

Volume – I

Tender Notification for

**Rate Contract For Supply of Indoor & Outdoor Manual
RMU And Motorized RMU With FRTU In BRPL**

CMC/BR/19-20/SV/RS/RJ/846

Due Date for Submission of Bids: 23.03.2020

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SECTION – I
REQUEST FOR QUOTATION

Tender Notification: CMC/BR/19-20/SV/RS/RJ/846

**Rate Contract For Supply of Indoor & Outdoor Manual
RMU and Motorized RMU with FRTU**

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SECTION – I: REQUEST FOR QUOTATION

1.0 Event Information

- 1.01** BRPL invites sealed tenders against Rate Contract for Supply of Indoor and Outdoor Type Manual RMU and Motorized RMU with FRTU in BRPL from the manufacturers. The bidder must qualify the technical requirements as specified in Clause 2.0 stated below. The sealed envelopes shall be duly superscribed as — **“BID FOR RATE CONTRACT FOR THE SUPPLY OF INDOOR & OUTDOOR MANUAL RMU AND MOTORIZED RMU WITH FRTU IN BRPL, TENDER NOTICE/CMC/BR/19-20/SV/RS/RJ/846 DUE FOR SUBMISSION ON DT. 23.03.2020”**.

Sl. No.	Item Description	Specification	Requirement	Estimated Cost
			Total Qty.	
BRPL, DELHI				
1	Rate Contract for Supply of Indoor and Outdoor Type Manual RMU and Motorized RMU with FRTU in BRPL	SECTION V	531 Nos	22.55 Cr

Note: Quantity may vary to any extent of +/- 30% of above mentioned total quantity.

- 1.02** The schedule of specifications with detail terms & conditions can be obtained from address given below against demand draft/ Pay Order of **Rs.1180/- with GST-**, drawn in favour of **BSES RAJDHANI POWER LTD**, payable at New Delhi. The sale of tender documents will be issued from **01.03.2020** onwards on all working days upto **10.03.2020**. The tender documents can also be downloaded from the website **“www.bsesdelhi.com”**.

In case tender papers are downloaded from the above website, then the bidder has to enclose a demand draft covering the cost of bid documents as stated above in a separate envelope with suitable superscription —**“Cost of Bid Documents: Tender Notice Ref: CMC/BR/19-20/SV/RS/RJ/846”**. This envelope should accompany the Bid Documents.

- 1.03** Offers will be received upto **1530 Hrs. on dt. 23.03.2020** as indicated earlier and will be opened at the address given below dt. **23.03.2020 at 1600 Hrs.** in the presence of authorized representatives of the bidders. The schedule of specifications with detail terms & conditions are enclosed. It is the sole responsibility of the bidder to ensure that the bid documents reach this office on or before the due date.

**HEAD OF THE DEPARTMENT, 1st FLOOR, ‘C’ BLOCK,
CONTRACTS & MATERIALS DEPARTMENT, BSES RAJDHANI POWER LTD,
BSES BHAWAN,
NEHRU PLACE, NEW DELHI-110019.**

1.04 BRPL reserves the right to accept/ reject any or all Tenders without assigning any reason thereof and alter the quantity of materials mentioned in the Tender documents at the time of placing purchase orders. Tender will be summarily rejected if:

- i) Earnest Money Deposit (EMD) @ 1% (One percent) of the Tender value i.e. **Rs. 22,55,000/-** is not deposited in shape of Bank Draft in favour of BSES RAJDHANI POWER LTD, payable at New Delhi or Bank Guarantee executed on favour of BSES RAJDHANI POWER LTD.
- ii) The offer does not contain “FOR, NEW DELHI price indicating break-up towards all taxes & duties”.
- iii) Complete Technical details are not enclosed.
- iv) Tender is received after due time due to any reason.

1.05 BRPL reserves the right to reject any or all bids or cancel/ withdraw the invitation for bids without assigning any reason whatsoever and in such case no bidder/ intending bidder shall have any claim arising out of such action time of placing purchase orders.

2.0 Qualification Criteria:-

QUALIFICATION CRITERIA FOR RMU (INDOOR/OUTDOOR TYPE):-

The prospective bidder must qualify all of the following requirements to participate in the bidding process. Bidder who meet following requirements will be considered as successful bidder and management has the right to disqualify those bidders who do not meet these requirements.

1. The bidders must have the manufacturing/Assembly base in India for RMU. The bidders must be a manufacturer of 11 kV Ring Main Unit and must possess valid Type test report carried out at CPRI/ERDA with in last 5 Years for similar design of RMU. In case type test reports are older than five (5) years from the date of bid opening, bidder shall submit the undertaking that there is “No Design Change”. Non submission of type test reports will lead to rejection of the offer. Type test older than ten (10) years shall not be acceptable and bid is liable for rejection
2. The bidder shall have servicing , repairing, testing & refurbishment facility in INDIA with necessary spares and testing equipment for providing prompt after sales service for RMU. Details of the set-up available shall be brought out in the offer, failing which the offer will be rejected. The bidder shall submit undertaking along with the bid confirming compliance to qualifying criteria for bidder.
3. The bidder should have qualified technical and dedicated QA personnel at various stages of manufacture & testing, documentary proof –Quality Mannual,Charts and Undertaking shall be furnish.

4. The bidder should have plant installed capacity to supply of minimum 25-30 nos RMU per month.
5. The Bidder should have supplied at least 50% of the tendered quantity to any major Utilities/SEB's/other reputed firm for installation in distribution network in last 3 years from the date of bid opening, out of which 50% of the supplied quantity must be in successful operation for at least in the last 2 years for which performance Certificate shall be furnished. In case of design change or models rolled out in last two years from the date of bid opening , bidder shall furnish the supply and performance certificate of at least 50 nos of said RMU to any major Utilities/SEB's/other reputed firm for installation in distribution network.
6. Bidder should have Average Annual Sales Turnover of Rs 500 Crores or more in last 3 financial Years.
7. In case bidder is a 100% owned subsidiary of their parent company then the credentials of the parent organization shall be considered as compliance to the QR requirement as listed below.
The QR parameters against which the bidder can submit the credential of their parent company are as below:
 - a. The Bidder should have supplied at least 50% of the tendered quantity to any major Utilities/SEB's/other reputed firm for installation in distribution network in last 3 years from the date of bid opening, out of which 50% of the supplied quantity must be in successful operation for at least in the last 2 years for which performance Certificate shall be furnished.
In case of design change or models rolled out in last two years from the date of bid opening , bidder shall furnish the supply and performance certificate of at least 50 nos of said RMU to any major Utilities/SEB's/other reputed firm for installation in distribution network.
 - b. Bidder should have Average Annual Sales Turnover of Rs 500 Crores or more in last 3 financial Years.
8. The Bidder must possess valid ISO 9001:2015 certification.
9. The Bidder shall submit an undertaking "No Litigation" is pending for the company and in case of any running litigation details and value to be provided (as per attached format).
10. An undertaking (self-certificate) that the bidder has not been blacklisted/debarred by any central/state government institution including electricity utilities.
11. The bidder must have valid PAN No., GST Registration Number, in addition to other statutory compliances. The bidder must submit the copy of registrations and submit an undertaking that the bidder shall comply all the statutory compliances as per the applicable laws/rules etc. before the start of the work.
12. In case of new bidders (not enlisted in BSES) , Factory Inspection & evaluation may be carried out to ascertain bidders manufacturing capabilities and quality procedures. BRPL reserves the right to assess the capabilities /installed capacity.

3.0 Bidding and Award Process

Bidders are requested to submit their questions regarding the RFQ or the bidding process after review of this RFQ. BRPL response to the questions raised by various bidders will be distributed to all participating bidders through website.

a. Time schedule of the bidding process

The bidders on this RFQ package should complete the following within the dates specified as under:

S.No.	Steps	Activity description	Due date
1	Technical Queries	All Queries related to RFQ	On or before 12.03.2020 1500 Hrs.
2	Technical Offer	Documentary evidence in support of qualifying criteria. Technical Literature/ GTP/ Drawings/ Type test report, if any, etc., Testing facilities, any other relevant document, acceptance to commercial terms & conditions viz. delivery Schedule/ Period, Payment terms, PBG etc. Quality assurance plan, Deviation from the specification, list of plant & machinery and testing equipments Unpriced items.	23.03.2020, 1530 HRS
3	Commercial Offer	Prices for RMU and Break up regarding basic price and taxes. Delivery commitment	23.03.2020, 1530 HRS
4	Opening of technical bid	As per RFQ	23.03.2020, 1600 HRS

This is a two part bid process. Bidders are to submit the bids (a) Technical Bid (b) Price Bid. Both these parts should be furnished in separate sealed covers superscribing with specification no., validity etc, with particulars as **Part-I “Technical Particulars & Commercial Terms & Conditions”** and **Part-II “Financial bid”** and these sealed envelopes should again be placed in another sealed cover which shall be submitted before the due date & time specified.

Bidders are requested to submit the bid in one original plus one copy in duplicate.

- **The Part-I (Technical Bid) -** Technical Bid should not contain any cost information whatsoever. In case of Bids where the qualification requirements, technical suitability and other requirements are found to be inadequate, Part-II “Financial Bid” will be returned unopened.
- **The Part-II (Financial Bid) -** Qualified bidders will be intimated after technical evaluation of all the bids is completed. The date and time of same shall be intimated in due course to the qualified bidders. Notwithstanding anything stated above, the Purchaser reserves the right to assess bidder’s capability to perform the contract, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

Purchaser intends to award the business on a lowest bid basis, so suppliers are encouraged to bid competitively. The decision to place Purchase Order / Letter of acceptance solely depends on purchaser on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that Purchaser may deem relevant.

The purchaser reserves all the rights to award the contract to one or more bidders so as to meet the delivery requirement or nullify the award decision without any reason.

BSES reserves the right to split the tender quantity amongst techno commercially qualified bidders on account of delivery requirement in tender, quantity under procurement etc.

Splitting of tender quantity amongst more than one bidder shall be governed by below mentioned guidelines:

- If the quantity is to be split among 2 bidders, it will be done in the ratio of 70:30 on L1 price.
- If the quantity is to be split among 3 bidders, it will be done in the ratio of 60:25:15 on L1 price.
- In case quantity needs to be distributed and order splitting is required, distribution of quantity shall be maximum among three (03) bidders.

In the event of your bid being selected by purchaser (and / or its affiliates) and your subsequent DEFAULT on your bid; you will be required to pay purchaser (and / or its affiliates) an amount equal to the difference in your bid and the next lowest bid on the quantity declared in RFQ.

In case any supplier is found unsatisfactory during the delivery process, the award will be cancelled and BRPL reserves the right to award other suppliers who are found fit.

Quantity Variation: The purchaser reserves the rights to vary the quantity by +/- 30% of the tender quantity.

Repeat Order: BRPL reserves the right to place repeat order at the same rates & terms and conditions as per this tender against additional requirement subject to mutual agreement between BRPL & supplier.

5.0 Market Integrity:

We have a fair and competitive marketplace. The rules for bidders are outlined in the Terms & Conditions. Bidders must agree to these rules prior to participating. In addition to other remedies available, we reserves the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the Terms & Condition. Bidders who violate the marketplace rules or engage in behavior that disrupts the fair execution of the marketplace restricts a bidder to length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace.
- Breach of the terms of the published in Request For Quotation.

6.0 Supplier Confidentiality

All information contained in this RFQ is confidential and may not be disclosed, published or advertised in any manner without written authorization from BRPL. This includes all bidding information submitted.

All RFQ documents remain the property of BRPL and all suppliers are required to return these documents to BRPL upon request.

Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

7.0 Contact Information

All communication as regards this RFQ shall be made (i) in English, (ii) in writing and (iii) sent by mail, facsimile to:

	Technical	Commercial
Contact Name	Mr. Sheshadri Krishnapura Copy to Ms. Fauzia Khalid	Mr. Robin Sebastian
Address	BSES RAJDHANI POWER LTD, 2nd Floor, B Block, Nehru Place, New Delhi – 110019	C&M Deptt. 1st floor, D- Block, BSES Rajdhani Power Limited, BSES Bhawan, Nehru Place, New Delhi -110019
Email-ID	sheshadri.krishnapura@relianceada.com	Robin.sebastian@relianceada.com

SECTION – II

INSTRUCTION TO BIDDERS (ITB)

**Rate Contract for Supply of Indoor and Outdoor Type
Manual RMU and Motorized RMU with FRTU in BRPL**

CMC/BR/19-20/SV/RS/RJ/846

- 1.0** BSES Rajdhani power Ltd, hereinafter referred to as the Purchaser are desirous of implementing the various Systems Improvement/ Repair & Maintenance works at their respective licensed area in Delhi The Purchaser has now floated this tender for procurement of Manual and Motorized RMU with FRTU as notified earlier in this bid document.

2.0 SCOPE OF WORK

The scope shall include Design, Manufacture, Testing at works conforming to the Technical Specifications enclosed along with Packing, Forwarding, Freight and Unloading and proper stacking at Purchaser's stores.

3.0 DISCLAIMER

- 3.01 This Document includes statements, which reflect various assumptions, which may or may not be correct. Each Bidder/ Bidding Consortium should conduct its own estimation and analysis and should check the accuracy, reliability and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.
- 3.02 Neither Purchaser nor its employees will have any liability whatsoever to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage whatsoever which may arise from or be incurred or suffered in connection with anything contained in this Document, any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Purchaser or its employees, or otherwise a rising in any way from the selection process for the Supply.
- 3.03 Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy itself that Documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.
- 3.04 This Document and the information contained herein are Strictly Confidential and are for the use of only the person(s) to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient's professional advisors).

4.0 COST OF BIDDING

The Bidder shall bear all cost associated with the preparation and submission of its Bid and Purchaser will in no case be responsible or liable for those costs. Further the purchaser has the right to get sample of Manual And Motorized RMU with FRTU tested by any reputed independent test lab (approved by BRPL) at the cost of bidder.

5.0 BIDDING DOCUMENTS

- 5.01 The Scope of Work, Bidding Procedures and Contract Terms are described in the Bidding Documents. In addition to the covering letter accompanying Bidding Documents, the Bidding Documents include:

Volume –I

- a) Request for Quotation (RFQ) - Section – I
- b) Instructions to Bidders (ITB) - Section – II
- c) General Conditions of Contract - Section - III
- d) Quantity and delivery requirement - Section –IV
- e) Technical Specifications (TS) - Section –V

Volume – II

- a) Bid Form - Annexure – I
- b) Bid Format - Annexure – II
- c) Price Schedule - Annexure – III
- d) Commercial Terms & Conditions - Annexure - IV
- e) No Deviation Sheet - Annexure - V
- f) Qualification Criterion - Annexure - VI

- 5.02 The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, Terms and specifications. Failure to furnish all information required by the Bidding documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.

6.0 AMENDMENT OF BIDDING DOCUMENTS

- 6.01 At any time prior to the deadline for submission of Bids, the Purchaser may for any reasons, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment.
- 6.02 The Amendment shall be part of the Bidding Documents, pursuant to Clause 5.01, and it will be notified in writing by Fax/e-mail to all the Bidders who have received the Bidding Documents and confirmed their participation to Bid, and will be binding on them.
- 6.03 In order to afford prospective Bidders reasonable time in which to take the Amendment into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of Bids.

7.0 LANGUAGE OF BID

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

8.0 DOCUMENTS COMPRISING THE BID

The Bid prepared and submitted by the Bidder shall comprise the following components:

- a) Bid Form ,Price & other Schedules (STRICTLY AS PER FORMAT) and Technical Data Sheets completed in accordance with Clause 9.0, 10.0, 11.0 and Technical Specification;
- b) All the Bids must be accompanied with the required EMD as mentioned in the Section-I against each tender.
- c) Power of Attorney or Authorization letter indicating that the person(s) signing the Bid have the authority to sign the Bid and thus that the Bid is binding upon the Bidder during the full period of its validity, in accordance with clause 12.0.

9.0 BID FORM

9.01 The Bidder shall complete an “Original” and another one “Copy” of the Bid Form and the appropriate Price & Other Schedules and Technical Data Sheets.

9.02 EMD

Pursuant to Clause 8.0 (b) above, the bidder shall furnish, as part of its bid, a EMD amounting to 1% of the total bid value (FOR Destination) i.e. Rs. **22,55,000/-**. The EMD is required to protect the Purchaser against the risk of Bidder’s conduct which would warrant the security’s forfeiture.

The EMD shall be denominated in the currency of the bid, and shall be in the following form:

- a) A bank guarantee issued by any scheduled bank strictly as per the form at enclosed and shall be valid for a period of thirty (30) days beyond the validity of the bid.
- b) Bank Draft in favour of BSES RAJDHANI POWER LTD, payable at New Delhi.

Unsuccessful bidders’ EMD will be discharged or returned as promptly as possible as but not later than thirty (30) days after the expiration of the period of bid validity.

The successful bidder’s EMD will be discharged upon furnishing the performance security. The EMD may be forfeited:

- a) If the Bidder:
 - i) withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form ; or

- b) in the case of a successful Bidder, if the Bidder fails:
- i) to sign the Contract, or
 - ii) to furnish the required performance security.

10.0 BID PRICES

- 10.01 Bidders shall quote for the entire Scope of Supply with a break-up of prices for individual items. The total Bid Price shall also cover all the Supplier's obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of Design, Supply, Transportation to site, all in accordance with the requirement of Bidding Documents. The Bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total Price.
- 10.02 The prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during execution of the supply work, breakup of price constituents, should be there. Prices quoted by the Bidder shall be—Firm “and not subject to any price adjustment during the performance of the Contract. A Bid submitted with an adjustable price quotation will be treated as non -responsive and rejected.

11.0 BID CURRENCIES

Prices shall be quoted in **Indian Rupees (INR) only**.

12.0 PERIOD OF VALIDITY OF BIDS

- 12.01 Bids shall remain valid for **120 days** post bid date.
- 12.02 Notwithstanding Clause 12.01 above, the Purchaser may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and the responses thereto shall be made in writing by Fax/e-mail.

13.0 ALTERNATIVE BIDS

Bidders shall submit Bids, which comply with the Bidding Documents. Alternative Bids will not be considered. The attention of Bidders is drawn to the provisions of Clause 22.03 & 22.04 regarding the rejection of Bids, which are not substantially responsive to the requirements of the Bidding Documents.

14.0 FORMAT AND SIGNING OF BID

- 14.01 The original Bid Form and accompanying documents (as specified in Clause 9.0), clearly marked "Original Bid", plus one copy must be received by the Purchaser at the date, time and place specified pursuant to Clauses 15.0 and 16.0. In the event of any discrepancy between the original and the copies, the original shall govern.

- 14.02 The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written Power-of-Authority accompanying the Bid.
- 14.03 The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

D SUBMISSION OF BIDS

15.0 SEALING AND MARKING OF BIDS

- 15.01 Bid submission: One original & one Copy (hard copies) of all the Bid Documents shall be sealed and submitted to the Purchaser before the closing time for submission of the bid.
- 15.02 The Technical Documents and the EMD shall be enclosed in a sealed envelope and the said envelope shall be superscribed with —**Technical & EMD**. The Financial bid shall be inside another sealed envelope with superscription — **Financial Bid**. Both these envelopes shall be sealed inside another big envelope. All the envelopes should bear the Name and Address of the Bidder and marking for the Original and Copy. The envelopes should be superscribed with —**“Tender Notice No, Due date of submission, Tender opening date”**.
- 15.03 The Bidder has the option of sending the Bids in person. Bids submitted by Telex/ Telegram/ Fax will not be accepted. No request from any Bidder to the Purchaser to collect the proposals from Airlines/Cargo Agents etc shall be entertained by the Purchaser.

16.0 DEADLINE FOR SUBMISSION OF BIDS

- 16.01 The original Bid, together with the required copies, must be received by the Purchaser at the address specified not later than **1530 HRS on 23.03.2020**.
- 16.02 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with Clause 9.0, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

17.0 ONE BID PER BIDDER

Each Bidder shall submit only one Bid either by itself, or as a partner in a Joint Venture. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

18.0 LATE BIDS

Any Bid received by the Purchaser after the deadline for submission of Bids prescribed by the Purchaser, pursuant to Clause 16.0, will be declared "Late" and rejected and returned unopened to the Bidder.

19.0 MODIFICATIONS AND WITHDRAWAL OF BIDS

19.01 The Bidder is not allowed to modify or withdraw its Bid after the Bid's submission.

E. EVALUATION OF BID**20.0 PROCESS TO BE CONFIDENTIAL**

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Purchaser's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

21.0 CLARIFICATION OF BIDS

To assist in the examination, evaluation and comparison of Bids, the Purchaser may, at its discretion, ask the bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

22.0 PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS

- 22.01 Purchaser will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order.
- 22.02 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.
- 22.03 Prior to the detailed evaluation, Purchaser will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.
- 22.04 Bid determined as not substantially responsive will be rejected by the Purchaser and/or the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

23.0 EVALUATION AND COMPARISON OF BIDS

- 23.01 The evaluation of Bids shall be done based on the delivered cost competitiveness basis.
- 23.02 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes: In the first stage, the Bids would be subjected to a responsiveness check. The Technical Proposals and the Conditional ties of the Bidders would be evaluated. Subsequently, the Financial Proposals along with supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids shall be considered for final evaluation.
- 23.03 The Purchaser's evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:
- (a) Supply Schedule
 - (b) Deviations from Bidding Documents

Bidders shall base their Bid price on the terms and conditions specified in the Bidding Documents. The cost of all quantifiable deviations and omissions from the specification, terms and conditions specified in Bidding Documents shall be evaluated. The Purchaser will make its own assessment of the cost of any deviation for the purpose of ensuring fair comparison of Bids.

- 23.04 Any adjustment in price, which results from the above procedure, shall be added for the purposes of comparative evaluation only to arrive at an "Evaluated Bid Price". Bid Prices quoted by Bidders shall remain unaltered.

F. AWARD OF CONTRACT**24.0 CONTACTING THE PURCHASER**

- 24.01 From the time of Bid submission to the time of contract award, if any Bidder wishes to contact the Purchaser on any matter related to the Bid, it should do so in writing.
- 24.02 Any effort by a Bidder to influence the Purchaser and/or in the Purchaser's decisions in respect of Bid evaluation, Bid comparison or Contract Award, will result in the rejection of the Bidder's Bid.

25.0 THE PURCHASER 'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

The Purchaser reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at anytime prior toward of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Purchaser's action.

26.0 AWARD OF CONTRACT

The Purchaser will award the Contract to the successful Bidder whose Bid has been Determined to be the lowest-evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to satisfactorily perform the Contract. Purchaser reserves the right to award order other bidders in the tender, provided it is required for progress of project & provided he agrees to come to the lowest rate.

27.0 THE PURCHASER'S RIGHT TO VARY QUANTITIES

The Purchaser reserves the right to vary the quantity i.e. increase or decrease the numbers/quantities without any change in terms and conditions during the execution of the Order.

28.0 LETTER OF INTENT/ NOTIFICATION OF AWARD

The letter of intent/ Notification of Award shall be issued to the successful Bidder whose bids have been considered responsive, techno-commercially acceptable and evaluated to be the lowest (L1). The successful Bidder shall be required to furnish a letter of acceptance within 7 days of issue of the letter of intent /Notification of Award by Purchaser.

29.0 PERFORMANCE BANK GUARANTEE

The successful Bidder shall furnish the Performance Bank Guarantee for an amount of 10% (Ten percent) of the Contract Price in accordance with the format provided. The Performance Bond shall be valid for a period of twenty four months (24) from the date of the commissioning or thirty months (30) from the date of receipt of material (last consignment) at site/stores whichever is earlier plus 3 months towards claim period. Upon submission of the performance security, the EMD shall be released.

30.0 CORRUPT OR FRADULENT PRACTICES

30.01 The Purchaser requires that the Bidders observe the highest standard of ethics during the procurement and execution of the Project. In pursuance of this policy, the Purchaser:

- (a) Defines, for the purposes of this provision, the terms set forth below as follows:
 - i) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them ,or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and
 - ii) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition.

- (b) Will reject a proposal forward if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question ;
 - (c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.
- 30.02 Furthermore, Bidders shall be aware of the provision stated in the General Conditions of Contract.

SECTION – III

GENERAL CONDITIONS OF CONTRACT (GCC)

**Rate Contract for Supply of Indoor and Outdoor Type Manual
RMU and Motorized RMU with FRTU in BRPL**

CMC/BR/19-20/SV/RS/RJ/846

GENERAL TERMS AND CONDITIONS

1.0 General Instructions

- 1.01 All the Bids shall be prepared and submitted in accordance with these instructions.
- 1.02 Bidder shall bear all costs associated with the preparation and delivery of its Bid, and the Purchaser will in no case shall be responsible or liable for these costs.
- 1.03 The Bid should be submitted by the Bidder in whose name the bid document has been issued and under no circumstances it shall be transferred/ sold to the other party.
- 1.04 The Purchaser reserves the right to request for any additional information and also reserves the right to reject the proposal of any Bidder, if in the opinion of the Purchaser, the data in support of RFQ requirement is incomplete.
- 1.05 The Bidder is expected to examine all instructions, forms, terms & conditions and specifications in the Bid Documents. Failure to furnish all information required in the Bid Documents or submission of a Bid not substantially responsive to the Bid Documents in every respect may result in rejection of the Bid. However, the Purchaser's decision in regard to the responsiveness and rejection of bids shall be final and binding without any obligation, financial or otherwise, on the Purchaser.

2.0 Definition of Terms

- 2.01 "Purchaser" shall mean BRPL Limited, on whose behalf this bid enquiry is issued by its authorized representative / officers.
- 2.02 "Bidder" shall mean the firm who quotes against this bid enquiry issued by the Purchaser. "Supplier" or "Supplier" shall mean the successful Bidder and/or Bidders whose bid has been accepted by the Purchaser and on whom the "Letter of Acceptance" is placed by the Purchaser and shall include his heirs, legal representatives, successors and permitted assigns wherever the context so admits.
- 2.03 "Supply" shall mean the Scope of Contract as described.
- 2.04 "Specification" shall mean collectively all the terms and stipulations contained in those portions of this bid document known as RFQ, Commercial Terms & Condition, Instructions to Bidders, Technical Specifications and the Amendments, Revisions, Deletions or Additions, as may be made by the Purchaser from time to time.
- 2.05 "Letter of Acceptance" shall mean the official notice issued by the Purchaser notifying the Supplier that his proposal has been accepted and it shall include amendments thereto, if any, issued by the Purchaser. The "Letter of Acceptance" issued by the Purchaser shall be binding on the "Supplier" The date of Letter of Acceptance shall be taken as the effective date of the commencement of contract.

- 2.06 “Month” shall mean the calendar month and “Day” shall mean the calendar day.
- 2.07 “Codes and Standards” shall mean all the applicable codes and standards as indicated in the Specification.
- 2.08 “Offer Sheet” shall mean Bidder's firm offer submitted to BRPL in accordance with the specification.
- 2.09 “Contract” shall mean the “Letter of Acceptance” issued by the Purchaser.
- 2.10 “Contract Price” shall mean the price referred to in the “Letter of Acceptance”.
- 2.11 “Contract Period” shall mean the period during which the “Contract” shall be executed as agreed between the Supplier and the Purchaser in the Contract inclusive of extended contract period for reason beyond the control of the Supplier and/or Purchaser due to force majeure.
- 2.12 “Acceptance” shall mean and deemed to include one or more of the following as will be stipulated in the specification:
- a) The written acceptance of material by the inspector at suppliers works to ship the materials.
 - b) Acceptance of material at Purchaser site stores after its receipt and due inspection/ testing and release of material acceptance voucher.
 - c) Where the scope of the contract includes supply, acceptance shall mean issue of necessary equipment / material takeover receipt after installation & commissioning and final acceptance.

3.0 Contract Documents & Priority

- 3.01 Contract Documents: The terms and conditions of the contract shall consist solely of these RFQ conditions and the offer sheet.
- 3.02 Priority: Should there be any discrepancy between any term hereof and any term of the Offer Sheet, the terms of these RFQ shall prevail.

4.0 Scope of Supply - General

- 4.01 The “Scope of Supply” shall be on the basis of Bidder’s responsibility, completely covering the obligations, responsibility and supplies provided in this Bid enquiry whether implicit or explicit.
- 4.02 Bidder shall have to quote for the Bill of quantities as listed in Section – IV of this RFQ.
- 4.03 Quantity variation and additional requirement if any shall be communicated to successful bidder during project execution.
- 4.04 All relevant drawings, data and instruction manuals.

5.0 Quality Assurance and Inspection

- 5.01 Immediately on award of contract, the bidder shall prepare detailed quality assurance plan / test procedure identifying the various stages of manufacture, quality checks performed at each stage, raw material inspection and the Customer hold points. The document shall also furnish details of method of checking, inspection and acceptance standards / values and get the approval of Purchaser before proceeding with manufacturing. However, Purchaser shall have right to review the inspection reports, quality checks and results of suppliers in house inspection department which are not Customer hold points and the supplier shall comply with the remarks made by purchaser or his representative on such reviews with regards to further testing, rectification or rejection, etc.
- 5.02 Witness and Hold points are critical steps in manufacturing, inspection and testing where the supplier is obliged to notify the Purchaser in advance so that it may be witnessed by the Purchaser. Final inspection is a mandatory hold point. The supplier needs to proceed with the work past a hold point only after clearance by purchaser or a witness waiver letter from BRPL.
- 5.03 The performance of waiver of QA activity by Purchaser at any stage of manufacturing does not relieve the supplier of any obligation to perform in accordance with and meet all the requirements of the procurement documents and also all the codes & reference documents mentioned in the procurement document nor shall it preclude subsequent rejection by the purchaser.
- 5.04 On completion of manufacturing the items can be dispatched only after issue of shipping release by the Purchaser.
- 5.05 All testing and inspection shall be done without any extra cost.
- 5.06 Purchaser reserve the right to send any material out of the supply to any recognized laboratory for testing and the cost of testing shall be borne by the Purchaser. In case the material is found not in order with the technical requirement / specification, the charges along with any other penalty which may be levied is to be borne by the bidder. To avoid any complaint the supplier is advised to send his representative to the stores to see that the material sent for testing is being sealed in the presence of bidders representative.
- 5.07 Bidder has to sign quality agreement before supply of the material.

6.0 Packing, Packing List & Marking

- 6.01 Packing: Supplier shall pack or shall cause to be packed all Commodities in boxes and containers and otherwise in such a manner as shall be reasonably suitable for shipment by road or rail to BRPL without undue risk of damage in transit.
- 6.02 Packing List: The contents of each package shall be itemized on a detailed list showing the exact weight and the extreme outside dimensions (length, width and height) of each container or box. One copy of the packing list shall be enclosed in each package delivered. There shall

also be enclosed in one package a master packing list identifying each individual package, which is part of the shipment. On any packaging where it is not feasible to place the packing list inside the container, all pertinent information shall be stenciled on the outside and will thus constitute a packing list.

7.0 Prices basis for supply of materials

Bidders require quoting their prices on Landed Cost Basis and separate price for each item. For Supply to BRPL Delhi the price shall be inclusive of packing, forwarding, GST and freights. The above supply prices shall also include unloading at site stores. Transit and storage insurance will be arranged by BRPL; however bidder to furnish required details in advance for arranging the same by BRPL.

8.0 Variation in taxes, duties & levies:

- 8.01 The total order value shall be adjusted on account of any variations in Statutory Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period only. However, incase of reduction in taxes, duties and levies, the benefits of the same shall be passed on to BUYER.
- 8.02 No other Taxes, Duties & Levies other than those specified above will be payable by BUYER except in case of new Levies, Taxes & Duties imposed by the Competent Authorities by way of fresh notification(s) subsequent to the issue of PURCHASE ORDER but within the stipulated delivery period.
- 8.03 Notwithstanding what is stated above, changes in Taxes, Duties & Levies shall apply only to that portion of PURCHASE ORDER not executed on the date of notification by Competent Authority. Further, changes in Taxes, Duties & Levies after due date of Delivery shall not affect PURCHASE ORDER Terms and Value.
- 8.04 PURCHASE ORDER value shall not be subject to any variation on account of variation in Exchange rate(s).

9.0 Taxes & Duties on raw materials & bought out components:

- 9.01 Taxes & Duties on raw materials & bought out components are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.
- 9.02 Taxes & Duties on raw materials & bought out components procured indigenously are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

10.0 Terms of payment and billing

10.01 For Supply of Equipments:

- 100% payment shall be made within 45 days from the date of receipt of material at store/ site against submission of 10 % performance bank guarantee. (Refer 10.01)

10.02 Bidder to submit the following documents against dispatch of each consignment:

- i) Consignee copy of LR
- ii) Supplier detailed invoice showing commodity description, quantity, unit price, total price and basis of delivery.
- iii) Original certificate issued by BRPL confirming receipt of material at site and acceptance of the same.
- iv) Dispatch clearance / inspection report in original issued by the inspection authority
- v) Packing List.
- vi) Test Reports
- vii) Guarantee Certificate.
- viii) Insurance policy to be obtained by supplier

11.0 Price Validity

11.01 All bids submitted shall remain valid, firm and subject to unconditional acceptance by BRPL Delhi for 120 days post bid-date. For awarded suppliers, the prices shall remain valid and firm till contract completion.

12.0 Performance Guarantee

12.01 Supplier shall establish a performance bond in favor of BRPL in an amount not less than Ten percent (10%) of the total price of the Contract (the "Performance Bond"). The Performance Bond shall be valid for a period of twenty four months (24) from the date of the commissioning or thirty months (30) from the date of receipt of material (last consignment) at site/stores whichever is earlier plus 3 months towards claim period. It shall be in accordance with one of the following terms:

- a) Depositing pay order /demand draft of the relevant amount directly with BRPL at the address listed above or as otherwise specified by BRPL, either of which shall constitute the Performance Bond hereunder; or
- b) Bank guarantee from any nationalized bank in favour of BSES RAJDHANI POWER LTD (BRPL). The performance Bank guarantee shall be in the format as specified by BRPL.

13.0 Forfeiture

13.01 Each Performance Bond established under Clause 10.0 shall contain a statement that it shall be automatically and unconditionally forfeited without recourse and payable against the presentation by BRPL of this Performance Bond to the ICICI Bank at Mumbai, or to the relevant company/ correspondent bank referred to above, as the case may be, together with a simple statement that supplier has failed to comply with any term or condition set forth in the Contract.

- 13.02 Each Performance Bond established under will be automatically and unconditionally forfeited without recourse if BRPL in its sole discretion determines that supplier has failed to comply with any term or condition set forth in the contract.

14.0 Release

All Performance Bonds will be released without interest within seven (7) days from the last date up to which the Performance Bond has to be kept valid (as defined in Clause 10.0) except for the case set forth in Clause 21.0.

15.0 Defects Liability Period

- 15.01 The bidder to Guarantee the materials / items supplied against any defect of failure, which arise due to faulty materials, workmanship or design for the entire defects liability period. The Defect liability period shall be 60 months from the date of commissioning or 66 months from the date of delivery whichever is earlier. If during the defects liability period any materials / items are found to be defective, these shall be replaced or rectified by the bidder at his own cost within 30 days from the date of receipt of intimation.

16.0 Return, Replacement or Substitution.

BRPL shall give Supplier notice of any defective Commodity promptly after becoming aware thereof. BRPL may in its discretion elect to return defective Commodities to Supplier for replacement, free of charge to BRPL, or may reject such Commodities and purchase the same or similar Commodities from any third party. In the latter case BRPL shall furnish proof to Supplier of the cost of such substitute purchase. In either case, all costs of any replacement, substitution, shipping, labour and other related expenses incurred in connection with the return and replacement or for the substitute purchase of a Commodity hereunder should be for the account of Supplier. BRPL may set off such costs against any amounts payable by BRPL to Supplier. Supplier shall reimburse BRPL for the amount, if any, by which the price of a substitute Commodity exceeds the price for such Commodity as quoted in the Bid.

17.0 Effective Date of Commencement of Contract:

- 17.01 The date of the issue of the Letter of Acceptance shall be treated as the effective date of the commencement of Contract.

18.0 Time – The Essence of Contract

- 18.01 The time and the date of completion of the “Supply” as stipulated in the Letter Of Acceptance / Purchase order issued to the Supplier shall be deemed to be the essence of the “Contract”. The Supply has to be completed not later than the aforesaid Schedule and date of completion of supply.

19.0 The Laws and Jurisdiction of Contract:

- 19.01 The laws applicable to this Contract shall be the Laws in force in India.

19.02 All disputes arising in connection with the present Contract shall be settled amicably by mutual consultation failing which shall be finally settled as per the rules of Arbitration and Conciliation Act, 1996 at the discretion of Purchaser. The venue of arbitration shall be at Mumbai in India

20.0 Events of Default

20.01 Events of Default. Each of the following events or occurrences shall constitute an event of default ("Event of Default") under the Contract:

- a) Supplier fails or refuses to pay any amounts due under the Contract;
- b) Supplier fails or refuses to deliver Commodities conforming to this RFQ/ specifications, or fails to deliver Commodities within the period specified in P.O. or any extension thereof
- c) Supplier becomes insolvent or unable to pay its debts when due, or commits any act of bankruptcy, such as filing any petition in any bankruptcy, winding-up or reorganization proceeding, or acknowledges in writing its insolvency or inability to pay its debts; or the Supplier's creditors file any petition relating to bankruptcy of Supplier;
- d) Supplier otherwise fails or refuses to perform or observe any term or condition of the Contract and such failure is not remediable or, if remediable, continues for a period of 30 days after receipt by the Supplier of notice of such failure from BRPL.

21.0 Consequences of Default.

- a) If an Event of Default shall occur and be continuing, BRPL may forthwith terminate the Contract by written notice.
- b) In the event of an Event of Default, BRPL may, without prejudice to any other right granted to it by law, or the Contract, take any or all of the following actions;
 - i) present for payment to the relevant bank the Performance Bond;
 - ii) purchase the same or similar Commodities from any third party; and/or
 - iii) recover any losses and/or additional expenses BRPL may incur as a result of Supplier's default.

22.0 Penalty for Delay

22.01 If supply of items / equipments is delayed beyond the supply schedule as stipulated in purchase order then the Supplier shall be liable to pay to the Purchaser as penalty for delay, a sum of 1% (one percent) of the contract price for every week delay or part thereof for undelivered quantities.

22.02 The total amount of penalty for delay under the contract will be subject to a maximum of ten percent (10%) of the contract price for undelivered quantities.

22.03 The Purchaser may, without prejudice to any method of recovery, deduct the amount for such damages from any amount due or which may become due to the Supplier or from the Performance Bond or file a claim against the supplier.

23.0 Force Majeure

23.01 General

An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control directly or indirectly, of the Party affected, but only if and to the extent that:

- i) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions, due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected party's ability to perform its obligations under this Contract and to mitigate the consequences thereof.
- ii) For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.
- iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract.
- iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause.

23.02 Specific Events of Force Majeure subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements:

23.03 Mitigation of Events of Force Majeure Each Party shall:

- i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure including recourse to alternate methods of satisfying its obligations under the Contract;
- ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and
- iii) Keep the other Party informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.

23.04 Burden of Proof In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Agreement. The burden of proof as to whether or not a force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.

- 23.05 Termination for Certain Events of Force Majeure. If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 3 months, the Parties shall promptly discuss in good faith how to proceed with a view to reaching a solution on mutually agreed basis. If a solution on mutually agreed basis cannot be arrived at within a period of 30 days after the expiry of the period of three months, the Contract shall be terminated after the said period of 30 days and neither Party shall be liable to the other for any consequences arising on account of such termination.
- 23.06 Limitation of Force Majeure event. The Supplier shall not be relieved of any obligation under the Contract solely because cost of performance is increased, whether as a consequence of adverse economic consequences or otherwise.
- 23.07 Extension of Contract Period due to Force Majeure event The Contract period may be extended by mutual agreement of Parties by way of an adjustment on account of any period during which an obligation of either Party is suspended due to a Force Majeure event.
- 23.08 Effect of Events of Force Majeure. Except as otherwise provided herein or may further be agreed between the Parties, either Party shall be excused from performance and neither Party shall be construed to be in default in respect of any obligations hereunder, for so long as failure to perform such obligations shall be due to and event of Force Majeure."

24.0 Transfer And Sub-Letting

- 24.01 The Supplier shall not sublet, transfer, assign or otherwise part with the Contract or any part thereof, either directly or indirectly, without prior written permission of the Purchaser.

25.0 Recoveries

- 25.01 Whenever under this contract any money is recoverable from and payable by the bidder, the purchaser shall be entitled to recover such sum by appropriating in part or in whole by detecting any sum due to which any time thereafter may become due from the supplier in this or any other contract. Should the sum be not sufficient to cover the full amount recoverable the bidder shall pay to the purchaser on demand the remaining balance.

26.0 Waiver

- 26.01 Failure to enforce any condition herein contained shall not operate as a waiver of the condition itself or any subsequent breach thereof.

27.0 Indemnification

- 27.01 Notwithstanding contrary to anything contained in this RFQ, Supplier shall at his costs and risks make good any loss or damage to the property of the Purchaser and/or the other Supplier engaged by the Purchaser and/or the employees of the Purchaser and/or employees of the other Supplier engaged by the Purchaser whatsoever arising out of the negligence of the Supplier while performing the obligations under this contract.

SECTION – IV: QUANTITY AND DELIVERY REQUIREMENT

Sl. No.	Item Description	Specification	Requirement	Delivery Schedule	Location
BRPL,DELHI					
1	Rate Contract for Supply of Indoor and Outdoor Type Manual RMU and Motorized RMU with FRTU in BRPL	SECTION V	531 Nos	Rate Contract for One (01) Year Delivery shall be as per the requirement over the period of 12 months from the date of Ordering	Stores BRPL Delhi

Annexure –I

BID FORM

Rate Contract for Supply of Indoor and Outdoor Type Manual RMU and Motorized RMU with FRTU in BRPL

To

Head of the Department Contracts & Materials BSES Rajdhani Power Ltd BSES Bhawan, Nehru Place New Delhi– 110019

Sir,

We understand that BRPL is desirous of procuring “Indoor and Outdoor Manual RMU and Motorized RMU with FRTU” in its licensed distribution network area in Delhi. Having examined the Bidding Documents for the above named works, we the undersigned, offer to deliver the goods in full conformity with the Drawings, Conditions of Contract and specifications for the sum of AS PER PRICE BID ENCLOSED or such other sums as may be determined in accordance with the terms and conditions of the contract .The above amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

If our Bid is accepted, we undertake to deliver the entire goods as per delivery schedule given by you from the date of award of purchase order/letter of intent.

If our Bid is accepted, we will furnish a performance bank guarantee for an amount of 10% (Ten) percent of the total contract value for due performance of the Contract in accordance with the General Conditions of Contract.

We agree to abide by this Bid for a period of 120 days from the date fixed for bid opening under clause 9.0 of GCC, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

We declare that we have studied the provision of Indian Income Tax Law and other Indian Laws for supply of equipments/materials and the prices have been quoted accordingly.

Unless and until Letter of Intent is issued, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest, or any bid you may receive.

There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract, Clause 19 of GCC .

Dated this.....day of.....20.....

Signature..... In the capacity of.....

.....duly authorized to sign for and on behalf of (IN BLOCK CAPITALS).....

Annexure -II

FORMAT FOR EMD BANK GUARANTEE

(To be issued in a Non Judicial Stamp Paper of Rs.50/-purchased in the name of the bank)

Whereas [name of the Bidder] (hereinafter called the “Bidder”) has submitted its bid dated [date of submission of bid] for the supply of [name and/or description of the goods] (hereafter called “the Bid”). KNOW ALL PEOPLE by these presents that WE [name of bank]at[Branch Name and address],having our registered office at[address of the registered office of the bank](herein after called —“the Bank”),are bound unto BSES Rajdhani Power Ltd., with its Corporate Office at BSES Bhawan Nehru Place, New Delhi -110019, (herein after called —the “Purchaser”) in the sum of _____ for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this ____ day of __ 20__.

THE CONDITIONS of this obligation are:

If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or

If the Bidder, having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity:

fails or refuses to execute the Contract Form ,if required; or
fails or refuses to furnish the performance security, In accordance with the Instructions to Bidders/GENERAL CONDITIONS.;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that is its demand the purchaser will note that amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including thirty (30) days after the period of bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

(Signature of the bank)

Signature of the witness

Annexure III

FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed & stamped by the bidder along-with bid)

BSES Rajdhani Power Ltd (BRPL) intends to use reverse auction through SAP-SRM tool as an integral part of entire tendering process. All bidders who are techno-commercially qualified on the basis of tender requirements shall participate in the reverse auction.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid:-

1. In case of bidding through Internet medium, bidders are advised to ensure availability of all associated infrastructure as required to participate in the reverse auction event. Inability to bid due to telephone glitch, internet response issues, software & hardware hangs/failures, power failures or any other reason shall not be the responsibility of BRPL.
2. In case bidder fails to participate in the reverse auction event due to any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid submitted by them as a part of tender shall be considered as bidder's Final .No Regret offer.Any off-line price bids received from a bidder in lieu of non-participation in the reverse auction event shall be rejected by BRPL.
3. The bidder is advised to understand the auto bid process t safeguard themselves against any possibility of non-participation in the reverse auction event.
4. The bidder shall be prepared with competitive price quotes during the day of reverse auction event.
5. The prices quoted by bidder in reverse auction event shall be on FOR Landed cost BRPL Store/site basis inclusive of all relevant taxes, duties, levies, transportation charges etc.
6. The prices submitted by the bidder during reverse auction event shall be binding on the bidder.
7. The bidder agrees to non-disclosure of trade information regarding bid details e.g.purchase, identity, bid process/technology, bid documentation etc.
8. BRPL will make every effort to make the bid process transparent. However award decision of BRPL will be final and binding on the bidder.
9. The prices submitted during reverse auction event shall be binding on the bidder.
10. No request for Time extension of the reverse auction event shall be considered by BRPL.

Seal & Signature of Bidder

PRICE FORMAT

ENQUIRY NO & DATE: NIT: CMC/BR/19-20/SV/RS/RJ/846

PRICE SCHEDULE

ITEM DESCRIPTION	QTY AS PER RFQ	UOM	EX- WORKS RATE/ UNIT	CGST (%)	CGST AMT	SGST (%)	SGST AMT	IGST (%)	IGST AMT	FRT	LANDED RATE/ UNIT	TOTAL LANDED COST (INR)
MANUAL RMU												
SUPPLY OF 11kV OUTDOOR TYPE 3 WAY MANUAL RMU	109	Nos										
SUPPLY OF 11kV OUTDOOR TYPE 4 WAY MANUAL RMU	131	Nos										
SUPPLY OF 11kV INDOOR TYPE 3 WAY MANUAL RMU	107	Nos										
SUPPLY OF 11kV INDOOR TYPE 4 WAY MANUAL RMU	61	Nos										
SUPPLY OF RMU ,MET,OUTDR,3,11KV,30/5A	1	Nos										
MOTORISED RMU-SUPPLY												
SUPPLY OF 11kV INDOOR TYPE 3 WAY MOTORIZED RMU WITH FRTU AS PER TECH SPECS.	21	Nos										
SUPPLY OF 11kV OUTDOOR TYPE 3 WAY MOTORIZED RMU WITH FRTU	38	Nos										
SUPPLY OF 11kV OUTDOOR TYPE 3 WAY MOTORIZED RMU WITH FRTU. THE RMU, FRTU & ALL ACCESSORIES TO BE SUPPLIED FITTED INSIDE AN ENCLOSURE /KIOSK FOR OUTDOOR APPLICATION AS PER TECH SPECS	2	Nos										
SUPPLY OF 11kV INDOOR TYPE 4 WAY MOTORIZED RMU WITH FRTU	45	Nos										
SUPPLY OF 11kV OUTDOOR TYPE 4 WAY MOTORIZED RMU WITH FRTU	16	Nos										
LAPTOP (8GB RAM, 1TB HDD) ALONG WITH NECESSARY CONNECTING CABLE FOR FRTU/MODEM	01	Nos										

CONFIGURATION, LICENSED SOFTWARE FOR FRTU AND MODEM CONFIGURATION DULY INSTALLED.												
MOTORIZED RMU-SERVICES												
SUPERVISION OF ERECTION, TESTING AND COMMISSIONING OF MOTORIZED RMUs	122	Nos										
TESTING & COMMISSIONING OF FRTU, INCLUDING ALL KIND OF INTERNAL WIRING AND SUCCESSFUL CONFIGURATION AND INTEGRATION OF FRTU WITH SCADA. ARRANGEMENT OF ALL REQUIRED COMMISSIONING SPARES, EQUIPMENT, INSTRUMENTS, TOOLS FOR SUCCESSFUL TESTING AND COMMISSIONING.	122	Nos										

- Note: 1. The prices received without break up of ex works, Freight, GST are liable for rejection
2. Pls. Indicate the exact percentage of taxes in figures and words.
3. If there is a discrepancy between the unit price and the total price THE UNIT PRICE shall prevail.
4. Bidders are requested to attach the covering letter head along with the price bid indicating reference no and date.

Bidders seal & signature

Annexure – V

Enquiry No. : CMC/BR/19-20/SV/RS/RJ/846

COMMERCIAL TERMS AND CONDITIONS

S/NO	ITEM DESCRIPTION	AS PER BRPL	CONFIRMATION OF BIDDER
1	Validity of prices	120 days from date of offer	
2	Price basis	Firm, FOR Delhi store basis, Prices shall be inclusive of all taxes & duties, freight upto Delhi stores. Unloading at stores be in vendor's scope Transit insurance in BRPL scope	
3	Payment Terms	100% payment within 45 days after receipt of material at stores	
4	Delivery schedule	As per Section IV	
5	Defect Liability Period	60 months after commissioning or 66 months from the last date of supply, whichever is earlier.	
6	Penalty for delay	1% per week of delay of undelivered units or part thereof subject to maximum of 10% of total PO value of undelivered units	
7	Performance Bank Guarantee	10% of total PO value for 24 months after commissioning or 30 months from date of supply, whichever is earlier plus 3 months towards claim period	

ANNEXURE - VI

ENQUIRY NO: CMC/BR/19-20/SV/RS/RJ/846

NO DEVIATION SHEET

SL NO	SL NO OF TECHNICAL SPECIFICATION	DEVIATION, IF ANY

SIGNATURE & SEAL OF BIDDER

NAME OF BIDDER

SCOPE DEMARCATION-MANUAL RMU

Sl. No.	Descriptions	BRPL	Bidders
1	Submission of Drawing and GTP	X	√
2	Drawing and GTP approval	√	X
3	Design, Manufacturing, Testing of RMU at factory	X	√
4	Transportation of RMU from BRPL store to site	√	X
5	Civil Foundation	√	X
6	Erection of RMU	√	X
7	Testing and Commissioning of RMU	√	X
8	Supervision of Erection, Testing and Commissioning at BRPL site	X	√
9	Providing of Tools and Testing instrument for commissioning	√	X
10	Licensed Software for Realy configuration till warranty period (without any cost implication to BRPL)	X	√
11	Installation of Licensed software in BRPL nominated Laptop	X	√

SCOPE DEMARCATION-MOTORISED RMU WITH FRTU

Sl. No.	Descriptions	BRPL	Bidders
1	Submission of Drawing and GTP	X	√
2	Drawing and GTP approval	√	X
3	Design, Manufacturing, Testing of RMU at factory	X	√
4	Transportation of RMU from BRPL store to site	√	X
5	Civil Foundation	√	X
6	Erection of RMU	√	X
7	Testing and Commissioning of RMU excluding Automation Part	√	X
8	Supervision of Erection, Testing and Commissioning at BRPL site	X	√
9	Testing, Commissioning and SCADA integration of Automation part	X	√
10	Providing of 4G SIM for Modem	√	X
11	Modification of wiring during commissioning of Automation part (if any)	X	√
12	Providing of Tools and Testing instrument for commissioning of Automation part	X	√
13	Mandatory Spares to be provided as per the BRPL Technical Specification-GN101-03-SP-76-01 (1 Set irrespective of type of RMU)	X	√
14	Necessary Connecting Cable for FRTU and Modem configuration	X	√
15	Licensed Software for Modem, FRTU and Relay configuration till warranty period (without any cost implication to BRPL)	X	√
16	Installation of Licensed software in BRPL nominated Laptop	X	√

CHECK LIST

Sl No	Item Description	YES/NO
1	INDEX	YES/NO
2	COVERING LETTER	YES/NO
3	BID FORM (UNPRICED) DULY SIGNED	YES/NO
4	BILL OF MATERIAL (UNPRICED)	YES/NO
5	TECHNICAL BID	YES/NO
6	ACCEPTANCE TO COMMERCIAL TERMS & CONDITIONS	YES/NO
7	FINANCIAL BIDS (IN SEALED ENVELOPE)	YES/NO
8	EMD IN PRESCRIBED FORMAT	YES/NO
9	DEMAND DRAFT OF RS 1180/- DRAWN IN FAVOUR OF	BSES RAJDHANI POWER LTD
10	POWER OF ATTORNEY/ AUTHORISATION LETTER FOR SIGNING THE BID	YES/NO

SECTION – V

TECHNICAL SPECIFICATIONS (TS)

**Rate Contract for Supply of Indoor and Outdoor Type Manual RMU
and Motorized RMU with FRTU in BRPL**

CMC/BR/19-20/SV/RS/RJ/846



Technical Specification
For
11 kV Motorized Ring Main Unit

Specification no – GN101-03-SP-76-01

Prepared by		Reviewed by		Approved by		Rev/Pages	Date
Name	Sign	Name	Sign	Name	Sign		
Gautam Deka/ Pronab Bairagi	 26/02/2020	Amit Tomar	 26/02/2020	K. Sheshadri	 26/02/2020	R1/65	26-Feb- 2020

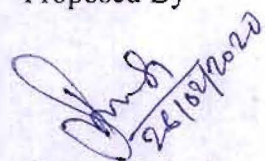
Technical Specification For 11 kV Motorized Ring Main Unit**Records of Revision**

S.no.	Revision no.	Item/Cl. No.	Nature of change	Approved by
1	R1	2.0	Included below standards IS 2705 - Current Transformer IS 3156 - Voltage Transformer	KS
2	R1	5.26	NO/NC Contact added to be taken for VPIS for Live line indication status to remote SCADA through FRTU.	KS
3	R1	Special requirement-SI. No-13	500VA Aux-PT added for outdoor RMU Only.	KS
4	R1	6.10.1	Suitable arrangement to be provided for remote load monitoring at SCADA for LBS	KS
5	R1	7.13 and 7.14	1. RS-485 Port to be provided on the Relay for remote communication of the parameters to the SCADA through FRTU over MODBUS Protocol. Necessary internal wiring also shall be done between Relay and FRTU. 2. Licensed software shall be provided for Relay communication with Laptop along with necessary cables for interconnection between Laptop and Relay (Based on requirement).. 3. Appropriate wiring to be done to connect all the relays to the FRTU.	KS
6	R1	12.3	The label shall be riveted and not pasted on the panel compartment door. Preferable the labels shall be engraved on the plate.	KS
7	R1	14.3	BRPL may carry out integration of the FRTU/Modem and BRPL SCADA during Inspection stage. OEM to carry out the configuration of both Modem and FRTU in this case to establish connection between FRTU and SCADA. SIM shall be provided by BRPL	KS
8	R1	17	1. As Built Drawings. (One set of As Built drawing to be provided with each RMU during dispatch. As Built drawing shall be provided to BRPL in soft copy) 2. IO termination chart shall be provided along with the schematic drawing for approval. IO Termination chart shall be provided on the inside of FRTU Compartment door.	KS

Technical Specification For 11 kV Motorized Ring Main Unit

S.no.	Revision no.	Item/Cl. No.	Nature of change	Approved by
			3. The FRTU and modem Configuration file for every FRTU shall be shared with BRPL after successful on-site integration with SCADA. 4. FRTU and modem licensed software to be provided to BRPL. Any future software upgrades and support to be provided to BRPL without any cost implication till warranty period. 5. FRTU and modem features brochure and tutorial for configuration to be provided to BRPL for reference during configuration for their engineers	
9	R1	Annexure - A, 1.13	Training for FTRU and Relay	KS
10	R1	Annexure - G	Only 12 dB High gain multi directional antenna with 15Mtr wire to be provided. Provision for taking antenna wire outside to be provided..	KS
11	R1	Annexure - G	Adequate accessories for mounting Antenna at appropriate Sub-station location (Roof/wall) for trouble free operation such as wall mounting bracket, roof mounting bracket etc. Shall be provided.	KS
12	R1	Annexure - G	Modem should be able to send a power failure signal in case when battery/battery charger fails before shutting down.	KS
13	R1	Annexure - H, 1.3	No access to the FRTU Compartment shall be given from the RMU back side.	KS
14	R1	Annexure - H, Annexure 2	Revised DI/DO/AI/SP list along with related signals added	KS
15	R1	Annexure - I, Make List	FRTU, CT, PT and Relay Make revised and added	KS
16	R1	5.1	Revised Panel Construction sheet.	KS

Proposed By

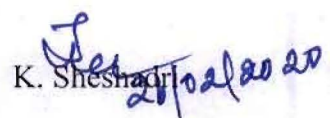
Gautam Deka/
Pronab Bairagi

Reviewed By



Amit Tomar

Approved By



K. Sheshadri

Technical Specification For 11 kV Motorized Ring Main Unit**Index**

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1.0 Scope of work

11kV Motorized RMU with FRTU, Modem (4G, GSM), Battery, Battery charger and auxiliary transformer (for outdoor RMU only) shall be supplied as per the specification. All the accessories mentioned above shall be supplied along with RMU's as a composite unit. Inside the composite unit, battery and battery charger shall be inbuilt inside RMU compartment and FRTU, modem shall be inbuilt inside LV compartment. Refer Annexure-J for drawing. Make of all accessories shall be as per Annexure-I. Spares are also to be supplied by bidder along with RMU as per the list mentioned in Annexure-D.

2.0 Codes & standards

Materials, equipment and methods used in the manufacture of switchboards shall conform to the latest edition of following –

S No.	Title
Indian Electricity Rules	With latest amendments
Indian electricity act	IE act 2003
IS 3427	A.C. Metal Enclosed Switchgear and Control gear for Rated Voltages Above 1 Kv
IS 9920 part 1,3 & 4	High voltage switches above rated voltage 1kv
IS 13118	General requirements of circuit breakers above rated voltage 1kv
IS 3231	Electric Relays for Power System Protection
IS 2705	Current Transformer {R1}
IS 3156	Voltage Transformer {R1}
IEC 60059	Preferred current ratings of high voltage switchgear
IEC 60298	AC metal enclosed switchgear
IEC 60529	Classification of degrees of protection provided by enclosures
IEC 60255	Electrical relays
IEC 62271	HV Switchgear and Control gear

Technical Specification For 11 kV Motorized Ring Main Unit

IEC 62271 – 103	HV Switchgear and Control gear - Switches for rated voltages above 1 kV up to and including 52 kV
IEC 62271 – 1	HV Switchgear and Control gear – Common Specifications
IEC 62271 – 201	HV Switchgear and Control gear - AC insulation-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 Kv
IEC 60044	Instrument Transformers – Current Transformers
IEC 62271 – 102	HV Switchgear and Control gear – Alternating Current Disconnecter and Earthing Switches

Note:

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows -

- i. Guaranteed Technical Particulars (GTP)
- ii. Specification including applicable codes & standards
- iii. Approved Vendor Drawings
- iv. Deviation sheet

3.0 Electrical Distribution System Data

3.1	Supply	3 phase AC, 3 wire
3.2	Voltage	11000 volt $\pm 10\%$
3.3	Frequency	50 Hz $\pm 5\%$
3.4	System neutral	Earthed at upstream 11kV source

4.0 11 kV RMU System layout

4.1	RMU Configuration	As per scheme given in Annexure E & type as per Purchase requisition
4.2	Extensibility	Right hand side
4.3	Load break switch, Circuit breaker & earth switch in RMU panel	All shall be non draw out type, fixed position
4.4.1	Insulation medium for panel	SF6 gas or Dry air in sealed metallic tank
4.4.2	Breakers	SF6 gas or Vacuum type (with disconnecter & earth switch)
4.4.3	load break switches	SF6 gas or Vacuum type (With Earth Switch)
4.5	Arc interruption chamber for breaker	i) Separate for each breaker ii) Arc interruption chamber of breakers shall be separate

Technical Specification For 11 kV Motorized Ring Main Unit

		from the main insulated tank.
4.6	Maximum dimensions for a 3 way panel (1 CB + 2 LBS), without FRTU Panel	
4.6.1	Width (measured from front)	1250 mm
4.6.2	Depth	800 mm
4.6.3	Height	2000 mm
4.7	FRTU	FRTU shall be provided integrated with RMU in the LV compartment completely wired along with Dual SIM auto change over Modem suitable for communicating with 4G, GSM network of any service provider and also have facility to communicate with available Optical fiber network. Vendor shall demonstrate the data communication of FRTU and modem with MCC/Existing SCADA for approval of owner in the Pre Order technical evaluation stage. FRTU shall be EMI free and EMC compatible. For detailed specification of FRTU, I/O requirements , refer our enclosed standard specification of FRTU
4.8	Modem	As per Modem Specifications given in Annexure G

5.0 RMU panel construction

5.1	Panel type	CRCA/GI Metal enclosed, framed, Compartmentalized panel construction. CRCA thickness shall be 2 to 2.5 mm subject to type test report from CPRI/ERDA.{R1}. Sheet thickness below 2 mm in any part of RMU shall not be accepted
5.2	Service Location	Indoor, non air conditioned environment / Outdoor with continuous ambient temperature of 50 deg C and shall be suitable for external climatic condition Resistant to water ultraviolet radiation (Canopy for outdoor application)
5.3	Mounting	Free Standing
5.4	Overall Enclosure Protection	IP4X minimum, vermin proof IP 54 (For outdoor duty)
5.5	Doors	Front access with anti theft hinge arrangement, Minimum three hinges. Hinges arrangement shall ensure that door cannot be removed.
5.6	Covers	Bolted (stainless steel) for rear access, with handles. Support for handle shall be provided at suitable place on RMU body. All the accessible bolts / screws shall be vandal proof. One set of required Special tools per RMU (if any) shall be in the scope of supply. All kind of nuts and bolts must be stainless steel

Technical Specification For 11 kV Motorized Ring Main Unit

5.7	Construction	(Stainless steel tank. 3.0 mm thickness shall be based on validated type tests for 21kA 1sec IAC test and 21kA, 3sec short ckt tests.)
5.8	Base frame	Base frame shall be made with 75mm ISMC/ISA channel for both Indoor and Outdoor type RMU. Proper Bolted fixing arrangement shall be provided for erection on RCC foundation. Also, base frame shall be painted with 2 coats of anti rust red oxide and 2 coats of bitumen paint shall be provided. {R9}Adjustable HDPE clits as cable supporting clamps for each power cable (to suit the cable size from 150 to 400 sq mm PILC / XLPE cable. Exact size shall be provided during drawing approval stage.), also cleat shall be adjustable vertically.
5.9	Lifting lugs	Four numbers
5.10	Cable Entry	Bottom 3mm metallic, removable type & split type in two parts, with 1no. 90 mm diameter knocks out punch/hole in the centre. Hole arrangement shall be done up to 11Kv, 3cx400 sqmm cable. (For double cable boxes, Un-drilled gland plate to be supplied. Approval should be taken for the same during drawing submission)
5.12	Cable type & size	3CX150 / 240 / 300/400sq mm Aluminum conductor XLPE/ PILC with armor & PVC outer sheath
5.13	Terminals for 11 kV cable termination	Suitable for Ring Type Bimetallic lug along with reducer/adaptor check nuts/bolts for different type lugs sizes as per annexure F
5.13.1	Right angled boots	Single piece cold shrink type (Minimum 20mm spacing between boots preferred)
5.13.2	Brass Nut bolt	Shall be suitable for all kind of lugs of cable size 11Kv, 3cx150 to 11kv, 3cx400 sqmm (Reducer to be provided to fit the nuts/bolts for all kind of lugs with all the bushing and all kind of nuts/bolt shall be the part of supply)
5.13.3	Bimetallic washers	Required (Not applicable for silver quoted bushing)
5.13.4	Termination type	suitable for heat shrinkable type
5.13.5	Termination height	For Indoor / Outdoor : Min. height from top of the gland plate to bushing center shall be 900mm
5.14	Bus bar	Copper with sleeve (Sizing Calculation to be submitted in support of its Guaranteed S.C. rating / Capability) {R1}
5.14.1	Bus bar continuous rated current	630amp (at designed 40 deg. C ambient)
5.14.2	Bus bar short time withstand capacity	21 KA for 3 sec

Technical Specification For 11 kV Motorized Ring Main Unit

5.14.3	Bus bar support insulator material	SMC / DMC resin
5.14.4	Maximum temperature rise above reference ambient 40 deg C	In line with Table 3 of IEC62271-1
5.15	Earth bus bar	Tinned Copper flat sized for rated fault duty for 3 sec
5.16	Earth bus internal connection to all Noncurrent carrying metal parts	By 2.5sq mm copper flexible wire, Earth connection point maximum 1 meter away from cable test facility
5.17	Earth bus external connection to owners earth	Studs on both sides with holes for M10 bolt +hardware to readily receive purchaser earth connection
5.18	Cooling arrangement	By natural air without fan
5.19	Panel internal wiring	Multi strand flexible color coded PVC insulated Cu wire 1 sq mm (SCADA) / 2.5 sq mm (for CT's) 1100 volt grade (AC-black, DC – grey, Earth – green) with ferrules at both ends.
5.20	Hardware (Nut, bolts & handle)	Stainless steel (Except termination nut-bolts which are Brass)
5.21	Gasket	Neoprene rubber
5.22	Marshalling terminal blocks	1 Sq mm, Nylon 66 material, Disconnecting type terminal blocks shall be provided. 20% spare in each row of TB.
5.23	Panel cover fixing bolts	Allen head 6mm with hexagonal slot Seals shall be provided between the Panel and removable covers to avoid theft. The seals shall be opened/broken by using specific equipment.
5.24	Padlock facility	Required for all earth switches & all handles
5.25	Bushings for future extensions of RMU	LHS extensible. Should be duly insulated & covered with metallic covers in unused condition, In addition a removable boot cover shall be provided on the extensible bushings.
5.26	Explosion vents	To ensure operator's safety, design should ensure that gases / flames generated during flash over / blast in any of the compartment, must not come out from the front of RMU as well shall not go to adjacent cable compartment. AFLR Internal arc test report (for Cable compartment & other compartments) must be submitted to support above, along with RMU GA drawing indicating these vents. There shall not be any type of holes, gaps etc on the walls of cable termination compartment.

Technical Specification For 11 kV Motorized Ring Main Unit

5.27	SF6 Gas Annual Loss	< 0.1% of total mass. Pressure of SF6 gas shall be above the operating limit throughout the life of the equipment.
5.28	VPIS	VPIS shall be provided with terminals facility for phasing purpose.VPIS sensor shall be installed on screened bushing NO/NC Contact shall be provided with VPIS for taking the Live line indication status to remote SCADA through FRTU. {R1}
5.29	Push Buttons	On/Off PBS shall be shrouded / covered to prevent accidental operation.
5.30	Internal Arc Classification	Shall comply to the requirements of IEC 62271-200, Accessibility type AFLR .Operators of equipment shall be protected against the effects of an arcing fault in any of the MV compartment at all times , including while carrying out the maintenance works on other compartments

6.0 Load break switch (LBS) / Isolator

6.1	Type	Three poles operated simultaneously by a common shaft
6.2	Arc interruption in dielectric medium	SF6 or Vacuum
6.3	Operation	3 position operation
6.3.1	Operating mechanism for close / open	Motorized LBS Each motor shall be provided with separate MCB or Local-Remote switch.
6.3.2	Manual operation	Possible without removal of motor
6.4.1	Addition / removal of motor	Without overhaul of operating mechanism
6.4.3	Motor rated voltage	24V DC
6.5.1	Battery type & size	1. Li-ion battery(LIB) 2. Battery provided in enclosure shall be rated for 10 close & 10 open operations of LBS / CB + 2 hrs back up for SCADA FRTU load (10watt).®
6.5.2	Battery charger rating	Two chargers of rating 10A each with parallel connection
6.5.3	Battery charger configuration	With auto changeover between two chargers using 10Amp diodes
6.5.4	MCBs at charger input & output supply	Required 2nos for AC Incoming supply. All the MCBs shall be easily accessible for operation, with proper labeling.
6.5.5	Charger temperature rise at heat sink at full load for 2 hours	Maximum 55 deg C above ambient of 40 deg C
6.5.6	DC power supply for FRTU	24v DC +/- 1 volt thru 2 Amp MCB
6.5.7	Battery charger cooling	Natural without any fans

Technical Specification For 11 kV Motorized Ring Main Unit

	method	
6.5.8	Individual LBS DC Control	Required with MCB
6.6.1	Continuous rating of LBS	630 Amp at design 40 deg C ambient
6.6.2	Short time withstand capacity	21 KA for 3 sec
6.7	Fault making capacity	50 kA peak
6.8	Minimum number of operations at rated current (as per IEC 62271-102)	Mechanical Endurance – Class M1(1000 operations) Electrical Endurance – Class E3 (100 operations)
6.9	Minimum number of operations at rated fault current (as per IEC 62271-102)	Class E3 (Min 10 operations)
6.10	Fault passage indicator (FPI) (Earth fault and over current protection type)	To be provided on each and every LBS for RMU. FPI shall be earth fault and over current protection type and shall be suitable for remote load monitoring at SCADA for LBS {R1}
6.10.1	Earth Fault and over current Indicator	CBCT – Split open type suitable for mounting without disconnection of cable for EF. Phase sensor – 3 Nos. for short ckt. purpose with mounting arrangement
6.10.2	Connection of CT sensors with FPI	Cable connection of FPI with CBCT/phase CTs shall be of pre moulded type on the CBCT side. Cable shall be 2.5 sq.mm cu cable
6.10.3	Fault Passage Indicator (Earth fault and over current protection type)	Digital type and shall operate as the current exceeds the set value. Flash indication for identifying faults with red LED with one flash for every one sec. Test & rest button 1 NO + 1 NC potential free contact for remote indication FPI power supply unit shall use lithium battery with minimum life of 1000 blinking hours , so that FPI shall continue to function even after main feeder has tripped. FPI shall be powered by 24V DC in all motorized RMUs and shall be suitable for remote load monitoring at SCADA for LBS {R1}
6.10.4	Data by Purchaser	
6.10.4.1	System Fault Level	2kA – 8.75kA
6.10.4.2	Type of Grounding	Solidly Grounded
6.10.4.3	Fault clearing time	100ms
6.10.4.4	Cable Type	PILC / XLPE , 150 sq.mm to 400 sq.mm
6.10.4.5	Earth Fault Indicator	

Technical Specification For 11 kV Motorized Ring Main Unit

6.10.4.5.1	Sensing Current	50 to 400A
6.10.4.5.2	Sensing Time	30 to 100 ms in steps of 10ms.
6.10.4.5.3	Reset Time	0.5 -1-2-3-4 hr
6.10.4.5.4	Resetting Facility	a) Self rest after reset time b) Self rest after restoration of voltage c) Manual d) Remote resetting
6.10.4.5.5	Contact Rating	1A at 230 V
6.10.4.5.6	Degree of Protection	IP 54
6.10.4.5.7	Mounting Arrangement	Surface or Flush Mounting
6.10.4.5.8	Ambient Temperature	-20 to 55 Deg C
6.10.5.5	Short Ckt indicator	
6.10.5.5.1	Sensing Current	200 to 1200 A
6.10.5.5.2	Sensing Time	30 to 100 ms in steps of 10 ms
6.10.5.5.3	Reset time	0.5-1-2-3-4 hr

7.0 Circuit breaker (CB)

7.1.1	Type	Three pole, operated simultaneously by a common shaft
7.1.3	Circuit breaker - CB	For controlling cable feeder, manual and remote operation. Remote trip operation by SCADA
7.2	Arc interruption in dielectric medium	Vacuum Bottle
7.3.1	NA	NA
7.3.2	Operating mechanism - CB	Manual and Motorized spring charged stored energy type, remote electrical close / open operation possible.
7.3.3	Addition / removal of motor	Without overhaul of operating mechanism
7.3.4	Motor rated voltage	24V DC
7.4	Emergency trip / open push button	On panel front with Protective flap to prevent any accidental tripping of breaker.
7.5.1	Continuous rating at design 40 deg C ambient	630amp
7.5.2	Short time withstand capacity	21 KA for 3 sec
7.6	Minimum number of operations at rated current (as per IEC 62271-100)	Mechanical Endurance – Class M1(2000 operations) Electrical Endurance – Class E2
7.7	Fault making capacity	50 KA peak
7.8	Fault breaking capacity	21 KA Minimum
7.9	Maximum number of operations at rated	Electrical Endurance – Class E2 . To be guaranteed by manufacturer with authorized lab test reports

Technical Specification For 11 kV Motorized Ring Main Unit

	Fault current (as per IEC 62271-100)	
7.10	Breaker status auxiliary contact	2NO + 2NC wired to terminal block
7.11	Current transformer	<ol style="list-style-type: none">1. 75-400 / 1 amp for TCB/ FCB. {R9}2. Considering three core cable terminations, mounting flexibility shall be provided for CT's (in horizontal & vertical direction both). Additionally, CAUTION marking (by sticker/ paint) shall be provided to avoid CT's installation above the screen of cable. (I.e. earth potential point.)3. Position of CTs inside compartment shall be adjustable in vertical and horizontal direction
7.12	CT accuracy class	5P10 minimum
7.13	Protection relay	<p>Self powered, Microprocessor based Numerical relay (with LCD display), IDMT over current and earth fault protection with high set element, manual reset type Relay mounting flush to panel front</p> <p>Display shall be powered with 24V DC or 230V AC for all motorized RMU</p> <p>RS-485 Port to be provided on the Relay for remote communication of the parameters to the SCADA through FRTU over MODBUS Protocol. Necessary internal wiring also shall be done between Relay and FRTU.</p> <p>Licensed software shall be provided for Relay communication with Laptop along with necessary cables for interconnection between Laptop and Relay (Based on requirement).</p> <p>Appropriate wiring to be done to connect all the relays to the FRTU. {R1}</p>
7.14	Relay auxiliary contacts for remote indication	<p>Potential free contact 1NO + 1NC wired to terminal block</p> <p>RS-485 Port to be provided on the Relay for remote communication of the parameters to the SCADA through FRTU over MODBUS Protocol. Necessary internal wiring also shall be done between Relay and FRTU.</p> <p>Licensed software shall be provided for Relay communication with Laptop along with necessary cables for interconnection between Laptop and Relay (Based on requirement)..</p> <p>Appropriate wiring to be done to connect all the relays to the FRTU. {R1}</p>
7.15	Shunt trip 230v AC (for WTI, OTI trip & door limit switch of Dry type transformer) & for remote trip from SCADA.	To be wired to terminal blocks (If the functional requirement is achieved by the Protection relay, then shunt trip is not required.

Technical Specification For 11 kV Motorized Ring Main Unit

7.16	Breaking Timing	40 to 60 ms {R1}
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8.0 Earth switch (ES)

8.1	Type	Three Pole, operated simultaneously by a common shaft, for each Circuit breaker & Load break switch.
8.2	Switching in dielectric medium	Dry Air in sealed medium or SF6 gas
8.3	Operating mechanism for close, open and Earth	Manual
8.4	Fault making capacity	50 kA
8.5	Auxiliary contacts	1NO+1NC wired to terminal block
8.6	Disconnect switch (if provided in series with vacuum bottle)	Desirable to be located on purchaser cable connection side of vacuum bottle
8.7	Minimum number of operations at no load (as per IEC 62271-102)	Mechanical Endurance – Class M0(1000 operations)
8.8	Making capacity endurance of earth switch (as per IEC 62271-102)	Class E2 (Min 5 operations)

9.0 Requirements of sealed housing live parts

9.1	Enclosure/Tank	Stainless steel enclosure suitable for IP67. Non ferrite & Non magnetic grade stainless of minimum 3.0 mm thickness. Stainless steel enclosure welding shall be robotic welding type.
9.2	SF6 gas pressure low alarm	To be given along with NO and NC Contracts
9.3	Provision for SF6 gas filling	To be given (For 'sealed for life' design of RMU, this is not applicable)
9.4	Provision for SF6 gas pressure indication	Manometer with integrated pressure density switch and temperature compensation required.
9.5	Arc interruption method for SF6 breaker / Load break switch	Puffer type / rotating arc type
9.6	Potential free contacts for SF6 gas pressure low	1NO +1NC

Technical Specification For 11 kV Motorized Ring Main Unit**10.0 Operational interlocks**

10.1.1	Interlock type	Mechanical. All interlocks shall be preferably guarded by flap , so as to prevent insertion of handle for wrong operation
10.1.2	Load break switch & respective earth switch	Only one in 'close' condition at a time
10.1.3	Circuit breaker & respective earth switch	Only one in 'close' condition at a time
10.2	Prevent the removal of respective cable covers if load break switch or circuit breaker is 'ON'	Electrical / Mechanical
10.3	Prevent the closure of load break switch or circuit breaker if respective cable cover is open	Electrical / Mechanical
	NA	NA
10.4	Cable test plug for LBS/CB accessible only if Earth switch connected to earth	Mechanical
10.5	Prevent motorized operation of LBS / CB during manual operation	Electrical / Mechanical Electrical signal shall cut-off completely during manual operation. If LBS fail to operate, the supply to motor shall be disconnected after certain time period to prevent burning of motor due to continuous supply.
10.6	Prevent motorized operation of more than one LBS / CB at a time	Necessary feature (Electrical)

11.0 Indication & signals (for SCADA / Local)

11.1	Operation counter on front / Inside the RMU LT chamber	To be provided for each LBS & Circuit breaker, with minimum four digits & non re-setable type
11.2	Cable charge status indication for all LBS & CB	Capacitor type voltage indicators with LED on all the phases (Shall be clearly visible in day light)
11.3	Spring charge status indication	On front for breaker
11.4	Earth switch closed indication (For Each LBS)	On front
11.5	Load break switch ON/OFF indication	Green for OFF / Red for ON

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11.6	Circuit breaker On/OFF indication	Green for OFF / Red for ON
11.7	Circuit breaker protection relay operated on fault	Flag
11.8	Fault passage indication	Flag
11.9	Status signals to SCADA-to be wired to marshalling terminal block	2NO + 2NC
11.9.1	LBS close / open	potential free contacts
11.9.2	LBS & CB Earth Switch close /open	potential free contacts
11.9.3	Battery charger Fail	potential free contacts
11.9.4	CB close / open	potential free contacts
11.9.5	Auto trip	potential free contacts
11.9.6	FPI operated	potential free contacts
11.9.7	SF6 gas pressure low	potential free contacts
11.9.8	Local/Remote Switch	Required
11.9.9	Spring Charge Status	Potential free contacts
11.9.10	Ready to Close Signal to control centre to indicate all interlocks are OK	Potential free contacts
11.9.11	Battery Health Monitoring Unit	Required
11.9.12	Auxiliary Circuit Healthy	Potential free contacts
11.9.13	Breaker Panel Disconnect Close/Open	Potential Free contacts
11.9.14	FRTU Door open	Potential Free Contacts
11.9.15	Interlock Card Operation fail	Potential Free Contacts
11.9.16	Command Acknowledgement	Potential free Contacts
11.10.1	Commands from SCADA- to be wired to marshalling terminal block	LBS close / open
11.10.2		CB close / open
11.10.3		FPI Reset
11.10.4	RS 485 MODBUS output of Protection relay	Required
11.10.5	Interlock Card Remote Reset	Required

Technical Specification For 11 kV Motorized Ring Main Unit**12.0 Mimic diagram, labels & finish**

12.1	Mimic	1. Mimic diagram (Shall not be accepted with Stickers) 2. On panel front with description of function & direction of operation of handles/buttons
	Operating Instructions	Operating instruction chart and Do's & Don'ts in English/Hindi / local language to be displayed on left / front side of panel enclosure on anodized Al Sheet 16SWG, duly affixed on panel. Sticker shall be provided for termination process along with required torque, feeder label.
12.2	Name plate on panel front	Fixing by rivet only
12.2.1	Material	Anodized aluminum 16SWG / SS
12.2.2	Background	SATIN SILVER
12.2.3	Letters, diagram & border	Black
12.2.4	Process	Etching
12.2.5	Name plate details	Month & year of manufacture, equipment type, input & output rating, purchaser name & order number, guarantee period, Model no, SLD
12.3	Labels for meters & indications	The label shall be riveted and not pasted on the panel compartment door. Preferable the labels shall be engraved on the plate. {R1}
12.4	Danger plate on front & rear side	Anodized aluminum 16 SWG with white letters on red background
12.5	Painting surface preparation	Chemical 10 tank process
12.6	Painting external finish	Powder coated epoxy polyester base grade A, shade -RAL 7032, uniform thickness 60 micron minimum
12.7	Painting internal finish	Powder coated epoxy polyester base grade A, shade -white, uniform thickness 60 micron minimum

13.0 Quality assurance

13.1	Vendor quality plan	To be submitted for purchaser approval
13.2	Inspection points in quality plan	To be mutually identified & agreed
13.3	Quality – Process Audits	BRPL shall carryout vendor process audits.
13.4	Field quality plan	Bidder to submit field quality plan along with the bid
13.5	Spare part list	Bidder to submit detailed spare part list along with the bid
13.6	Maintenance manual	Bidder to submit maintenance manual along with the bid
13.7	Approved sub vendor /make List	Please refer Annexure-I. Any deviation from make without written approval of BRPL shall not accept at any stage of

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contract.

14.0 Inspection & testing

14.1	Type test	<ol style="list-style-type: none"> Equipment of type tested quality only, including internal arc test (AFLR) on various compartments like cable chamber, SF6 gas tank etc. Type test certificate along with AFLR internal test report from CPRI/ERDA/Any other reputed independent international Lab equivalent or better than CPRI/ERDA to be submitted along with offer for scrutiny. Type test more than 5 years old will not be acceptable. In case type test is more than 5 years old, bidder shall conduct type test from CPRI/ERDA/Any other reputed independent international Lab equivalent or better than CPRI/ERDA as per standard without any cost implication to BRPL. In this regards if BRPL want to witness the test , all the expenses of BRPL inspector shall be borne by bidder. <u>Bidder to submit following test report for DC charger.</u> <ol style="list-style-type: none"> temperature rise test voltage regulation test
14.2	Routine test	As per relevant Indian standard
14.3	Acceptance test	<p>To be performed in presence of purchaser at manufacturer works. BRPL may carry out integration of the FRTU/Modem and BRPL SCADA during Inspection stage. OEM to carry out the configuration of both Modem and FRTU in this case to establish connection between FRTU and SCADA. SIM shall be provided by BRPL{R1}</p> <ol style="list-style-type: none"> Physical inspection & BOM, wiring check Insulation resistance test (Before & after HV test) HV test for one minute, Operation & interlock check Measurement of resistance of main circuit Voltage Indication check Functional testing of Fault passage Indicator for Alarm Primary current injection test for each circuit breaker feeder with relay Breaker closing & opening time measurement Temperature rise test Functional test of FRTU Motor Operation

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		13. Partial Discharge
		14. Raw material docs verification

15.0 Shipping, Handling and Site support

15.1	Packing Protection	Against corrosion, dampness, heavy rains, breakage and vibration
15.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label
15.3	Packing Identification Label (Anodized Aluminum Plate)	On each packing case, following details are required:
		i. Individual serial number
		ii. Purchaser's name
		iii. PO number (along with SAP item code, if any) & date
		iv. Equipment Tag no. (if any)
		v. Destination
		vi. Manufacturer / Supplier's name
		vii. Address of Manufacturer / Supplier / it's agent
		viii. Description (Configuration of RMU; e.g. 1CB + 2 ISO, Motorized / Non Motorized, Extensible / Non Extensible) and Quantity must be prominently displayed at least 3 sides of packing box & on top.
		ix. Country of origin
		x. Month & year of Manufacturing
		xi. Case measurements
		xii. Gross and net weights in kilograms
		xiii. All necessary slinging and stacking instructions
15.4	Shipping	The seller shall be responsible for all transit damage.
15.5	Handling and Storage	1. Manufacturer instruction shall be followed. 2. Detail handling & storage instruction sheet / manual to be furnished before commencement of supply.

16.0 Deviations

16.1	<p>a) Deviations from this specification shall be listed separately by bidder clause wise (as mentioned in Annexure-K) along with optional offer and has to submit the list along with bid./quotation. BRPL will review the deviations and if BRPL is agreed with the deviation, seller has to take written confirmation from BRPL on deviation during tender evaluation.</p> <p>b) In the absence of any separate list of deviations from the bidder with bid as well as written confirmation from BRPL on deviations, it will be assumed by the Buyer that the</p>
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Seller complies with the Specification fully.
 c) Any deviations mentioned in any other submitted bid documents (i.e.in filled GTP, Catalog, BRPL old approval, buyer's/seller's standards etc) by seller without separate deviation sheets will not consider as a deviation from this tech spec at any stage of contract.

17.0 Drawings/Documents and Software Submission

17.1	To be submitted along with bid	The seller has to submit following:
17.1.1	GA / cross sectional drawing of product showing all the views / sections	
17.1.2	Detailed reference list of customers using the offered product during the last 5 years with similar design and rating	
17.1.3	Completely filled GTP	
17.1.4	Manufacturer's quality assurance plan and certification for quality standards	
17.1.5	Type test reports for the type, size & rating of product / equipment offered	
17.1.6	Complete product catalogue and Manual.	
17.1	Recommended spare parts and consumable items for five years of operation and spare parts catalogue with price list	
17.2	All documents as per clause 13 of this specification	
17.3	After award of contract, Seller has to submit following drawings for buyer's Approval (A) / Reference (R)	
17.3.1	Program for production and testing (A)	
17.3.2	Guaranteed Technical Particulars (A)	
17.3.3	GA drawing along with civil foundation details.	
17.3.4	Schematic and wiring drawings for all components	
17.3.5	Terminal arrangement & cable box details including gland plate arrangement etc	
17.3.6	Bill of material	
17.3.7	Detailed loading drawing to enable the buyer to design and construct foundations	
17.3.8	Transport / Shipping dimensions with weights, wheel base details, un tanking height	
17.3.9	Detailed installation and commissioning instructions	
17.3.10	quality plan	
17.4	Submittals required prior to dispatch	
	-Inspection and test reports, carried out in manufacturer's works	
	-Test certificates of all bought out items	
	-Operation and maintenance Instruction as well as trouble shooting charts/ manuals	
17.5	Drawing and document sizes	Standard size paper A3, A4
17.6	Number of Documents required at different stages shall be per Annexure-A	
17.7	1. As Built Drawings. (One set of As Built drawing to be provided with each RMU during dispatch. As Built drawing shall be provided to BRPL in soft copy) 2. IO termination chart shall be provided along with the schematic drawing for approval. IO Termination chart shall be provided on the inside of FRTU Compartment door. 3. The FRTU and modem Configuration file for every FRTU shall be shared with BRPL after successful on-site integration with SCADA.	

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	4. FRTU and modem licensed software to be provided to BRPL. Any future software upgrades and support to be provided to BRPL without any cost implication till warranty period. 5. FRTU and modem features brochure and tutorial for configuration to be provided to BRPL for reference during configuration for their engineers {R1}
Note :	Duly signed & stamped copies of the drawings / documentation are required to be submitted to BRPL for approval along with deviation sheet.

18.0 Equipment ID

- A Slot shall be provided on the Compartment door at a clearly readable height from the base level of FRTU compartment. This slot shall be provided with a Fibre card which shall be accessible from inside only but shall be visible outside. Equipment ID shall be painted/printed on the Fibre Card and
- Equipment ID shall be painted on any appropriate face of RMU at a clearly readable height from the base level. Front recommended type face for the signage is True type or Post script
- Font Size: All painting should be in UPPERCASE. Recommended height of 50 mm with spacing between alphabets of 3 mm.
- Total No's of Character: 18
- Height of Font: 50 mm
- Height of Base: 100 mm
- Spacing between alphabets: : 3 mm
- Paint: Base coat – Dense Yellow. Letters – Black Quick Drying paint 2 coats.
- Equipment ID shall be separately provided by BRPL
- Equipment ID printing shall complete at factory by seller on each and every motorized RMU before dispatch.

19.0 BATTERY HEALTH MONITORING UNIT

- I. BHMU will have Auto and Manual test facility. In Auto Mode it ensures battery automatic discharge at preset set period with 100W discharge resistor along with suitable algorithm to check the healthiness based on rate of discharge.
- II. In manual Mode PB provided for battery testing.

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- III. Provision for Bypass mode pof BHMU also required.
- IV. Output contacts :230V/24V DC -5A
 - a. Battery Fail: 1 CO b.Test In process
- V. Indications:
 - b. BHMU healthy b. Battery Fail c. Battery Low d.Test On.
- VI. Make :as per annexure- I

Annexure A Scope of supply**1.0 The scope of supply shall include following**

- 1.1 Design, manufacture, testing at manufacturer works before dispatch, packing, delivery and submission of all documentation the 11kv Ring Main Unit (RMU).
- 1.2 11kV RMU shall be as per scheme enclosed as Annexure E.
- 1.3 FRTU along with necessary software's as per detailed specification in Annexure H
- 1.4 Supply of Modem (Dual SIM, Auto Change Over, 4G, and GSM) for FRTU communication with Control Centre as per specification in Annexure G. SIM card shall be provided by BRPL.
- 1.5 Battery, Battery Charger and BHMU
- 1.6 Configuration of 11kV RMU shall be as per Purchase Requisition.
- 1.7 Testing & Commissioning of all motorized RMUs at site before charging is included in the scope of vendor including all operational checks, LV wiring checks, battery / charger checks, VPI , FPI, self powered relay, FRTU and SCADA integration. Vendor shall depute the service team with 1 day prior notice from owner.
- 1.8 FRTU customization, parameterization along with integration of FRTU with Control Centre has to be carried out at all sites by vendor engineer.
- 1.9 Guarantee Period for RMU along with FRTU & Modem: 66 months from the date of supply or 60months from date of commissioning, whichever is earlier.
- 1.10 Service Performance Requirements During Guarantee Period:

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- a) RMU including battery charger: Complaint to be attended on urgent basis and to be resolved within 24hrs, 1 day from intimation. Necessary spares may be maintained by vendor service team at Delhi.
 - b) FRTU: After reporting of FRTU modules compliant / failure, within 24 hours FRTU modules shall be replaced by vendor at site. Spare cards / modules shall be maintained by the vendor at Delhi during the guarantee period.
 - c) Modem: After reporting of Modem compliant / failure, within 24 hours Modem to be rectified / replaced by vendor at site. Spare modems if required shall be maintained by the vendor at Delhi during the guarantee period.
- 1.11 Each RMU shall be supplied with 2 sets of Operating Handle.
- 1.12 All the accessories mentioned above shall be supplied along with RMU's as a composite unit. Inside the composite unit, battery and battery charger shall be inbuilt inside RMU compartment and FRTU, modem shall be inbuilt inside LV compartment. Refer Annexure-J for drawing.
- 1.13 Supplier scope includes training of BRPL team – 4 batches (each batch with 4-6 engineers or team member as per BRPL requirement.) for minimum 3 days each at factory as well as at BRPL site for erection, testing commissioning and maintenance trouble shooting mechanism of Motorized RMU including Automation part. This shall be carried out 1 week from date of 1st shipment/ dispatch. Supplier shall also provide training for Self Powered relay & FRTU at respective manufacturer' factory as well as at BRPL site for minimum 3 days for BRPL team – 4 batches (each batch with 4-6 engineers or team member as per BRPL requirement.) ..This is applicable for each and every P.O. of Motorized RMU's.
- 1.14 Unit price for Conversion kit should be offered separately for converting the RMU from single cable termination design to double cable termination design, at site.
- 1.15 BOQ as following –

Sr No	Purchaser Equipment Tag No / SAP code	RMU standard configuration Type	Unit	Quantity
1		<i>Example – Type A2</i>	No	<i>e.g. 1</i>
2		<i>Example – Type R5</i>		
3				
4				

Technical Specification For 11 kV Motorized Ring Main Unit**2.0 Submission of documents**

	Along with offer	For Approval after award of contract	Final after approval
Documents as given in clause no 17 of specification	3 copies + 1 soft copy on CD	4 copies + 1 soft copy on CD	6 copies + 1 soft copy on CD for all type of documents

3.0 Delivery schedule

3.1	Delivery period start date	-	from date of purchase order
3.2	Delivery period end date	-	as agreed with supplier
3.3	Material dispatch clearance	-	after inspection by purchaser

Annexure B Technical particulars (Data by purchaser)

Sr No	Description	Data by purchaser
1.	Reference design ambient temperature	40 deg C
2.	Maximum ambient temperature	50 deg c for Delhi
3.	Relative humidity	e.g. 85% for Delhi
4.	Seismic zone	e.g. 4 for Delhi
5.	Extensibility of RMU on both side is required -	Yes
6	Minimum ambient temperature	0 deg C

Annexure C Guaranteed Technical Particulars (Data by Supplier)

Bidder shall furnish the GTP format with all details against each clause.

Bidder shall not change the format of GTP or clause description.

Deviation sheets shall be submitted separately along with company seal and sign. Deviation mentioned in submitted GTP or any other documents except deviation sheet shall not be considered as a deviation.

Sr. No.	Description	Data to be filled by Manufacturer
1	11 kV RMU (as per scope of supply annexure A)	Separate GTP to be filled for each type of RMU
2	Equipment make	
	Equipment type / brand name	
3	Conformance to design standards as per specification clause no 2.0 –	Yes/No

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4	Conformance to specification clause no 3.0 to 17.0 –	Yes/No
5	If NO for pt 3 or pt 4 above, Submission of deviation sheet for each specification clause no –	Yes/No
6	Panel overall dimensions in mm	
	Width (measured from front)	
	Depth	
	Height	
7	Panel weight in kg	
8	Panel extensible on RHS sides	Yes
9	Panel enclosure protection offered	
10	Panel tested for internal arc (Cable & other compartments) –Yes / No	
11	Heat generated by the panel in Kw	
12	Insulation level for complete panel	
12.1	Impulse withstand (kV peak) -70kvp min	
12.2	Power frequency withstand (kV rms) – 28kV min	
13	Bus bar	
13.1	Material & grade	
13.2	Bus bar cross section area in sq mm	
13.3	Bus bar rated current in amp i) at designed 40 deg.C ambient ii) at 50 deg.C ambient	
13.4	Max temperature rise above reference ambient of 40 deg C	
13.5	Short time current withstand capacity for 3 seconds (in KA)	
13.6	Bus bar clearances in mm P-P / P-E	
13.7	Bus bar with insulation sleeve / barriers	

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13.8	Bus bar support insulator type	
13.9	Bus bar support insulator voltage class	
13.10	Bus bar support insulator minimum creepage distance / mm	
13.11	Earth bus bar material	
13.12	Earth bus bar size	
14	Circuit breaker type – SF6 or VCB	
14.1	Rated voltage & frequency	
14.2	Rated current in amp	
14.3	Rated breaking current – KA rms symmetrical	
14.4	Short time withstand capacity in KA for 3 sec	
14.5	Rated making current - KA peak	
14.6	Breaker total opening time at rated breaking capacity (in milliseconds)	
14.7	Number of breaks per pole	
14.8	Total length of contact travel in mm	
14.9	No of circuit breaker operation cycles (close & open) guaranteed at rated current, Electrical endurance class	25% rated current -
		50% rated current -
		75% rated current -
		100% rated current -
14.10	No of breaker opening operations guaranteed at rated fault current, Electrical Endurance Class	
14.11	No of breaker mechanical operation cycles (close & open) guaranteed at zero current , Mechanical endurance class	
14.12	Contact material	
14.13	Operating mechanism – trip free	

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	Manual Spring charge type	
14.14.1	Spring charging motor rating– Watt	
14.14.2	Spring charging motor rated Dc voltage	
14.14.3	Closing coil wattage & rated DC voltage	
14.14.4	Trip coil wattage & rated DC voltage	
14.15	Transformer CT class, ratio &Vk	
15	Load break switch type – SF6 or VCB	
15.1	Rated voltage & frequency	
15.2	Rated current in amp	
15.3	Load break switch total opening time at rated current (in milliseconds)	
15.4	Number of breaks per pole	
15.5	Total length of contact travel in mm	
15.7	No of LBS close & open operation cycles guaranteed at	25% rated current -
		50% rated current -
		75% rated current -
		100% rated current -
15.8	No of LBS making operations guaranteed at rated fault current, Electrical endurance class	
15.9	No of LBS close & open operations guaranteed at zero current, Mechanical endurance class	
15.10	Contact material	
15.11	Operating mechanism type	
15.12	Operating motor voltage with acceptable % variation	
15.13	Minimum permissible SF6 gas pressure (For SF6 type RMU only)	
15.14	Capacitor type cable voltage indication	Yes / No

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	provided?	
15.15	Operation counter provided	Yes/ No
15.16	Motor Details Parameter	
16.1	Disconnect switch continuous rating (Amp)	
16.2	Disconnect switch Short time withstand rating -20kA for 3 sec minimum	Yes / No
16.3	One LBS open operation possible in the event of loss of SF6 gas	Yes/No
16.4	DC charger rating in amps – min 10 Amp Dual	Yes
a	MCB rating at 230v AC input of charger	Amp
b	MCB rating at 24v DC output of charger	Amp
c	Charger heat sink temperature rise (max 55 deg C above ambient 40 deg C)	
d	Voltage variation in 24v Dc output for FRTU	(Max +/-1 V)
e	Charger with natural cooling (no cooling fans)	Yes/No
f	Charger tested for input supply voltage regulation test (input variation 150v-250v, output Dc voltage variation +/- 1 volt max)	Yes/No
g	Charger temperature rise test certificate submitted	Yes/No
16.5	DC battery rating in Ah – 20Ah standard	Yes/No
16.6	DC charger changeover – Diode rating 10A min	Yes/No
17.1	Cable termination – Height of power terminal from gland plate	Mm
17.2	Torque required for tightening terminal lug	
18	Mimic diagram, labels & finish as per cl	Yes / No

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	no 12	
19	Submission of RMU / component catalogue	Yes/No
20	Unit price for Conversion kit offered separately for converting the RMU from single cable termination design to double cable termination design	Yes / No
21	Earth Switch	
21.1	Minimum number of operations at no load- Mechanical Endurance class	
21.2	Making capacity endurance of earth switch – Electrical endurance class	
22	Self Powered Relay – Make / Model	As per Annexure-I
22.1	CT Input	
22.2	IDMT Setting Range 4 element – Over Current & Earth fault & steps	Overcurrent- Earth Fault- Instantaneous O/C- Instantaneous E/F-
22.3	Operating Time	Over Current – IDMT Instantaneous
22.4	Pick up Current	
22.5	Resetting Current	
22.6	Relay Burden	
22.7	Time Accuracy	
22.8	Tripping Coil O/P – type & duration	
22.9	Fault Current Display	
22.10	No of Fault Current Latching with time stamping	
22.11	Display Facility / Type	
22.12	Operational Indicators	
22.13	Potential Free Output Contacts	

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22.14	Thermal Withstand Capacity of Relay	
23	Fault Passage Indicator (shall be for both earth fault and over current protection)	
23.1	CBCT	
a	Type	
b	Mounting Arrangement	
c	CT to indicator connection	
d	ID of sensor	
e	Make	As per Annexure-I
23.2	Phase CT – LBS	
A	Type	
B	Mounting Arrangement	
C	CT to indicator connection	
D	ID of sensor	
23.2	Earth Fault Indicator make	As per Annexure-I
a	Sensing Current (i) Earth Fault (ii) Short Ckt Indicator	
b	Sensing Time (i) Earth Fault (ii) Short Ckt Indicator	
c	Indication	
d	Reset Time (i) Earth Fault (ii) Short Ckt Indicator	
e	Resetting Facility	
f	Output Contact	
g	Contact Rating	
h	Aux Power Supply	
i	Degree of Protection	
j	Mounting Arrangement	

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k	Ambient Temperature	
l	Make	As per Annexure-I
24	Current Transformer- Make	As per Annexure-I
24.1	Ratio	
24.2	Burden	
24.3	Accuracy Class	
25	Voltage Presence Indicator- Make / Model	As per Annexure-I
26	FRTU	
26.1	Make & Model No	As per Annexure-I
26.2	No of DI Modules	
26.2.1	Type I – 1CB + 2ISO	
26.2.2	Type 2 – 2CB + 2ISO	
26.3	No of DO Modules	
26.3.1	Type I – 1CB + 2ISO	
26.3.2	Type 2 – 2CB + 2ISO	
26.4	No of AI Modules	
26.4.1	Type 1/ Type 2	
26.5	Make of Protocol converter	As per Annexure-I
26.6	Modem	Make -As per Annexure-I
	Type – 4G, GSM, Dual SIM Auto Change Over Facility Speed – 800/1900 MHZ	Yes / No Yes / No
26.7	Interposing Relay with freewheeling diode	
	Make	As per Annexure-I
	Rating	
	Model No	
26.8	Terminal Blocks, Disconnecting type fuses make	As per Annexure-I

Technical Specification For 11 kV Motorized Ring Main Unit

Bidder / Vendor seal / signature

Name of the bidder	
Address of bidder	
Name of contact person	
Telephone no & email id	

Annexure-D Recommended spares

List of recommended and mandatory spares are as following

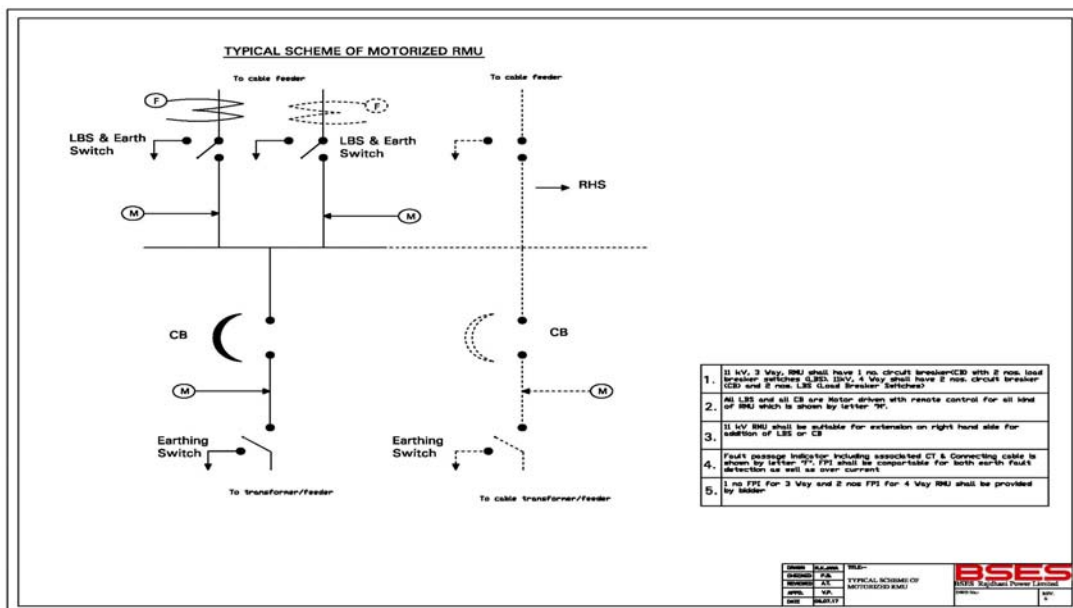
Mandatory spares are the part of supply along with RMU.

Sr No	Description of spare part	Unit	Quantity
1	Battery Charger set for RMU – Dual	No	10
2	FPI (over current and earth fault)	No	10
3	VPIS	No	10
4	Manometer with pressure indicator switch	No	10
5	Motor Kit for LBS and Circuit Breaker	No	10
6	Self Powered Relay (communicable)	No	10
7	Aux Relays	No	10 no.s of each type
8	Aux Switches	No	10 nos. of each type
9	Modem (4G, Dual SIM, Auto change Over)	No	5
10	CPU with Power Supply Card,I/O Adapter Board, rack etc	No	5
11	DO Card – 8 DO	No	5
12	DI Card -16DI	No	5
	Mandatory Spares {R1}		
1	High Gain Antenna	No	5
2	FRTU	No	1 no. of each type
3	HRC Fuses for Aux Transformer	No	20
4	Single Phase Aux Transformer	No	1

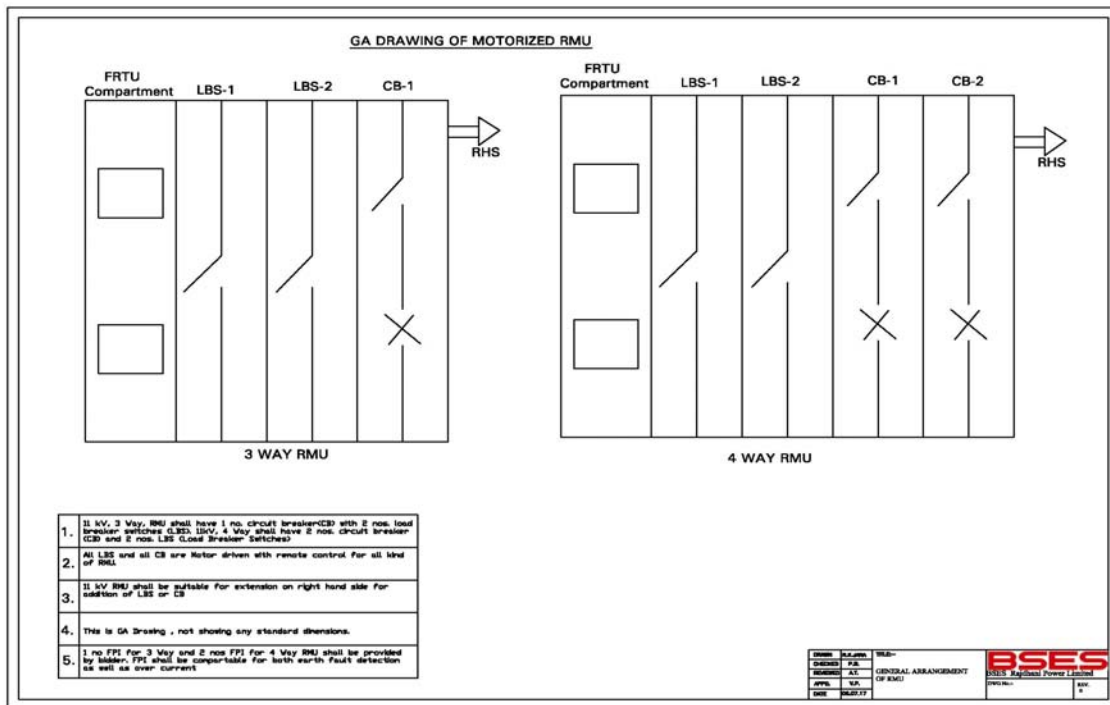
Note-Any additional spares, if required shall be separately listed by bidder and same shall be taken approval from BRPL during bid evaluation.

Technical Specification For 11 kV Motorized Ring Main Unit

Annexure E Typical scheme of RMU



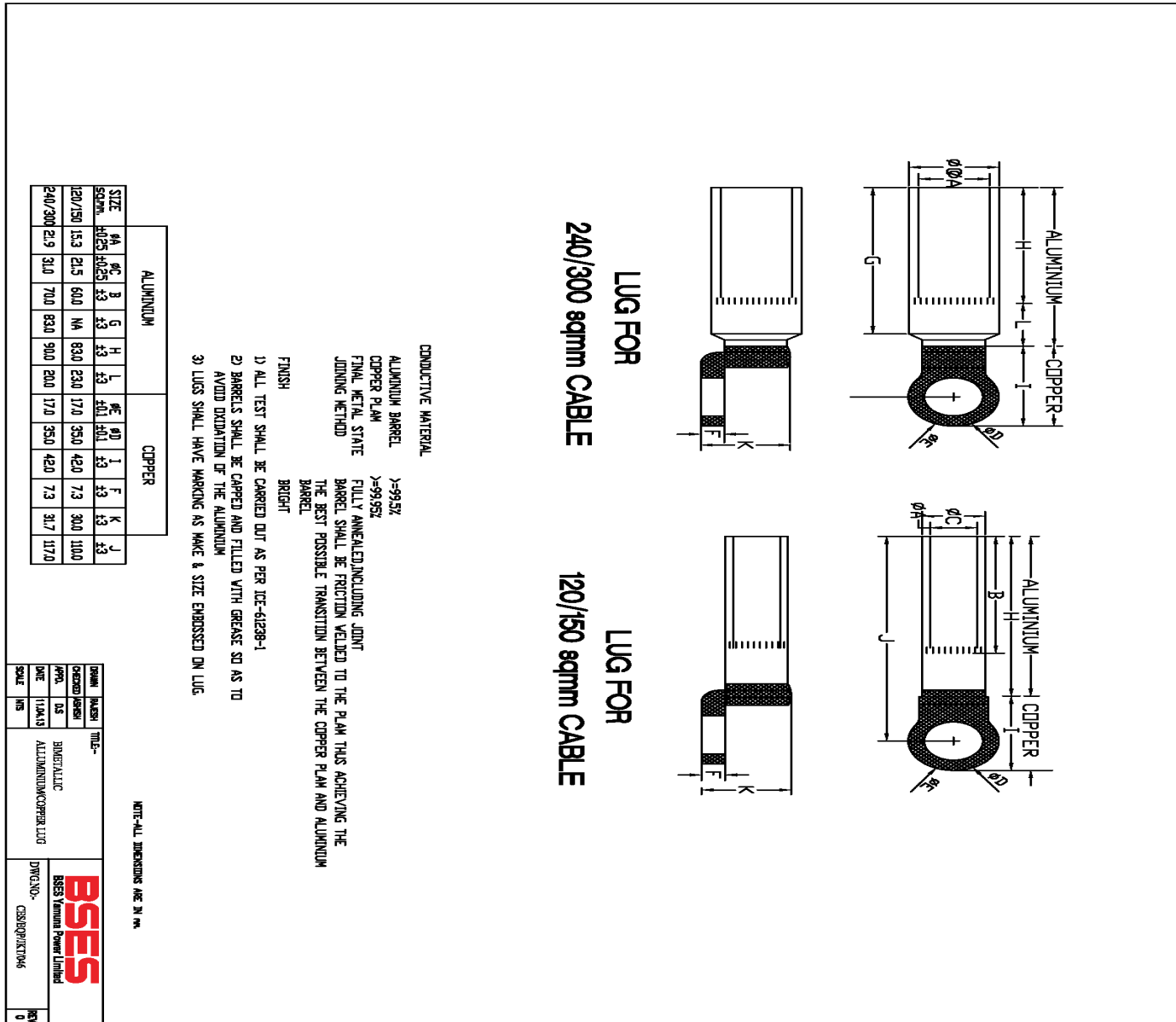
Technical Specification For 11 kV Motorized Ring Main Unit



- a) 11kv RMU shall have circuit breakers (CB) with Load break switches (LBS) as per configuration defined in Purchase Requisition.
- b) Motor drive for LBS or CB is shown by letter 'M'.
- d) 11kv RMU shall be suitable for extension on RHS for addition of LBS, CB.
- e) Fault passage indicator (FPI) including associated CT & connecting cable is shown by letter 'F'.

Technical Specification For 11 kV Motorized Ring Main Unit

Annexure F Drawing of Bimetallic Ring Type Lug



Annexure G Specification for Modem

Modem : 4G GSM (800/1900 MHZ), (Dual SIM auto change over-optional.)
Modem should be able to send a power failure signal in case when battery/battery charger fails before shutting down. {R1}

Make- As per Annexure-I

Technical Specification For 11 kV Motorized Ring Main Unit

RUIM Interface	: External RUIM 3.0V
SMS	: Supports Text
Data	: Data circuit Asynchronous and non transparent Up to 153.6 kbps Auto baud rate (2400, 4800, 9600, 19200, 38400, 57600 bps) Fixbaud rate (300, 600, 1200, 9600, 115200 bps)
AT Commands Interface	: RS-232 port for supporting AT commands, PPP Protocol
Communication Interface	: Remote management features like telnet & remotely download facility.
LED Indications	: Power ON, Network
Connectors / Switches	: RS-232 Serial, RUIM Card Holder, DC power connector, SMA Antenna connector, Make shall be As per Annexure-I
Power Supply	: 6 – 30V DC (with reverse current protection)
Enclosure	: Aluminium Extrusion
Mounting	: DIN Rail Mounting
Temperature	: Operating (-10 to 65 Degree Centigrade)
Antenna	: : 12 dB High gain multi directional antenna with 15Mtr wire to be provided . Provision for taking antenna wire outside to be provided. Adequate accessories for mounting Antenna at appropriate Sub-station location (Roof/wall) for trouble free operation such as wall mounting bracket, roof mounting bracket etc. {R1}
Accessories	: a) 1 Meter cable for connecting to external DC power source (5V – 30V) b) Standard RS232 serial data cable(1 Meter)
SIM Capability	: The Modem shall be provided with GSM 4G compatible. Dual SIM Capability along with auto change over facility between the two SIM may be provided as a optional. {R1}

Annexure G(1)
SERVICING AND WARRANTY REQUIREMENT- EQUIPMENT SUPPLY
(11KV RING MAIN UNIT)

INDEX

- 1.0 Purpose**
- 2.0 Applicability**
- 3.0 Priority**
- 4.0 Liability**
- 5.0 Warranty Requirements**
- 6.0 Process Requirements**
- 7.0 Documents/records/report submission**
- 8.0 Qualification requirement for service engineers**
- 9.0 Safety**
- 10.0 Communication**
- 11.0 Changes/revision management**

Technical Specification For 11 kV Motorized Ring Main Unit**1. Purpose**

This document is prepared to specify the servicing requirement and Warranty / Guarantee handling procedure in case of difficulty that arises in the supplied equipment within the useful service life of the equipment being procured by BRPL Rajdhani Power Limited.

2. Applicability

It is applicable to any equipment supplied directly or indirectly for installation / use in BRPL Rajdhani Power Limited.

3. Priority

This document which include service, warranty / guarantees management / handling procedures shall be considered a final in case of any contradiction with other contractual document.

4. Liability

- i) Supplier shall be liable to arrange OEM qualified service engineers as and when required by BRPL Rajdhani Power Limited to attend defects, trouble shooting to restore equipment health to ensure 100 % capacity availability.
- ii) OEM shall be liable to provide essential spares at reasonable price for entire lifespan of the equipment.
- iii) Service call shall be attended within reasonable time frame as mentioned in this document.
- iv) Service cannot be denied by supplier/OEM till completion of useful life of the equipment.
- v) The commercial liability shall be restricted to supply/service contract provision.

It will be liability of manufacturer /vendor tie up with accessories / component manufacturer to full fill requirement stipulated this document.

5. Warranty Requirements

Technical Specification For 11 kV Motorized Ring Main Unit

- i) The equipment failed / malfunctioned within stipulated warranty period shall be attended free of cost for the reasons not attributed to BRPL Rajdhani Power Limited.
- ii) The cost incurred for service, spares, transportation, consumable and manpower / labour shall be borne by supplier.
- iii) OEM is bound to send service engineer to site on request for troubleshooting promptly.
- iv) There is no cap on number of visit or spare replacement required to repair / trouble shoot the problem in the equipment during warranty period.
- v) Each break down / problem reported shall be analysed scientifically to establish the root cause of breakdown.
- vi) In case it is established that any component or accessories is not performing satisfactorily or causing repeated failure due to poor performance, manufacturing mistakes, design mistakes or not suitable to our environment condition applicable to NCR region, the OEM shall be liable to rectify or replace the same in all equipment supplied to BRPL irrespective of warranty period.
- vii) In case if RMU supplier is not OEM of the equipment / accessories, the supplier will be liable to tie up with OEM to provide service / spares to meet warranty / servicing requirement stipulated in this documents.
- viii) Irrespective of onsite or workshop repairing, it will be responsibility of OEM to maintain work quality to ensure no compromise on performance and useful life of the equipment.

6. Process requirements**6.1 Complain Registration.**

- i) Supplier to provide communication details for complaint registration in O&M Manual, on website as well as shall be printed on the equipment. In case of changes, same shall be communicated to BRPL.
- ii) BRPL will register complain through a e-mail / telephonic call to the call centre / service centre

Technical Specification For 11 kV Motorized Ring Main Unit**6.2 Confirmation and Service time Schedule.**

- i) All timing will be counted from date of call registration by BRPL till restoration of equipment health at respective site in operation condition satisfactory of BRPL engineer.
- ii) Service call confirmation & service engineer visit schedule shall be provided within two hour for working hour call (09:00AM to 06:00PM, Monday to Saturday) and before 10 AM next working day for off working hour calls.
- iii) Emergency trouble shooting calls - within 12 Hrs including spare arrangements.
- iv) Normal trouble shooting call - within 48 Hrs.
- v) On site repairing / component replacement - within 7 days.
- vi) OEM workshop repairing - within 30 days including returning to BRPL stores.
- vii) Replacement of complete RMU - within 45 days.
- viii) The service engineer shall intimate necessary requirement to attend call along with confirmations

6.3 Site visit & Investigation.

- i) The OEM shall depute qualified and experienced engineer to carryout trouble shoot as well as testing and collecting necessary data / details essential for root cause analysis.
- ii) The service engineer shall collect preliminary details to understand and estimate the spare requirement, shutdown time requirement from our respective area engineer whose details will be provided along with service call.
- iii) The necessary tools shall be carried by service engineer attending calls.
- iv) Service engineer to get call attendance certificate from respective area BRPL engineers.
- v) Service engineer to intimate necessary precaution required to prevent repetition of problem to respective area BRPL engineer as well as CES Team.

Technical Specification For 11 kV Motorized Ring Main Unit

- vi) Detailed technical report (root cause analysis) to be submitted to CES Team for records and analysis against each call.

6.4 Recommendation.

- i) Shall be based on scientific study / test results only.
- ii) Shall cover root cause analysis for failure.
- iii) Shall cover spares / component list for repairing.
- iv) Shall cover time requirement.
- v) Shall cover site preparation / condition requirement.
- vi) Other critical measures essential for quality work.

6.5 On Site Repairing.

- i) All site repairing shall be under supervision of OEM engineer and shall meet all OEM recommendation to ensure quality of work.
- ii) All spares arrangement shall be carried out well in advance to minimize outage time. The list must be shared with CES team
- iii) Necessary repairing process to be intimated to CES team in advance. It shall include in process & final quality and performance checks / test.
- iv) The repairing process shall be certified by OEM design / quality expert.
- v) Detailed time schedule and spares arrangement details shall be submitted to CES team for necessary planning.
- vi) The repairing work shall be witness by BRPL CES engineer, who may insist in process / performance checks / test in addition to above if felt essential.
- vii) If BRPL engineer observed any quality problem / skill problem, may insist for repairing at OEM facility.

6.6 Repairing at OEM facility.

Following requirement shall be fulfilled during OEM workshop repairing work: -

- i) During site inspection, if service engineer felt necessary to send equipment to OEM facility, the same shall be organized by OEM.

Technical Specification For 11 kV Motorized Ring Main Unit

- ii) In case if BRPL felt that site repairing is not up to the required quality or felt necessary to analyze cause of failure, the same shall be organized by OEM.
- iii) Equipment unpacking, testing and opening for analysis inspection shall be carried out in presence of BRPL engineer. It shall be intimated to BRPL at least 3 days in advance for necessary travel arrangement.
- iv) If cause of failure observed due to design mistake / manufacturing mistakes, the same shall be rectified in all other similar design equipments without any cost to BRPL.
- v) OEM to intimate the final testing for inspection. BRPL may depute engineer or third party representative to carryout inspection / testing before dispatch.
- vi) Dispatch shall be carried out only after BRPL clearance.
- vii) Necessary lifting, shifting, loading / unloading & transportation arrangement shall be in the scope of OEM / supplier.
- viii) A document required essential for lifting and shifting of equipment will be intimated at least two days in advance.

6.6 Witness / Inspection stages.

Even though OEM is liable for overall quality of work, BRPL may witness / Inspection following activity:-

- i) On site inspection, repairing/replacement work.
- ii) Testing / inspection equipments / any accessories / component to establish the cause of failure.
- iii) Opening of equipment for internal part inspection.
- iv) Final testing/inspection before despatch.
- v) Testing / checking of the evidence causing failure / problem.

Note: It will be responsibility of OEM / Supplier to establish with facts, figure, photographs, and evidence to prove that cause of failure not attributed to design.

7 .0 Documents / records / report submission

Technical Specification For 11 kV Motorized Ring Main Unit

The following be recorded and provided to BRPL by OEM against each call / repairing / rectification works for BRPL clearance and future reference:-

- i) Root cause analysis report.
- ii) All test report.
- iii) Minutes of meeting.
- iv) Spares / accessories test report / calibration certificates.
- v) Proof of expenditure for cost incurred to BRPL.
- vi) Copy of transportation documents.
- vii) All technical details of parts / accessories being replaced.

8.0 Qualification requirements for service engineers

- i) All work must be carried out by only qualified, experience engineer certified by OEM. BRPL may request qualification and experience details if felt necessary.

9.0 Safety.

- i) All necessary personal protective equipments requirement for the personal and labour will be in the scope of OEM / supplier.
- ii) It will be liability of OEM / Supplier to meet the necessary safety norms , standards, rules & regulation .
- iii) BRPL may audit the same during on site work.

10.0 Communications.

For better coordination, single channel communication must be followed. BRPL and OEM / Supplied to communicate to each other their team for communication time to time in case of any changes.

At present, all warranty related communication is to be done with CES team.

11.0 Changes / revision management.

Necessary approval of O&M analytic cell is essential for changes in this document. In case if any stack holders do not agree or wish to amend its content may send request to BRPL O&M analytic cell for approval. The request will be in effect only on consideration and authorized release of revision in document by O&M analytic cell.

Specification for FRTU

ANNEXURE-H: FRTU DETAILS**Index**

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Technical Specification For 11 kV Motorized Ring Main Unit**Record of Revision**

Sl. No.	Clause no.	Descriptions	Revised No	Old Revision

1.0.0 Feeder Remote Terminal Units

This specification encompasses the requirements for Feeder Remote Terminal Units (FRTU's) for acquisition of real time status and control functions associated with selected 11 kV Ring Main Units (for sites where 11 kV/415 V distribution transformers or capacitors are installed). Make of FRTU shall be As per Annexure-I.

1.1.0 FRTU Architecture

The FRTU's shall have an architecture that supports convenient installation, maintenance and expansion features. Their configuration shall include a central processing module, I/O module, time / date facilities, data storage capacity etc.

1.1.1 Central Processing Module

The central processing module (CPM) shall handle all protocol emulation, perform data acquisition, and execute control requests. It shall accept commands from the master station, perform address recognition, assemble response messages in accordance with the received command messages, and transmit these messages to the SCADA/DMS master station. The CPM shall also provide interfaces for a time standard and a test set.

The CPM shall have user configurable routines / procedures to carry out connection establishment, link failure detections and reconnection after failures for dialup connectivity. The parameters viz: user name & password, baud rate, no. of retries after link failure shall be user configurable.

The CPM shall manage communications between all other functional modules of the FRTU and shall determine the integrity of the FRTU. The processor shall provide diagnostic information in the message structure that the SCADA/DMS shall monitor. A flag shall be set if the FRTU performs a restart for any reason including power failure.

The CPM shall be programmable in a high level language like C. BRPL shall be able to program the FRTU and manage the FRTU database from the FRTU test set and download parameters and configuration data from the SCADA/DMS system.

1.1.2 I/O Module

Each I/O module shall be capable of interfacing with digital inputs, control output points and combinations of point types. I/O modules shall be replaceable without reprogramming, redefinition of configuration parameters or rewiring.

Technical Specification For 11 kV Motorized Ring Main Unit

A control disable switch shall be provided within each I/O module. When the switch is in the control position, the SCADA/DMS or test set shall have control of the digital control outputs. When the switch is in the disable position, the digital control outputs shall be disabled. A status input contact shall be available to monitor the position of this switch. The switch position shall be reported to the SCADA/DMS system. The required number of points shall be the responsibility of the Contractor.

1.1.3 FRTU Time and Date Facility

The FRTU shall have an internal clock for data collection coordination and time tagging. This shall include support for feeder fault detection. The FRTU internal clock time shall be maintained within hundred (100) millisecond of the same time reference used by the respective SCADA/DMS. The FRTU synchronization shall be accomplished by the communication protocol.

1.2.0 Functional Requirements

The FRTU's shall include all hardware, software, and firmware necessary to meet the Input/Output(I/O) point requirements including input and output cards and output relays.

1.2.1 Input / Output Point Types

The FRTU's shall include facilities for handling status input and control output points. Requirements for each type of I/O point are described in the following sub-sections.

1.2.2 Status Inputs

The Contractor shall supply the necessary sensing voltage, current limiting, input isolation, and bounce filtering for all status inputs. The debounce time period for each status input shall be individually configurable. The input circuit of the status input modules shall be optically isolated from the external signal. In addition, each input circuit shall include an LED indicator next to the circuit terminations to show the status of the associated input contact.

The state of each status point shall be reported to the SCADA/DMS on a contention basis. That is, a status point shall not be reported unless the point state has changed from the last scan. The FRTU shall also report the state of selected status points upon receipt of a demand scan request from the SCADA/DMS.

The FRTU's shall include the following types of status input points:

Technical Specification For 11 kV Motorized Ring Main Unit

- 1) Single Contact, Two-State Status: For single contact, two-state status points, a single contact shall represent both states of the monitored device. One position of the contact shall indicate an alarm or failure condition, while the opposite state of the contact shall indicate the normal condition.
- 2) Double Contact, Two-State Status: For double contact, two-state status input points; separate contacts shall be provided for representing each state of the monitored device. One contact shall indicate an OPEN condition of the monitored device. The other shall indicate a CLOSED condition. The contacts shall be treated as a complimentary pair. Conflicting contact positions (e.g., either indicates CLOSED or OPEN) shall be labeled INVALID.

1.2.3 Control Outputs

The FRTU's shall include on/off device control points to support control actions initiated from the SCADA/DMS master stations. The FRTU's shall perform on/off control actions using complimentary pairs of contact outputs. One contact output shall perform the ON control action, and a second output contact shall perform the OFF control action. The FRTU's shall be designed such that only one output in a complimentary pair can be activated at a time. For single point indications FRTU shall also support single command output.

To support the above capabilities, the FRTU's shall include momentary control outputs as required by the feeder device being controlled. Each momentary control output shall provide a contact closure (pulse) that shall have programmable pulse duration. The pulse duration shall be adjustable on an individual point basis from 0.1 to 60 seconds in increments of 0.01 seconds.

FRTU control outputs shall be equipped with high power relays with free-wheeling diodes that are integral to the FRTU so that external auxiliary control relays are not required. The associated high and low control power shall be obtained from the dc power supply in the switch. The voltage rating of the control output contacts shall be 24 V DC. All control outputs shall be capable of driving a load of eight (8) amps at the primary control voltage with provision for an additional NO contact for DI status of Command Execute Acknowledgement wired up to terminal blocks. External auxiliary control relays are not preferred, but may be applied if integral relays do not satisfy the above ratings. These relays shall be supplied by the Contractor.

All control points shall follow a Select - Check back – Before - Operate (SCBO) procedure for control operation. The SCBO procedure shall be equivalent to the following:

1. The point selection command is received from the SCADA/DMS master station.
2. The FRTU checks that no other point is selected.
3. The FRTU selects the addressed point and transmits a selection confirmation to the SCADA/DMS.

Technical Specification For 11 kV Motorized Ring Main Unit

4. The FRTU starts the command receipt timer and checks that only the required point remains selected and no other points become selected.
5. The operate command is received from the SCADA/DMS.
6. The FRTU verifies the operate command and energizes the selected control point relay for a predetermined time.

Point selection shall be canceled automatically following the completion of the control action, and re-selection of the point shall be required for subsequent control actions.

1.2.4 Input / Output Point Counts

The FRTU's shall be equipped to handle the I/O point requirements as per each FRTU types described in Sr.No. 1.9 of index.

All I/O channels provided (used as well as additional / spares) irrespective of immediate application shall be wired from FRTU I/O card along with interposing relays for DOs to the associated terminal strips in the cabinet with proper segregation and identification of Digital inputs and Digital outputs.

It shall be possible to expand the FRTU capacity by an additional twenty percent (50%) of the initially delivered (including spares) I/O points by providing space for adding cards and terminations at future date.

1.2.5 Analog Inputs

FRTU shall be able to capture Analog values from current & voltage transducers and communicate the Analog Measured Information (AMI) to control centre through communication media in the intervals of 10 minutes.

Unipolar and bipolar analog measurements shall be collected by the AI cards. Input to the cards shall be programmable for various mA and V input ranges.

1.2.6 Programmable Logic Control (PLC)

The FRTU shall be provided with a PLC Module. The PLC module shall have access to the controlling process via its process interface imaged in the FRTU process DB actualized by the internal communication. That allows to use nearly all process information from direct connected process signals as well as from process data points received via serial communication line. Control information for actuators to the process will be handled in the same way from the PLC to the physical output signals etc. The overall transaction time for a PLC task is therefore to be given by the PLC cycle time plus the update time between the process actuators and sensors and the PLC's FRTU process DB.I

Technical Specification For 11 kV Motorized Ring Main Unit

Programming of the PLC program is to be done by a specific PLC programming tool. The integration of the PLC task and the link between the IO interfaces of the PLC to the real process signals is to be supported by FRTU Configuration Utility together with the PLC programming tool.

More than one PLC task shall be active. The FRTU shall allow to have more than one PLC module in the FRTU running.

1.2.7 FRTU Data Communications

The communication between the FRTU's and BCC/MCC shall be through all 4G GSM cellular network using Wireless VPN. Alternatively FRTU's shall also communicate with BCC/MCC wherever all 4G GSM cellular communication/Optical fiber network is available. The FRTU's shall support communications using the IEC 608705-104 and Modbus set of protocols. Contractor shall provide Interoperability document specifying all the sets of parameters / functions implemented by its device. The message security defined in the protocol should be fully implemented, and if needed later, a convenient means of changing the communication protocol in the field should be provided.

The FRTU's shall have three (3) number serial ports, one port used for communication with slave device and one port for communication with BCC and MCC, and one RS485 port for Modbus communication with IEDs. The FRTU shall also have one Ethernet port for diagnostic and communication with MCC / BCC in addition to the serial ports. Each of the serial ports shall be individually selectable in RS-232 or RS485 mode and for operation from 9,600 to 38,400 bps. FRTU's shall support communication with redundant masters installed at both BCC and MCC ie. 4 masters. The FRTU shall support IEC 61131-3 PLC programming for incorporation of peer to peer communication & achieve Self Healing Grid (SHG) automation logic.

1.2.8 Wifi Connectivity for local access

An inbuilt wifi communication modem shall be offered in FRTU for local access via hand held devices (Tablet / smart phone / etc..). It shall be secured by means of

- Activation/deactivation from the SCADA
- SSID visibility configurable
- Passphrase
- Automatic disconnection by timeout

1.2.9 Cyber Security

In order to secure all controls and data acquisition, the FRTU shall be designed to be compliant with NERC and IEC62351-5 requirements. The FRTU shall support secure access based on RBAC, with the possibility to configure the roles.

Technical Specification For 11 kV Motorized Ring Main Unit

Local and remote access connection shall be secured for maintenance (locally and remotely)

1.3 FRTU Enclosures

FRTU enclosure shall be provided integrated with the RMU as a single composite unit. A separate compartment for the FRTU shall be provided with protection class in accordance with RMU IP class. The enclosure shall be fabricated using 2-2.5 mm thick CRCA/GI sheet and powder coated using 10 tank process. The shade shall be same as the RMU. No access to the FRTU Compartment shall be given from the RMU back side. All the equipments housed in FRTU Compartment shall be accessible from front. The FRTU enclosure back side shall be bolted with SS Bolts.

3 Nos keys for the FRTU Compartment shall be provided along with the RMU. {R1}

The dimensions shall be suitable to accommodate FRTU CPM and I/O modules, power supply accessories, terminal blocks, communication modem with power adaptor, Ethernet switch for FO connection and ease of intra-panel wiring/termination and maintenance thereafter. Suitably sized PVC perforated channels to be used for routing intra-panel wiring.

The front access door shall be hinged on cabinet with a common lock & key arrangement.

Removable type gland plates shall be provided at bottom of enclosure with 8-12 nos. knock out holes suitable for CBW01 gland for control cable entry. Provision of entry shall be kept for extending GSM modem antenna outside the enclosure. Alternately BRPL shall also have an option to mount communication switch connecting to optical fiber network.

Suitable ventilation, if necessary forced ventilation, and louver with dust filters shall be provided to maintain operating temperature under permissible limits of electronic components.

Contractor shall indicate gross weight of FRTU in GA drawing.

Alternately Fiber Reinforced Plastic (FRP) enclosure with suitable thickness and dimension may also be quoted.

1.4 FRTU Power Supply

Power supply for FRTU shall be on 24V DC system which would be made wired from Battery Charger system to FRTU cabinet.

The main DC circuits shall be protected by incoming circuit breakers. Each circuit shall be tapped through single pole MCBs so as to provide an individual DC feed to each of the I/O modules,

Technical Specification For 11 kV Motorized Ring Main Unit

modems and protocol converters. Contractor shall provide maximum power consumption data of each of the type of FRTU.

Type 3 Pluggable Surge Protection Device in accordance with IEC 61643 with KEMA & UL approval must be installed at the incoming power supply of FRTU. DIN Rail Mounted Suitable Surge Protection must be installed on all communication lines (Ethernet/RS 485)

1.5 FRTU Test Systems

The Contractor shall supply FRTU test systems for performing the functions listed below. Portable computers shall be used for this purpose. The FRTU test system shall comply with the following requirements:

- 1 Each test system shall support all maintenance aspects: verifying proper operation, troubleshooting, reconfiguring, and setting operational parameters for the FRTU's.
- 2 The test systems shall support all functional capabilities of the FRTU's, including functions which are not explicitly required in these Technical Specifications and functions which may not be included in the delivered FRTU's.
- 3 It shall be possible to use a test system locally at the site of the FRTU under test, and also remotely wherever access can be obtained to the communication channel of the FRTU.
- 4 All the required data rates shall be easily selectable.
- 5 It shall be possible to use the test systems to monitor communications between the respective SCADA/DMS and the FRTU's by selecting specific data streams, or portions of such data streams, both to and from FRTU. The data shall be displayed in a form that is easy for the user to interpret.
- 6 It shall be possible to connect the test system directly to the FRTU and to use the test system to perform all necessary FRTU management and expansion functions, monitor all stored data, monitor FRTU inputs, exercise FRTU outputs, and diagnose and troubleshoot the FRTU. It shall also be possible to use the test system as a local user interface at the FRTU location.
- 7 No programming skills shall be required to use the field test system. Interactive procedures relying mostly on pull down menus shall be used. The user shall not be required to type in commands, and shall be prompted when data entry is needed.
- 8 The test system shall be ruggedly constructed and suitable for field work and transportation in trucks. All cables, connectors, equipment, and documentation associated with their operation shall be included and stored either within the test system package or in suitable separate containers.

The test systems shall operate on internal battery and 220 V. AC, 50 Hz

1.6 Software / Firmware

The term software is used in this Technical Specification to mean software or software implemented through firmware. All software shall be implemented according to the Contractor's latest established design and coding standards. Complete and comprehensive documentation shall be provided for all software. Contractor may consider providing windows based software as it is preferred for its user friendliness. All the related software and related communication ports shall be provided to BRPL by OEM with latest version till warranty period without any cost implications to BRPL.

1.6.1 General

A real-time non-proprietary operating system that is capable of managing the FRTU applications shall be provided.

This software shall provide automatic restart of the FRTU upon power restoration, memory parity errors, hardware failures, and manual request. The software shall initialize the FRTU and begin execution of the FRTU functions without intervention by the SCADA/DMS master station. All restarts shall be reported to the SCADA/DMS.

The software shall be prepared in a high level language and shall be documented in detail. No separate licensing charges or agreements shall attach to the FRTU software or its underlying operating system.

In order to easily support the system under continuously changing site conditions all protocol, configuration, and application data must be contained in easily programmable non-volatile memory such as Flash EPROM.

The FRTU design shall be independent of any communication protocol that would impose restrictions on the flexibility or functionality of the FRTU. Protocol changes shall be accomplished by software/firmware changes only.

ALL FRTU cards to be coated with conformal coating for protection against weather related deterioration.

FRTU to have capability of reporting to four distinct IP addresses of same or different domains.

1.6.2 Diagnostic Software

Software shall be provided to continuously monitor operation of the FRTU and report FRTU hardware errors to the SCADA/DMS. The software shall check for memory, processor, and

Technical Specification For 11 kV Motorized Ring Main Unit

input/output errors and failures. It is desirable that internal diagnostics be sufficiently detailed to detect malfunctions to the level of the smallest replaceable component.

The FRTU shall facilitate isolation and correction of all failures and shall include features that promote rapid fault isolation and component replacement. All functional module nodes shall be designed with integrated on-line diagnostic functions. The results of these diagnostics shall be reported to the central processing module. The central module shall store this information and report it to the SCADA/DMS as permitted by the protocol. FRTU shall be able to access from remote (BCC/MCC) for down loading configuration.

1.7 FRTU Testing

1.7.1 Type Tests

The FRTU controller shall be KEMA /CPRI/ERDA Certified and in accordance with IEC 255-4, 255-5, 255-6, 801-2, and 801-3 to demonstrate that the FRTU's comply with the ratings stated in these standards. As a minimum, certificates for the following type tests shall be furnished:

1. Dielectric test
2. Impulse voltage withstand test
3. High frequency disturbance test
4. Thermal requirement test
5. Mechanical requirement test
6. Limiting dynamic value test
7. Contact performance test
8. Electromagnetic radiation susceptibility test
9. Electrostatic discharge susceptibility test
10. EMI free & EMC Compatible

1.7.2 Routine Tests

The FRTU's shall pass the Manufacturer's standard routine tests in accordance with the referenced standards.

In addition to the tests described in the IEC standards, the routine tests and test report of the FRTU's shall include the following:

1. Visual tests to confirm that construction and sizing requirements have been met.

Technical Specification For 11 kV Motorized Ring Main Unit

2. Rigorous testing of each input and output function of the FRTU's. This shall include the fault detection and the disturbance data storage functions as well as the operation and performance of the FRTU time and date facilities.
3. Verification of the use of the FRTU test equipment for maintenance and testing.
4. Verification of the ability to download parameters and configuration data from the SCADA/DMS master station.
5. Verification that FRTU software and firmware support FRTU sizing and expansion requirements.
6. Verification of successful communications (i.e. protocols) at all the required data rates.
7. Testing for secure operation, including verification that: a) Communication errors are detected. b) SCBO procedures are properly performed for control outputs. c) No erroneous control operation occurs and no incorrect data is generated when power is turned on or off or when operating on low battery voltage.

1.8 FRTU Spares:

Bidder shall supply spares for 5 years trouble free operations as per the spares list given in this tech spec.

1.9 FRTU Types:

FRTU's are categorized as type 1 to 7 in this specification, according to their DI/ DO/AI Channel requirements as indicated in the annexure –1. FRTU shall be modular construction type.

1.10 High Gain Antenna

Scope :

: 12 dB High gain multi directional antenna with 15Mtr wire to be provided . Provision for taking antenna wire outside to be provided. Adequate accessories for mounting Antenna at appropriate Sub-station location (Roof/wall) for trouble free operation such as wall mounting bracket, roof mounting bracket etc. {R1}

Annexure –1: Guaranteed Technical Particulars

FRTU Types	Digital Input Channels	Digital Output Channels	Analogue Channels
1	24	8	6
2	32	16	6
3	48	24	6
4	64	32	6

Technical Specification For 11 kV Motorized Ring Main Unit

5	80	40	6
6	96	48	6
7	112	32	6

(Vendors shall furnish the General Technical Particulars along with their offer. Any kind of deviation along with offer shall be listed and submitted separately clause wise as per the deviation format given in this specification for approval of BRPL. Deviation shall not be considered which mentioned in any other submitted bid documents)

Sr. No.	Description	Buyer's Requirement	Vendors Data
1	Vendors Name		
2	Guarantee period	5 yrs.	
3	Make of FRTU base module	As per Annexure-I	
4	No. of DI modules		
	Type 2	2 x 16	
5	No. of DO modules		
	Type 2	2 x 8	
6	No. of AI modules		
	Type 1 to 2	1x 6	
7	Dimensions &Weight of FRTU		
	Type 2	Vendor shall Provide	
8	Make of protocol converter	As per Annexure-I	
9	Interposing relay with freewheeling diode		
	Make	As per Annexure-I	
	Capacity	>8 A	
	Model	CR-P with 2C/O contacts / Eqv	
10	AC & DC MCB	As per Annexure-I	
11	Terminal Blocks	As per Annexure-I	
12	Disconnecting type fuses make	As per Annexure-I	
13	Enclosure		
	Sheet steel thickness	As per type test design	
	Painting process	10 tank and powder coating	
	Construction of steel according to IEC 529 , index of protection	IP52	

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	Shade	RAL-7035	
	Louvers with filters	2 Nos	

Annexure – 2: IO List {R1}

Signals List for Motorized RMU						
Digital Inputs	Equipments	Signals	DI for 3Way		DI for 4Way	
	Isolator	Isolator ON	DI1, DI2	2	DI1, DI2	2
		Isolator OFF	DI3, DI4	2	DI3, DI4	2
		Earth Status	DI5, DI6	2	DI5, DI6	2
		FPI operated	DI7, DI8	2	DI7, DI8	2
		Local/Remote	DI9, DI10	2	DI9, DI10	2
		VPIS Status	DI11, DI12	2	DI11, DI12	2
	Circuit Breaker	CB ON	DI13	1	DI13, DI14	2
		CB OFF	DI14	1	DI15, DI16	2
		Disconnecter Open	DI15	1	DI17, DI18	2
		Disconnecter Close	DI16	1	DI19, DI20	2
		Earth Status	DI17	1	DI21, DI22	2
		Ready to Close Signal to control centre to indicate all interlocks are OK (including spring charge and trip ckt healthy)	DI18	1	DI23, DI24	2
		Auto Trip	DI19	1	DI25, DI26	2
		Local/Remote	DI20	1	DI27, DI28	2
		SF6 Low	DI21	1	DI29	1
		VPIS Status	DI22	1	DI30, DI31	2
	Common Signals	Battery Charger-1 Fail	DI23	1	DI32	1
		Battery Charger-2 Fail	DI24	1	DI33	1
		Command Acknowledgement	DI25	1	DI34	1
		Battery Health Monitoring Unit/Battery in Trouble	DI26	1	DI35	1
		FRTU Door Open	DI27	1	DI36	1

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		Interlock Card operation Fail	---	0	---	0
		Auxiliary Circuit Healthy (Control Ckt healthy)	DI28	1	DI37	1
		MOG Alarm from field	DI29	1	DI38, DI39	2
		WTI Alarm from field	DI30	1	DI40, DI41	2
	APFC	APFC Incomer MCCB Trip	DI31	1	DI42, DI43	2
		APFC Fan MCCB Trip+Other common alarm	DI32	1	DI44, DI45	2
			total	32	total	45
		Spare DI		8		3

Signals List for Motorized RMU

Digital Outputs	Signals	DO for 3 way		DO for 4Way	
	Isolator ON	DO1, DO2	2	DO1, DO2	2
	Isolator OFF	DO3, DO4	2	DO3, DO4	2
	FPI Reset	DO5, DO6	2	DO5, DO6	2
	CB ON	DO7	1	DO7, DO8	2
	CB OFF	DO8	1	DO9, DO10	2
	Inteerlock card remote reset	DO9	1	DO11	1
	Modem interlock card remote reset	DO10	1	DO12	1
	Modem Remote Reboot	DO11	1	DO13	1
	FRTU Remote Reboot	DO12	1	DO14	1
	Auto Trip Reset	DO13	1	DO15	1
		total	13	total	15
	Spare DO	DO14-DO16	3	DO16	1

Analog Inputs	LT Palm Temp	AI1
	Oil Temp of Trf.	AI2

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	Oil Level	AI3
	Spare	AI4 to AI8

Serial Port	DT Energy Meter Data	SP1
	Relay of RMU (Both relays to be connected to FRTU in case of 4 Way RMU)	SP2

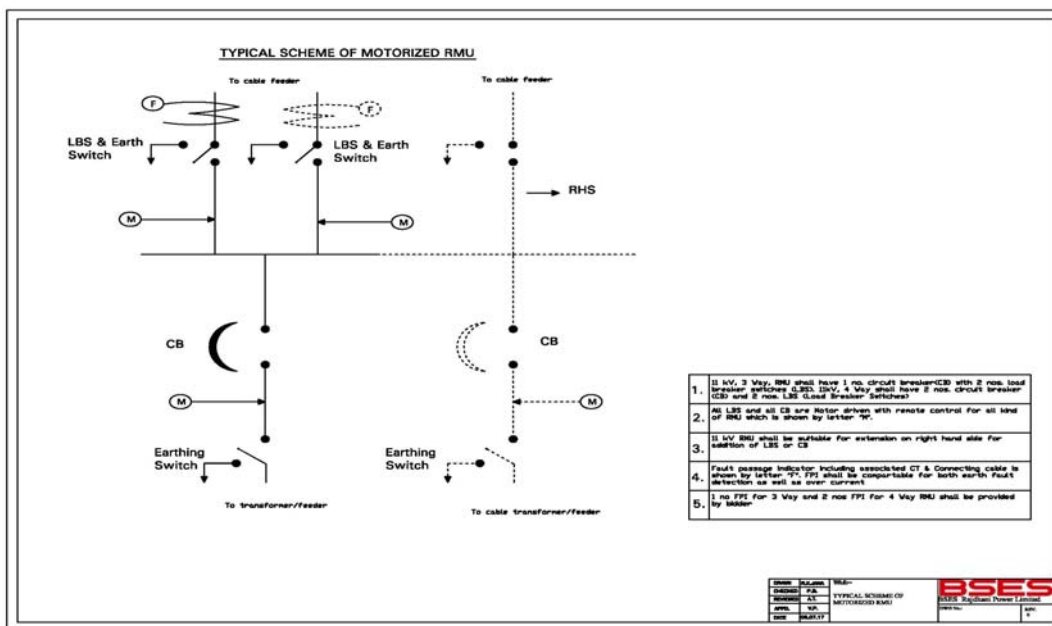
Annexure-I : Make List

Make List of RMU's Accessories		
Sl. No.	Descriptions	Make
1	Relay (Self Power+ External DC Supply+ Communicable) {R1}	Ashida (ADR241S-761),
2	CT and Aux PT {R1}	Narayan Power Tech (NPT)/Gilbert Maxwell, Pragati ,Nortex
3	FRTU	Schneider - HUA/HUBI ABB - RTU520 CG - USP-020i Wago (Model-750) Phoenix (ILC 171 ETH 2TX)
4	Interposing relay with freewheeling diode	ABB/Tyco/OEN
5	FPI(Both for Earth fault and Over current protection)	EMG/Schneider/SIEMENS/C&S
6	CBCT (Both for Earth fault and Over current protection)	EMG/Schneider/SIEMENS/C&S
7	Boot	3M/Raychem/K.D.Joshi
8	Modem (GSM 4G+) {R1}	Nomus
9	Battery	GOGATE/Allan
10	Battery Charger (2 nos. For each RMU with free wheeling diode)	GOGATE/Allan
11	Wire	Polycab/Havells/Finolex/KEI
12	AC & DC MCB	SIEMENS/Havells/C&S/ Schneider

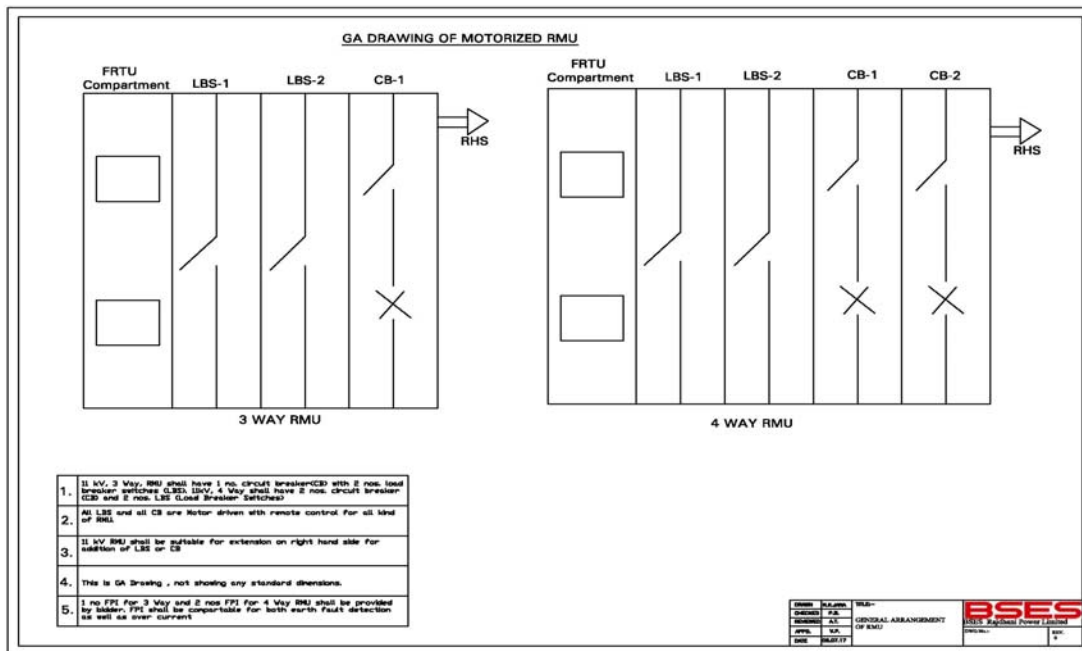
Technical Specification For 11 kV Motorized Ring Main Unit

13	Disconnecting type fuses	Connectwell/Wago/Phoenix/Elmex
14	TB (disconnecting type)	Connectwell/Wago/Phoenix/Elmex
15	Protocol converter	ABB/Tyco/OEN
16	DC power connector	Wago/Havells/Connectwell
20	Vacuum Interrupter{R1}	CG/ ABB/Schneider/SIEMENS/Any other type tested (CPRI/ERDA)make
21	Battery Health Monitoring Unit	GOGATE/Allan

Annexure-J: Composite RMU Drawing



Technical Specification For 11 kV Motorized Ring Main Unit



Annexure-K: Deviation Sheet Format

(To be filled in by Vendor with submission of Offer)

We hereby confirm compliance of our product / system with BRPL Technical Specifications / GTP / BOQ / QAP / Approved Drawings, if any (strike off whichever not applicable) – in all respects / subject to the following Deviations listed below till closing of contract.

Sl. No.	Document Name	Clause No.	Deviation	Reason	Merit to BRPL

Special Requirement:

Sl. No	Descriptions
1	Animated video for ETC guide of RMU shall be submitted to BRPL before delivery of first lot
2	Relay Protection setting (min 10%)
3	All the communicable accessories shall have Latch contact

Technical Specification For 11 kV Motorized Ring Main Unit

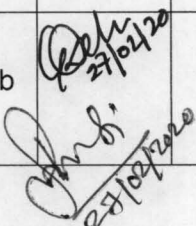
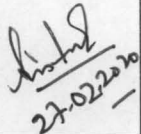
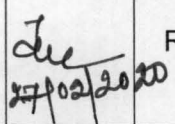
Sl. No	Descriptions
4	NO/NC contact for manometer shall be provided
5	--Bidders shall have additional RMU readily available of each type to replace under warranty faulty RMU in case it is repairable at OEM factory --In case of under warranty failure and if the faulty RMU is repairable only at OEM factory, bidder has to replace the faulty RMU during lifting with new/operatable same type of RMU within the time period mentioned in the tech spec warranty clauses. --BRPL shall not issue any RMU from their assests for replacement activity. In case of delay, penalty shall be imposed as per this corrigendum sl no 9 --After Warranty period completion (5 years), these clause shall not be applicable to OEM
6	Sample RMU
6.1	1 sample RMU of each type shall be manufactured as per BRPL specification after award of PO. BRPL will do the routine testing and inspection of the sample RMU and if found satisfactory as per BRPL specification, BRPL will give clearance/ approval for bulk manufacturing
6.2	During inspection of the sample RMU, BRPL may ask the vendor to modify/change the design as per BRPL requirement including the make of accessories mentioned in the specification. OEM is liable to modify the design irrespective of the offer submitted during tender stage. However, BRPL will not ask for the requirement beyond the technical specification.
6.3	The lead time required to arrange the accessories/ to modify the design required as per BRPL requirement shall be in the account of bidder.
6.4	BRPL is not liable to bear any extra cost out of the PO for the approval of sample RMU and the bulk quantity afterwards.
6.5	The sample may be used in BRPL network based on fulfilment of technical requirement and BRPL approval. Else fesh RMUs as per the approved sample shall be supplied in line with PO quantity.
6.6	During bulk manufacturing and PO execution, BRPL may ask necessary changes to be done (if required). Bidder is liable to provide the required changes as per the BRPL requirement irrespective of the offer / design given during tendering stage without any cost implication to BRPL. However, BRPL will not ask any changes out of BRPL Technical specification
7	Warranty clause's terms & conditions mentioned in the technical specification Annexure- G(1), Clause no-6.2 shall be strictly followed by the OEM, in the event of violation of warranty clauses, BRPL is liable to impose penalty with 1% of RMU unit rate per day basis (Unit rate shall be considered as per the PO)
8	Submission of Type test report (not more than 5 years from the date of tender opening date) of internal arc for 1 sec (AFLR 20kA for 1 sec) from CPRI/ERDA is mandatory with 3 way RMU

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Sl. No	Descriptions
9	Complete Civil foundation Drawing along with sectional view (RCC casting shall be followed) and BBS shall be submitted by bidders along with drawing
10	Submission of 3nos as built drawing to BRPL before dispatch of first lot of material is mandatory. Also one set of as built drawing shall send with each unit of supplied RMU. Proper holding arrangement to be provided to place as built drawing inside the RMU.
11	Test bushing feature-The bushing of RMU must have the feature of "Test Bushing".
12	Broken conductor feature in relay-The relay must have the feature of detecting change in impedance (negative phase sequence over current) <u>Aux-PT for Outdoor RMU Only {R1}</u>
13	<u>1. Cast Resin, Single Phase Auxiliary Power transformer to be provided. Turns ratio – 11kV to 230V</u> <u>2. 230V AC supply to be provided to RMU battery charger for power supply</u> <u>3. Minimum VA Burden – 500VA</u> <u>4. HRC Fuses to be provided on HT and MCB to be provided on LT Side of the Aux. Transformer</u> <u>5. Aux Transformer to be placed on LHS of RMU</u> <u>6. Resin material type shall be cycloaliphatic</u> <u>7. CPRI/ERDA type test report shall be submitted for review and same shall not be older than 5 years. In case of type test report is more than 5 years old, type test shall be conducted form CPRI/ERDA without any cost implications to BRPL.</u> <u>8. GA drawing for auxiliary voltage transformer arrangement along with schematic diagram, ratings and fuse details to be submitted for approval</u>

Technical Specification for 11 kV Ring Main Unit

Specification no – SP-ERMUX-15-R9

Prepared by		Reviewed by		Approved by		Rev	Date
Name	Sign	Name	Sign	Name	Sign		
Gautam Deka/Pronab Bairagi		Amit Tomar		K. Sheshadri		R9	27/02/2020

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Technical Specification For 11 kV Ring Main Unit**Record of Revision**

Revision No	Item / clause no.	Nature of Change	Approved By
R5	1, Annex. 1.9	Service performance requirements during guarantee period specified.	DS
R5	1, Annex. 1.11	Training requirements for RMU & Self powered relay specified.	DS
R5	2	IEC 62271 specified	DS
R5	4.4.1	Solid Shielded Insulation Added	DS
R5	5.6	Added – Operating Handle support	DS
R5	5.13.3	Cable termination height is increased to 900 mm.	DS
R5	5.14.2	Bus bar short time withstand capacity changed to 20kA for 3 sec	DS
R5	5.24	Added – Avoid any type of Gaps or holes on the cable termination chamber wall.	DS
R5	6.5.4	Included provision of 2nos AC incoming supply MCB	DS
R5	6.6.2	LBS short time withstand capacity revised to 20kA for 3 sec	DS
R5	6.7	LBS fault making capacity revised to 50kA peak	DS
R5	6.8	Mechanism endurance class M1 and Electrical Endurance class E3 specified	DS
R5	6.9	Minimum no. of operations at rated fault current specified – Electrical endurance class E3	DS
R5	6.10	Fault Passage Indicator specifications included	DS
R5	7.2	CB arc interruption medium only in Vacuum bottle	DS
R5	7.4	Added – Protective flap on Emergency PB	DS
R5	7.5.2	20kA short time withstand capacity specified	DS
R5	7.6	Mechanical – M1 & Electrical-E2 endurance class specified for circuit breaker module	DS
R5	7.7	CB fault making capacity revised to 50kAspecified	DS
R5	7.8	CB fault breaking capacity revised to 20kA	DS
R5	8.7	No load mechanical endurance class M0 specified for earth switch	DS

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R6	8.8	Making capacity endurance class E2 specified	DS
R5	10.6	Added – Prevent electrical operation if handle is inserted for manual operation	DS
R5	12.1	Sticker type mimic diagram non acceptance specified	DS
R5	13.3	Process audit included in the Quality systems for RMU, self powered relay	DS
R5	13.4	Approved sub vendor list specified for FPI self powered relay	DS
R5	Annexure A – 1.5	2 nos. is changed to 2 sets of Operating handle	DS
R5	Annexure C – 21 to 26	Earth Switch , Self powered relay, FPI, CT, VPI details included in GTP particulars, to be provided by supplier	DS
R5	Annexure F	BSES 11kV terminal connection lug dwg. – Bimetallic Ring type, provided for supplier to provide suitable terminal fixing arrangement at 11Kv bushing.	DS
R6	Annexure I	Requirement of 11 kV “Metering Cubicle” requirement added	DS/GS
R7	4.2	Added Both side extensible (L.H.S. and R.H.S.) requirement	VP
R7	18.0	Added Equipment ID requirement	VP
R7	1.10	Added Equipment ID requirement	VP
R7	7.11	Circuit breaker (TCB / FCB): Added all the CTS shall be bushing mounted requirement	VP
R7	Annexure G(1)	Added Servicing and Warranty requirement-Equipment supply (11kV Ring Main Unit) requirement	VP
R8	6.10	FPI (for both Earth Fault and Over Current Protection)	VP
R8	Annexure-I	Make List	VP
R8	16	Deviation Clause	VP
R8	1.0A	Motorized Compatibility	VP
R8	7.13	Self Powered –shall be communicable	VP
R8	9.4	Digital Manometer for SF6 gas pressure measurement	VP
R8	Annexure-E (f)	4 Way Outdoor RMU (2VCB+2LBS)	VP
R9	5.1, 5.7	Panel Construction –CRCA/GI with 2 to 2.5 mm thick sheet	KS
R9	5.8	Base frame shall be constructed with 75mm ISMC/ISA channel and HDPE cleat shall be adjustable to hold the cable	KS
R9	5.12	11kV, 3CX400 sqmm cable added provision of termination facility.	KS

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R9	5.15	Earth Bus bar-Tinned Copper flat sized for rated fault duty for 3 sec	KS
R9	5.20	TBs shall be push on type in the place of screw type.	KS
R9	6.10.2	Connection of CBCT with FPI shall be with only PVC wire	KS
R9	7.11	Position of CTs inside compartment shall be adjustable in vertical and horizontal direction	KS
R9	7.12	CT accuracy class shall be 5P10	KS
R9	7.16	VCB breaking timing shall be 40 to 60ms	KS
R9	8.8	Making capacity endurance of earth switch- E2 Class with 5 operation as per IEC 62271-102	KS
R9	9.1	Stainless steel Tank enclosure suitable for IP67. Metal thickness shall be 3mm	KS
R9	Annexure-H-8.14 and 9.10	Make and grade of Epoxy Resin shall be Cycloaliphatic	KS
R9	12.8	Printed copy of termination and wiring diagram shall be fixed/mounted inside each and every compartment	KS
R9	Annexure-I	Make list	KS
R9	Annexure-K	Special Technical Requirement	KS

Proposed by

Gautam deka/
Pronab Bairagi

Reviewed By

Amit Tomar

Approved by

K. Sheshadri

Technical Specification For 11 kV Ring Main Unit**1.0 Scope of work**

- A. 11kV Manual RMU shall be supplied as per the specification. All the manual RMU shall be compatible for retrofit solution of motorized RMU in future
- B. Metering Cubicle (Only with Outdoor RMU, if specified with purchase requisite) **[R6]**
- C. For scope of supply, refer annexure – A

2.0 Codes & standards

Materials, equipment and methods used in the manufacture of switchboards shall conform to the latest edition of following –

S No.	Title
Indian Electricity Rules	With latest amendments
Indian electricity act	IE act 2003
IS 3427	A.C. Metal Enclosed Switchgear and Control gear for Rated Voltages Above 1 Kv
IS 9920 part 1,3 & 4	High voltage switches above rated voltage 1kv
IS 13118	General requirements of circuit breakers above rated voltage 1kv
IS 3231	Electric Relays for Power System Protection
IEC 60265 part 1	High voltage switches
IEC 60056	High voltage alternating current circuit breakers
IEC 60059	Preferred current ratings of high voltage switchgear
IEC 60185	Current transformers
IEC 60694	Specification for high voltage switchgear
IEC 60298	AC metal enclosed switchgear
IEC 60129	Ac disconnect and earth switches
IEC 60529	Classification of degrees of protection provided by enclosures
IEC 60255	Electrical relays

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows -

- i. Guaranteed Technical Particulars (GTP)
- ii. Specification including applicable codes & standards
- iii. Approved Vendor Drawings
- iv. Other documents

3.0 Electrical Distribution System Data

3.1	Supply	3 phase AC, 3 wire
3.2	Voltage	11000 volt $\pm 10\%$

Technical Specification For 11 kV Ring Main Unit

3.3	Frequency	50 Hz \pm 5%
3.4	System neutral	Earthed at upstream 11kv source

4.0 11kv RMU System layout

4.1	RMU Configuration	As per scheme given in Annexure E & type as per Purchase requisition
4.2	Extensibility	Both side extensible (L.H.S. and R.H.S.) [R7]
4.3	Load break switch, Circuit breaker & earth switch in RMU panel	All shall be non draw out type, fixed position
4.4.1	Insulation medium for panel	SF6 gas or Dry air in sealed metallic tank
4.4.2	Breakers	SF6 gas or Vacuum type (with disconnecter & earth switch)
4.4.3	Load break switches	SF6 gas or Vacuum type (With Earth Switch)
4.5	Arc interruption chamber for breaker	i) Separate for each breaker ii) Arc interruption chamber of breakers shall be separate from the main insulated tank. (Desirable feature)
4.6	Maximum dimensions for a 3 way panel (1 CB + 2 LBS)	
4.6.1	Width (measured from front)	1250 mm
4.6.2	Depth	800 mm
4.6.3	height	2000 mm

5.0 RMU panel construction

5.1	Panel type	CRCA/GI Metal enclosed, framed, Compartmentalized panel construction {R9}
5.2	Service Location	Indoor, non air conditioned environment / Outdoor with continuous ambient temperature of 50 deg C and shall be suitable for external climatic condition Resistant to water ultraviolet radiation (Canopy for outdoor application)
5.3	Mounting	Free Standing
5.4	Overall Enclosure Protection	IP4X minimum, vermin proof IP 54 (For outdoor duty)

Technical Specification For 11 kV Ring Main Unit

5.5	Doors	Front access with anti theft hinge arrangement, Minimum three hinges. Hinges arrangement shall ensure that door cannot be removed.
5.6	Covers	Bolted for rear access, with handles. Support for handle shall be provided at suitable place on RMU body. [R5] All the accessible bolts / screws shall be vandal proof. One set of required Special tools per RMU (if any) shall be in the scope of supply.
5.7	Construction	CRCA/GI Metal enclosed, framed, Compartmentalized panel construction. CRCA thickness shall be 2 to 2.5 mm subject to type test report from CPRI/ERDA. Sheet thickness below 2 mm in any part of RMU shall not be accepted {R9}
5.8	Base frame	Base frame shall be made with 75mm ISMC/ISA channel for both Indoor and Outdoor type RMU. Proper Bolted fixing arrangement shall be provided for erection on RCC foundation. Also, base frame shall be painted with 2 coats of anti rust red oxide and 2 coats of bitumen paint shall be provided. {R9}Adjustable HDPE clits as cable supporting clamps for each power cable (to suit the cable size from 150 to 400 sq mm PILC / XLPE cable. Exact size shall be provided during drawing approval stage.), also cleat shall be adjustable vertically. {R9}
5.9	Lifting lugs	Four numbers
5.10	Cable Entry	Bottom 3mm metallic, removable type & split type in two parts, with 1no. 90 mm diameter knocks out punch/hole in the centre (For double cable boxes, Un-drilled gland plate to be supplied. Approval should be taken for the same during drawing submission)
5.12	Cable type & size	3c x 150 / 240 / 300/400 sq mm Aluminum conductor XLPE/ PILC with armor & PVC outer sheath {R9}
5.13	Terminals for 11kv cable termination	Suitable for Ring Type Bimetallic lug as per annexure F [R5]
5.13.1	Right angled boots	Single piece cold shrink type per bushing
5.13.2	Brass Nut bolt	M16 size
5.13.3	Bimetallic washers	Required
5.13.4	Termination type	suitable for heat shrinkable type
5.13.5	Termination height	For Indoor / Outdoor : Min. height from gland plate shall be 900mm [R5]

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5.14	Bus bar	Copper with sleeve (Sizing Calculation to be submitted in support of its Guaranteed S.C. rating / Capability) {R9}
5.14.1	Bus bar continuous rated current	630amp (at designed 40 deg.C ambient) {R9}
5.14.2	Bus bar short time withstand capacity	20 KA for 3 sec (R5)
5.14.3	Bus bar support insulator material	SMC / DMC resin
5.14.4	Maximum temperature rise above reference ambient 40 deg C	In line with Table 3 of IEC60694
5.15	Earth bus bar	Tinned Copper flat sized for rated fault duty for 3 sec {R9}
5.16	Earth bus internal connection to all non current carrying metal parts	By 2.5 sq mm copper flexible wire, Earth connection point maximum 1 meter away from cable test facility
5.17	Earth bus external connection to owners earth	Studs on both sides with holes for M10 bolt + hardware to readily receive purchaser earth connection
5.18	Cooling arrangement	By natural air without fan
5.19	Panel internal wiring	Multi strand flexible color coded PVC insulated Cu wire 1 sq mm (SCADA) / 2.5 sq mm (for CT's) 1100 volt grade (AC-black, DC – grey, Earth – green) with ferrules at both ends.
5.20	Hardware (Nut, bolts & handle)	Stainless steel (Except termination nut-bolts which are Brass / Tinned Copper)
5.21	Gasket	Neoprene rubber
5.22	Marshalling terminal blocks	1 Sq mm, Nylon 66 material, push on type + 20% spare in each row of TB. {R9}
5.23	Panel cover fixing bolts	Allen head 6mm with hexagonal slot
5.24	Padlock facility	Required for all earth switches & all handles
5.25	Bushings for future extensions of RMU	Should be duly insulated & covered with metallic covers in unused condition
5.26	Explosion vents	To ensure operator's safety, design should ensure that gases / flames generated during flash over / blast in any of the compartment, must not come out from the front of RMU as well shall not go to adjacent cable compartment. Internal

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		arc test report (for Cable compartment & other compartments) must be submitted to support above, along with RMU GA drawing indicating these vents. There shall not be any type of holes, gaps etc on the walls of cable termination compartment. [R5]
5.27	SF6 gas annual Loss	< 0.1% of total mass. Pressure of SF6 gas shall be above the operating limit throughout the life of the equipment.

6.0 Load break switch (LBS) / Isolator

6.1	Type	Three poles operated simultaneously by a common shaft
6.2	Arc interruption in dielectric medium	SF6 or Vacuum
6.4.2		Clause deleted. [R5]
6.6.1	Continuous rating of LBS	630 Amp at design 40 deg C ambient
6.6.2	Short time withstand capacity	20 KA for 3 sec [R5]
6.7	Fault making capacity	50 kA peak [R5]
6.8	Minimum number of operations at rated current (as per IEC 62271-102)	Mechanical Endurance – Class M1(1000 operations) Electrical Endurance – Class E3 (100 operations) [R5]
6.9	Minimum number of operations at rated fault current (as per IEC 62271-102)	Class E3 (Min 10 operations) [R5]
6.10	Fault passage indicator (FPI) (For both Earth fault and Over Current Protection) [R8]	To be provided on right hand side of one LBS for panel type 1CB + 2 LBS. For all other configuration of RMU, FPI to be provided on all LBS. Wherever, there are two cables per LBS, two FPI needs to be considered for that particular LBS
6.10. 1	Earth Fault Indicator	CBCT – Split open type suitable for mounting without disconnection of cable.
6.10.2	Connection of CBCT with FPI	Cable connection of FPI with CBCT shall be of pre moulded type on the CBCT side. Cable shall be 2.5 sq.mm cu cable or {R9}

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6.10.3	Fault Passage Indicator (For both Earth Fault and Over Current Protection) [R8]	Digital type and shall operate as the current exceeds the set value. Flash indication for identifying faults with red LED with one flash for every one sec. Test & rest button 1 NO + 1 NC potential free contact for remote indication FPI power supply unit shall use lithium battery with minimum life of 1000 blinking hours , so that FPI shall continue to function even after main feeder has tripped.
6.10.4	Data by Purchaser	
6.10.4.1	System Fault Level	2kA – 8.75kA
6.10.4.2	Type of Grounding	Solidly Grounded
6.10.4.3	Fault clearing time	100ms
6.10.4.4	Cable Type	PILC / XLPE , 70 sq.mm to 400 sq.mm {R9}
6.10.4.5	Earth Fault Indicator	
6.10.4.5.1	Sensing Current	100 to 400A {R9}
6.10.4.5.2	Sensing Time	30 to 100 ms in steps of 10ms.
6.10.4.5.3	Reset Time	0.5 -1-2-3-4 hr
6.10.4.5.4	Resetting Facility	a) Self rest after reset time b) Self rest after restoration of voltage c) Manual d) Remote resetting
6.10.4.5.5	Contact Rating	1A at 230 V
6.10.4.5.6	Degree of Protection	IP 54
6.10.4.5.7	Mounting Arrangement	Surface or Flush Mounting
6.10.4.5.8	Ambient Temperature	-20 to 50 Deg C {R9}

7.0 Circuit breaker (TCB / FCB)

7.1.1	Type	Three pole, operated simultaneously by a common shaft
7.1.2	Transformer circuit breaker -TCB	For controlling transformer, manual operation only
7.1.3	Feeder circuit breaker - FCB	For controlling cable feeder, manual operation. Remote trip operation by SCADA
7.2	Arc interruption in dielectric medium	Vacuum Bottle (R5)
7.3.1	Operating mechanism - TCB	Manual spring charged stored energy type
7.3.2	Operating mechanism - FCB	Manual spring charged stored energy type, remote electrical close / open operation possible.
7.4	Emergency trip / open push button	On panel front with Protective flap to prevent any accidental tripping of breaker. [R5]
7.5.1	Continuous rating at design 40 deg C	630amp

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	ambient {R9}	
7.5.2	Short time withstand capacity	20 KA for 3 sec (R5)
7.6	Minimum number of operations at rated current (as per IEC 62271-100)	Mechanical Endurance – Class M1(2000 operations) Electrical Endurance – Class E2 (R5)
7.7	Fault making capacity	50 KA peak (R5)
7.8	Fault breaking capacity	20 KA Minimum (R5)
7.9	Maximum number of operations at rated Fault current (as per IEC 62271-100)	Electrical Endurance – Class E2 . To be guaranteed by manufacturer with authorized lab test reports (R5)
7.10	Breaker status auxiliary contact	2NO + 2NC wired to terminal block
7.11	Current transformer	<ol style="list-style-type: none">1. 75-400 / 1 amp for TCB/ FCB. {R9}2. Considering three core cable terminations, mounting flexibility shall be provided for CT's (in horizontal & vertical direction both). Additionally, CAUTION marking (by sticker/ paint) shall be provided to avoid CT's installation above the screen of cable. (I.e. earth potential point.)3. Position of CTs inside compartment shall be adjustable in vertical and horizontal direction {R9}
7.12	CT accuracy class	5P10 minimum {R9}
7.13	Protection relay	Self powered, Microprocessor based Numerical relay (with LCD display), IDMT over current / earth fault protection with high set element, manual reset type Relay mounting flush to panel front. Relay shall be communicable for automation purposes
7.14	Relay auxiliary contacts for remote indication	Potential free contact 1NO + 1NC wired to terminal block
7.15	Shunt trip 230v AC (for WTI trip & door limit switch of Dry type transformer) & for remote trip from SCADA.	To be wired to terminal blocks (If the functional requirement is achieved by the Protection relay, then shunt trip is not required.
7.16	Breaking Timing	40 to 60 ms {R9}

8.0 Earth switch (ES)

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8.1	Type	Three Pole (ON, OFF and Earth), operated simultaneously by a common shaft, for each Circuit breaker & Load break switch.
8.2	Switching in dielectric medium	Dry Air in sealed medium or SF6 gas
8.3	Operating mechanism for close & open	Manual
8.4	Fault making capacity	50 kA (Desirable)
8.5	Auxiliary contacts	1NO+1NC wired to terminal block
8.6	Disconnect switch (if provided in series with vacuum bottle)	Desirable to be located on purchaser cable connection side of vacuum bottle
8.7	Minimum number of operations at no load (as per IEC 62271-102)	Mechanical Endurance – Class M0(1000 operations) [R5]
8.8	Making capacity endurance of earth switch (as per IEC 62271-102)	Class E2 (Min 5 operations) [R5] {R9}

9.0 Requirements of sealed housing live parts

9.1	Enclosure	Stainless steel enclosure suitable for IP67. Metal thickness shall be 3mm. {R9}
9.2	SF6 gas pressure low alarm	To be given
9.3	Provision for SF6 gas filling	To be given (For 'sealed for life' design of RMU, this is not applicable)
9.4	Provision for SF6 gas pressure indication	Digital Manometer with non return valve
9.5	Arc interruption method for SF6 breaker / Load break switch	Puffer type / rotating arc type
9.6	Potential free contacts for SF6 gas pressure low	1NO +1NC (Desirable)

10.0 Operational interlocks

10.1.1	Interlock type	Mechanical
10.1.2	Load break switch & respective earth switch	Only one in 'close' condition at a time
10.1.3	Circuit breaker & respective earth switch	Only one in 'close' condition at a time

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10.2	Prevent the removal of respective cable covers if load break switch or circuit breaker is 'ON'	Electrical / Mechanical
10.3	Prevent the closure of load break switch or circuit breaker if respective cable cover is open	Electrical / Mechanical
10.4		® clause deleted
10.5	Cable test plug for LBS/CB accessible only if Earth switch connected to earth	Mechanical

11.0 Indication & signals (for Local)

11.1	Operation counter on front / Inside the RMU LT chamber	To be provided for each LBS & Circuit breaker, with minimum four digits & non resettable type
11.2	Cable charge status indication for all LBS & CB	Capacitor type voltage indicators with LED on all the phases (Shall be clearly visible in day light)
11.3	Spring charge status indication	On front for breaker
11.4	Earth switch closed indication (For Each LBS)	On front
11.5	Load break switch ON/OFF indication	Green for OFF / Red for ON
11.6	Circuit breaker On/OFF indication	Green for OFF / Red for ON
11.7	Circuit breaker protection relay operated on fault	Flag
11.8	Fault passage indication on LBS	Flag
11.9	Status signals to SCADA-to be wired to marshalling terminal block	2NO + 2NC
11.9.1	LBS close / open	potential free contacts
11.9.2	LBS & CB Earth Switch close /open	potential free contacts
11.9.4	CB close / open	potential free contacts
11.9.5	Protection relay operated	potential free contacts

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11.9.6	FPI operated	potential free contacts
11.9.7	SF6 gas pressure low	potential free contacts (Desirable)
11.10.1	Commands from SCADA- to be wired to marshalling terminal block	LBS close / open
11.10.2		FCB close / open
11.10.3		FPI Reset

12.0 Mimic diagram, labels & finish

12.1	Mimic	<ol style="list-style-type: none"> 1. Mimic diagram (Shall not be accepted with Stickers) [R5] 2. On panel front with description of function & direction of operation of handles/buttons
	Operating Instructions	Operating instruction chart and Do's & Don'ts in Hindi / local language to be displayed on left / front side of panel enclosure on anodized Al Sheet 16SWG, duly affixed on panel.
12.2	Name plate on panel front	Fixing by rivet only
12.2.1	Material	Anodized aluminum 16SWG / SS
12.2.2	Background	SATIN SILVER
12.2.3	Letters, diagram & border	Black
12.2.4	Process	Etching
12.2.5	Name plate details	Month & year of manufacture, equipment type, input & output rating, purchaser name & order number, guarantee period
12.3	Labels for meters & indications	The label shall be riveted and not pasted on the panel compartment door. Preferable the labels shall be engraved on the plate.
12.4	Danger plate on front & rear side	Anodized aluminum 16 SWG with white letters on red background
12.5	Painting surface preparation	Shot blasting or chemical 7 tank process
12.6	Painting external finish	Powder coated epoxy polyester base grade A, shade -RAL 7032, uniform thickness 60 micron minimum
12.7	Painting internal finish	Powder coated epoxy polyester base grade A, shade -white, uniform thickness 60 micron minimum
12.8	Termination Drawing and Wiring Drawing	Printed copy shall be fixed/mounted inside each and every compartment. {R9}

13.0 Quality assurance

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13.1	Vendor quality plan	To be submitted for purchaser approval
13.2	Inspection points in quality plan	To be mutually identified & agreed
13.3	Quality – Process Audits	BSES shall carryout vendor process audits.
13.4	Field quality plan	Bidder to submit field quality plan along with the bid
13.5	Spare part list	Bidder to submit detailed spare part list along with the bid
13.6	Maintenance manual	Bidder to submit maintenance manual along with the bid
13.7	Approved sub vendor List	[R5]
13.7.2	Fault Passage Indicator	pls refer make list
13.7.4	Self Powered O/C & E/F Relay	Ashida ADR241S-761 {R9}
13.7.5	Boots	3M / Raychem/K.D.Joshi

14.0 Inspection & testing

14.1	Type test	<ol style="list-style-type: none"> 1. Equipment of type tested quality only, including internal arc test on various compartments like cable chamber, SF6 gas tank etc. 2. Type test certificate to be submitted along with offer for scrutiny. Type test more than 5 years old will not be acceptable. 3. <u>a) temperature rise test</u> <u>b) voltage regulation test</u>
14.2	Routine test	As per relevant Indian standard
14.3	Acceptance test	<p>To be performed in presence of purchaser at manufacturer works</p> <ol style="list-style-type: none"> 1. Physical inspection & BOM, wiring check 2. Insulation resistance test (Before & after HV test) 3. HV test for one minute, 4. Operation & interlock check 5. Measurement of resistance of main circuit 6. Voltage Indication check 7. Functional testing of Fault passage Indicator for Alarm 8. Primary current injection test for each circuit breaker feeder with relay 9. Breaker closing & opening time measurement

15.0 Shipping, Handling and Site support

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15.1	Packing Protection	Against corrosion, dampness, heavy rains, breakage and vibration
15.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label
15.3	Packing Identification Label (Anodized Aluminum Plate)	On each packing case, following details are required:
		i. Individual serial number
		ii. Purchaser's name
		iii. PO number (along with SAP item code, if any) & date
		iv. Equipment Tag no. (if any)
		v. Destination
		vi. Manufacturer / Supplier's name
		vii. Address of Manufacturer / Supplier / it's agent
		viii. Description (Configuration of RMU; e.g. 1CB + 2 ISO, Manual, Extensible and Quantity must be prominently displayed at least 3 sides of packing box & on top.
		ix. Country of origin
		x. Month & year of Manufacturing
		xi. Case measurements
		xii. Gross and net weights in kilograms
		xiii. All necessary slinging and stacking instructions
15.4	Shipping	The seller shall be responsible for all transit damage due to improper packing.
15.5	Handling and Storage	1. Manufacturer instruction shall be followed. 2. Detail handling & storage instruction sheet / manual to be furnished before commencement of supply.

16.0 Deviations

16.1	<p>a) Deviations from this specification shall be listed separately by bidder clause wise (format given below) along with optional offer and has to submit the list along with bid/quotation. BRPL will review the deviations and if BRPL is agreed with the deviation, seller has to take written confirmation from BRPL on deviation during tender evaluation.</p> <p>b) In the absence of any separate list of deviations from the bidders with bid as well as written confirmation from BRPL on deviations, it will be assumed by the Buyer that the Seller complies with the Specification fully.</p> <p>c) Any deviations mentioned in any other submitted bid documents (i.e. in filled GTP, Catalog, BRPL old approval, buyer's/seller's standards etc) by seller without separate deviation sheets will not consider as a deviation from this tech spec at any stage of contract.</p>
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Technical Specification For 11 kV Ring Main UnitDeviation sheet format.

Sl. No.	Document Name	Clause No.	Deviation	Reason	Merit to BRPL

17.0 Drawings Submission

17.1	To be submitted along with bid	The seller has to submit following:
17.1.1	GA / cross sectional drawing of product showing all the views / sections	
17.1.2	Detailed reference list of customers using the offered product during the last 5 years with similar design and rating	
17.1.3	Completely filled GTP	
17.1.4	Manufacturer's quality assurance plan and certification for quality standards	
17.1.5	Type test reports for the type, size & rating of product / equipment offered	
17.1.6	Complete product catalogue and Manual.	
17.1	Recommended spare parts and consumable items for five years of operation and spare parts catalogue with price list	
17.2	All documents as per clause 13 of this specification	
17.3	After award of contract, Seller has to submit following drawings for buyer's Approval (A) / Reference (R)	
17.3.1	Program for production and testing (A)	
17.3.2	Guaranteed Technical Particulars (A)	
17.3.3	GA drawing	
17.3.4	Schematic and wiring drawings for all components	
17.3.5	Terminal arrangement & cable box details including gland plate arrangement etc	
17.3.6	Bill of material	
17.3.7	Detailed loading drawing to enable the buyer to design and construct foundations	
17.3.8	Transport / Shipping dimensions with weights, wheel base details, un tanking height	
17.3.9	detailed installation and commissioning instructions	
17.3.10	quality plan	
17.4	Submittals required prior to dispatch	
	-Inspection and test reports, carried out in manufacturer's works	
	-Test certificates of all bought out items	
	-Operation and maintenance Instruction as well as trouble shooting charts/ manuals	

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17.5	Drawing and document sizes	Standard size paper A3, A4
17.6	Number of Documents required at different stages shall be per Annexure-A	
Note :	Duly signed & stamped copies of the drawings / documentation are required to be submitted to BRPL for approval.	

18.0 Equipment ID [R7]

- I. Equipment ID shall be painted on any appropriate face of the equipment at a clearly readable height from the base level of the equipment.
- II. Font: Recommended type face for the signage is True type or Post script
- III. Font Size: All painting should be in UPPERCASE. Recommended height of 50 mm with spacing between alphabets of 3 mm.
- IV. Total No's of Character: 18
- V. Height of Font: 50 mm
- VI. Height of Base: 100 mm
- VII. Spacing between alphabets: : 3 mm
- VIII. Paint: Base coat – Dense Yellow. Letters – Black Quick Drying paint 2 coats.
- IX. Equipment ID shall be separately provided by BRPL

Annexure A Scope of supply**1.0 The scope of supply shall include following**

- 1.1 Design, manufacture, testing at manufacturer works before dispatch, packing, delivery and submission of all documentation the 11kv Ring Main Unit (RMU). All the manual RMU shall be compatible for retrofit solution of motorized RMU in future 11kV RMU shall be as per scheme enclosed as Annexure E.
- 1.2 Configuration of 11kV RMU shall be as per Purchase Requisition.
- 1.3 Control Center has to be carried out at all sites by vendor engineer. [R5]
- 1.4 Guarantee Period for RMU shall be 66 months from the date of supply or 60months from date of commissioning, whichever is earlier. [R5]
- 1.5 Service Performance Requirements During Guarantee Period: [R5].
- 1.6 Each RMU shall be supplied with 2 sets of Operating Handle. [R5]
- 1.7 Supplier scope includes training of BRPL team – Minimum 4 batches (each batch with 4-5 engineers) for minimum 3 days at factory for erection, commissioning,

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maintenance trouble shooting of mechanism, FPI and all other components. This shall be carried out within 1 week from date of 1st shipment/ dispatch. Supplier shall also provide training for Self Powered relay at respective manufacturer' factory for 12 engineers/ technicians in 2 batches. [R5].All the trainings shall be applicable for each P.O.

1.8 Unit price for Conversion kit should be offered separately for converting the RMU from single cable termination design to double cable termination design, at site.

1.9 BOQ as following –

Sr No	Purchaser Equipment Tag No / SAP code	RMU standard configuration Type	Unit	Quantity
1		<i>Example – Type A2</i>	No	<i>e.g. 1</i>
2		<i>Example – Type R5</i>		
3				
4				

2.0 Submission of documents

	Along with offer	For Approval after award of contract	Final after approval
Documents as given in clause no 17 of specification	3 copies + 1 soft copy on CD	4 copies + 1 soft copy on CD	6 copies + 1 soft copy on CD for all type of documents

3.0 Delivery schedule

3.1	Delivery period start date	-	from date of purchase order
3.2	Delivery period end date	-	as agreed with supplier
3.3	Material dispatch clearance	-	after inspection by purchaser

Annexure B Technical particulars (Data by purchaser)

Sr No	Description	Data by purchaser
1.	Reference design ambient temperature	40 deg C
2.	Maximum ambient temperature	50 deg c for Delhi
3.	Relative humidity	e.g. 85% for Delhi
4.	Seismic zone	e.g. 4 for Delhi
5.	Extensibility of RMU on one side is required -	Yes / No

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Annexure C Guaranteed Technical Particulars (Data by Supplier)

Bidder shall furnish the GTP format with all details against each clause.

Bidder shall not change the format of GTP or clause description.

Bidder to submit duly filled GTP in hard copy format with company seal.

Sr. No.	Description	Data to be filled by Manufacturer
1	11kv RMU (as per scope of supply annexure A)	Separate GTP to be filled for each type of RMU
2	Equipment make	
	Equipment type / brand name	
3	Conformance to design standards as per specification clause no 2.0 –	Yes/No
4	Conformance to specification clause no 3.0 to 17.0 –	Yes/No
5	If NO for pt 3 or pt 4 above, Submission of deviation sheet for each specification clause no –	Yes/No
6	Panel overall dimensions in mm	
	Width (measured from front)	
	Depth	
	height	
7	Panel weight in kg	
8	Panel extensible on both sides – Yes / No	
9	Panel enclosure protection offered	
10	Panel tested for internal arc (Cable & other compartments) –Yes / No	
11	Heat generated by the panel in Kw	
12	Insulation level for complete panel	
12.1	Impulse withstand (Kv peak) -70kvp min	
12.2	Power frequency withstand (Kv rms) –	

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	28kv min	
13	Bus bar	
13.1	Material & grade	
13.2	Bus bar cross section area in sq mm	
13.3	Bus bar rated current in amp i) at designed 50 deg.C ambient {R9} ii) at 50 deg.C ambient	
13.4	Max temperature rise above reference ambient of 40 deg C	
13.5	Short time current withstand capacity for 3 seconds (in KA)	
13.6	Bus bar clearances in mm P-P / P-E	
13.7	Bus bar with insulation sleeve / barriers	
13.8	Bus bar support insulator type	
13.9	Bus bar support insulator voltage class	
13.10	Bus bar support insulator minimum creepage distance / mm	
13.11	Earth bus bar material	
13.12	Earth bus bar size	
14	Circuit breaker type – SF6 or VCB	
14.1	Rated voltage & frequency	
14.2	Rated current in amp	
14.3	Rated breaking current – KA rms symmetrical	
14.4	Short time withstand capacity in KA for 3 sec	
14.5	Rated making current - KA peak	
14.6	Breaker total opening time at rated breaking capacity (in milliseconds)	
14.7	Number of breaks per pole	

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14.8	Total length of contact travel in mm	
14.9	No of circuit breaker operation cycles (close & open) guaranteed at rated current, Electrical endurance class	25% rated current -
		50% rated current -
		75% rated current -
		100% rated current -
14.10	No of breaker opening operations guaranteed at rated fault current, Electrical Endurance Class	
14.11	No of breaker mechanical operation cycles (close & open) guaranteed at zero current , Mechanical endurance class	
14.12	Contact material	
14.13	Operating mechanism – trip free	
	Manual Spring charge type	
14.14	Feeder circuit breaker (FCB) –VCB	
14.14.3	Closing coil wattage & rated DC voltage	
14.14.4	Trip coil wattage & rated DC voltage	
14.15	Transformer CT class, ratio & Vk	
15	Load break switch type – SF6 or VCB	
15.1	Rated voltage & frequency	
15.2	Rated current in amp	
15.3	Load break switch total opening time at rated current (in milliseconds)	
15.4	Number of breaks per pole	
15.5	Total length of contact travel in mm	
15.7	No of LBS close & open operation cycles guaranteed at	25% rated current -
		50% rated current -
		75% rated current -
		100% rated current -
15.8	No of LBS making operations guaranteed	

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	at rated fault current, Electrical endurance class	
15.9	No of LBS close & open operations guaranteed at zero current, Mechanical endurance class	
15.10	Contact material	
15.11	Operating mechanism type	
15.13	Minimum permissible SF6 gas pressure (For SF6 type RMU only)	
15.14	Capacitor type cable voltage indication provided?	Yes / No
15.15	Operation counter provided	Yes/ No
16.1	Disconnect switch continuous rating (Amp)	
16.2	Disconnect switch Short time withstand rating -20kA for 3 sec minimum	Yes / No
16.3	One LBS open operation possible in the event of loss of SF6 gas	Yes/No
17.1	Cable termination – Height of power terminal from gland plate	mm
17.2	Torque required for tightening terminal lug	
18	Mimic diagram, labels & finish as per cl no 12	Yes / No
19	Submission of RMU / component catalogue	Yes/No
20	Unit price for Conversion kit offered separately for converting the RMU from single cable termination design to double cable termination design	Yes / No
21	Earth Switch	
21.1	Minimum number of operations at no load- Mechanical Endurance class	

Technical Specification For 11 kV Ring Main Unit

21.2	Making capacity endurance of earth switch – Electrical endurance class	
22	Self Powered Relay – Make / Model	As per make list (refer annexure I (Relay shall be communicable with SCADA)
22.1	CT Input	
22.2	IDMT Setting Range 4 element – Over Current & Earth fault & steps	Overcurrent- Earth Fault- Instantaneous O/C- Instantaneous E/F-
22.3	Operating Time	Over Current – Curves Instantaneous
22.4	Pick up Current	
22.5	Resetting Current	
22.6	Relay Burden	
22.7	Time Accuracy	
22.8	Tripping Coil O/P – type & duration	
22.9	Fault Current Display	
22.10	No of Fault Current Latching with time stamping	
22.11	Display Facility / Type	
22.12	Operational Indicators	
22.13	Potential Free Output Contacts	
22.14	Thermal Withstand Capacity of Relay	
23	Fault Passage Indicator	Over Current and Earth Fault
23.1	CBCT	
a	Type	
b	Mounting Arrangement	
c	CT to indicator connection	

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d	ID of sensor	
23.2	Earth Fault Indicator	Make / Model as per Annexure-I
a	Sensing Current	
b	Sensing Time	
c	Indication	
d	Reset Time	
e	Resetting Facility	
f	Output Contact	
g	Contact Rating	
h	Aux Power Supply	
i	Degree of Protection	
j	Mounting Arrangement	
k	Ambient Temperature	
24	Current Transformer- Make	As per Annexure-I
24.1	Ratio	
24.2	Burden	
24.3	Accuracy Class	
25	Voltage Presence Indicator	
	Make	As per Annexure-I
	Rating	
	Model No	
26.8	Terminal Blocks, Disconnecting type fuses make	

Bidder / Vendor seal / signature

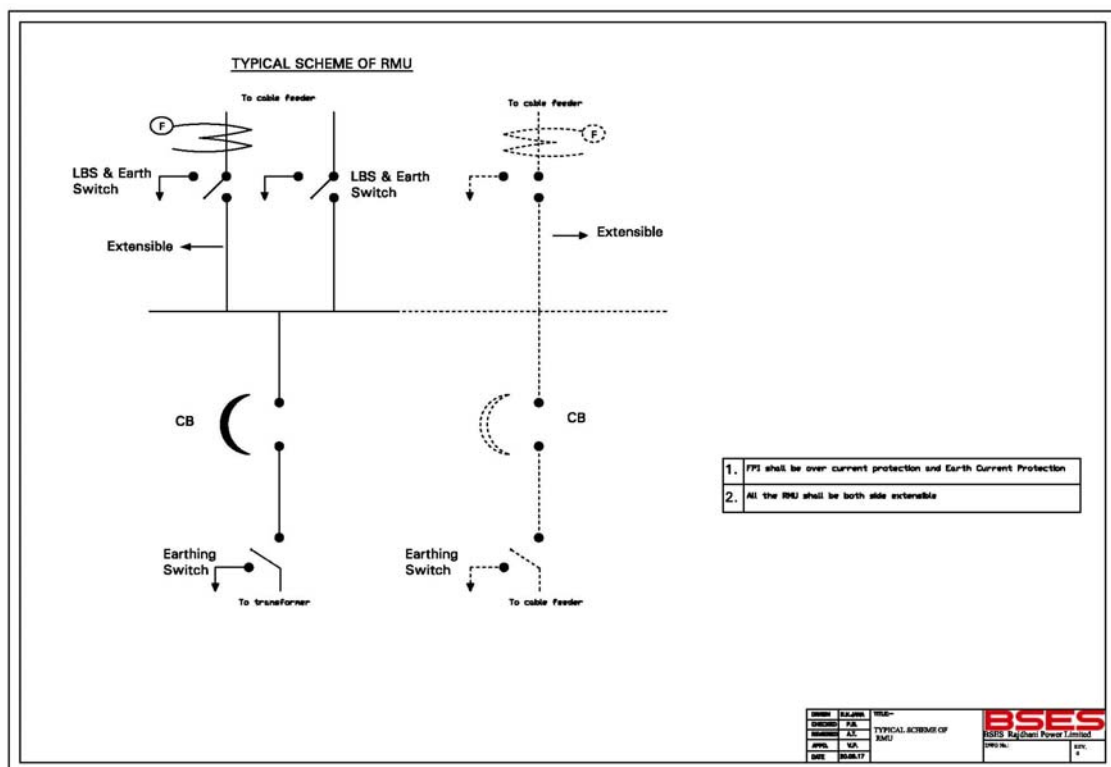
Name of the bidder	
Address of bidder	
Name of contact person	
Telephone no & email id	

Annexure D Recommended spares (Data by supplier)

List of recommended spares as following

Sr No	Description of spare part	Unit	Quantity
1		No	
2		No	
3			
4			
5			
6			

Annexure E Typical scheme of RMU



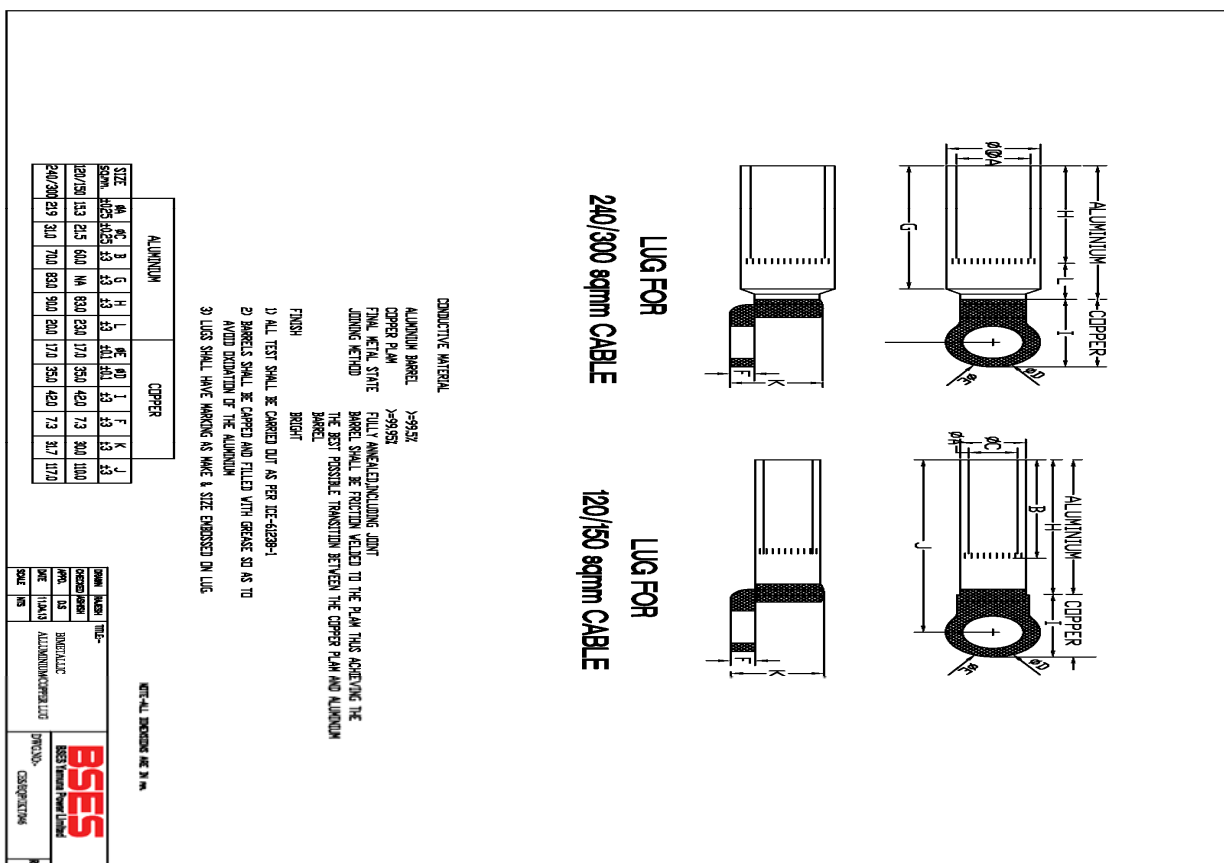
a) 11kv RMU shall have Transformer circuit breakers (TCB) with Load break switches (LBS) or Feeder circuit breakers (FCB) as per configuration defined in Purchase Requisition.c) TCB shall be operated manually only with facility for remote shunt trip.

Technical Specification For 11 kV Ring Main Unit

- d) 11kv RMU shall be suitable for extension on sides for addition of LBS, TCB or FCB.
- e) Fault passage indicator (For Both Earth Fault and Over Current Protection) including associated CT & connecting cable is shown by letter 'F'.
- f) RMU Configuration-

S.no.	Item description	Type	Combination
1	3 Way	Indoor	2LBS+1VCB
2	4 Way	Indoor	2LBS+2VCB
3	3 Way	Outdoor	2LBS+1VCB
4	4 Way	Outdoor	2LBS+2VCB
5.	1 way	Outdoor	1VCB

Annexure F Drawing of Bimetallic Ring Type Lug



**Annexure G(1) [R7] SERVICING AND WARRANTY REQUIREMENT-
EQUIPMENT SUPPLY (11KV RING MAIN UNIT)****INDEX**

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Technical Specification For 11 kV Ring Main Unit**1. Purpose**

This document is prepared to specify the servicing requirement and Warranty / Guarantee handling procedure in case of difficulty that arises in the supplied equipment within the useful service life of the equipment being procured by BSES Rajdhani Power Limited.

2. Applicability

It is applicable to any equipment supplied directly or indirectly for installation / use in BSES Rajdhani Power Limited.

3. Priority

This document which include service, warranty / guarantees management / handling procedures shall be considered a final in case of any contradiction with other contractual document.

4. Liability

- i) Supplier shall be liable to arrange OEM qualified service engineers as and when required by BSES Rajdhani Power Limited to attend defects, trouble shooting to restore equipment health to ensure 100 % capacity availability.
- ii) OEM shall be liable to provide essential spares at reasonable price for entire lifespan of the equipment.
- iii) Service call shall be attended within reasonable time frame as mentioned in this document.
- iv) Service cannot be denied by supplier/OEM till completion of useful life of the equipment.
- v) The commercial liability shall be restricted to supply/service contract provision.

It will be liability of manufacturer /vendor tie up with accessories / component manufacturer to full fill requirement stipulated this document.

5. Warranty Requirements

Technical Specification For 11 kV Ring Main Unit

- i) The equipment failed / malfunctioned within stipulated warranty period shall be attended free of cost for the reasons not attributed to BSES Rajdhani Power Limited.
- ii) The cost incurred for service, spares, transportation, consumable and manpower / labour shall be borne by supplier.
- iii) OEM is bound to send service engineer to site on request for troubleshooting promptly.
- iv) There is no cap on number of visit or spare replacement required to repair / trouble shoot the problem in the equipment during warranty period.
- v) Each break down / problem reported shall be analysed scientifically to establish the root cause of breakdown.
- vi) In case it is established that any component or accessories is not performing satisfactorily or causing repeated failure due to poor performance, manufacturing mistakes, design mistakes or not suitable to our environment condition applicable to NCR region, the OEM shall be liable to rectify or replace the same in all equipment supplied to BRPL irrespective of warranty period.
- vii) In case if RMU supplier is not OEM of the equipment / accessories, the supplier will be liable to tie up with OEM to provide service / spares to meet warranty / servicing requirement stipulated in this documents.
- viii) Irrespective of onsite or workshop repairing, it will be responsibility of OEM to maintain work quality to ensure no compromise on performance and useful life of the equipment.

6. Process requirements**6.1 Complain Registration.**

- i) Supplier to provide communication details for complaint registration in O&M Manual, on website as well as shall be printed on the equipment. In case of changes, same shall be communicated to BRPL.
- ii) BRPL will register complain through a e-mail / telephonic call to the call centre / service centre

Technical Specification For 11 kV Ring Main Unit**6.2 Confirmation and Service time Schedule.**

- i) All timing will be counted from date of call registration by BRPL till restoration of equipment health at respective site in operation condition satisfactory of BRPL engineer.
- ii) Service call confirmation & service engineer visit schedule shall be provided within two hour for working hour call (09:00AM to 06:00PM, Monday to Saturday) and before 10 AM next working day for off working hour calls.
- iii) Emergency trouble shooting calls - within 12 Hrs including spare arrangements.
- iv) Normal trouble shooting call - within 48 Hrs.
- v) On site repairing / component replacement - within 7 days.
- vi) OEM workshop repairing - within 30 days including returning to BRPL stores.
- vii) Replacement of complete RMU - within 45 days.
- viii) The service engineer shall intimate necessary requirement to attend call along with confirmations

6.3 Site visit & Investigation.

- i) The OEM shall depute qualified and experienced engineer to carryout trouble shoot as well as testing and collecting necessary data / details essential for root cause analysis.
- ii) The service engineer shall collect preliminary details to understand and estimate the spare requirement, shutdown time requirement from our respective area engineer whose details will be provided along with service call.
- iii) The necessary tools shall be carried by service engineer attending calls.
- iv) Service engineer to get call attendance certificate from respective area BRPL engineers.

Technical Specification For 11 kV Ring Main Unit

- v) Service engineer to intimate necessary precaution required to prevent repetition of problem to respective area BRPL engineer as well as CES Team.
- vi) Detailed technical report (root cause analysis) to be submitted to CES Team for records and analysis against each call.

6.4 Recommendation.

- i) Shall be based on scientific study / test results only.
- ii) Shall cover root cause analysis for failure.
- iii) Shall cover spares / component list for repairing.
- iv) Shall cover time requirement.
- v) Shall cover site preparation / condition requirement.
- vi) Other critical measures essential for quality work.

6.5 On Site Repairing.

- i) All site repairing shall be under supervision of OEM engineer and shall meet all OEM recommendation to ensure quality of work.
- ii) All spares arrangement shall be carried out well in advance to minimize outage time. The list must be shared with CES team
- iii) Necessary repairing process to be intimated to CES team in advance. It shall include in process & final quality and performance checks / test.
- iv) The repairing process shall be certified by OEM design / quality expert.
- v) Detailed time schedule and spares arrangement details shall be submitted to CES team for necessary planning.
- vi) The repairing work shall be witness by BRPL CES engineer, who may insist in process / performance checks / test in addition to above if felt essential.
- vii) If BRPL engineer observed any quality problem / skill problem, may insist for repairing at OEM facility.

6.6 Repairing at OEM facility.

Following requirement shall be fulfilled during OEM workshop repairing work: -

Technical Specification For 11 kV Ring Main Unit

- i) During site inspection, if service engineer felt necessary to send equipment to OEM facility, the same shall be organized by OEM.
- ii) In case if BRPL felt that site repairing is not up to the required quality or felt necessary to analyze cause of failure, the same shall be organized by OEM.
- iii) Equipment unpacking, testing and opening for analysis inspection shall be carried out in presence of BRPL engineer. It shall be intimated to BRPL at least 3 days in advance for necessary travel arrangement.
- iv) If cause of failure observed due to design mistake / manufacturing mistakes, the same shall be rectified in all other similar design equipments without any cost to BRPL.
- v) OEM to intimate the final testing for inspection. BRPL may depute engineer or third party representative to carryout inspection / testing before dispatch.
- vi) Dispatch shall be carried out only after BRPL clearance.
- vii) Necessary lifting, shifting, loading / unloading & transportation arrangement shall be in the scope of OEM / supplier.
- viii) A document required essential for lifting and shifting of equipment will be intimated at least two days in advance.

6.6 Witness / Inspection stages.

Even though OEM is liable for overall quality of work, BRPL may witness / Inspection following activity:-

- i) On site inspection, repairing/replacement work.
- ii) Testing / inspection equipments / any accessories / component to establish the cause of failure.
- iii) Opening of equipment for internal part inspection.
- iv) Final testing/inspection before despatch.
- v) Testing / checking of the evidence causing failure / problem.

Technical Specification For 11 kV Ring Main Unit

Note: It will be responsibility of OEM / Supplier to establish with facts, figure, photographs, and evidence to prove that cause of failure not attributed to design.

7.0 Documents / records / report submission

The following be recorded and provided to BRPL by OEM against each call / repairing / rectification works for BRPL clearance and future reference:-

- i) Root cause analysis report.
- ii) All test report.
- iii) Minutes of meeting.
- iv) Spares / accessories test report / calibration certificates.
- v) Proof of expenditure for cost incurred to BRPL.
- vi) Copy of transportation documents.
- vii) All technical details of parts / accessories being replaced.

8.0 Qualification requirements for service engineers

- i) All work must be carried out by only qualified, experience engineer certified by OEM. BRPL may request qualification and experience details if felt necessary.

9.0 Safety.

- i) All necessary personal protective equipments requirement for the personal and labour will be in the scope of OEM / supplier.
- ii) It will be liability of OEM / Supplier to meet the necessary safety norms , standards, rules & regulation .
- iii) BRPL may audit the same during on site work.

10.0 Communications.

For better coordination, single channel communication must be followed. BRPL and OEM / Supplied to communicate to each other their team for communication time to time in case of any changes.

At present, all warranty related communication is to be done with CES team.

Technical Specification For 11 kV Ring Main Unit**11.0 Changes / revision management.**

Necessary approval of O&M analytic cell is essential for changes in this document.

In case if any stack holders do not agree or wish to amend its content may send request to BRPL O&M analytic cell for approval.

The request will be in effect only on consideration and authorized release of revision in document by O&M analytic cell.

Annexure 'H' 11 Kv Metering Cubicle**1.0 General Requirement**

1	Panel Type	Outdoor, Metal enclosed, framed, Compartmentalized panel construction
2	Service Location	Outdoor
3	Mounting	Free Standing
4	Overall Enclosure Protection	IP 54 Minimum (Complete unit i.e. RMU coupled to Metering unit shall be IP54)
5	Panel Fabrication	The metering cubicle shall be fabricated with 2.0mm CRC sheet. Load bearing members and high voltage compartments shall be 3.0 mm. The panel shall be vermin proof and totally enclosed. CT/PT compartment shall be fabricated after bending the M.S. Sheets on three sides and fourth side shall be welded to make the complete assembly tamper proof. Pressure release device/ explosion vent should be provided on the CT PT compartment at the rear side.
6	Compartmentalized panel construction	The panel shall have four separate compartments. All the compartments shall be completely segregated from each other. 1. Meter Compartment 2. CT- PT compartment 3. Incoming 4. Outgoing

Technical Specification For 11 kV Ring Main Unit

7	Meter Compartment	The Upper compartment i.e. the “meter compartment” shall be suitable for housing 3 phase 4 wire Energy Meter (energy meter not in bidder’s scope of supply) and associated wiring.
7.1	Double door	<ol style="list-style-type: none">1. Double door arrangement as front and back door to meet IP54 requirement. Both the doors should have 02 no’s concealed type (Anti Theft) hinges.2. Front door should have at least 01 no’s padlocking and 02 no’s sealing arrangements.
7.2	Meter reading Window	<p>Provided on front and back door to enable the meter reader to perform inspection of meter compartment and note down the reading of meter.</p> <ol style="list-style-type: none">1. Front Door: window of size 350 (W) X 300 (H) mm approximately with colour-less transparent acrylic sheet and wire mesh welded from inside.2. Back door: window of size 350 (W) X 300 (H) mm approximately with colour-less transparent acrylic sheet.
7.3	Data Downloading slot	<p>Slot to facilitate installation of data downloading cable with DB9 serial connector.</p> <ol style="list-style-type: none">1. Front door: Slot of size 25mm X10 mm (+/- 2 mm) should be provided on front door with sealable cover.2. Back door: Slot of size 30 mm X 50 mm shall be provided to facilitate installation of data downloading cable.
7.4	Meter hanging arrangement	The meter compartment shall contain hanger arrangement of slotted angle for mounting meter so that meter can be adjusted vertically and horizontally. Two horizontal and two vertical slotted channels should be provided for the same.
8	CT PT Compartment	The CT/PT compartment shall be completed welded type and house the 11 KV dry type current transformers (3 no’s) and 3 phase dry type potential transformer.
8.1	Current Transformers	The metering current transformers shall be suitable for 11 KV; 50Hz effectively earthed neutral system. The CT shall be single core, epoxy resin cast, copper wound primary type with rated burden 5VA and accuracy class 0.5s or better conforming to IS:2705 (Part-I&II). Instrument security factor shall be less than or equal to 10. CTs should have solid copper bus bar type primary terminals for connection with main busbar/bushing terminal. Secondary terminals of CTs should be made of copper or brass.

Technical Specification For 11 kV Ring Main Unit

		SL	CT ratio	Short time rating	Size of main Bus bar
8.2	STC of CT	1	15 / 5 A	6 KA for 1 sec.	30 x 4 sqmm
		2	30 / 5 A	6 KA for 1 sec.	30 x 4 sqmm
		3	60 / 5 A	18KA for 1 seconds	30 x 4 sqmm
		4	100 / 5A	18KA for 1 seconds	30 x 4 sqmm
		5	150 / 5 A	18KA for 1 seconds	30 x 4 sqmm
		6	300 / 5 A	18KA for 1 seconds	40 x 6 sqmm
8.3	Potential Transformer	The Potential Transformer shall be dry type Epoxy resin cast, Copper wound suitable for 3 phase 11KV, 50Hz effectively earthed neutral system. The PT shall be connected in star to have ratio $11KV/\sqrt{3}$ / $110/\sqrt{3}$ V with rated burden of 10VA per phase and accuracy class 0.5 or better conforming to IS:3156 (Part I & II). Primary terminal of PT should be of copper. Secondary terminals of PT should be made of copper or brass.			
8.4	Pressure release device	Pressure release device/ explosion vent should be provided on the CT PT compartment at the rear side.			
9	Incoming	1. Coupled to the breaker module of RMU. 2. Coupling arrangement should meet the IP54 requirement.			
10	Outgoing	Cable compartment with cover/ door.			
10.1	Cable type & size	3C x 300 to 400 sq mm Aluminum conductor XLPE with armor & PVC outer sheath {R9}			
10.1	Cable Entry	1. Bottom 2. Gland plate - 3mm metallic, removable & split type in two parts, with 1no. 90 mm diameter knocks out punch/hole in the centre. Approval should be taken for the same during drawing submission			
10.2	Cable support	'HDPE' cleat(s) shall be provided.			
10.3	Termination Type	Suitable for heat shrinkable type			
10.4	Terminals for cable termination 11kV	1. Suitable for Ring Type Bimetallic lug. 2. Material of Nut, bolts and spring washer- Brass 3. Size of Nut bolt- M16			

Technical Specification For 11 kV Ring Main Unit

10.5	Termination height	From gland plate 900 mm minimum
10.6	Right angled boots	Single piece cold shrink type (make – 3M/K.D.Joshi Raychem) {R9}
11	Panel Wiring	<ol style="list-style-type: none">1. Secondary wiring of CTs and PTs shall be done with 2.5 sq. mm PVC insulated cables with stranded copper conductor.2. CT and PT wiring should run in independent rigid steel conduit pipes of appropriate size from CT/PT compartment to meter compartment.3. Conduit pipes shall be clamped with the inner wall of the panel and shall be so laid that none of the wires can be tampered from outside.4. Current transformer and Potential transformer secondary wiring shall be colour coded as per IS and shall be suitably ferruled for identification.5. No link or test terminals shall be provided in wire from CT/PT to meter terminals.
12	Earthing	<ol style="list-style-type: none">1. The assembly comprising of the chassis, framework and the fixed parts of the metal casing shall be provided with two separate earthing terminals of M10 or above.2. These terminals shall be provided over and above all other means provided for securing and earthing metallic enclosures (armour or other metallic coverage) or current-carrying cables.3. The earthing terminals shall be readily accessible and so placed that the earth connection of the CT/ PT chamber is maintained when the cover or any other movable part is removed.4. The earthing terminals shall be protected against corrosion and shall be metallically clean.5. Earth continuity shall be provided to all Gasketed joints by copper braid suitable for rated fault current.6. Under no circumstances shall a movable metal part of the enclosure be insulated from the part carrying the earthing terminals when the movable part is in place.7. The earthing terminals shall be identified by means of the symbol marked in a legible and indelible manner on or adjacent to the terminals.

Technical Specification For 11 kV Ring Main Unit

13	Bushing	<p>Bushing should be made of homogeneous epoxy / polymeric material free from laminations, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality. Bushings shall be designed to have ample insulation level, mechanical strength and rigidity for the conditions under which they will be used. The hollow porcelain bushings shall conform to IS-5621.</p> <p>Bushing clamping accessories, bolts, studs etc shall be hot dip galvanized. All the nuts and washer shall be SS-304. All iron parts shall be hot tin galvanized and all points shall be airtight. All current carrying contact surfaces shall be silver plated. The creepage distance of the bushing shall not be less than 31 mm/KV. Bushing shall be tested in accordance with IS-2099. Routine as well as type tests reports in conformity with IS-2099 shall be furnished to the purchaser.</p>
14	Connections	<ol style="list-style-type: none">1. No joint in the primary winding of CT shall be acceptable.2. Connection between CT terminal and bushing terminals shall be done with solid copper busbar of adequate size.3. Flexible copper strip / rope are not acceptable for primary connection.4. PT should be connected to primary busbar through bus bar of appropriate size (connections using flexible conductor are not acceptable).5. All bus bars/ connections in the CT/PT compartment shall be encapsulated in epoxy.
15	Lifting Lug	<ol style="list-style-type: none">1. 04 No's lifting lugs shall be provided at the top of the metering cubicle for transportation.2. All nuts, bolts, flat and spring washers shall be SS only.
16	Height of the Base frame	<p>The total height including base channel shall not be more than 2000 mm. Width and depth should be minimum possible and may be increased suitably to accommodate CT's/PT's.</p>
17	Provision for Sealing	<p>Welded Stud with nut must be provided for the purpose of sealing on the following compartments/ locations.</p> <ol style="list-style-type: none">1. Meter compartment2. Coupling arrangement of RMU and metering cubicle.3. Outgoing cable compartment

2.0 Labels & painting

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1	Name plate	The metering cubicles shall be provided with a non detachable type nameplate with legible and indelible marking fixed on the enclosure sheet with welded arrangement so that in case name plate is removed no passage holes are left. (separate name plate should be provided for RMU & metering cubicle)
2.1	Location	Name plate having complete data shall be provided outside as well as inside the metering cubicle at a suitable place where it can be easily read.
2.2	Material	Anodized aluminum 16SWG / SS
2.3	Background	SATIN SILVER
2.4	Letters, diagram & border	Black
2.5	Process	Etching
2.6	Name plate details	<ol style="list-style-type: none">1. BRPL Property2. Supplier's name3. P.O. No. & Year of manufacturing4. Sr. No. of metering cubicle5. Particulars of CT's such as ratio, VA burden, accuracy class, SC rating, BIL.6. Particulars of PT's such as ratio, accuracy class, VA burden, BIL.7. Standard connection diagram8. Consumer account no9. Sanctioned load.10. Date of release of connection.
2.7	Labels for CT Ratio	On CT PT compartment by anodized aluminum with white character on black background OR 3 ply lamicoid
2.8	Danger plates	<ol style="list-style-type: none">1. On CT PT compartment and each cable compartment2. Anodized aluminum 16 SWG with white letters on red background
2.9	BSES Insignia	<ol style="list-style-type: none">a) 01 no'sb) Shall be etched on anodized aluminium 16SWG / SS

Technical Specification For 11 kV Ring Main Unit

		plate. c) Details shall be finalized during drawing approval.
2.10	Enclosure painting surface preparation	7 tank chemical process
2.11	Enclosure painting internal/ external finish Powder coated epoxy polyester base	Hot dip galvanizing – 80 micron thick grade A, shade - RAL 7032, uniform thickness 60 micron minimum.

3.0 Technical requirement of CT and PT

SL	Description	Requirement for CT	Requirement for PT
1	Nominal System Voltage (KV rms)	11KV	11KV
2	Highest System Voltage (KV rms)	12KV	12KV
3	Type	Single phase Indoor CT's	Three phase Star/Star PT.
4	Accuracy Class	0.5s	0.5
5	Rated frequency	50Hz	50Hz
6	Rated Secondary Current Amp.	5 Amp	N / A
7	Rated continuous thermal current	1.2 times of rated primary current,	NA
8	Max Ratio error	As per IS 2705	As per IS 3156
9	Max Phase angle error	As per IS 2705	As per IS 3156
10	Rated burden	5VA at 0.8 pf (Lag)	10VA/ phase at 0.8 pf (Lag)
11	Rated voltage factor	N / A	1.2 times continuous and 1.5 times for 30 seconds
12	Short time current rating		
12.1	Thermal rating	As provided in section 3.2	N / A
12.2	Dynamic rating	2.55 times of short time thermal current rating	N / A

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13	One minute high voltage power frequency withstand voltage		
13.1	On primary winding KV rms On secondary winding KV rms	28KV (rms) for 1 minute for 11 KV class 3KV (rms) for 1 minute	28KV (rms) for 1 minute for 11 KV class 3KV (rms) for 1 minute
13.2	1.2 / 50 impulse withstand voltage	75 KV (peak) for 11 KV class	75 KV (peak) for 11 KV class
14	Winding materials	Copper	Copper
15	Insulation security factor	< 10	N / A

4.0 Inspection & testing

1	Type test	<ol style="list-style-type: none"> 1. Metering cubicle shall be type tested as per IS 3427 2. CT and PTs shall be type tested as per IS2705 and IS3156 respectively. 3. Bushings shall be type tested in accordance with IS2099. 4. Type tests should not pertain to period earlier than five Years.
2	Routine test	<ol style="list-style-type: none"> 1. Metering cubicle shall be tested as per IS 3427 2. CT and PTs will be tested in accordance with IS2705 and IS3156 respectively. 3. Temperature rise test will have to be carried out during Inspection. 4. During inspection, all routine and acceptance tests shall be carried out in presence of purchaser's representative.
3	Physical Inspection	<ol style="list-style-type: none"> 1. Checks of all mounting plates / fasteners. 2. Checking of components as per drawing. 3. Electrical circuit's fasteners tightness / surface area contacts. 4. Labels / identification / nameplates. 5. All doors checks – safety and accessibility. 6. Panel surface finish / smoothness.

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4	Right to waive off tests	Reserved by Purchaser
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5.0 Guaranteed Technical Particulars (Data by Supplier)

SL	Description	Requirement	Data By Supplier
1	Name of Manufacturer		
2	Type and Designation	Outdoor type with resin cast CT and PT	
3	Normal system voltage	11KV	
4	Highest system voltage	12KV	
5	Frequency	50Hz	
6	Insulation Class		
7	Impulse Withstand Voltage (On assembled CT-PT set)	75 KV peak	
7.1	One minute power frequency dry withstand voltage (On assembled CT-PT set Primary)	28KV rms	
7.2	Secondary	3KV rms	
8	Current Transformers:	(3 nos. total, 01 no. per phase)	
8.1	Type	Resin cast wound type	
8.2	Transformation ratio (CT Ratio)	As per requirement	
8.3	Rated Output (VA Burden)	5VA	
8.4	Class of accuracy	0.5s	
8.5	Rated continuous thermal current	1.2 times of rated primary current	
8.6	Short time thermal current rating for one second	As per CT ratio and specification	
8.7	Rated Dynamic current	2.55 times of short time thermal current rating	
8.8	Security factor	Less than 10	

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SL	Description	Requirement	Data By Supplier
8.9	Insulation level	28KV for 1 min	
8.10	No. of cores	One	
8.11	Max Ratio error	As per IS:2705/1992	
8.12	Max phase angle error	As per IS:2705/1992	
8.13	Max. temp rise over max ambient temp of 50 deg C at rated continuous thermal current at rated frequency & withstand burden	As per IS:2705/1992	
8.14	Make and Grade of epoxy resin	<u>Cycloaliphatic</u> {R9}	
9	Potential Transformers	(3 Phase 4 wire unit)	
9.1	Burden in VA/Phase	10 VA/phase	
9.2	Transformation ratio	11KV/110V (L-L)	
9.3	Class of accuracy	0.5	
9.4	Winding connection	Star/Star	
9.5	Insulation level	28KV for 1 min	
9.6	Rated voltage factor and time	1.2 continuous and 1.5 for 30 seconds	
9.7	Temp rise over max ambient temp	Within limits of IS-3156/1992	
9.8	Max phase angle error	Within limits of IS-3156/1992	
9.9	Max Ratio error	Within limits of IS-3156/1992	
9.10	Make and Grade of epoxy resin	<u>Cycloaliphatic</u> {R9}	
10	Size of main bus bar		
10.1	For CT ratio less than and equal to 150/5	30 x 4mm (minimum)	
10.2	For CT ratio of 400/5 {R9}	40 x 6mm (minimum)	

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SL	Description	Requirement	Data By Supplier
11	Core material	CRGO (Virgin grade)	
12	Minimum creepage for HT Bushing	341mm	
13	Clearances a. Phase to phase clearance b. Phase to earth clearance		
14	No. of Paint coats a. Primer b. Enameled RAL 7032	2 coats 2 coats	
15	Weight of complete unit		
16	Gauge of a. Meter box b. HT compartments	2mm (min) 3 mm (min)	
17	Dimensions of complete Metering cubicle a. Height (mm) b. Breadth (mm) c. Length (mm)		
18	Meter compartment		
18.1	Dimensions of meter compartment with double door (minimum sheet thickness 2mm) a. Height (mm) b. Breadth (mm) c. Length (mm)		
18.2	Protection class	IP 5X	
18.3	Provision of Acrylic window		
18.4	Provision of slotted channel (40*12mm) suitable for 6mm bolts (4 Nos)	Required	
18.5	Provision of Pad locking & sealing arrangement of door		
18.6	Provision of mounting metering reading port on door.		
19	Metering cubicle mounting	Floor mounting	

Technical Specification For 11 kV Ring Main Unit**Annexure 'I' Make list**

Make List of RMU's Accessories {R9}		
Sl. No.	Descriptions	Make
1	Relay (Self Power+ AUX DC/ACSupply+ Communicable)	Ashida 241S-761
2	CT	Narayan Power Tech (NPT)/Gilbert Maxwell, 400/75-1/1, 5P10, 2.5 VA, Pragati, Nortex
3	FPI (Both for Earth Fault and Over Current Protection)	EMG/C&S/Schneider/SIEMENS
4	CBCT (Both for Earth fault and Over current protection)	EMG/C&S/Schneider/SIEMENS
5	Boot	3M/Raychem/K.D.Joshi
6	Wire	Polycab/Havells/Finolex/KEI
7	AC & DC MCB	SIEMENS/Havells/C&S/Schneider
8	Disconnecting type fuses	Connectwell/Wago/Phoenix/Elmex
9	TB (disconnecting type)	Connectwell/Wago/Phoenix/Elmex
10	Vacuum Interrupter	CG/ ABB/Schneider/SIEMENS/other type tested

Annexure 'J' Type test

The entire product shall be type tested from CPRI / ERDA. In case of new offer or type test report is older than 5 years, bidders shall carry out type tests from CPRI / ERDA without any cost implication to BRPL

Annexure-K -Special Technical Requirement: {R9}

Sl. No	Descriptions
1	Animated video for ETC guide of RMU shall be submitted to BRPL before delivery of first lot
2	Relay Protection setting (min 10%)
3	All the communicable accessories shall have Latch contact
4	NO/NC contact for manometer shall be provided

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Sl. No	Descriptions
5	--Bidders shall have additional RMU readily available of each type to replace under warranty faulty RMU in case it is repairable at OEM factory --In case of under warranty failure and if the faulty RMU is repairable only at OEM factory, bidder has to replace the faulty RMU during lifting with new/ operatable same type of RMU within the time period mentioned in the tech spec warranty clauses. --BRPL shall not issue any RMU from their assets for replacement activity. In case of delay, penalty shall be imposed as per this corrigendum sl no 9 --After Warranty period completion (5 years), these clause shall not be applicable to OEM
6	Sample RMU
6.1	1 sample RMU of each type shall be manufactured as per BRPL specification after award of PO. BRPL will do the routine testing and inspection of the sample RMU and if found satisfactory as per BRPL specification, BRPL will give clearance/ approval for bulk manufacturing
6.2	During inspection of the sample RMU, BRPL may ask the vendor to modify/ change the design as per BRPL requirement including the make of accessories mentioned in the specification. OEM is liable to modify the design irrespective of the offer submitted during tender stage. However, BRPL will not ask for the requirement beyond the technical specification.
6.3	The lead time required to arrange the accessories/ to modify the design required as per BRPL requirement shall be in the account of bidder.
6.4	BRPL is not liable to bear any extra cost, out of the PO for the approval of sample RMU and the bulk quantity afterwards.
6.5	The sample may be used in BRPL network based on fulfilment of technical requirement and BRPL approval. Else fresh RMUs as per the approved sample shall be supplied in line with PO quantity.
6.6	During bulk manufacturing and PO execution, BRPL may ask necessary changes to be done (if required). Bidder is liable to provide the required changes as per the BRPL requirement irrespective of the offer / design given during tendering stage without any cost implication to BRPL. However, BRPL will not ask any changes out of BRPL Technical specification
7	Warranty clause's terms & conditions mentioned in the technical specification Annexure- G(1), Clause no-6.2 shall be strictly followed by the OEM, in the event of violation of warranty clauses, BRPL is liable to impose penalty with 1% of RMU unit rate per day basis (Unit rate shall be considered as per the PO)
8	Submission of Type test report (not more than 5 years from the date of tender opening) of internal arc for 1 sec (AFLR 20kA for 1 sec) from CPRI/ERDA is mandatory with minimum 3 way RMU configurations.
9	Complete Civil foundation Drawing along with sectional view (RCC casting shall be followed) and Bar Bending Scheduled (BBS) shall be submitted by bidders

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Sl. No	Descriptions
	along with drawing
10	Submission of 3nos as built drawing to BRPL before dispatch of first lot of material is mandatory. Also one set of as built drawing shall send with each unit of supplied RMU. Proper holding arrangement to be provided to place as built drawing inside the RMU.
11	Test bushing feature-The bushing of RMU must have the feature of "Test Bushing".
12	Broken conductor feature in relay-The relay must have the feature of detecting change in impedance (negative phase sequence over current)
13	BRPL may conduct stage wise inspection of RMU manufacturing at vendor works. OEM is liable to intimate the manufacturing scheduled along with related dates before commencement of manufacturing.