

TENDER DOCUMENT

FOR

**Design, manufacture, supply & delivery to site of 11kV, 630A,
SF6 insulated Ring Main Unit at Cotton University**

PART – A

TECHNO-COMMERCIAL BID



अप्रमत्तेन वेद्व्यम्

NIT No. 05 of 2021-2022

Dt. 08.03.2022

Cotton University
Panbazar, Guwahati-781001, Assam, India
www.cottonuniversity.ac.in
Phone: 0361-2733530: Fax: 0361-2733502

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NOTICE INVITING TENDER
NIT No. 05 of 2021-2022
Date: 08.03.2022

Sealed tenders in two-bid-system are invited from reputed manufacturers of 11kV, 630A, SF6 insulated Ring Main Unit for the following works,

Name of work	Design, manufacture, supply & delivery to site of 11kV, 630A, SF6 insulated Ring Main Unit at Cotton University
Earnest Money	₹ 12,500.00/-
Last Date & time for Submission Tenders (Both Technical & Commercial parts i.e. Part-A & B)	23.03.2022 Till 14.00 Hrs.
Date & time for opening of Part-A (Technical Bid)	23.03.2022, 16.00 Hrs
Time of completion	45 (Forty Five) Days

TERMS AND CONDITIONS –

A. Qualifying criteria:

1. Only the manufacturers or their authorized dealers/distributor of the following brands shall be eligible to participate —

SCHNEIDER/ABB/SIEMENS

- 1.1 In case of authorized dealer/distributor, the agency must submit valid certificate to establish their dealership/distributorship.

2. RMU brand must be ISI marked for the type of RMUs offered. Valid certificate from BIS shall be submitted.

B. Other Terms & Conditions:

1. Soft copy of the tender will be available in the university's website. Interested bidders can deposit the cost of the tender amounting to Rs. 500/- either through DD drawn in favour of "Cotton University" payable at Guwahati or ICICI bank challan **FEECODE011(available in the website)** and the counter folio must be submitted with the technical bid of the tender failing to which the tender will summarily be rejected.
2. EMD for ₹ 12,500.00/- (Rupees Twelve Thousand Five Hundred only) shall be enclosed along with the tender. The EMD shall be paid in the form of Demand Draft drawn in favour of "Cotton University" payable at Guwahati. Tender submitted without EMD will not be considered.
3. In case the tender is submitted through authorized dealer/distributor of the approved brands of RMUs, attested copy of dealership/distributorship certificate from the manufacturer must be enclosed, without which, the offer will be rejected.
4. The Tenderers shall submit their technical as well as the price bid in two separate envelopes marking one envelopes as **Techno-commercial Part-A** & other as **Part-B: Price Bid** with name of work & bidder's name on it on the separate envelope. These two envelopes shall be placed inside another envelope with name of work & bidder's name on it. **Part A** shall include the following : —
 - a) Earnest Money Deposit as mentioned in Sl. No. 1 above.
 - b) All documents in support of the qualifying criteria mentioned at A. above.
 - c) Technical details, catalogues and commercial terms etc. complying against each specification mentioned in Annexure – I
 - d) The tenderer must furnish the technical bid along with all required documents in hard binding. Hard copy of tenders in loose or staple paper will not be accepted.



Part B shall contain the Price offer filled up as per the format of Price Bid of the Tender Document. The Price Bid of the bidders fulfilling the criteria as per the NIT on the basis of documents submitted in the Techno-Commercial Bid shall only be opened in presence of bidders or their authorized representatives.

The Tenderer must furnish the Technical bid along with all required documents in hard or spiral binding only and in the event of non compliance of this instruction, tender is liable to be cancelled.

Tenderers must submit tender at the following office:

**The Registrar,
Cotton University
Panbazar, Guwahati – 781001**

5. The technical specification of the RMU is enclosed in Annexure – I. The evaluation of the technical bid shall be based on compliance of all the specifications as mentioned under Annexure – I.
6. Rates must be valid for 6 (six) months and shall be inclusive of all GST, transportation to the site (i.e. Cotton University, Panbazar, Guwahati), loading & unloading at site.
7. Rate shall be shown (as per enclosed format) with break-up of basic rate, transportation and transit insurance, GST etc. till unloading at site. The quoted rate shall be inclusive of the cost of loading at the factory and unloading at site.
8. Relevant technical details, reports of test conducted on similar RMUs at authorized test centers, quality certification if any, list of similar orders executed along with performance certificates etc. shall be submitted with the tender (in the Techno-Commercial Bid).
9. The University reserves the right to approve more than one supplier and split the order accordingly.
10. Time allotted for the delivery of RMU shall not be more than 45 (Forty Five) days from the date of issue of order.
11. The RMUs supplied shall be guaranteed for a minimum period of 12 months from the date of commissioning or 18 months from the date of supply.
12. The successful bidder shall submit security deposit equivalent to 5% of the total value of the RMUs to be ordered, through Demand Draft / Bank Guarantee of any Nationalized Bank. The security deposit shall be retained till the expiry of the guarantee period of RMUs supplied against the order. The security deposit shall stand forfeited against failure to execute the order as per above terms or failure to do rectification / replacement needed in case of any defect in design, materials and workmanship of the supplied RMUs within the guarantee period.
13. Onetime payment will be made against submission of bill after supply and acceptance of the RMUs against the order. However, no payment will be released unless the security deposit as mentioned under item 14 as submitted. No part payment will be entertained.
14. Tolerance in length in individual drum shall be $\pm 5\%$, while the overall tolerance on the total length of individual size of RMUs shall not exceed $\pm 2.5\%$. **Payment shall be made as per actual length of the RMUs supplied.**
15. In case, the day of submission of the tender happens to be a holiday on account of Govt. notification or due to some unavoidable circumstances and the submission & opening of the tenders shall automatically be extended to the next working day, the times specified remaining the same.

The University reserves the right to reject any or all of the tenders without assigning any reasons thereof.

TECHNICAL SPECIFICATION

Annexure-I

TECHNICAL SPECIFICATION FOR 11KV, 630A, SF6 INSULATED, RING MAIN UNIT:-

1.0 Design Criteria for SF6 RMU

This specification covers Design, Engineering, Manufacture, Assembly, Stage testing, Inspection, Testing before supply, packing and transportation to site of 11 kV Ring Main Units Non-Extensible type, Indoor comprising of configuration as indicated in Annexure-A. The RMU to be supplied against this specification are required for vital installations where continuity of service is very important. The design, materials and manufacture of the equipment shall, therefore, be of the highest order to ensure continuous and trouble-free service over the years.

The RMU offered shall be compact, maintenance free, easy to install reliable, safe and easy to operate and complete with all parts necessary for their effective and trouble-free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.

It is not the intent to specify herein complete details of design and construction. The offered equipment shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements. In actual practice, notwithstanding any anomalies, discrepancies, omissions, in-completeness, etc. in these specifications, the design and constructional aspects, including materials and dimensions, will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulations in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, Electricity Act-2003 and other statutory provisions.

The Tenderer/supplier shall bind himself to abide by these considerations to the entire satisfaction of the purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.

1.1 Scope of Work

- Supply, Installation and Commissioning of of 3 way (1LBS+2VCB), Ring Main Unit

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1.2 RMU key components

- Load break Switch & vacuum Circuit Breaker with independent spring-operated mechanism for **Manual** operations.
- RMU should be of **Non-Extensible** Type.
- Capacitor voltage dividers serving live-line RMU indicators with Phase comparison sockets.
- RMU shall have a common enclosure of **2mm GI for outdoor application** with degree of protection IP54

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- RMU Main Tank should be of **3mm thick stainless steel robotically welded** with degree of protection IP67.

1.3 AppliRMU standards

The RMUs shall be manufactured to the highest quality consistent with best practice and workmanship and in full accord with the Contractor's quality assurance plan. The RMUs and the work associated with their installation shall also conform to the Indian and equivalent international standards that are appliRMU. The Contractor shall provide an English language copy of the appliRMU Indian and equivalent international standards met by the proposed RMU. Rating, characteristics, tests and test procedures etc. for the RMU, protection Relays, monitoring and control devices and accessories including current transformer shall comply with the provisions and requirements of the standards of the IEC and IS where specified.

Description	Standard
<u>11kV Ring Main units</u>	
AC metal enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV	IS 3427
Classification of degrees of protection provided by enclosures of electrical equipment	IS 12063
High Voltage Switches	IS 9920 (Parts 1 to 4)
Specification for AC disconnectors and earthing switches for voltages above 1000 V	IS 9921 (Parts 1 to 5)
HV AC Circuit Breakers	IS 13118
Dimensions of terminals of HV Switchgear and Control gear	IS 10601
General requirements of switchgear and control gear for voltages exceeding 1000 V	IS 12729
High voltage/Low voltage prefabricated substations	IEC 1330
Common clauses for MV switchgear standards	IEC 62271-100/200
Monitoring and control	IEC 6081
Current Transformers	IS 2705
Voltage transformers	IS 3156
Specification for Static Protective Relays	IS 8686
Standards for high voltage metal clad switchgear up to 52 KV.	IEC 62271-200

1.4 Service Conditions

System particulars:

- Nominal system voltage ... 11 kV
- Corresponding highest system voltage ... 12 kV
- Frequency ... 50 Hz \pm 3%
- Number of phases ... 3
- Neutral earthing ... Solidly grounded

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f. Fault level (minimum) ... 21 kA for 3 sec for 11kV

Equipment supplied against the specification shall be suitable for satisfactory operation under the following tropical conditions:-

- a. Max. ambient air temperature : 45 Deg. C
- b. Max. relative humidity : 95 %
- c. Max. annual rainfall : 1450 mm
- d. Max. wind pressure : 150 kg/sq.m.
- e. Max. altitude above mean sea level : 1000 mtrs.
- f. Climatic Condition: Moderately hot and humid tropical climate conducive to rust and fungus growth.

1.5 11 KV RMU TECHNICAL PARAMETERS

1.5.1 The RMU to be supplied shall be compact and shall meet the following requirements:

- Easy to install
- Safe and easy to operate
- Compact
- Low maintenance

1.5.2 It shall include, within the same metal enclosure number of MV functional units required for connection,

- Load break switches,
- Earthing Switches
- Vacuum Circuit Breakers
- Self- Powered relays

1.5.3 Equipment and material conforming to any other standard, which ensures equal or better quality, may be accepted. In such case copies of English version of the standard adopted shall be submitted.

1.5.4 All design features of the proposed RMU, as described in the supplier's bid and in the bid's reference materials, shall be fully supported by the equipment actually delivered.

The key design features include those that relate to:

- Maintainability, expandability, and life span
- Ability to operate in severe outdoor environmental conditions.
- Immunity to electrical stress and disturbance.
- Acceptable insulation properties.

1.6 Design Features

1.6.1 General:

- The RMUs shall be designed specifically for indoor installation. Outer enclosure should be of 2mm GI. (Galvanize sheets). The basic design should be compact (kiosk type design is not acceptable) & should be suitable for indoor application having degree of protection IP42/ 41. Housing is fully treated using zinc coated steel and electrostatically applied oven cured paint ,to resist weather and pollution attacks.They

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shall also be suitable for conditions in which they will be exposed to heavy industrial pollution, and high levels of airborne dust.

- The Indoor RMU shall be conformably coated to meet these climatic conditions. In this respect, standards such as IEC 62271-200, covering equipment, systems, operating conditions, and environmental conditions shall apply. In particular, the RMU equipment shall have been type tested for IP42/ 41. Failure to conform to this requirement shall constitute grounds for rejection of the proposal.
- In addition to the above, materials promoting the growth of fungus or susceptibility to corrosion and heat degradation shall not be used, and steps shall be taken to provide rodent proofness.

1.6.2 Corrosion protection

The main SF6 tank, housing the on-load break switches and the vacuum circuit breakers, should be of 3 mm stainless steel, robotically welded to produce consistent leak proof equipment ensuring a leakage rate not more than 0.1 % per annum. Except for stainless steel, all steel surfaces that are not galvanized shall be treated to protect against corrosion. As a minimum, corrosion treatment shall include the following procedures:

- The surface shall be cleaned to bare material by mechanical or chemical means.
- Must be powder coated by means of seven tank process

1.7 Design Parameters

The RMUs shall be suitable for RMU networks of 630 Amps. The minimum design parameters to which their major components shall conform or exceed are summarized in the following tables.

1.7.1 Technical Data :

1	Rated Voltage	12KV
2	Service Voltage	11 KV
3	System frequency	50 Hz
4	Lightning Impulse Withstand Voltage	
a	Phase-to-Phase & Phase-to- Earth	75KVp
b	Across isolating distance	85KV
5	Power Frequency Withstand Voltage	28 Kv rms for 1 minute
6	Normal Current	
	a) Load Break Switch	630A
	b) Bus Bar	630A
7	Short Time withstand and peak with stand current and duration	21KA/3sec
8	Short circuit Breaking current	21KA
9	Short circuit peak making current	52.5KA
10	Number of mechanical operations of CB	2000
11	Number of mechanical operations of Load Break Switch	5000
12	Number of mechanical operations of Earth Switch	1000
13	Internal Arc test on tank	21KA for 1sec
14	Minimum operating pressure	0.05Bar G
15	Operating Pressure Bar g	0.4Bar G

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16	Minimum operating pressure Bar g	0.05 Bar G
17	Degree of Protection	
18	Main Tank	IP67
19	Enclosure for Indoor	IP42/41
20	RMU termination -	RMU box suitable for RMU size 1x3Cx120 sq.mm.

- The RMU shall be designed to operate at the rated voltage of 12 kV, 21kA STC.
- It shall include, within the same metal enclosure, On-load break switch, circuit breakers and earthing switches for each Load Break Switch/Circuit Breaker.
- Suitable fool-proof interlocks shall be provided to the earthing switches to prevent inadvertent or accidental closing when the circuit is live and the concerned Load Break Switch/Circuit Breaker is in its closed position.
- Interlocked RMU compartments with the Earthing Switch.
- The degree of protection required for indoor application shall be IP 42/ 41.
- The active parts of the switchgear shall be maintenance free. Otherwise, the RMU shall be of low-maintenance type.
- The tank shall be made of minimum 3 mm thickness of stainless steel.
- The Stainless Steel tank should be completely welded so as to ensure IP 67 degree of protection and shall be internal arc tested for 21kA for 1 sec.
- The RMU shall be suitable for mounting on its connecting RMU trench.
- For each RMU enclosure, a suitably sized nameplate clearly identifying the enclosure and the electrical characteristics of the enclosed devices shall be provided.
- The access to the RMU compartment should be from the Side &Rear / front of the switchgear only to have minimum operating & maintenance space at site.
- The RMU design shall be such that access to live parts shall not be possible without the use of tools.
- The design shall incorporate features that prevent any accidental opening of the earth switch when it is in the closed position. Similarly, accidental closing of a Circuit Breaker or Load Break Switch shall be prevented when the same is in an open position.
- The RMU tank must be equipped with a suitable pressure relief device. The pressure relief must ensure that the escaping gases are dissipated to the top of the switchgear with IAC 21kA for 1 Sec to ensure operators safety. Designs with arc venting through rear bottom of the switchgear are not acceptable since it requires

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additional arc tunnel to be made extending the trench and making it non practical for outdoor installations.

- Liquid filled temperature compensated manometers shall be provided as mandatory with clear marking of green zone & red zone for ease of operator understanding.

1.7.2 Load Break Switches:

- The Load Break Switches shall be maintenance free. With outdoor canopy doors open, the position of power contacts and earthing contacts shall be clearly visible from the front of the RMU through the Mimic fascia. The front fascia should be screen printed. Sticker type fascia not acceptable.
- The position indicator shall provide positive contact indication in accordance with IS 9920. In addition, the manufacturer shall prove the reliability of indication in accordance with IS 9921. These switches shall have three positions (or states), i.e., Open, Closed, and Earthed, and shall be constructed in such a way that natural interlocking prevents unauthorized operations.
- The switches shall be fully assembled, tested, and inspected in the factory.
- In case of Manual operation without motors, opening and closing shall be driven by a fast-acting mechanism independent of manual operator action.
- The motorization provision should be provided such that the motors can directly be fitted on the front fascia easily avoiding any downtime during future motorization. Designs in which motors are required to be mounted inside fascia are not acceptable since it creates dependency on the manufacturer for motor installation.
- Removal of fascia plate for motor installation in future is not acceptable.
- A facility shall be provided with an electrical operating mechanism allowing an operator at the RMU site to operate the Load Break Switches without any modification of the operating mechanism and without de-energizing the RMU.
- The switch and earthing switch mechanisms shall have a mechanical endurance of at least 5,000 operations , this is necessary since the load break switches require more operations to be carried out as compared to the VCB. This is mandatory requirement considering long life of the Ring main unit.

1.7.3 Circuit Breakers

- The Circuit Breakers shall be maintenance free and, when standing in front of the RMU with outdoor canopy doors open, their positions shall be clearly visible, through the Mimic fascia. The position indicator shall provide positive contact indication in accordance with IS 9920. The breakers shall have three positions (or states), i.e., Open, Closed, and Earthed, and shall be constructed in such a way

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that natural interlocking prevents unauthorized operations. They shall be fully assembled, tested, and inspected in the factory.

- An operating mechanism shall be used to manually close the Circuit Breaker and charge the mechanism in a single movement. It shall be fitted with a local system for manual tripping. There shall be no automatic reclosing. The Circuit Breaker shall be capable of closing fully and latching against the rated making current. Mechanical indication of the OPEN, CLOSED, and EARTHED positions of the Circuit Breaker shall be provided.
- Circuit breaker mechanisms provided with inbuilt spring charging handles are not acceptable since breakage or damage to the handles shall render the whole mechanism inoperative creating dependence on the manufacturer.
- The Circuit Breaker Mechanism is assembled with stainless steel parts & not from MS as MS parts will get rusty over a period of time & fails to operate on fault thereby bypassing the protection system leading to the failure.
- Each Circuit Breaker shall operate in conjunction with a suitable protection relay under transformer feeder/ circuit phase and earth fault conditions. In addition, the Circuit Breaker shall be provided with a motorized operating mechanism that can be remotely controlled by the SCADA.
- Low energy pulse operated Epoxy Molded Trip coil for the Circuit Breaker. The Trip coil / tripper design should be epoxy molded type to prevent ingress of dust, moisture etc. ensuring positive tripping & longer life.

Earthing of outgoing RMU from circuit breaker is achieved by use circuit breaker and in series with 2 position i.e. Service & Earthing off load isolator /selector switch. This ensures that the earthing facility has a full short circuit making capability

1.7.4 RMU Termination

- Bushings shall be conveniently located for working with the specified RMUs and shall allow for the termination of these RMUs in accordance with the prevailing practice and guidelines of RMU manufacturers.
- A non-Ferro-magnetic / metallic RMU clamp arrangement shall be provided for each RMU to be terminated in the RMU.
- A suitable arrangement for the Circuit Breakers, Earthing Switches, and Load Break Switches shall be provided so that these devices can be padlocked in the "Open" and "Closed" positions.
- A permanent "Live RMU" indication as per IEC 61958 shall be provided for each RMU using a capacitor voltage divider.

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- It shall be possible to test the core or sheath insulation of the RMUs without disconnecting the RMUs in the RMU compartment, after accessing the RMU compartment.
- RMU termination for isolators shall be on side & Rear of the RMU.

1.8 Safety of Equipment

- With respect to the RMU's SF6-filled equipment, any accidental overpressure inside the sealed chamber shall be limited by the opening of a pressure-limiting device in the enclosure so that the gas will be released away from the operator and to the rear top of the tank without endangering the operator or anyone else in the vicinity of the RMU.
- Designs with arc venting through rear bottom of the switchgear are not acceptable since it requires additional arc tunnel to be made extending the trench and making it non practical for outdoor installations.
- RMU shall be type tested in an accredited INDIAN or FOREIGN laboratory and designed for an Internal Arc for 21kA 1 sec.

1.9 Current Transformers

- 3 Nos. ring type, single core CTs shall be provided in each circuit breaker RMU compartment to mount a 3 Nos. single-core, ring type CT for protection purposes.
- The CTs shall conform to IS 2705. The design and construction shall be sufficiently robust to withstand thermal and dynamic stresses during short circuits. Secondary terminals of CTs shall be brought out suitably to a terminal block, which will be easily accessible for testing and terminal connections.
- Further characteristics and features distinguishing CTs used for metering from CTs used for protection are listed as follows:

CTs for Protection:

- Material : Epoxy resin cast/ Tape wound
- Burden : 2.5VA
- Ratio : 100-50/1 A
- Accuracy Class : 5P10

The RMU's other CTs / sensors, i.e., those used by Fault Passage Indicators (FPIs), shall be supplied by the FPI manufacturer. These CTs/sensors shall be an integral part of the FPI's design to ensure that they properly match the requirements of the FPI

1.10 Fault Passage Indicator for RMU

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- The FPI shall facilitate quick detection of faulty section of line. The fault indication may be on the basis of monitoring fault current flow through the device. The FPI should be self-powered and should have internal lithium battery for external indication and setting of FPI in the absence of current. The FPI shall be mandatorily mounted outside the RMU so that no opening of door is required to view the FPI during service condition.

The FPIs shall include:

- Fault detection - Phase to phase and Phase to earth faults.
- One potential-free output contacts for hardwiring to FRTUs. On this basis, the SCADA/DMS will be able to monitor phase / earth fault condition.
- Local fault indications - FPI front panel along with LED indication on front panel of RMU enclosure.

Multiple reset option –

- End of time delay (Adjustable from 2 to 16 Hrs)
- Remote reset (Via potential free input contact of FPI)
- Manual reset (Reset button on front panel of FPI)
- Phase fault thresholds configurable from at least 100 to 800 A
- Earth fault thresholds configurable from at least 20 to 200 A
- Multiple number of steps for adjusting phase and earth fault thresholds.
- Fault current duration range configurable from at least 40 ms to 100 ms in 20 ms steps and further 100 ms to 300 ms in 50 ms steps.
- Variations with respect to these characteristics may be acceptable as long as they prove appliRMU and provide the same or better flexibility.

1.11 Protection Relay

- The RMU shall be equipped with self-powered numerical relays (CommuniRMU relays shall be with auxiliary power which shall be given from battery but the tripping shall be self powered philosophy) communiRMU to trip the RMU circuit breakers.
- The Circuit Breaker in the RMU shall be fitted with a communiRMU-type, self-powered numerical relay, i.e., one for each outgoing circuit breaker. The protection relay's auxiliary contacts shall be provided for hardwiring to the FRTU. The relay shall also interface with future FRTU via an RS 232/485 port in order to send, as a minimum, real-time readings using the MODBUS protocol.

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- The numerical relay shall be self-powered and should provide Inverse Definite Minimum Time (IDMT) and Instantaneous protection characteristics. On this basis, the relay as a minimum shall provide:
 - Phase Overcurrent Protection (50/51)
 - Earth Fault Protection (50N/51N)
- The relay shall be provided with an input for remote tripping, which shall be realized via an electric output pulse even without presence of phase current. A flag indicator shall be installed for signaling the occurrence of trip conditions.

Features and Characteristics

The numerical relay shall have the following minimal features and characteristics noting that variations may be acceptable as long as they provide similar or better functionality and/or flexibility:

- It shall be housed in a flush mounting case and powered by the RMU power supply unit.
- It shall have three phase overcurrent elements and one earth fault element.
- IDMT trip current settings shall be 50-200% in steps of 1% for phase overcurrent and 10-80% in steps of 1% for earth fault.
- Instantaneous trip current settings shall be 100-3000% in steps of 100% for phase overcurrent and 100-1200% in steps of 100% for earth fault.
- Selectable IDMT curves shall be provided to include, for example, Normal Inverse, Very Inverse, Extreme Inverse, Long Time Inverse, and Definite Time. Separate curve settings for phase overcurrent and earth fault shall be supported.
- For IDMT delay multiplication, the Time Multiplier Setting (TMS) shall be adjustable from 0.01 to 0.1 in 0.01 steps.
- The relay shall also be provided with:
 - Alphanumeric Liquid Crystal Display (LCD) for relay setting.
 - Communications via a MODBUS RS232/RS485 port to provide the future FRTU (and hence the DMS) with phase current measurements. It is also desirable that this same means of communication can be used by the FRTU to send setting and control commands to the relay.
 - Parameter change capability that is password protected.

1.12 Enclosures

- All supplied enclosures shall be sized to provide convenient access to all enclosed components. It shall not be necessary to remove any component to gain access to another component for maintenance purposes or any other reason for e.g mimic removal for motorization.

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- Gas filling / Top up provision shall be provided outside the ring main unit without removal of mimic fascia, design with gas filling required after removing manometer value is not acceptable since the chances of gas leakage are more during refitting of the manometer.
- Constructed of GI of 2 mm thickness according to IEC 60529 with IP rating 54 or better. Must be grit/shot blasted, thermally sprayed with Zinc alloy, phosphate, and subsequently painted with polyurethane based powder paint, the overall paint layer thickness including Zinc spraying shall be of the order of 60 to 80 microns.
- Designs using CRCA for outdoor enclosures are not acceptable since the nature of installation requires high amount of corrosion protection.
- Door opening mechanism with built-in key-lock facility suitable for padlocking. An opening mechanism that is less prone to breaking than a projecting door handle is preferred, e.g., a push-button opening mechanism.
- A grounding terminal including grounding bolt and lock washer for connecting a 50 mm² copper or galvanized steel grounding conductor. The grounding bolt and lock washer shall be made of stainless steel.

1.13 Spares : If any maintenance spares is essential for operation and maintenance, the same shall be included in the scope of supply at no extra cost to the purchaser.

1.14. Completeness of supply : The equipment shall be supplied with all accessories required for installation & commissioning including foundation bolts, handles etc. for operation, 11KV boots for covering the terminals of incoming and outgoing RMUs, as required without any extra cost. **IN CASE, THE RMU TERMINAL BOX REQUIRES SPECIAL TERMINATION KIT FOR TERMINATION OF 11 KV RMUS, THE SAME SHALL BE INCLUDED IN THE SCOPE.**

2.0 Inspection and Test

- Inspections and tests shall be performed to ensure RMU compliance with these Technical Specifications. Responsibility for conducting the inspections and tests shall rest with the Supplier. The Utility representatives will participate in the RMU inspections and will witness the testing as described in the following sub-clauses.

2.1 Inspections

- Owner's representatives shall be allowed access to supplier's facility where the RMU or its parts are being produced or tested. Such access will be used to verify by inspection that the RMUs are being or have been fabricated and tested in accordance with the Technical Specifications.
- The supplier shall give the Owner's representatives 15 days notice in writing concerning the date and place at which the equipment will be ready for inspection or testing.

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- The supplier shall provide any and all documentation that is necessary to complete the inspections. The representatives shall be allowed to inspect the supplier's quality assurance standards, procedures, and records. Inspections, as a minimum, shall include checks on inventory, general appearance, cabling, drawing conformance, and labeling.

2.2 Test Procedures

- The supplier shall provide test plans and detailed procedures for all required testing. The plans and procedures shall ensure that each test is comprehensive and verifies proper performance of the RMU under test and, in this respect, shall be submitted for review and approval by the Utility.
- The test plans shall include all routine tests and acceptance tests as per relevant BIS/IEC standards and shall describe the overall test process including the responsibilities of the test personnel and how the test results will be documented.
- The test procedures shall describe the individual tests segments and the steps comprising each segment, particularly the methods and processes to be followed.

2.3 Test Reports

- The Tenderers should, along with the tender documents, submit copies of all Type test certificate valid for 5 years of their make in full shape as confirming to relevant IS/IEC of latest issue obtained from a International/National Govt. Lab/Recognized laboratory.
- The above type test certificates should accompany the drawings for the materials duly signed by the institution that has type test report.
- The supplier shall maintain complete records of all test results. The records shall be keyed to the test procedures.
- Upon completion of each test, the supplier shall submit a test report summarizing the tests performed and the results of the tests.

2.4 Factory Acceptance Test

- A formal factory acceptance test shall be conducted to ensure that the RMUs have been designed to meet the utility's functional requirements in all respects. Utility representatives shall witness the test on a representative RMU, and the test shall be carried out in accordance with the supplier's test plan and procedures as approved by the Utility. Should the factory acceptance test prove unsatisfactory in any way, the Utility reserves the right to have further tests conducted and, if appliRMU, request further improvements in the supplier's RMU design.

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2.5 Routine Factory Tests

- These tests shall be carried out during RMU manufacture as a quality control measure, i.e., to ensure each RMU to be delivered meets the Employer's minimum requirements including all relevant standards. Recording and reporting the routine test results shall be the responsibility of the Supplier.
- At the Utility's discretion, Utility representatives will witness such testing. This may include requesting the Supplier to perform tests on RMUs selected at random from each batch of RMUs that the Supplier deems ready to be delivered to site. Should any such test prove unsatisfactory, the Utility reserves the right to have further tests conducted and for delivery not to take place until a mutually agreed course of action has been reached.
- Further for additional reliability of the manufactured RMU it is mandatory to have the complete assembled tank tested for partial discharge

2.6 Operating Manuals

- The Supplier shall submit, operating manuals for all RMU components including items provided by the bidder. These manuals shall be in English. They shall include the RMU operating instructions. Context sensitivity shall be used to go directly to the appropriate place in the manual.
- The manuals shall be organized for quick access to each detailed description of the operator procedures that are required to interact with the RMU functions. This shall include the procedures to define, build, edit, and expand all data points provided with the RMU.
- The manuals shall present in a clear and concise manner all information that operators, including maintenance personnel, need to know to understand and operate RMUs satisfactorily. The manuals shall make abundant use of diagrams and/or photographs to illustrate the various procedures involved.

2.7 As-Built Documents and Drawings

The supplier shall submit as built documents including appliRMU drawings for review and approval. All deliverable documents and drawings shall be revised by the supplier to reflect the as- built RMU components including all the FPI, LLI & Relay. Any errors in or modifications to an RMU resulting from its factory and/or site acceptance test shall be incorporated. Within this same context, all previously submitted documents that are changed because of engineering changes, contract changes, errors, or omissions shall be resubmitted for review and approval. The successful bidder has to provide his quality document to Utility.

2.8 Type test:

Test certificates certified by NABL/central Govt. or any international recognized testing

laboratory as per IEC 62271-100/200 or relevant IS Standard with latest amendments. Following Test Certificates have to be submitted.

- Dielectric Withstand Test
- Short time withstand - STC withstand test
- Short circuit making breaking test.
- Mechanical endurance test
- Mechanical endurance test for isolator for 5000 operations & Circuit Breaker 2000 nos.
- Internal Arc test – IAC: AFLR 21kA 1 sec with top gas vent.
- Degree of protection test – IP67 test for tank and IP54 test for GI enclosure.

3.0 PACKING & FORWARDING:

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

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

Name of the consignee.

Details of consignment.

Destination.

Total weight of consignment.

Sign showing upper/lower side of the crate.

Handling and unpacking instructions.

Bill of material indicating contents of each package.

All the equipment covered in this specification shall be installed at site at the specified location. The equipment shall be suitably packed to avoid damages during transit in the case of indigenous supplies.

4.0 ON SITE TRAINING & SUPERVISION DURING INSTALLATION AND COMMISSIONING

The successful tenderer for switchgear shall provide operational training to the engineering/technical staff at site for operation, maintenance and troubleshooting. Besides, the company shall depute its engineer for supervision of installation & commissioning. All the services mentioned above (training and supervision of installation & commissioning) shall be provided by the company free of cost.

John

Price-Bid

NIT No- 05 of 2021-2022 Dtd. 08.03.2022

Sr. No.	Item Description	Unit	Basic Rate in Rs. (a)	GST IN % (b)	Total in Rs. (c=a+b)	Qty (d)	Amount in Rs. (e=c*d)
1	Design, manufacture, supply, delivery to site including cost of transportation, transit insurance and loading & unloading of 11kV, SF6, 3 Way Ring Main Unit, Outdoor and Non Extensible type having manually operated load break switch and vacuum circuit breaker (1 LBS+ 2VCB) with Numerical Relay. Approved Make: SCHNEIDER/ABB/SIEMENS	Set				1	

Date:
Place:

Signature:
Seal: