cooling**		Natural air cooled
4.0	**Ripple content of charger**		
4.1	Peak to peak	%	± 1%
5.0	**Degree of Protection (DOP)**		
5.1	Rectifier transformer cubicle		IP-42
5.2	Control cubicle		IP-42
6.0	**Constructional features**		
6.1	Panel sheet thickness/ material	mm	1.6mm Cold rolled sheet steel for panel fabrication with folded type construction and 2.0mm Cold rolled sheet steel for panel frame.
6.2	Paint shade		Treatment as per IS 6005.Two coats of lead oxide primer followed by powder painting with final shade of RAL 9002 for complete panel except end covers & RAL 5012 for end covers.
6.3	Cable gland plate thickness/ material	mm	3 mm / Sheet steel
6.4	Gasket thickness/ material	mm	3 mm / Rubber

6.5	**CABLE SIZES** a) Cable size from Battery TB to Fuse Box b) Cable size from Fuse Box to DCDB c) Cable size from Charger to DCDB d) Cable Size for FCB Charger AC Incomer		Actual cable size and number of runs shall be informed during detailed engineering.
7.0	**Type Tests**		
7.1	Type tests to be conducted for this contract, despite availability of valid & acceptable test certificates	Yes/ No	YES, As per Technical Specification requirement / Quality plan. Heat Run test to be conducted on one charger.
8.0	**EARTHING**		
8.1	Grounding terminal size/ no. for each charger		50X6 MM./ 2 nos.
8.2	Grounding terminal size/ no. for each fuse box		50X6 MM./ 2 nos.
8.3	Grounding terminal size/ no. for each discharge resistor		50X6 MM./ 2 nos.
9.0	**Mandatory Spares**		
9.1	Mandatory Spares to be quoted for this contract	Yes/ No	NA
9.2	If yes, list of mandatory spares		NA
10.0	**E & C Spares**		
10.1	E & C Spares to be quoted for this contract	Yes/ No	Yes
10.2	If yes, list of E & C Spares		As per BOQ cum price schedule enclosed with NIT
11.0	**Special tools & tackles**		
11.1	Special tools & tackles to be quoted for this contract	Yes/ No	Yes (If applicable)
11.2	If yes, list of Special tools & tackles		Bidder to furnish the list.
12.0	**Battery Fuse Box**	Fuses for both Positive and Negative Pole shall be provided. Also Construction shall be same as Charger Panel. Battery Fuse Box shall be wall-mounted type. Minimum rating of Battery Fuse Box shall be as indicated in the BOQ cum price schedule.	
13.0	**Discharge Resistor Panel**	a) Portable type 90AH NI-CD battery discharge resistor panels shall be supplied with shunt suitable for 5 hrs discharge rate **OR** Portable type 150AH Lead acid battery	

		discharge resistor panels shall be supplied with shunt suitable for 10 hrs discharge rate . b) Cooling of discharge resistor shall be natural/ forced air cooled. DOP for load bank, shall be at least IP 20. c) Construction shall be same as Charger panel. Handle and wheel arrangement shall be provided for easy movement. d) Control - Using rotary switches for step control of current against falling voltage with ON-OFF facility.

Notes:

1) BHEL will provide 3 PH-3 wire power Supply. Further distribution for single Phase shall be created by Bidder.

2) All tests as per QP No. : 0000-999-QOE-S-005 to be carried out.

3) Specific Technical Requirements along-with Packing Requirement for 220V DC battery Charger are enclosed as Annexure-A & B respectively.

3) Actual rating of Battery fuse box and discharge resistor panel shall be selected by the bidder based on load duty cycle (Annexure-I).

DATA TO BE FURNISHED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT

Sr. No.	PARAMETER	UNIT	VALUE
1.0	**Manufacturer's Name**		
2.0	**Design ambient temperature**	°C	50
3.0	**Charger Rating & Type**	A/V	50A, 220V Float-cum Boost Charger, Thyristor Controlled
4.0	**Charger rated output current & voltage:**		
4.1	AC input voltage, frequency with variation		
4.2	Reference standard		
4.3	Float mode charging current	A	
4.4	Boost mode charging current	A	
5.0	**Load limiter current setting range (Trickle mode)**		
6.0	**Automatic voltage regulator (Trickle mode)**		
6.1	Type		
6.2	% Stabilization of the output DC voltage		
6.3	Voltage setting range		
6.4	Walk in time of Automatic Voltage Regulator		
6.5	Time taken to stabilize voltage for under shoot & overshoot		
7.0	**Manual voltage regulator (Trickle mode)**		
7.1	Type		
7.2	Voltage setting range		
8.0	**Boost charging**		
8.1	Current setting range		
8.2	Voltage limit setting range		
8.3	Rated output of charger		
9.0	**Rectifier assembly**		
9.1	Type of semi-conductor material		
9.2	Rated direct current per cell (Average)		
9.3	SCR Rating Selected		
9.4	Heat sink for SCR		
9.5	Permissible hottest stack temp. while carrying 200% current	°C	85

9.6	Short time current in amps with duration & temp/ rise	A , sec & °C	
9.7	Rated direct voltage (surge)	PIV	
9.8	Rated input voltage	V	
9.9	Type of connections of rectifier element		
9.10	Standard applicable		
9.11	Ripple content	%	1% (peak to peak)
10.0	**Blocker Diode**		
10.1	Make		
10.2	Continuous rating	A	
10.3	R.M.S current	A	
10.4	Peak Inverse Voltage (Surge)	PIV	
10.5	Type		
10.6	Reference standard		
11.0	**Rectifier transformer**		
11.1	Type		
11.2	Rated KVA & % impedance		
11.3	Class of insulation		
11.4	Input line (primary) winding connection in vector representation		
11.5	Cell winding (secondary) connection in vector representation		
11.6	1 min. power frequency withstand voltage	kV	
11.7	Overload capacity of transformer		
11.8	Standard applicable		
12.0	**Charger full load Efficiency at nominal input & output voltage & current**		
13.0	**Power factor at nominal input & output voltage & current**		
14.0	**Instrument**		
14.1	Manufacturer		
14.2	Type		
14.3	AC voltmeter range	V	
14.4	DC voltmeter range	V	
14.5	DC Ammeter range	V	
14.6	Dial size		

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14.7	Accuracy class as per IS		
15.0	**Contactor**		
15.1	Manufacturer		
15.2	Type		
15.3	Rated voltage	V	
15.4	Rated current	A	
15.5	No. of power contact		
15.6	No. type and rating of Aux. Contacts		
15.7	Operating coil voltage		
15.8	Drop-out voltage		
15.9	Reference standard		
16.0	**Thermal over load relay**		
16.1	Manufacturer		
16.2	Tripping current range	A	
16.3	Whether single phasing protection provided	Yes/ No	
16.4	Reference standard		
17.0	**Air - break switches (both DC & AC side)**		
17.1	Manufacturer		
17.2	Type		
17.3	Rated voltage	V	
17.4	Rated current	A	
17.5	Type & material of contacts		
17.6	Reference standard		
18.0	**Output fuse**		
18.1	Manufacturer		
18.2	Type		
18.3	Rupturing capacity (both AC & DC)	A	
18.4	Reference standard		
19.0	**Painting**		
19.1	Paint shade		
19.2	Painting process		
20.0	**Degree of Protection (DOP)**		
20.1	Rectifier transformer cubicle		

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20.2	Control cubicle		
21.0	**Earthing busbar size & material**		
22.0	**Charger dimension: (approx.) [L x W x H]**		
23.0	**Sheet thickness (mm) / material**		
24.0	**Cable gland plate thickness**		
25.0	**Gasket material**		
26.0	**Charger weight (Kg.)**		

ANNEXURE-A
SPECIFIC TECHNICAL REQUIREMENT

CLAUSE NO.	TECHNICAL REQUIREMENTS

BATTERY CHARGER

1.00.00 CODES AND STANDARDS

1.01.00 All standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions as on date of opening of techno-commercial bid. In case of conflict between this specification and those (IS codes, standards etc.) referred to herein, the former shall prevail. All work shall be carried out as per the following standards and codes.

ANSI-C 37.90a	Guide for surge withstand capability tests
IS:5	Colours for ready mix paints.
IS : 694	PVC Insulated Cable for working voltages upto and including 1100 V.
IS : 1248	Specification for Direct acting indicating analogue electrical measuring instruments.
IS:13947 Part-1	Degree of protection provided by enclosures for low voltage switch gear and control gear.
IS : 13947	Specification for low voltage switch gear and control gear
IS : 3231	Electrical relays for power system protection.
IS : 3842	Application guide for Electrical relays for AC System
IS : 3895	Mono-crystalline semi-conductor Rectifier Cells and Stacks
IS : 4540	Mono crystalline semi-conductor Rectifier assemblies and equipment.
IS:6005	Code of practice for phosphating of Iron and Steel.
IS:6619	Safety Code for Semi-conductor Rectifier Equipment.
IS:6875	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages upto 1000 V AC or 1200 V DC.
IS : 9000	Basic environmental testing procedures for electronic and electrical items.
IS:13703	Low voltage fuses for voltages not exceeding 1000 V AC or 1500 V DC.

CLAUSE NO.	TECHNICAL REQUIREMENTS

	EEUA-45D	Performance requirements for electrical Alarm Annunciation System
		Indian Electricity Rules
		Indian Electricity Act.
	IS 2026-	POWER TRANSFORMERS

1.02.00 Equipment complying with other internationally accepted standards such as IEC, BS, VDE etc. will also be considered if they ensure performance and constructional features equivalent or superior to standards listed above. In such a case, the Bidder shall clearly indicate the standard(s) adopted, furnish a copy in English of the latest revision of the standards along with copies of all official amendments and revisions in force as on date of opening of techno-commercial bid and shall clearly bring out the salient features for comparison.

2.00.00 EQUIPMENT DESCRIPTION

2.01.00 PART-I BATTERY CHARGER FOR LEAD ACID PLANTE TYPE BATTERY

(a.) The Battery Chargers as well as their automatic regulators shall be of static type. Battery chargers shall be capable of continuous operation at the respective rated load in Trickle mode i.e. Trickle charging the associated DC lead-acid Batteries while supplying the D.C. loads. The Batteries shall be Trickle charged at 2.25 Volts per cell. All chargers shall also be capable of Boost Charging the associated D.C. Battery at 2.3 to 2.7 Volts per cell at the desired rate. The Chargers shall be designed to operate, as mentioned above, at an ambient air temperature of 50°C.

(b.) All Battery Chargers shall have provision to receive two input supplies along with suitable automatic changeover between the sources.

(c.) Battery Chargers shall have a selector switch for selecting the battery charging mode i.e. whether Trickle or Boost charging.

(d.) All Battery Chargers shall be provided with facility for both automatic and manual control of output voltage and current. A selector switch shall be provided for selecting the mode of output voltage/current control, whether automatic or manual. Means shall be provided to avoid current/voltage surges of harmful magnitude/nature which may arise during changeover from Auto to Manual mode or vice-versa under normal operating condition.

(e.) Soft start feature shall be provided to build up the voltage to the set value slowly within fifteen seconds. The chargers shall have load limiters which shall cause, when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the load limiter setting of the Charger. The load limiter

characteristic shall be such that any sustained overload or short circuit in DC system shall neither damage the Charger nor shall it cause blowing of any of the charger fuses. The Charger shall not trip on overload or external short circuit. After clearance of fault, the Charger voltage shall build up automatically when working in automatic mode.

(f.) When on automatic control mode during Trickle charging, the Charger output voltage shall remain within +/-1% of the set value for AC input voltage variation of +/-10%, frequency variation of +3/-5%, a combined voltage and frequency (absolute sum) variation of 10% and a continuous DC load variation from zero to full load. Uniform and step-less adjustments of voltage setting (in both manual and automatic modes) shall be provided on the front of the Charger panel covering the entire Trickle charging output range specified & shall be capable of matching the float voltage correction recommendations(w.r.t. temperature) as suggested by the respective battery manufacturer. Step-less adjustment of the load limiter setting shall also be possible from 80% to 100% of the rated output current for Trickle charging mode.

(g.) During Boost charging, the Battery Chargers shall operate on constant current mode (When automatic regulator is in service). It shall be possible to adjust the Boost charging current continuously over a range of 50 to 100% of the rated output current for Boost charging mode. The charger output voltage shall automatically go on rising, when it is operating on boost mode, as the battery charges up. For limiting the output voltage of the charger, a potentiometer shall be provided on the front of the panel, whereby it shall be possible to set the upper limit of this voltage anywhere in the output range specified for boost charging mode. All voltage and current setting potentiometers shall be vernier type.

(h.) Energizing the Charger with fully charged battery connected plus 10% load shall not result in output voltage greater than 110% of the voltage setting. Time taken to stabilize, to within the specified limits as mentioned elsewhere, shall be less than fifteen seconds.

(i.) Momentary output voltage of the Charger, without the Battery connected shall be within 94% to 106% of the voltage setting during sudden load Change from 100% to 20% of full load or vice-versa. Output voltage shall return to, and remain, within the limits specified as mentioned elsewhere in less than 2 seconds after the above mentioned change.

(j.) The Charger manufacturer may offer an arrangement in which the voltage setting device for Trickle charging mode is also used as output voltage limit setting device for

CLAUSE NO.	TECHNICAL REQUIREMENTS

Boost charging mode, and the load limiter of the trickle charging mode is also used as Boost charging current setting device.

(k.) Suitable filter circuits shall be provided in all the Chargers to limit the ripple content (peak to peak) in the output voltage to 1% irrespective of the DC load, even when they are not connected to a battery.

(l.) The DC System shall be ungrounded and float with respect to the ground potential when healthy.

2.02.00 PART-II BATTERY CHARGER FOR NICKEL-CADMIUM TYPE BATTERY

(a.) The Battery Chargers as well as their automatic regulators shall be of static type. Battery chargers shall be capable of continuous operation at the respective rated load in Trickle mode i.e. Trickle charging the associated DC Nickel-Cadmium Batteries while supplying the D.C. loads. The Batteries shall be Trickle charged at 1.4 to 1.42 Volts per cell. All chargers shall be capable of Boost Charging the associated D.C. Battery at 1.53 to 1.7 Volts per cell at the desired rate. The Chargers shall be designed to operate, as mentioned above, at an ambient air temperature of 50°C.

(b.) All Battery Chargers shall have provision to receive two input supplies along with suitable automatic changeover between the sources.

(c.) Battery Chargers shall have a selector switch for selecting the battery charging mode i.e. whether Trickle or Boost charging.

(d.) All Battery Chargers shall be provided with facility for both automatic and manual control of output voltage and current. A selector switch shall be provided for selecting the mode of output voltage/current control, whether automatic or manual. Means shall be provided to avoid current/voltage surges of harmful magnitude/nature which may arise during changeover from Auto to Manual mode or vice-versa under normal operating condition.

(e.) Soft start features shall be provided to build up the voltage to the set value slowly within fifteen seconds. The chargers shall have load limiters which shall cause, when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the load limiter setting of the Charger. The load limiter characteristic shall be such that any sustained overload or short circuit in DC system shall not damage the Charger, nor shall it cause blowing of any of the charger fuses. The Charger shall not trip on overload or external short circuit. After clearance of fault, the Charger voltage shall build up automatically when working in automatic mode.

CLAUSE NO.	TECHNICAL REQUIREMENTS

(f.) When on automatic control mode during Trickle charging, the Charger output voltage shall remain within +/-1% of the set value for AC input voltage variation of +/-10%, frequency variation of +3 to -5%, a combined voltage and frequency (absolute sum) variation of 10% and a continuous DC load variation from zero to full load. Uniform and stepless adjustments of voltage setting (in both manual and automatic modes) shall be provided on the front of the Charger panel covering the entire Trickle charging output range specified & shall be capable of matching the float voltage correction recommendations(w.r.t. temperature) as suggested by the respective battery manufacturer. Stepless adjustment of the load limiter setting shall also be possible from 80% to 100% of the rated output current for Trickle charging mode.

(g.) During Boost charging, the Battery Chargers shall operate on constant current mode (When automatic regulator is in service). It shall be possible to adjust the Boost charging current continuously over a range of 50 to 100% of the rated output current for Boost charging mode. The charger output voltage shall automatically go on rising, when it is operating on boost mode, as the battery charges up. For limiting the output voltage of the charger, a potentiometer shall be provided on the front of the panel, whereby it shall be possible to set the upper limit of this voltage anywhere in the output range specified for boost charging mode. All voltage and current setting potentiometers shall be vernier type.

(h.) Energising the Charger with fully charged battery connected plus 10% load shall not result in output voltage greater than 110% of the voltage setting. Time taken to stabilise, to within the specified limits as mentioned elsewhere shall be less than fifteen seconds.

(i.) Momentary output voltage of the Charger, without the Battery connected shall be within 94% to 106% of the voltage setting during sudden load Change from 100% to 20% of full load or vice-versa. Output voltage shall return to, and remain, within the limits specified as mentioned elsewhere in less than 2 seconds after the above mentioned change.

(j.) The Charger manufacturer may offer an arrangement in which the voltage setting device for Trickle charging mode is also used as output voltage limit setting device for Boost charging mode, and the load limiter of the trickle charging mode is also used as Boost charging current setting device.

(k.) Suitable filter circuits shall be provided in all the Chargers to limit the ripple content (peak to peak) in the output voltage to 1% irrespective of the DC load, even when they are not connected to a battery.

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	(l.) The DC System shall be ungrounded and float with respect to the ground potential when healthy.
2.03.00	Printed Circuits Boards (PCB) PCB shall be made of glass epoxy of 1.6 mm thick, fire resistant, bonded with 99.8% pure copper foil, free of wrinkles, blisters, scratches and pinholes. The contact surface of the edge connectors of the PCBs shall be plated with hard gold to a minimum thickness of 5 microns. Component identification shall be printed on PCB by silk screen method. All PCBs shall be tropicalised and masked.
2.04.00	CONTACTORS All Battery Chargers shall have an AC contactor on the input side. It shall be of air break type and suitable for continuous duty. The operating coil shall be rated for 415 Volts AC.
2.05.00	Thermal Overload Relay A thermal overload relay incorporating a distinct single phasing protection (using differential movement of bimetal strips) shall also be provided for the AC input. The relay shall trip the above contactor.
2.06.00	Rectifier-Transformers and Chokes The rectifier transformer and chokes shall be dry and air cooled (AN) type. The rating of the rectifier-transformers and chokes shall correspond to the rating of the associated rectifier assembly. The rectifier-transformers and chokes shall have class-B insulation with temperature rise limited to class-A insulation value.
2.07.00	Rectifier Assembly The rectifier assembly shall be full wave bridge type and designed to meet the duty as required by the respective Charger. The rectifier cells shall be provided with their own heat dissipation arrangement with natural air cooling for up to 400A rating chargers. However, the rectifier cells shall be provided with their own heat dissipation arrangement along with forced air cooling for above 400A rating chargers and fan shall be temperature controlled with 100% standby redundancy. The rectifier shall utilise diodes/thyristors and heat sinks rated to carry 200% of the load current continuously and the temperature of the heat sink shall not be permitted to exceed 85°C absolute duly considering the maximum charger panel inside temperature. The Contractor shall submit calculations to show what maximum junction temperature will be and what the heat sink temperature will be when operating at 200% and 100% load current continuously duly considering the maximum surrounding air temperature for these devices inside the charger panel assuming air ambient temperature of 50°C outside the panel. Necessary surge protection devices and rectifier type fast acting fuses shall be provided in each arm of the rectifier connections.

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2.08.00	DIGITAL INDICATING INSTRUMENTS Digital indicating instruments with built in communication port for remote data transfer shall be provided for all chargers. The instruments shall indicate DC current, DC voltage & AC voltage and instrument shall be 96 x 96 mm^2, with display accuracy 0.5%, 4 digit-7 segment LED/LCD display and RS 485 Serial Bus port.
2.09.00	AIR BREAK SWITCHES All Chargers shall have AC input and DC output switches of air break, single throw, load break and fault make type. The contacts of the switches shall open and close with a snap action. Switches shall be rated for 120% of the maximum continuous load. 'ON' & 'OFF' position of the switch shall be clearly indicated.
2.10.00	CONTROL AND SELECTOR SWITCHES Control and selector switches shall be of rotary stayput type with escutcheon plates showing the functions and positions. The switches shall be of sturdy construction and suitable for mounting on panel front. Switches with shrouding of live parts and sealing of contacts against dust ingress shall be preferred. The contact ratings shall be atleast the following: (a.) Make and carry continuously – 10 Amps. (b.) Breaking current at 220 V DC – 0.5 Amp. (inductive) (c.) Breaking current at 240 V AC – 5 Amp. At 0.3 p.f.
2.11.00	FUSES Fuses shall be of HRC cartridge fuse link type. Fuses shall be mounted on fuse carriers which are mounted on fuse bases. Wherever it is not possible to mount fuses on fuse carriers, fuses shall be directly mounted on plug in type bases. In such cases one insulated fuse pulling handle shall be supplied for each charger. Kick-off fuses (trip fuses) with alarm contacts shall be provided for all D.C. fuses.
2.12.00	Indicating Lamps Three (3) indicating lamps shall be provided to indicate A.C. supply availability. The indicating lamp shall be of panel mounting, filament type low wattage or LEDs and capable of clear status indication under the normal room illumination. The lamps shall be provided with series resistors (non-hygroscopic) preferably built in the lamp assembly and replaceable from front. The lamp covers shall be preferably screwed type, unbreakable and moulded from heat resistant material

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2.13.00	Blocking Diode Blocking diode shall be provided in the output circuit of each Charger to prevent current flow from the D.C. Battery into the Charger.
2.14.00	Annunciation System Visual indications through indicating lamps/LEDs or annunciation fascia shall be provided in all Chargers for the following: (a.) A.C. supply failure (b.) Rectifier fuse failure (c.) Surge circuit fuse failure (d.) Filter fuse failure (e.) Load limiter operated (f.) Charger trip (g.) Battery on Boost Potential free NO contacts of all above conditions shall be provided for following remote alarms in the PLC/DCS: (a) Battery on Boost (b) Charger trouble (this being a group alarm initiated by any of the faults other than 'Battery on Boost')
2.15.00	Name Plates and Marking The name plates shall be made of non-rusting metal/3 ply Lamicoid and shall have black back-ground with white engraved letters and secured by screws. These shall be provided near top edge on the front as well as on rear side of Charger. Name plates with full and clear inscriptions shall also be provided on and inside the panels for identification of the various equipments.
3.00.00	**CONSTRUCTION**
3.01.00	The Chargers shall be indoor, floor mounted, self supporting sheet metal enclosed cubicle type. The Contractor shall supply all necessary base frames, anchor bolts and hardware. The Charger shall be fabricated using cold rolled sheet steel shall not less than 1.6 mm and shall

CLAUSE NO.	TECHNICAL REQUIREMENTS

have folded type of construction. The panel frame shall be fabricated using cold rolled sheet steel of thickness not less than 2.0 mm. Removable undrilled gland plates of at least 3.0 mm sheet steel and lugs for all cables shall be supplied by the Contractor. The lugs for cables shall be made of electrolytic copper with tin coat. Cable sizes shall be advised to the Contractor at a later date for provision of suitable lugs and gland plates. The Charger shall be tropicalised and vermin proof. Ventilation louvers shall be backed with fine brass wire mesh. All doors and covers shall be fitted with synthetic rubber gaskets. The Chargers shall have hinged double leaf doors provided on front and/or backside for adequate access to the Charger internals. All the Charger cubicle doors shall be properly earthed. The degree of protection of Charger enclosure shall be atleast IP-42.

3.02.00 All indicating instruments, control & selector switches and indicating lamps shall be mounted on the front side of the Charger. Design of panels shall be based on the following dimensions.

1)	Overall height	-	Maximum 2350 mm
2)	Operating handles (highest and lowest positions reached by operator's hands), protective mechanical indicators	-	Maximum 1800 mm Minimum 350 mm
3)	Doors and panel handles and locks	-	Maximum 1800 mm Minimum 300 mm

3.03.00 The layout of Charger components shall be such that their heat losses do not give rise to excessive temperature within the Charger panel surface. Location of the electronic modules will be such that temperature rise of the location, in no case, will exceed 10°C over ambient air temperature outside the Charger.

3.04.00 Each Charger panel shall be provided with an illuminating lamp and one 5 Amp. Socket. Switches and fuses shall be provided separately for each of the above.

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3.05.00	Locking facilities shall be provided as following: 1. For locking Trickle/Boost selector switch in the respective position. 2. The Charger enclosure door locking requirements shall be met by the application of padlocks. Padlocking arrangement shall allow ready insertion of the padlock shackle but shall not permit excessive movement of the locked parts with the padlock in position.
3.06.00	**Wiring**
3.06.01	Each Charger shall be furnished completely wired upto power cable lugs and terminal blocks ready for external connection. The power wiring shall be carried out with 1.1 KV grade PVC insulated cables conforming to IS:1554 (Part-I). The control wiring shall be of 1.1KV grade PVC insulated stranded copper conductors of 2.5 sq.mm. conforming to IS:694. Control wiring terminating at electronic cards shall not be less than 1.0 sq. mm. Control terminal shall be suitable for connecting two wires with 2.5 sq.mm. stranded copper conductors. All terminals shall be numbered for ease of connections and identification. At least 20% spare terminals shall be provided for circuits.
3.06.02	Power and control wiring within panels shall be kept separate. Any terminal or metal work which remains alive at greater than 415 V, when panel door is opened, shall be fully protected by shrouding.
3.06.03	An air clearance of at least ten (10) mm shall be maintained throughout all circuits, except low voltage electronic circuits, right upto the terminal lugs. Whenever this clearance is not available, the live parts should be insulated or shrouded.
3.07.00	**PAINTING** Treatment as per IS:6005. Two coats of lead oxide primer followed by powder painting with final shade of RAL9002 for complete panel except end covers & RAL 5012 for end covers.
4.00.00	**TESTS**
4.01.00	All equipment to be supplied shall be of type tested design. During detail engineering, the contractor shall submit for Owner's approval the reports of all the type tests as listed in this specification and carried out within last ten years from the date of techno-commercial bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.
4.02.00	However if the contractor is not able to submit report of the type test(s) conducted within last ten years from the date of techno-commercial bid opening, or in the case of type test

Refer Section-I, Clause 3.2(a) of this specification for dates to be considered.

Refer Section-I, Clause 3.2(a) of this specification for dates to be considered.

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	report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client/owners representative and submit the reports for approval.
4.03.00	All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.
4.04.00	The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design change". Minor changes if any shall be highlighted on the endorsement sheet.
4.05.00	GENERAL 1. The contractor shall conduct/ furnish the following Routine tests/ Type test reports for each rating of the equipment to be supplied under this contract. For details of Type/ Routine tests, refer QP no. 0000-999-QOE-S-005. a) Complete physical examination b) Temperature rise test at full load. (For chargers of up to 400A rating, Temperature rise test report for rectifier assembly at 200% of full load shall also be submitted.) Rectifier assembly details shall be in line with clase 2.07.00 of this spec. Heat run test for other charger components shall be carried at 100% rated current. c) Insulation resistance test. d) High voltage (power frequency) test on power and control circuits except low voltage electronic circuits. e) Ripple content test at i) No load ii) Half load iii) Full load f) Automatic voltage regulator operation test at specified A.C. supply variations at i) No load ii) Half load iii) Full load

g) Load limiter operation test

h) Efficiency and power factor measurement.

i) Surge withstand capability test at the following points of the Charger:

i) Across each A.C. input phase

ii) Across AC input line to ground.

iii) Across D.C. output terminals.

iv) Across each D.C. output terminal to ground

The Charger shall not exhibit any component damage and there shall be no change in performance as per (g) and (h).

j) Environmental Tests

Steady state performance tests (f) and (g) shall be carried out before and after each of the following tests.

i) Soak Test

The electronic modules shall be subjected to continuous operation for a minimum period of 72 hours. During last 48 hours, the ambient temperature shall be maintained at 50 deg. C. The 48 hour test period shall be divided into four equal 12 hour segments. The input voltage during each 12 hours shall be nominal voltage for 11 hours followed by 110% of nominal voltage for 30 minutes, followed by 90% of nominal voltage for 30 minutes.

ii) Degree of protection test.

2. Dynamic response test and Temperature rise test at full load shall be carried out on each charger before dispatch at manufacturer's works.

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- BLANK SHEET -

PACKING SPECIFICATION FOR BATTERY CHARGER

CHARGER shall be despatched in "Crate Packing" using wood.

1.0 PREPARATION OF PACKING CASES:

1.1 **DIMENSIONS:**

1.1.1 Minimum number of planks shall be used for a shook.
1.1.2 Thickness of planks for Front, rear, top and bottom sides and binding, jointing battens shall be 25/20mm +2/-3 mm
1.1.3 Horizontal, vertical, diagonal planks shall be given for binding
1.1.4 Width of binding planks shall be minimum 100mm
1.1.5 Distance between any 2 binding planks shall be less than 750mm
1.1.6 Diagonal planks shall be used in between vertical binding planks when distance between inner to inner of vertical planks is more than 750mm
1.1.7 Distance of the outer edges of these planks from the edge of case shall be less than 250mm.
1.1.8 Diagonal planks are not required for top planks and width side, if the width of pallet is less than 750mm.

1.2 JOINTING OF PLANKS:

Single length planks shall be used for cubicles whose overall length is less than 2400 mm. For cubicles of length more than 2400 mm, jointing is permitted. The jointing shall be done with one single or maximum of 2 planks of wood same as other planks of width 250 mm (minimum) with two rows of nails on either side of the joint in zigzag manner. From the joint along height side, it shall be of lap joint with overlap of at least the width of plank.

1.3 PERMISSIBLE DEFECTS

Wood shall be free from knots, bows, visible sign of infection and any kind of decay caused by insects, fungus, etc.

End splits: Longest end splits at each end shall be measured and lengths added together. The added length shall not exceed 60mm per meter run of shook's. Wood pins shall be used to prevent further development of split.

Surface cracks: Surface cracks with a maximum depth of 3mm are permissible. A continuous crack of any depth all along the length is not allowed.

1.4 OTHER MATERIALS

1.5.1 NAILS

Nils of suitable dia and length shall be used for joining the planks.

1.5.2 BLUE NAILS

If applicable, these shall be used for nailing bituminized Kraft paper/hessian cloth to the planks.

1.5.3 HOOP IRON STRIPS

These are used for strapping the boxes. The material shall be free from rust. If sufficient nailing is done for bigger boxes, strapping need not be done.

1.5.4 CLIPS

These shall be used for strapping the hoop iron strips on the boxes.

1.5.5 BRACKETS

Brackets of suitable dimension shall be used for nailing to the corners of cubicle boxes. The brackets shall be of mild steel of suitable thickness. The brackets shall be of “L" shape. Two holes shall be provided towards the end of each side for screwing /nailing.

1.5.6 MULTI LAYERED CROSS LAMINATED POLYTHELENE FILM

100GSM(colourless) Multi Layered Cross Laminated Polyethylene Film shall be used to make covers to the jobs individually. The cross lamination gives qualities of extra toughness, together with flexibility and lightness coupled with good weather resistance to ultra violet rays.

1.5.6 RUBBERISED COIR:

The rubberized coir is used as cushioning material. For the packing of loose items, items are to be arrested by using rubberized coir.

1.5.7 FASTENERS

Bolts, double nuts, spring washers will have to be used to hold the job to the bottom plank of the box so that there shall be no jerk on the CHARGER during transit.

1.5.8 PACKING SLIP:

Packing slip kept in the polyethylene bag shall be placed in the box at appropriate place. In addition, one more packing slip covered in polyethylene cover and packing slip holder shall be nailed to front / rear of case.

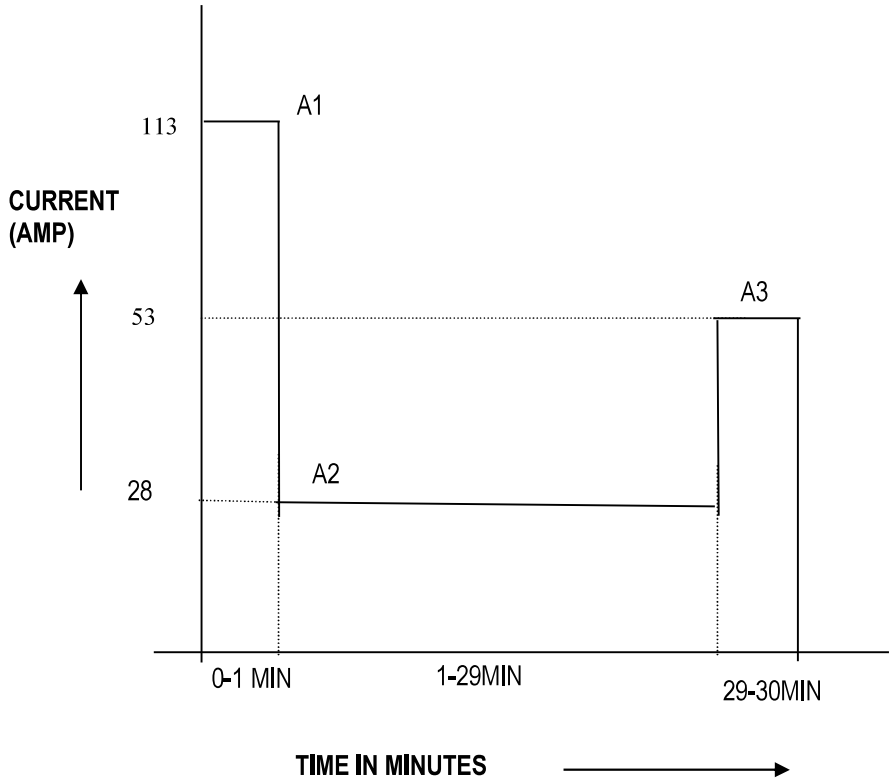
1.5.9 MARKING PLATE:

Marking on the packing case shall be done as per the manufacturer standard.

	TECHNICAL SPECIFICATION FOR 220V DC BATTERYCHARGER	SPECIFICATION NO. PE-TS- 442 -508-E002	
		REVISION 0	DATE : 09.05.2024
		SHEET	

ANNEXURE-I

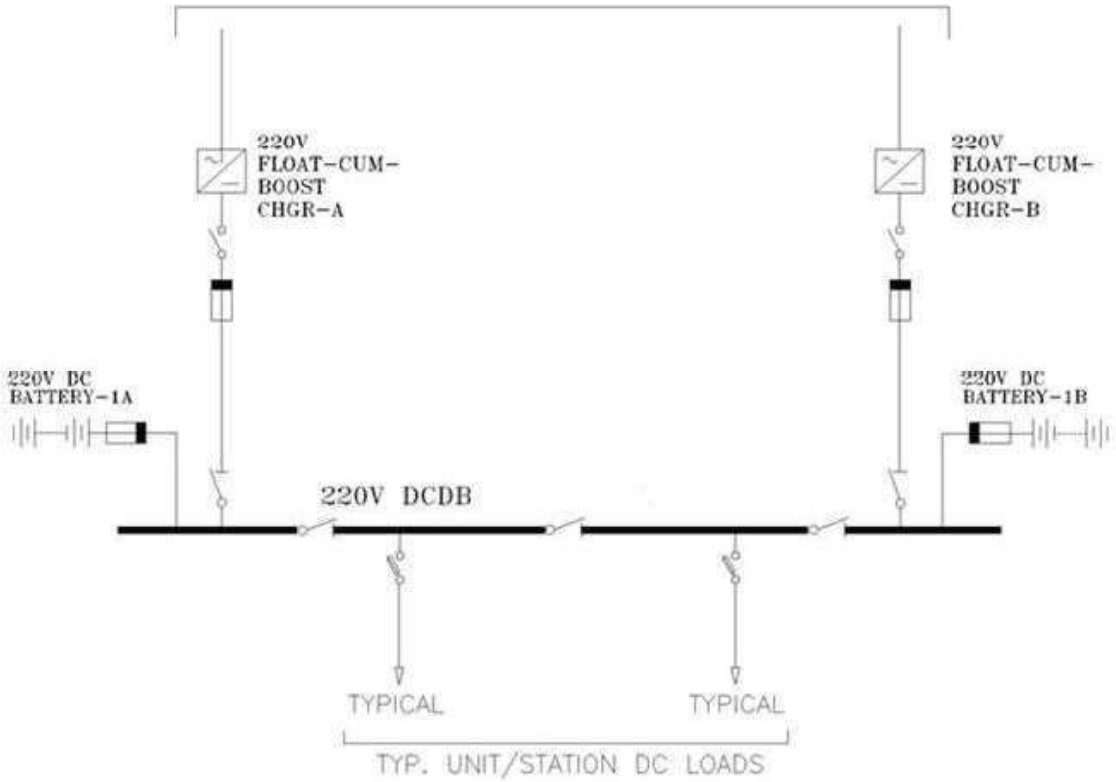
LOAD DUTY CYCLE



	TECHNICAL SPECIFICATION FOR 220V DC BATTERYCHARGER	SPECIFICATION NO. PE-TS- 442 -508-E002	
		REVISION 0	DATE 09.05.2024
		SHEET	

ANNEXURE-II

ONE LINE DIAGRAM FOR 220 V DC SYSTEM



ANNEXURE III
SUB VENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE
AC CONTACTORS	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
AC CONTACTORS	2	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
AC CONTACTORS	3	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
AC CONTACTORS	4	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
AC CONTACTORS	5	B04	BCH	20/4, MATHURA ROAD, FARIDABAD, HARYANA-121006	0129-4293000
AC LOAD BREAK SWITCH	1	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
AC LOAD BREAK SWITCH	2	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
AC LOAD BREAK SWITCH	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
AC LOAD BREAK SWITCH	4	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687
AC LOAD BREAK SWITCH	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
AC MCCB	1	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
AC MCCB	2	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
AC MCCB	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
AC MCCB	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
AC MCCB	5	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
AC MCCB	6	C02	CROMPTON GREAVES	RAIL TRANSPORTATION SYSTEMS,VANDANA BUILDING, 11, TOLSTOY MARG, TOLSTOY MARG, NEW DELHI, DL 110001	011 3041 6300
AIR CIRCUIT BREAKER	1	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
AIR CIRCUIT BREAKER	2	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015,	0124-2842000, 9873424331 amit.bhadauria@siemens.com
AIR CIRCUIT BREAKER	3	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
AIR CIRCUIT BREAKER	4	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
AIR CIRCUIT BREAKER	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
AUXILIARY RELAYS	1	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449
AUXILIARY RELAYS	2	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000
AUXILIARY RELAYS	3	E1075	JYOTI LTD.	JYOTI LIMITED, E&CS DIVISION,3/15, BIDC, GORWA,VADODARA - 390 016, E-MAIL ID: ECS@JYOTI.COM	Ph. No.:+91-265-2281214 , Fax No.:+91-265-2281214
AUXILIARY RELAYS	4	E1099	OEN INDIA LTD	29/1479, VYTILLA, COCHIN - 682 019 KERALA, INDIA	Phone : +91 484 2301132, 2303709 Fax : +91 484 2302287, 2302221 sales@oenindia.com
AUXILIARY RELAYS	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
BIMETAL RELAYS	1	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
BIMETAL RELAYS	2	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447

282955/2024/PS-PEM.EL

ANNEXURE III
SUB VENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE
BIMETAL RELAYS	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
BIMETAL RELAYS	4	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
CABLE GLANDS	1	E1201	ALLIED TRADERS & EXPORTERS	C-124 A, SECTOR-2, NOIDA -201 301, UTTAR PRADESH, INDIA	Mr. Vijay Mohan Sood +(91)-(120)-2525694 +(91)-(120)-3052594 +(91)-(11)-23287156 vijay_mohansood@yahoo.com
CABLE GLANDS	2	E1017	ARUP ENGG & FOUNDARY WORKS	391/119,PRINCE ANWAR SHAH ROAD, CALCUTTA-700068	033 2473 0850
CABLE GLANDS	3	E1206	BALIGA LIGHTING EQPT.PVT.LTD.	63A,CP RAMASWAMY ROAD, ALWARPET,P.B.No 6910, CHENNAI-600018	44-24995505,22680990-4
CABLE GLANDS	4	E1036	COMMET BRASS PRODUCTS	NUTAN CHEMICAL COMPOUND, WALBHAT ROAD, GOREGAON, MUMBAI-400063	91-022-26852961/62/63 comet@vsnl.net
CABLE GLANDS	5	DW08	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGOAN (EAST). MUMBAI 400 063.	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/ 022-29270878.
CABLE GLANDS	6	E1044	ELECTROMAC INDUSTRIES	27/28AF NEW EMPIRE IND.ESTT., R.KRISHNA MANDIR RD.JB NGR ,ANDHERI(E),MUMBAI-400059	91-22-28324829 / 66919034 devang@electromacglands.com
CABLE GLANDS	7	I01	INCAB	HARE STREET,KOLKATA,WEST BENGAL-700001	91-33-2480161/62/63/64 Fax : 91-33-2485766
CABLE LUGS	1	E1040	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGOAN (EAST).	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/
CABLE LUGS	2	E1149	UNIVERSAL MACHINES LTD.	4,B.B.D.BAG (EAST) 90,STEPHEN HOUSE,5TH FLR CALCUTTA-700001	033 2282 2540
D.C. MCCB	1	C02	CROMPTON GREAVES	RAIL TRANSPORTATION SYSTEMS,VANDANA BUILDING, 11, TOLSTOY MARG, TOLSTOY MARG, NEW DELHI, DL 110001	011 3041 6300
D.C. MCCB	2	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
D.C. MCCB	3	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL,	044-49681447
D.C. MCCB	4	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
EARTH LEAKAGE CB	1	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
EARTH LEAKAGE CB	2	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
EARTH LEAKAGE CB	3	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
EARTH LEAKAGE CB	4	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
EARTH LEAKAGE CB	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
EARTH LEAKAGE CB	6	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449
EARTH LEAKAGE CB	7	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222
EARTH LEAKAGE CB	8	E1088	MDS SWITCHGEAR LTD	314-317SHAH NAHAR ESTATE	011 - 25793021
EARTH LEAKAGE CB	9	E1120	S&S POWER SWITCHGEAR LTD,	NEW NO. 67, OLD NO. 19, DR. RANGA ROAD, MYLAPORE, CHENNAI - 600004	044 - 24988056, 044 - 24988057, 044 - 24988058
DC CONTACTORS	1	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
DC CONTACTORS	2	E1030	BHEL (BHOPAL)	HEAVY ELECTRICAL PLANT	
DC CONTACTORS	3	E1044	ELECTROMAC INDUSTRIES	27/28AF NEW EMPIRE IND.ESTT., R.KRISHNA MANDIR RD.JB NGR ,ANDHERI(E),MUMBAI-400059	91-22-28324829 / 66919034 devang@electromacglands.com
DC CONTACTORS	4	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
DC CONTACTORS	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
DC CONTACTORS	6	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400

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ANNEXURE III
SUB VENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE
DC CONTACTORS	7	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
CONTROL SWITCHES/ SELECTOR SWITCH	1	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687
CONTROL SWITCHES/ SELECTOR SWITCH	2	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
CONTROL SWITCHES/ SELECTOR SWITCH	3	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479000
CONTROL SWITCHES/ SELECTOR SWITCH	4	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
CONTROL SWITCHES/ SELECTOR SWITCH	5	SRC01	M/s Shrenik & Co.	39A/3, PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ-BAVLA ROAD, CHANGODAR,	
CONTROL SWITCHES/ SELECTOR SWITCH	6	RE05	RECOM PVT. LTD.	M/S RECOM PVT. LTD.,16A , 2ND FLOOR A, WING RAJ INDUSTRIAL COMPLEX, MILITARY	Mr. Chandrashekar Kamath (MD) : 09820249503
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	1	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	2	E1066	INDCOIL	PLOT NO. A- 150/ 151, 23RD U ROAD, WAGLE ESTATE, THANE WEST, CST RD, FRIENDS COLONY, HALLOW PUL, KURLA WEST, MUMBAI, MAHARASHTRA 400070	Phone:022 2583 8305
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	3	K18	KAPPA ELECTRICALS	KAPPA ELECTRICALS, KAPPA CONSOLIDATED PVT. LTD., 14, CART TRACK ROAD, MADUVANKARAI, CHENNAI - 600 042, INDIA.	PHONE: +91 - 44 - 22454709, 22454516, 22450794, 22450795 FAX: +91 - 44 - 22351662, 22451693 E-MAIL: mira@kappaelectricals.com sales@kappaelectricals.com
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	4	E1082	LOGICSTAT	B-160, INDUSTRIAL AREA, C BLOCK RD, OKHLA I, OKHLA INDUSTRIAL AREA, NEW DELHI, DL 110020	011 2681 0032
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	5	E1106	PRECISE ELECTRICALS	47A-49A,CHAKALA ROAD ANDHERI(E),MUMBAI-99 MUMBAI, MAHARASHTRA, INDIA PIN-400 099	022-8323402 / 022-8216433
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	6	E1128	UNILEC ENGINEERS PVT. LTD.	PLOT NO: R-247, T.T.C. INDUSTRIAL AREA, M.I.D.C , RABALE, NAVI MUMBAI- 400 701 INDIA	+91-22- 27607787 / 27607927 +91-22- 27607997
CONTROL TRANSFORMER	7	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)
LT- CURRENT TRANSFORMER	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
LT- CURRENT TRANSFORMER	2	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482
LT- CURRENT TRANSFORMER	3	E1066	INDCOIL	PLOT NO. A- 150/ 151, 23RD U ROAD, WAGLE ESTATE, THANE WEST, CST RD, FRIENDS COLONY, HALLOW PUL, KURLA WEST, MUMBAI, MAHARASHTRA 400070	Phone:022 2583 8305
LT- CURRENT TRANSFORMER	4	K18	KAPPA ELECTRICALS	KAPPA ELECTRICALS, KAPPA CONSOLIDATED PVT. LTD., SOUTHERN ELECTRIKS 14, CART TRACK ROAD, MADUVANKARAI, CHENNAI - 600 042, INDIA.	PHONE: +91 - 44 - 22454709, 22454516, 22450794, 22450795 FAX: +91 - 44 - 22351662, 22451693 E-MAIL: mira@kappaelectricals.com sales@kappaelectricals.com
LT- CURRENT TRANSFORMER	5	E1104	PRAGATI ELECTRICALS	280/3,II POKHRAN RD	5341779,5427041
LT- CURRENT TRANSFORMER	6	E1106	PRECISE ELECTRICALS	47A-49A,CHAKALA ROAD ANDHERI(E),MUMBAI-99 MUMBAI, MAHARASHTRA, INDIA PIN-400 099	022-8323402 / 022-8216433
LT- CURRENT TRANSFORMER	7	E1128	SILKAANS ELECT.MFG.CO.PVT.LTD	PLOT NO: R-247, T.T.C. INDUSTRIAL AREA, M.I.D.C , RABALE, NAVI MUMBAI- 400 701 INDIA	+91-22- 27607787 / 27607927 +91-22- 27607997

ANNEXURE III
SUB VENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE
LT- CURRENT TRANSFORMER	8	E1111	PRAYOG ELECTRICALS PVT. LTD.	GROUND FLOOR, THAKORE INDUSTRIAL COMPUND, STATION ROAD, VIDYA VIHAR (W), NATHANI ROAD , OPP. AMIBIKA TEMPLE,MUMBAI Mumbai - 400086, Maharashtra, India	91-22-25164288/25133146 Mr. P. U. PATWARDHAN (MANAGING DIRECTOR)
LT- CURRENT TRANSFORMER	9	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
LT- CURRENT TRANSFORMER	10	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)
LT- POTENTIAL TRANSFORMER	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
LT- POTENTIAL TRANSFORMER	2	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482
LT- POTENTIAL TRANSFORMER	3	E1066	INDCOIL	PLOT NO. A- 150/ 151, 23RD U ROAD, WAGLE ESTATE, THANE WEST, CST RD, FRIENDS COLONY, HALLOW PUL, KURLA WEST, MUMBAI, MAHARASHTRA 400070	Phone:022 2583 8305
LT- POTENTIAL TRANSFORMER	4	K18	KAPPA ELECTRICALS	KAPPA ELECTRICALS, KAPPA CONSOLIDATED PVT. LTD., SOUTHERN ELECTRIKS 14, CART TRACK ROAD, MADUVANKARAI, CHENNAI - 600 042, INDIA.	PHONE: +91 - 44 - 22454709, 22454516, 22450794, 22450795 FAX: +91 - 44 - 22351662, 22451693 E-MAIL: mira@kappaelectricals.com sales@kappaelectricals.com
LT- POTENTIAL TRANSFORMER	5	E1104	PRAGATI ELECTRICALS	280/3,II POKHRAN RD	5341779,5427041
LT- POTENTIAL TRANSFORMER	6	E1106	PRECISE ELECTRICALS	47A-49A,CHAKALA ROAD ANDHERI(E),MUMBAI-99 MUMBAI, MAHARASHTRA, INDIA PIN-400 099	022-8323402 / 022-8216433
LT- POTENTIAL TRANSFORMER	7	E1128	SILKAANS ELECT.MFG.CO.PVT.LTD	PLOT NO: R-247, T.T.C. INDUSTRIAL AREA, M.I.D.C , RABALE, NAVI MUMBAI- 400 701 INDIA	+91-22- 27607787 / 27607927 +91-22- 27607997
LT- POTENTIAL TRANSFORMER	8	E1111	PRAYOG ELECTRICALS PVT. LTD.	GROUND FLOOR, THAKORE INDUSTRIAL COMPUND, STATION ROAD, VIDYA VIHAR (W), NATHANI ROAD , OPP. AMIBIKA TEMPLE,MUMBAI Mumbai - 400086, Maharashtra, India	91-22-25164288/25133146 Mr. P. U. PATWARDHAN (MANAGING DIRECTOR)
LT- POTENTIAL TRANSFORMER	9	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)
DC SWITCH	1	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
DC SWITCH	2	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687
DC SWITCH	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
FUSE BASE	1	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222
FUSE BASE	2	G01	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
FUSE BASE	3	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
FUSE BASE	4	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
FUSE BASE	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 ;amit.bhadauria@siemens.com
FUSE BASE	6	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449
FUSE BASE	7	S02	SPACEAGE SWITCHGEARS LTD.	68 & 13-A INDUSTRIAL DEVELOPMENT COLONY, MEHRAULI ROAD GURGAON, HARYANA-122001	0124-2302711, 4085091

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ANNEXURE III
SUB VENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE
FUSE BASE	8	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
FUSE BASE	9	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000
FUSE BASE	10	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060
HRC FUSES	1	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222
HRC FUSES	2	G01	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
HRC FUSES	3	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
HRC FUSES	4	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
HRC FUSES	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 ;amit.bhadauria@siemens.com
HRC FUSES	6	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449
HRC FUSES	7	S02	SPACEAGE SWITCHGEARS LTD.	68 & 13-A INDUSTRIAL DEVELOPMENT COLONY, MEHRAULI ROAD GURGAON, HARYANA-122001	0124-2302711, 4085091
HRC FUSES	8	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
HRC FUSES	9	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000
HRC FUSES	10	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060
INTERPOSING RELAY	1	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449
INTERPOSING RELAY	2	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000
INTERPOSING RELAY	3	E1075	JYOTI LTD.	JYOTI LIMITED, E&CS DIVISION,3/15, BIDC, GORWA,VADODARA - 390 016, E-MAIL ID: ECS@JYOTI.COM	Ph. No.:+91-265-2281214 , Fax No.:+91-265-2281214
INTERPOSING RELAY	4	E1099	OEN INDIA LTD	29/1479, VYTILLA, COCHIN - 682 019 KERALA, INDIA	Phone : +91 484 2301132, 2303709 Fax : +91 484 2302287, 2302221 sales@oenindia.com
INTERPOSING RELAY	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
INDICATING LAMPS	1	B04	BCH	20/4, MATHURA ROAD, FARIDABAD, HARYANA-121006	0129-4293000
INDICATING LAMPS	2	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	6832259,6918834-37
INDICATING LAMPS	3	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060
INDICATING LAMPS	4	E1153	VAISHNO(HOTLINE SWGR.& CONTROL)	G-19, SECTOR - 11, NOIDA - 201301, UTTAR PRADESH, INDIA	8377805157 9818338922
INDICATING LAMPS	5	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	9818338922
INDICATING LAMPS	6	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
INDICATING LAMPS	7	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
MCB	1	E1088	MDS SWITCHGEAR LTD	314-317SHAH NAHAR ESTATE	011 - 25793021
MCB	2	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222
MCB	3	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
MCB	4	E1120	S&S POWER SWITCHGEAR LTD,	NEW NO. 67, OLD NO. 19, DR. RANGA ROAD, MYLAPORE, CHENNAI - 600004	044 - 24988056, 044 - 24988057, 044 - 24988058
PROTECTION - RELAYS (PNUEMATIC)	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
PROTECTION - RELAYS (PNUEMATIC)	2	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
PROTECTION - RELAYS (PNUEMATIC)	3	A35	GE-MULTILINE, GE INDIA INDUSTRIAL PVT. LTD.	NO. 90- B, ELECTRONICS CITY, HOSUR ROAD, BENGALURU - 560016, KARNATAKA	(080) 41314617, 9945478935
PROTECTION - RELAYS (PNUEMATIC)	4	SC01	SCHWEITZER ENGG. LAB (SEL)	406, BHIKAJI CAMA BHAVAN, BHIKAJI CAMA PLACE, BHIKAJI CAMA PLACE, MOHAMMADPUR, RK PURAM, NEW DELHI, DL 110066	011 4152 7899
PROTECTION - RELAYS (PNUEMATIC)	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29

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ANNEXURE III
SUB VENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE
PROTECTION - RELAYS (PNUEMATIC)	6	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000
PROTECTION - RELAYS (PNUEMATIC)	7	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449
PROTECTION - RELAYS (PNUEMATIC)	8	C01	AVK-SEG & CONTROLS(I) LTD	C-60,NOIDA PHASE-II	6918834-37
TERMINAL BLOCKS	1	C01	WAGO-CONTROLS	C 27, GREATER NOIDA, SECTOR 58, C BLOCK, SECTOR 58, NOIDA, UTTAR PRADESH 201307	0120-2580409/10
TERMINAL BLOCKS	2	E1038	CONNECT WELL	309A/4, 3RD FLOOR, KALKAJI, OKHLA IND AREA PH-2, GOVINDPURI, NEW DELHI, DL 110019	9811881085 09871419996 011-65908877
TERMINAL BLOCKS	3	E1047	ELMEX CONTROLS PVT. LTD.	12,G.I.D.C.ESTATE,MUKARPURA ROAD,VADODARA-390010	9374631074
TERMINAL BLOCKS	4	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060
TERMINAL BLOCKS	5	E1142	TECHNOPLAST	OPP.I.M.INTER COLLEGE, BEGUM SARAI KHURD ROAD, AMROHA - 244221, U.P.	PH:- 05922 264006 CELL NO:- 9012676000, 9319520799, 9319582467
TERMINAL BLOCKS	6	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	TEL.- +912066745000 Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126 contact person : Vishwa bandhu E-mail:d.gupta@pmipl-online.com ;admin@pmipl-online.com
TERMINAL BLOCKS	7	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060
TIMERS - PNEUMATIC	1	B04	BCH	20/4, MATHURA ROAD, FARIDABAD, HARYANA-121006	0129-4293000
TIMERS - PNEUMATIC	2	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000
TIMERS - PNEUMATIC	3	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
TIMERS - PNEUMATIC	4	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
TIMERS - PNEUMATIC	5	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
TIMERS - PNEUMATIC	6	E01	ELECTRONIC AUTOMATION PVT. LTD.	20, KHB INDUSTRIAL AREA YELAHANKA BANGLORE-560064	080 -28567561 / 080 -28567562 / 080 -42802345
ENERGY METER (ANALOG)	1	B07	BHEL (EDN)	MYSORE ROAD,BANGALORE-560026	080-26998500
ENERGY METER (ANALOG)	2	E1129	SIMCO ENGG. LTD	NO. 126, K ROAD, TIRUCHIRAPPALLI -620001, TAMIL NADU	Mr. Madaswamy Muthu +(91)-(431)-4046223 +(91)-(431)-4046210 +(91)-9786600915
ENERGY METER (ANALOG)	3	R01	RISHABH INST.PVT LTD	RISHABH INSTRUMENTS PVT. LTD. F-31, MIDC, SATPUR NASHIK - 422007 MAHARASHTRA INDIA	marketing@rishabh.co.in 91-253 2202202/203 Fax: 91 253 2351064
ENERGY METER (ANALOG)	4	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482
ENERGY METER (ANALOG)	5	CON1	CONZERVE SYSTEMS PVT. LTD.(SCHNEIDER)	87, 1ST FLOOR INDUSTRIAL DEVELOPMENT COLONY (IDC) MEHRAULI ROAD, UGURGAON 122001 HARYANA, INDIA.	4268899, 9910695701
ENERGY METER (DIGITAL)	1	CON1	CONZERVE SYSTEMS PVT. LTD.(SCHNEIDER)	87, 1ST FLOOR INDUSTRIAL DEVELOPMENT COLONY (IDC) MEHRAULI ROAD, UGURGAON 122001 HARYANA, INDIA.	4268899, 9910695701
ENERGY METER (DIGITAL)	2	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)
AMMETER	1	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482
AMMETER	2	R01	RISHABH INST.PVT LTD	RISHABH INSTRUMENTS PVT. LTD. F-31, MIDC, SATPUR NASHIK - 422007 MAHARASHTRA INDIA	marketing@rishabh.co.in 91-253 2202202/203 Fax: 91 253 2351064
AMMETER	3	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)

282955/2024/PS-PEM-EL

ANNEXURE III
SUB VENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE
VOLTMETER	1	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482
VOLTMETER	3	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)
MPCB	1	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
MPCB	2	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
MPCB	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
MPCB	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
MPCB	5	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
MPCB	6	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
MULTIFUNCTION METER	1	CON1	CONZERVE SYSTEMS PVT. LTD./ SCHNEIDER ELECTRIC INDIA PVT. LTD.	87, 1ST FLOOR INDUSTRIAL DEVELOPMENT COLONY (IDC) MEHRAULI ROAD, GURGAON 122001 HARYANA, INDIA.	4268899, 9910695701
MULTIFUNCTION METER	2	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)
RCCB	1	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29
RCCB	2	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400
RCCB	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com
RCCB	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447
RCCB	5	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59
RCCB	6	C02	CROMPTON GREAVES	RAIL TRANSPORTATION SYSTEMS,VANDANA BUILDING, 11, TOLSTOY MARG, TOLSTOY MARG, NEW DELHI, DL 110001	011 3041 6300
VAF METER (DIGITAL)	1	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)

Note: Make of equipment/ components is indicative. Make of equipment/ components shall be subject to customer approval after award of contract without any commercial or delivery implication.

282955/2024/PS-REM-EL

एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 005 A REV NO: 00 DATE :10-APR-08 PAGE 1 OF 7	REVIEWED BY: A.MANDAL V. TALWAR C. P. NIRANJAN S.D. SINGH	APPROVED BY: QUALITY ASSURANCE 10 APR 2008 REMARKS APPROVED NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	VALID UPTO : 9-APR-11		

SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD S	FORMAT OF RECORD D*	AGENCY M	AGENCY C	AGENCY N	
1.	2.	3.	4.	5.	6		7.	8.	9.		10.			

Note

1. A list of major components / bought out items is indicated at Appendix A. Makes for these will be proposed by the manufacturer along with the Endorsement Sheet for NTPC acceptance.
2. Documents identified in the SQP for NTPC verification will be maintained. However, other documents i.e. IR, IPIR & Mfr's TCs mentioned in the QP will also be maintained by the Manufacturer, which NTPC may verify on surveillance basis at the time of final inspection. QC Records in soft form are also acceptable.

1.0	**Raw Material:**													
1.1	M.S. Sheet (CRCA)	1. Grade	Major	Visual	100%	-	Mfr drg	Mfr drg	IR		P	-	-	IR= Inspection record
		2.Thickness & Finish	Major	Physical	Sample/lot	-	NTPC Specification	NTPC Specification	-do-		P	-	-	
1.2	Powder Paint	Shade	Major	Visual	Sample/Lot	-	IS-5(1994) SHADE CARD	NTPC appd drg / data sheet	-do-		P	-	-	
2.0	**Major Bought Out Items (Refer note 1 also)**													
2.1	Power Switches, MCCB Contactor & Relay	1) Type, Rating	Major	Physical	100%	100%	NTPC appd drg / data sheet	NTPC appd drg / data sheet	IR		P	V	V	
		2) Mechanical Operation / functional check	Major	Visual	100%	-	Mfr std.	Mfr std.	-do-		P	-	-	
2.2	MCB, Push Buttons HRC fuse terminal blocks, control & selector switches, Semiconductor Fuses, Heaters, Thermostat, Lamps, Plug in socket, Neutral Link, Lamp holders and Exhaust Fan, Heat sink	1) Type, Rating	Major	Visual	100%	-	NTPC approved Drg / Data Sheet	NTPC approved Drg / Data Sheet	-do-		P	-	-	
		2) Continuity Test	Major	Electrical	100%	-	Mfr std.	Mfr std.	do-		P	-	-	
2.3	Rectifier bridge Elements	Type, Rating	Major	Visual	100%	100%	NTPC appd drg./ Data Sheet	NTPC appd drg / Data Sheet	IR	√	P	V	V	
2.4	Digital Multi Function Meters	1) Type & rating	Major	Visual	100%	100%	NTPC appd drg / data sheet	NTPC appd drg / data sheet	-do-		P	V	V	
		2) Calibration Certificate	Major	Visual	100%	100%	-do-	-do-	Mfr TC	√	V	V	V	
		3) Routine TC	Major	Electrical	100%	100%	-do-	-do-	-do-		V	V	V	
2.5	PVC Insulated Electric Cable	1) Type, size	Major	Visual	100%	At random	NTPC Specification / Data Sheet	NTPC Specification / Data Sheet	IR		P	V	V	All power cables to confirm to IS 1554; Control wires to confirm to IS 694
		2) I.R. Test	Major	Electrical	Sample/lot	-	-do-	-do-	-do-		P	-	-	

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"

Note: NTPC Inspection Engineer to check, approval date/ revision no. of reference documents at the time of inspection

NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 9000-999-QOE- S - 005 A REV. NO: 00 DATE :10-APR-08 PAGE 2 OF 7	REVIEWED BY A.MANDAL V.TALWAR O.P. NIRANJANA S.D. SINGH	APPROVED BY QUALITY ASSURANCE 10 APR 2008 REMARKS APPROVED NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	VALID UPTO : 9-APR-11		

SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N
1.	2.	3.	4.	5.	6		7.	8.	9.		10.		
		3) H.V. Test	Major	Electrical	Sample/lot	-	-do-	-do-	-do-		P	-	-
2.6	Transducer	1) Routine TC & calibration report	Major	Electrical	100%	100%	NTPC Specification / Data Sheet / IS 12784	NTPC Specification / Data Sheet / IS 12784	Mfr TC	√	P	V	V
		2) Type, Rating	Major	Visual	100%	100%	-do-	-do-	do-		P	V	V
2.7	Current Transformer, Dimmerstat Control Transformer	1) Routine Tests	Major	Electrical	100%	10%	NTPC appd drg / Data Sheet / IS 2705	NTPC appd drg / Data Sheet / IS 2705	Mfr TC	√	V	V	V
		2) Type, Rating	Major	Visual	100%	10%	-do-	-do-	IR		P	V	V
2.8	Busbar	1) Dimensional checkup	Major	Physical	100%	-	NTPC appd drg / Data Sheet	NTPC appd drg / Data Sheet	-do-		P	-	-
		2) Conductivity Test	Major	Electrical	Sample / lot	-	-do-	-do-	-do-		P	-	-
2.9	Annunciation facia (If Applicable)	All routine tests as per EEUA-45D	Major	Electrical	100%	100%	NTPC Specification / appd drg / data sheet	NTPC Specification / appd drg / data sheet	Mfr TC		P	V	V
2.10	Visual Indications for charger status using LED / indicating lamps (if annunciation facia not used)	Electronic card usec for indication (Refer Electronic card assembly & location at cl. no. 3.4, for checks)					NTPC Specification / appd drg / data sheet	NTPC Specification / appd drg / data sheet					
2.11	Rectifier transformer	1). Rating	Major	Visual	100%	100%	NTPC approved data sheet	NTPC approved data sheet	IR	√	P	V	V
		2) Dimensional check	Major	Physical	100%	100%	Mfr drg.	Mfr drg.	-do-	√	P	V	V
		a) Overall size	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V
		b) Mounting details	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V
		3) Terminal Board	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V
		4) Polarity Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	V	V
		5) I.R. Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	V	V
		6) Routine Tests											
		a) Voltage Ratio Test	Major	Electrical	100%	100%	NTPC approved data sheet / NTPC spec / IEC 146	NTPC approved data sheet / NTPC spec./ IEC 146	IR / Mfr TC	√	P/V	V	V
		b) DC Resistance Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V
		c) No Load Test & Measurement of iron losses	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V

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Note: NTPC Inspection Engineer to check, approval date/ revision no. of reference documents at the time of inspection

282955/2024/PS-PEM-EL

NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 005 A REV. NO 00 DATE :10-APR-08 PAGE 3 OF 7	REVIEWED BY: A.MANDAL V.TALWAR O.P. NIRANJANI S.D. SINGH	APPROVED BY: QUALITY ASSURANCE DEPTT. 10 APR 2008 APPROVED NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	VALID UPTO : 9-APR-11		

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	
1.	2.	3.	4.	5.	6		7.	8.	9.		10.			
		d) Measurement of Tap Voltages	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		e) Measurement of Cu. Losses	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		f) High voltage test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		g) Induced High Voltage test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		h) Heat run Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	Temp. rise limited to class A insulation value
2.12	Choke	1) Rating	Major	Physical	100%	100%	NTPC approved data sheet	NTPC approved data sheet	IR	√	P	V	V	
		2) Dimensional check	Major	Physical	100%	100%	Mfr drg.	Mfr drg.	-do-	√	P	V	V	
		a) Overall Size			100%	100%	-do-	-do-	-do-	√	P	V	V	
		b) Mounting details			100%	100%	-do-	-do-	-do-	√	P	V	V	
		3. Terminal Board / Bakelite plate or busbar	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		4. Terminal rating	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		5. Air Gap Measurement	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		6. Continuity test	Major	Elec.	100%	100%	-do-	-do-	-do-	√	P	V	V	
		7. Insulation Resistance	Major	Elec.	100%	100%	NTPC approved data sheet / NTPC spec./ IEC 146	NTPC approved data sheet / NTPC spec./ IEC 146	IR / Mfr TC	√	P/V	V	V	
		8 High Voltage test	Major	Elec.	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		9. DC resistance test	Major	Elec.	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		10) Heat run Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	Temp. rise limited to class A insulation value
2.12	Printed Circuit Boards	1) Visual Checks	Major	Physical	100%	-	Mfr drg & NTPC spec.	Mfr drg & NTPC spec.	IR		P	-	-	
		2) Compliance report	Major	-	100%	-	NTPC spec. req. for PCB	NTPC spec. req. for PCB	-do-		P	-	-	
3.0	In process Inspection				-									
3.1	Enclosure fabrication	1) Dimensional checks	Major	Physical	100%	-	Mfr Fabrication Drawing	Mfr Fabrication Drawing	IPIR		P	-	-	IPIR = In process Inspection Report
		2)Diagonal (Skewness)	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-	
		3) Straightness	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-	
		4) Welded Joints	Major	Visual	-do-	-	-do-	-do-	-do-		P	-	-	

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE. CNP: NTPC SHALL IDENTIFY IN COLUMN "N" AS 'W'

Note: NTPC Inspection Engineer to check, approval date/ revision no. of reference documents at the time of inspection

282955/2024/PS-PEM-EL

एनटीपीसी NTPC

ITEM /EQUIPMENT :
220 V /110 V BATTERY CHARGER
(FLOAT CUM BOOST CHARGER)

STANDARD QUALITY PLAN

CONFORMING TO NTPC SPECIFICATION

QP NO.: 0000-999-QOE- S - 006 | A
REV. NO: 00 DATE :10-APR-08
PAGE 4 OF 7
VALID UPTO : 9-APR-11

REVIEWED BY:
AMANDAL
V. TALWAR
O P. NIRANJAN
S.D. SINGH

APPROVED BY:

QUALITY ASSURANCE
APPROVED
NTPC Limited, NOIDA
4 APR 2008

SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N
1.	2.	3.	4.	5.	6		7.	8.	9		10.		
		5) Deburring & Finishing of welded joints	Major	Visual	-do-	-	-do-	-do-	-do-		P	-	-
3.2	Pre treatment of enclosure	1) Degreasing	Major	Physical	-do-	-	IS 6005 / Mfr Std Practice	IS 6005 / Mfr Std Practice	-do-		P	-	-
		2) Water rinsing	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-
		3) Derusting	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-
		4) Water rinsing											
		5) Phosphating	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-
		6) Water Rinsing	Major	Physical	-do-	-	-do-	-do-	IPIR –		P	-	-
		7) Hot-Chromating	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-
		8) Sealing (If used)											
3.3	Powder Coating	1) Shade, thickness & finish	Major	Cross Hatch	Random	-	-do-	-do-	-do		P	-	-
		2) Adhesion check by cross hatch method	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-
3.4	Electronic card assembly & location	1) Check electronic cards are modular fitted in standard 19" metal racks with guides	Major	Visual	100%	100%	NTPC spec	NTPC spec.	-do-		P	V	V
		2) Check for mechanical interlock to avoid wrong insertion of cards	Major	Visual	100%	100%	NTPC spec	NTPC spec.	-do-		P	V	V
		3) Check for correct electronic components	Major	Visual	100%	-	Mfr drg.	Mfr Drg.	-do-		P	-	-
		4) Check for jumpers / track modifications	Major	Visual	100%	random	NTPC spec.	No unplanned jumpers / track modifications			P	V	V
		5) Check finish of electronic cards	Major	Visual	100%	-	Mfr drg.	No dry soldering	-do-		P	-	-
		6) Environmental check on cards to remove cards with infant mortal components	Major	Visual	100%	-	Mfr Std.	Mfr std.	-do-		P	-	-
3.5	Assembly of components & Modules	1. Transformer & choke	Major	Visual	100%	-	Mfr drg	Mfr drg.	-do-		P	-	-

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Note: NTPC Inspection Engineer to check, approval date/ revision no. of reference documents at the time of inspection

एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 006 A REV. NO: 00 DATE :10-APR-08 PAGE 5 OF 7	REVIEWED BY: AMANDAL V. TALWAR O P. NIRANJAN S.D. SINGH	APPROVED BY:
		CONFORMING TO NTPC SPECIFICATION	VALID UPTO : 9-APR-11		

SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	
1.	2.	3.	4.	5.	6		7.	8.	9		10.			11.
		2. Mounting of components such as switches rectifiers stack, fuses, meter and contractor	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		3. Minimum clearance between busbar	Major			-	-do-	-do-	-do-		P	-	-	
		4. Electronic cards location inside panels	Major	Visual	100%	100%	NTPC spec.	Temp. rise of the location should not exceed 10^c over ambient during heat run test	-do-		P	V	V	
3.6	Wiring	1. Bunching	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		2. Marking	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		3. Ferruling	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		4. Lugs crimping	Major	Physical	100%	-	-do-	-do-	-do-		P	-	-	
		5. Continuity	Major	Electrical	100%	-	-do-	-do-	-do-		P	-	-	
		6. Identification labels	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
3.7	Finishing of Equipment	1. Proper pasting of gasket	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		2. Earthing busbar	Major	Physical	100%	-	-do-	-do-	-do-		P	-	-	
	Note : Review of type test clearance from NTPC Engineering													
4.0	**Final Inspection**													
4.1	**Overall**	1. Dimensional & Sheet Thickness	Major	Physical	100%	Random	NTPC approved drawings & data sheet	NTPC approved drawings & data sheet	IR	√	P	W	W	
		2. Gen.Arr. & B.O.M.	Major	Visual	100%	100%	-do-	-do-	-do-	√	P	W	W	
		3. Aesthetic Look, Straightness, Skewness, Door Alignment, Labels etc.	Major	Visual	100%	Random	-do-	-do-	-do-	√	P	W	W	
		4. Provision of lifting arrangement	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		5. Proper earthing	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		6. Gasketing (Check with 1mm wire)	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		7. Gland Plat arrangement	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		8. Mounting arrangement	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	

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282955/2024/PS-PEM-EL

एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 6000-999-QOE- S - 005 A REV. NO. 00 DATE :10-APR-06 PAGE 6 OF 7	REVIEWED BY A.MANDAL V. TALWAR O.P. NIRANJ S.D. SINGH	APPROVED BY QUALITY ASSURANCE 10 APR 2006 REMARKS APPROVED NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	*VALID UPTO* : 9-APR-11		

SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY M	AGENCY C	AGENCY N	
1.	2.	3.	4.	5.	6		7.	8.	9	D*	10.			
		9. Wiring quality	Major	Visual	100%	-do-	-do-	-do-	-do-		√	P	W	W
		10 Paint shade, Adhesion and Thickness check	Major	Visual	100%	-do-	-do-	-do-	-do-		√	P	W	W
4.2	**Electrical Testing**	1) Burn in check at 50°C for 48 hrs in energized condition	Major	Electrical	100%	100%	NTPC specification & appd Data sheet	NTPC specification & appd Data sheet	IR -		√	P	V	V
		2) AVR operation Test with input voltage variation of +/- 10%	Major	Electrical	100%	100%	-do-	-do-	-do		√	P	W	W
		a) No Load					-do-	-do-	-do-		√	P	W	W
		b) Half Load					-do-	-do-	-do-		√	P	W	W
		c) Full Load					-do-	-do-	-do-		√	P	W	W
		3) Ripple Test	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		a) No Load					-do-	-do-	-do-		√	P	W	W
		b) Half Load					-do-	-do-	-do-		√	P	W	W
		c) Full Load					-do-	-do-	-do-		√	P	W	W
		4) Logic simulation / interlocks/ General operation test	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		a) Trickle / boost mode selector switch operation	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		b) Auto / manual selector switch operation	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		c) Soft start feature check	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		c) Uniform step-less trickle mode voltage adjustment in auto / manual operation	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		e) Boost charge mode current adjustment from 50 % to 100 % continuously	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		5) Control Circuit and Charger status indication test	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		6) Load Limiter Operation	Major	Electrical	100%	100%	-do-	-do-	-do-		√	P	W	W
		7) Heat Run Test	Major	Electrical	One unit	One unit	-do-	-do-	-do-		√	P	*	*

Burn In test to be performed before offering for NTPC Inspection	* Witness on one unit if temperature rise test as a type test is waived off.

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282955/2024/PS-PEM-EL

एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 006 A REV. NO: 00 DATE :10-APR-08 PAGE 7 OF 7	REVIEWED BY: A.MANDAL V.TALWAR O.P. NIRANJANI S.D. SINGH	APPROVED BY: QUALITY ASSURANCE NTPC Limited, NOIDA 10 APR 2008
		CONFORMING TO NTPC SPECIFICATION	*VALID UPTO :* 9-APR-11		

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			
					M	C/ N					M	C	N	
1.	2.	3.	4.	5.	6		7.	8.	9.	D*	10.			11
		8) Dynamic response test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		9) Input AC current measurement Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		10) Degree of protection check for IP 4X	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		11) I.R. Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		12) H. V. Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	

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282955/2024/PS-PEM-EL

3 x 660 MW NTPC BARH FGD ST-I **ANNEXURE-B**

BOQ CUM PRICE SCHEDULE FOR DC BATTERY CHARGER

S. No.	Item code	Item Description	Unit	Quantity	Unit Price	Total Price	Remarks
1	**508-12010-A**	220V FLOAT-CUM-BOOST CHARGER, 220V DC, 50A	NOS	2			NI-CD BATTERY OF RATING 90AH (SINGLE STRING)OR LEAD ACID BATTERY OF RATING 150AH (SINGLE STRING)
2	**508-12001-A**	**BATTERY FUSE BOX**					
2.1		BATTERY FUSE BOX WITH SHEET STEEL ENCLOSURE SUPPORT STRUCTURE	NOS	2			BATTERY FUSE BOX OF ADEQUATE RATINGAS PER LOAD DUTY CYCLE (ANNEXURE-II OF SPECIFICATION) . **MINIMUM RATING 32A.**
3	**508-12005-A**	**DISCHARGE RESISTOR**					
3.1		DISCHARGE RESISTOR (SUITABLE FOR 90AH NI-CD BATTERY OR 150AH LEAD ACID PLANTE TYPE BATTERY)	NOS	1			DISCHARGE RESISTOR SUITABLE FOR 90AH NI-CD BATTERY WITH SHUNT FOR 5HRS DISCHARGE RATE OR SUITABLE FOR 150AH LEAD ACID PLANTE TYPE BATTERY WITH SHUNT FOR 10HRS DISCHARGE RATE. MINIMUM DOP FOR LOAD BANK SHALL BE ATLEAST IP 20.
4	**508-12006-A**	**E & C SPARES**					
4.1		E & C SPARES FOR FLOAT CUM BOOST CHARGER	SET	1			
4.1.1		FUSE LINK WITHOUT HOLDER					
a		AC I/P HRC FUSE LINK	NOS	6			
b		GLASS FUSE	NOS	6			
c		CONTROL HRC FUSE LINK	NOS	6			
d		RECTIFIER FUSE LINK	NOS	6			
e		FILTER CAPACITOR FUSE LINK	NOS	6			
f		DC O/P FUSE LINK	NOS	6			
4.1.2		INDICATING LAMP					
a		AC I/P LAMP RED COLOR	NOS	6			
b		AC I/P LAMP YELLOW COLOR	NOS	6			
c		AC I/P LAMP BLUE COLOR	NOS	6			
d		DC O/P LAMP	NOS	6			
5	**508-12020-A**	**SUPV OF E&C**	**SET**	**1**			
5.1		LUMP SUM CHARGES PER VISIT FOR ENGINEER (EXCEPT DAILY CHARGES)	VISIT	1			REFER NOTE - 1, 2 & 3
5.2		LUMP SUM DAILY CHARGES FOR ENGINEER	DAYS	4			REFER NOTE - 1, 2 & 3

NOTES :

1) AMOUNT PAYABLE FOR ENGINEER PER VISIT TO SITE = VISIT CHARGES AS PER SL. NO. 5.1 ABOVE + (DAILY CHARGES AS PER SL. NO. 5.2 ABOVE X NO. OF DAYS AT SITE) (TO BE CERTIFIED BY BHEL SITE).

2) THE VISIT CHAGRES SHALL BE INCLUSIVE OF CHARGES OF AIR FARE/TRAIN FARE , BOARDING/LODGING, LOCAL CONVEYANCE, MEDICAL , INSURANCE ETC.

3) SITE VISIT CHARGES SHALL BE APPLICABLE FOR ANY VISIT MADE BY VENDOR AT SITE AFTER RECEIVING THE INSTRUCTION FROM BHEL FOR DEPUTATION OF VENDOR REPRESENTATIVE. THE VISIT CAN BE CALLED FOR SUPERVISION OF COMMISSIONING & TESTING ETC.

4) ALL CABLE GLANDS & LUGS AT CHARGER, FUSE BOX & DISCHARGE RESISTOR END ARE IN BIDDER'S SCOPE.

CIN No. U99999MH1970GAP014629

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Cir. No. 08/ PVC/BTR CHRG/05 **27 February 2023**

To Members of Battery Storage and Charging Infrastructure Division,
member manufactures of Battery chargers and
SEBs and other listed purchasing bodies

Sub: Revision in Battery Charger PV formulae

1. Revision in Battery Charger Equipment PV Clause, 'Conventional Battery Charger'
2. New PV clause for 'Modular Battery Charger' and 'Electric Vehicle Charger'

In view of current practices and technology used for manufacturing and volatility in prices, battery charger manufacturers' felt the need to revise the current applicable PV formula of IEEMA which is effective from Jan 2002. Members then discussed the subject at length and mentioned that battery charger equipment comprises of Semiconductors and Switchgear product (switches, fuses, contactors, MCBs, MCCBs etc.) whose costing to be covered while revising the formula. Considering the demand, members also felt the need to have price variation formula for 'Modular Battery Charger' and 'Electric vehicle charger'.

IEEMA has collected costing data, lead and lag time for manufacturing etc. from major manufacturers of battery chargers and in consensus arrived at the draft Price Variation Clauses for Conventional Battery charger, Modular Battery charger and for Electric vehicle charger vide cir no. **01/ PVC/BTR CHRG/05 dated 04th January 2023.**

Since there are no adverse comments received; we are making these operational from 1st January 2023.

Although, these PV clauses are made effective from 1st January 2023, practically they can be incorporated in all the current new tenders/contracts starting from 1st February 2023.

We request and recommend all the users & stakeholders including Utilities, PSUs etc. to incorporate these new PV formulae in all the new tenders/contracts henceforth.

For pending contracts, for the date of delivery on or after 1st February 2023, to arrive at the final price variation, we recommend using the following two stage method, which is a standard institutionalized methodology adopted by IEEMA for change over in all IEEMA PV clauses.

1. Calculate price variation 'P' from applicable prices/indices as per your base date / date of tendering up to January 2023 i.e. considering all prices/indices published in PV circular of January 2023; using applicable IEEMA PV clause of Battery Charger which is effective from June 2002.
2. Treat the above calculated 'P' as 'P_0' and calculate final price variation considering all prices / indices published in PV circular of January 2023 applicable for revised PV clause of Battery Charger effective from 1st January 2023 as base prices/indices up to the applicable prices/indices as per the date of delivery; applicable as per revised relevant PV clause of Battery Charger effective from 1st January 2023.

Director

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IEEMA/PVC/BTR-CHRG/2023 **Effective from: 1st January 2023**

PRICE VARIATION CLAUSE FOR BATTERY CHARGER EQUIPMENT

The price quoted/confirmed is based on the cost of raw materials/components, the wholesale price index numbers and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials, index numbers for wholesale prices and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices and Index numbers, the price payable shall be subject to adjustment up or down in accordance with the following formulae:

(A) Conventional Battery Charger

$$P = \frac{P_o}{100}\left(12 + 28\,\frac{C}{C_o} + 25\,\frac{ES}{ES_o} + 8\,\frac{AL}{AL_o} + 8\,\frac{ER}{ER_o} + 7\,\frac{EP}{EP_o} + 12\,\frac{W}{W_o}\right)$$

(B) Modular Battery Charger

$$P = \frac{P_o}{100}\left(11 + 15\,\frac{C}{C_o} + 17\,\frac{ES}{ES_o} + 4\,\frac{AL}{AL_o} + 32\,\frac{ER}{ER_o} + 8\,\frac{EP}{EP_o} + 13\,\frac{W}{W_o}\right)$$

(C) Electric Vehicle Charger

$$P = \frac{P_o}{100}\left(11 + 14\,\frac{C}{C_o} + 12\,\frac{ES}{ES_o} + 2\,\frac{AL}{AL_o} + 35\,\frac{ER}{ER_o} + 12\,\frac{EP}{EP_o} + 14\,\frac{W}{W_o}\right)$$

Wherein,

P = Price payable as adjusted in accordance with the above formula.
P_0 = Price quoted/confirmed.

C_0 = Price of CC copper rods (refer notes)
This price is as applicable for the month, **ONE** month prior to the date of tendering.

ES_0 = Price of CRGO Electrical Steel Lamination (refer note)
This price is as applicable for the month, **ONE** month prior to the date of tendering.

AL_0 = LME CSP Average of Aluminium (refer notes)
This price is as applicable for the month, **ONE** month prior to the date of tendering.

ER_0 = IEEMA's Banker's selling rate of exchange between foreign currency prevailing on the Banker's first working day, **ONE** month prior to the date of tendering (refer notes)

EP_0 = Wholesale Price Index Number (WPI) of Electronic PCB/ Micro Circuits (refer notes)
This price is as applicable for the month, **THREE** months prior to the date of tendering.

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W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)

This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if the date of tendering falls in June 2023, the applicable price of Copper (C_o), Aluminium (AL_0), CRGO Electrical Steel Lamination (ES_0) and Exchange Rate (ER_0) should be for the month of May 2023, and wholesale price index numbers for 'Electronic PCB/ Micro Circuits' (EP_o) and all India average consumer price index number (W_o) should be for the month of March 2023.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/ BTR/(R-1)/_/_ **ONE** month prior to the date of tendering.

C = Price of CC copper rods (refer notes)
This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer note)
This price is as applicable for the month, **ONE** month prior to the date of delivery.

AL = LME CSP Average of Aluminium (refer notes)
This price is as applicable for the month, **ONE** month prior to the date of delivery.

ER = IEEMA's Banker's selling rate of exchange between foreign currency prevailing on the Banker's first working day, **TWO** month prior to the date of delivery (refer note)

EP = Wholesale Price Index Number (WPI) of Electronic PCB/ Micro Circuits
This price is as applicable for the month, **THREE** months prior to the delivery (refer note)

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)

This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if the date of delivery falls in August 2023, the applicable price of Copper (C), Aluminium (AL) and CRGO Electrical Steel Lamination (ES) should be for the month of Jul 2023 and Exchange Rate (ER) should be for the month of Jun 2023, and wholesale price index numbers for 'Electronic PCB/ Micro Circuits' (EP) and all India average consumer price index number (W) should be for the month of May 2023.

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IEEMA/PVC/BTR-CHRG/2023 **Effective from: 1st January 2023**

For example, if the date of delivery falls in August 2023, the applicable price of Copper (C), Aluminium (AL) and CRGO Electrical Steel Lamination (ES) should be for the month of Jul 2023 and Exchange Rate (ER) should be for the month of Jun 2023, and wholesale price index numbers for 'Electronic PCB/ Micro Circuits' (EP) and all India average consumer price index number (W) should be for the month of May 2023.

The "date of delivery" is the date on which the Battery Charger equipment is notified as being ready for inspection/despatch. (In the absence of such notification the date of manufacturer's despatch note is to be considered as the date of delivery) or the contracted delivery date (including any agreed extension thereto), whichever is earlier.

Notes:

(a) All prices are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
(b) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
(c) The details of prices are as under:

1. Price of LME average Cash SELLER Settlement price of Primary Aluminium in US$ per MT as published by London Metal Bulletin (LME) including Premium for Aluminium Ingot in US$ per MT is converted in Indian Rs./MT using exchange rate and adding appropriate customs duty.

2. Price of 8 mm CC copper rod (in Rs/MT) is ex-works price as quoted by the primary producer.

3. The price of CRGO Electrical Steel Lamination is the average price as quoted by processing centres of overseas mills and lamination suppliers

4. The wholesale price index number for 'Electronic PCB/ Micro Circuits' is as published by the Office of Economic Advisor, Ministry of Industry, Govt. of India, New Delhi with base 2011-12=100.

5. The exchange rates that would be published by IEEMA would be for the following currencies only.
   1) US Dollars 2) pound Sterling 3) Japanese Yen 4) Euro

Authorised Signatory

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2012-2022

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7. Floating / creation of work contracts as Custom Bids in Services.
8. Seeking sample with bid or approval of samples during bid evaluation process. (However, in bids for attached categories, trials are allowed as per approved procurement policy of the buyer nodal Ministries)
9. Mandating foreign / international certifications even in case of existence of Indian Standards without specifying equivalent Indian Certification / standards.
10. Seeking experience from specific organization / department / institute only or from foreign / export experience.
11. Creating bid for items from irrelevant categories.
12. Incorporating any clause against the MSME policy and Preference to Make in India Policy.
13. Reference of conditions published on any external site or reference to external documents/clauses.
14. Asking for any Tender fee / Bid Participation fee / Auction fee in case of Bids / Forward Auction, as the case may be.

Further, if any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

This Bid is also governed by the General Terms and Conditions/ यह बिड सामान्य शर्तों के अंतर्गत भी शासित है

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws./जेम की सामान्य शर्तों के खंड 26 के संदर्भ में भारत के साथ भूमि सीमा साझा करने वाले देश के बिडर से खरीद पर प्रतिबंध के संबंध में भारत के साथ भूमि सीमा साझा करने वाले देश का कोई भी बिडर इस निविदा में बिड देने के लिए तभी पात्र होगा जब वह बिड देने वाला सक्षम प्राधिकारी के पास पंजीकृत हो।बिड में भाग लेते समय बिडर को इसका अनुपालन करना होगा और कोई भी गलत घोषणा किए जाने व इसका अनुपालन न करने पर अनुबंध को तत्काल समाप्त करने और कानून के अनुसार आगे की कानूनी कार्रवाई का आधार होगा।

---Thank You/धन्यवाद---