TRANSMISSION CORPORATION OF TELANGANA LIMITED

Website: www.tstransco.in. GST No. 36AAFCT0166J1Z9 CIN No. U40102TG2014SGC094248

From:
The Chief Engineer,
P&MM, TSTransco,
Vidyut Soudha,
HYDERABAD – 500 082.
Tel/Fax : 040-23303736

To
M/s. Siemens Limited,
E-76, MIDC, Waluj,
Aurangabad - 431 136
Maharashtra, India.
Tel/Fax: +91 22 39677500.

SAP PO.No.4500003030/web PO No.579-PMM/2021/CE(P&MM)/SE(P&MM)/DE41/ TSPMM41-07/2021/132KV CBs/D.No.55/2021, Dt: 16.06.2021.

Sirs,

Sub: Tender Specification No. TSPMM41-07/2021 – Supply of 47Nos. 132kV Circuit Breakers – Detailed Purchase Order – Issued – Regarding.

Ref:
1. Tender Specification No. TSPMM41-07/2021.
2. Your offer against Tender Specification No.TSPMM41-07/2021 on e - platform.
3. LOI No. CE(P&MM)/SE(P&MM)/DE41/TSPMM41-07/2021/132KV CBs/ D.No. 48/2021, Dt: 09.06.2021.
4. Your L.r No.SE GP T/ SF201710647/SK, Dated 10/06/2021.

* * *

I, acting for and on behalf of and by the order and direction of TRANSMISSION CORPORATION OF TELANGANA LIMITED, accept the prices offered by you against Tender Specification No. TSPMM41-07/2021**,** for supply of equipment detailed in clause (2) below, with the terms and conditions as per the Tender Specification No. TSPMM41-07/2021. This Purchase Order is issued as per your confirmation vide ref (4^{th}) cited, for the Letter of Intent issued vide ref (3^{rd}) cited.

1. Scope of Contract:

This contract relates to the supply of the equipment detailed in clause –2 below and covers design, manufacture, acceptance, testing, dispatch and delivery F.O.R. destination/Stores/site within State of Telangana as detailed in this purchase order.

2. Schedule of Equipment & Prices:

(a) Supply of 47Nos. 132kV Circuit Breakers conforming to latest IEC/IS, complete with Terminal Connectors suitable for single ACSR Moose conductor and as per Technical specification as per the price break-up indicated below:

All Financial Figures are in Rs.

Sl. No.	Description	132kV Circuit Breakers (HSN Code: 85352911)
1	Ex-Works	4,52,000.00
2	Packing & Forwarding	0.00
3	Freight	4,900.00
4	Insurance	149.00
5	Total Taxable Unit Rate	4,57,049.00
6	IGST @ 18% on Ex-Works+ Freight+Insurance	82,268.82
7	**Unit FADS Price including Taxes**	**5,39,317.82**
8	Quantity (Nos.)	47
9	**Total Amount**	**2,53,47,937.54**
10	SF6 gas 62kgs spare (i.e. 20% of the total SF6 gas requirement of all breakers) shall be supplied in separate cylinders, at free of cost.	**0.0**
Total Rupees Two Crores Fifty Three Lakhs Forty Seven Thousand Nine Hundred Thirty Seven and Paisa Fifty Four only		

(b) The equipment shall be supplied from your Aurangabad works. The prices of equipment accepted above are FIRM and FOR delivery destination stores/site.

(c) The dispatch of the equipment is by road only. The transit insurance shall include storage cover for 45 days at destination stores.

(d) The present rate of IGST is 18% on the total of Ex-works, Freight and Insurance.

(e) The TSTransco shall have the right to vary the ordered quantity by +/- 50% at any time during the execution of the order.

(f) The Price is inclusive of all incidental charges such as packing, forwarding, handling, unloading and other incidentals.

(g) TCS at prevailing rates is applicable on any payment made, if company's aggregate sales consideration during the relevant financial year exceeds Rs.50 Lakhs and total sales, gross receipts or total turnover including GST if any exceeds Rs.10 Crores in the financial year immediately preceding the financial year of subject sales.

The payment of TCS shall be subjected to furnishing of necessary documents. The stipulated conditions are to be verified by the DDOs while processing the bills.

The PAN No. of TS TRANSCO is AAFCT0166J.

3. Delivery: To supply

13Nos. in 3rd month from the date of Letter of Intent

13Nos. in 5th month from the date of Letter of Intent.

13Nos. in 7th month from the date of Letter of Intent.

8Nos. in 9th month from the date of Letter of Intent**.**

4. Performance Security:

Performance Security for 10% of the contract value i.e. for **Rs. 25,34,794**/- (Rupees Twenty Five Lakhs Thirty Four Thousand Seven Hundred and Ninety Four Only) with a validity 60 days beyond the date of completion of performance obligations including warranty obligations is to be furnished.

In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected/replaced material will be extended to a further period of 12 months and the Performance Bank Guarantee for proportionate value will be extended 60 days over and above the extended warranty period. It is entirely your responsibility to extend the validity of this Bank Guarantee to cover the period of guarantee well before its expiry.

5. Guaranteed Technical Particulars: The Guaranteed Technical Particulars are enclosed to this Purchase Order. The drawings shall be furnished immediately for approval.

6. Payment:

a) 100% payment will be arranged through PFC/REC/Bank/TSTransco funds within 45 days reckoned from the check measurement date in Form-13.

b) For Real Time Gross Settlement (RTGS) the details of your Bank Account are as follows:

(i)	Company Name	M/s. Siemens Ltd.,
(ii)	Name of the Bank	Deutsche Bank
(iii)	Branch Address	TRS, DB House, Hazarimal Somani Marg, Fort, Mumbai 400 001
(iv)	Branch Code	002
(v)	City	Mumbai
(vi)	Account No.	0000786000
(vii)	MICR Code	400200002
(viii)	IFSC Code	DEUT0784BBY
(ix)	PAN No.	AAACS0764L
(x)	GST No.	27AAACS0764L1Z6

c) Applicable transaction charges will be recovered from the bill amount for each disbursement on LOA raised by unit officers.

d) The 100% payment mentioned above is subject to submission of performance security by the supplier as per clause (4) above.

e) The performance guarantee to be executed in accordance with this specification will be furnished on a stamp paper of value Rs.100/- as per the format indicated in Form-4 of the specification. The Bank Guarantee will be extended if required suitably in accordance with the provisions of Performance Security Clause of the Specification.

f) If the supplier has received any over payments by oversight or if any amounts are due to the TSTransco due to any other reasons, when it is not possible to recover such amounts under the contract resulting out of this specification, TSTransco reserves the right to collect the same from any other amount due to the supplier and / or Bank Guarantees given by the company due to or with TSTransco.

g) When the supplier does not at any time, fulfill his obligations in replacing / rectifying etc. the damaged / defective materials in part or whole promptly to the satisfaction of the TSTransco Officers, TSTransco reserves the right not to accept the bills against subsequent dispatches made by the supplier and only the supplier will be responsible for any demurrages, wharfages or damage occurring to the consignments so dispatched.

h) Any incidental charge such as stamp duty, bank charges etc., shall be to the Supplier's account and any charges in relation there to shall not be included in the bills submitted to TSTransco.

i) All payments will be made in non-convertible Indian Rupees.

7. Responsibility of the supplier for Loss/Damage:

(a) The supplier is responsible for the safe delivery of the goods in good condition at the destination. He should acquaint himself of the conditions obtaining for handling and transport of the goods to destination and shall include and provide for security and protective packing of the goods so as to avoid damage in transit.

(b) External damages or shortages that are prima-facie the results of rough handling in transit or due to defective packing will be intimated within a fortnight of the receipt of the materials. Internal defects, damages or shortages of any internal parts which cannot ordinarily be detected on a superficial visual examination will be intimated subsequently.

In either case, the defective or damaged materials should be replaced by the supplier free of cost to the TSTransco. If no steps are taken within 15 days of receipt of intimation of defects or such other reasonable time as the TSTransco may deem proper to afford, TSTransco may without prejudice to its other rights and remedies cause to be repaired or rectified the defective material or replace the same and recover the expenditure incurred there for from the deposit such as Earnest Money, Security and Performance or other monies available with TSTransco or by resorting to legal action.

(c) For the purpose of any legal consideration, the material shall be deemed to pass into TSTransco's ownership only at the final destination where they are delivered and accepted.

8. Penalty for Late Delivery:

a) The delivery period as per agreed delivery schedule shall be deemed to be the essence of the contract. In case of delay in delivery of materials beyond the agreed delivery schedule or to perform the services within the period specified in the contract whatever be the reason the TSTransco may at its option, demand and recover from the supplier from the contract price, as liquidated damages, a sum equivalent to 0.5% per week on the undelivered portion subject to a maximum of 5% of total value of contract.

b) For penalty, the number of days of delay would be rounded off to the nearest week and penalty calculated accordingly.

c) Equipment which is not of acceptable quality (or) not confirming to specification would be deemed to be not delivered.

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

e) The check measurement date in Form-13 i.e., the date of receipt of equipment at the destination stores in good condition will be taken as date of delivery.

9. Force Majeure:

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

b) For the purpose of this clause 'Force Majeure' means an event beyond the control of the Supplier and not involving the Suppliers' fault or negligence and not foreseeable. Such events may include but are not restricted to wars or revolutions, fires, floods, epidemics, earth quakes, Tsunami, quarantine restrictions and freight embargoes.

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

10. Termination for Default:

(a) The Purchaser without prejudice to any other remedy for breach of Contract, by written notices of default sent to the Supplier, may terminate this Contract in whole or part :

i) If the Supplier fails to deliver any or all of the Materials/equipment within the period(s) specified in the Contract, or within any extension thereof granted by the Purchaser.

ii) If the Supplier fails to perform any other obligation(s) under the Contract.

iii) If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

(b) In the event the Purchaser terminates the Contract in whole or in part, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Materials/equipment or services similar to those undelivered and the Supplier will be liable to the Purchaser for any excess costs for such similar Materials/equipment or Services. However, the Supplier will continue performance of the Contract to the extent not terminated.

11. Termination for convenience:

(i) The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination will specify the termination is for the Purchaser's convenience, the extent to which performance of the supplier under the Contract is terminated, and date upon which termination becomes effective.

(ii) However the Materials / equipment that are complete and ready for shipment within thirty (30) days after the supplier's receipt of notice of termination will be accepted by the Purchaser at the Contract terms and prices.

12. Warranty:

The material shall be guaranteed for satisfactory performance for a period of 18 months from the date of receipt of material/equipment at TLC stores or at site in good condition against defects proved to be due to faulty design of material/ workmanship. If during this

period, any of the material is found defective they shall be repaired or replaced by you free of all costs to the TSTransco. To and fro freight charges shall also be to your account only.

13. Taxes:

Taxes as indicated in the price schedule at para (2) are applicable. You shall agree, that if, at any time, any GST reported to have been paid has not been paid, or a lesser amount has been paid, or on subsequent adjudication or appeal or revision it is decided that a lesser amount is payable, you shall refund such amounts irrespective of time lag.

14. Statutory Variations:

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

Statutory variation if any allowed, it is allowed only once during delivery period, i.e. at the time of delivery of goods at factory. In case of sub-vendor items, taxes & duties are inclusive in tender price and no statutory variation is applicable.

In cases where the bidder assumes less tax rates and become lowest, upward variation of taxes will not be considered. In case of the bought out items for which the prices are quoted all-inclusive of taxes, statutory variation shall not be applicable.

15. Dispatch Instructions:

The dispatch instructions for the equipment will be issued after inspection/satisfactory routine/acceptance tests results. The prices indicated in clause (2) above shall remain unaltered whatever be the destination.

16. Inspection:

After completion of manufacture of the equipment/ material, routine tests shall be performed as per relevant standards and requisite copies of test certificates shall be furnished to the purchaser. Various components of the equipment shall be routine tested in accordance with approved standards and manufacture standards.

As soon as the material/ equipment are ready the supplier will duly send intimation to TSTransco by post/fax and carry out the tests in the presence of the representative of TSTransco. The Supplier shall give at least 15 days advance intimation to enable the

Purchaser to depute his representative for witnessing acceptance and routine tests. All charges in connection with inspection shall be borne by the supplier.

The equipment should not be dispatched without final inspection of the tests, approval of test certificates and issue of specific dispatch instructions or specific waiver thereof from this office. The equipment shall reach the destination store/site within three weeks of issue of Dispatch Instructions.

17. Contract Drawings:

Approval by TSTransco to the supplier's drawings shall not relieve the supplier of his responsibility for correctness thereof or from results arising out of error or omission therein or from any obligation or liability under the contract. Any supplementary drawings necessary to permit the complete design of the installation prior to receiving the equipment shall also be supplied. Within two weeks of approval, six sets of all approved drawings and soft copy of drawings shall be furnished. One set of drawings and instruction manuals along with soft copy shall be sent along with each equipment at the time of dispatch. Copies of the drawings and manuals shall also be sent to other offices as indicated below.

Consignee	:	One set of approved drawings per consignee
Two Sets	:	Concerned Executive Engineer
To this office	:	Three sets.

18. Erection, Operation & Maintenance Manuals:

Erection, operation and maintenance manuals along with soft copy shall be supplied as per distributions given below giving detailed instructions with illustrations along with the equipment. They shall contain clear recommended schedule of maintenance for the guidance of the operating staff. Any items requiring the special attention of the operation engineer should be highlighted.

Consignee	:	One set per consignment
Concerned Executive Engineer	:	Two sets
To this office	:	One set

These shall be sent to the Divisional Engineers / Executive Engineers concerned.

19. Completeness of Contract:

All minor accessories that are normally necessary for satisfactory and efficient operation of the equipment shall be supplied by you free of cost to the TSTransco whether these are specifically mentioned or not in the specification, your tender schedules or in this purchase order and the equipment shall be complete in itself.

20. General Conditions of Contract:

Except in so far as it is provided otherwise in this contract, you shall abide by the terms and conditions appended to the specification. Except as specifically accepted in this order the terms and conditions mentioned in your quotation under reference are not accepted.

21. Risk:

The risk in the property is entirely yours till the goods are received in good condition at the destination.

22. Packing:

Each equipment shall be securely packed separately in such a manner as to withstand rough handling during rail and road transit upto site and as per latest IS/BSS/IEC.

23. Material & Workmanship:

All the materials shall be of the best class and shall be capable of satisfactory operation in the tropics under service conditions without distortion or deterioration. No welding or filling or plugging of defective parts shall be permitted, unless otherwise specified they shall conform to the requirement of the appropriate Indian, British or American standards (where a standard specification covering the material in question has not been published the standards of the American society for testing of materials should be followed).

The entire design and construction shall be capable of withstanding the several stresses likely to occur in actual services and of resisting rough handling during transport.

24. Insurance:

As insurance charges are included in your prices you should cover the equipment against transit risks and also for further period of 45 days towards storage from the date of receipt of equipment at site. It is entirely your responsibility for arranging the insurance through your underwriters. The damages and shortages will be intimated to you as stipulated in purchase order and you shall arrange for replacement/repairs immediately without awaiting settlement from insurance authorities.

Note: The material will not be taken into stock unless documentary evidence for Freight and Insurance is furnished along with material.

25. Interchangeability:

All similar equipment and removable parts of similar equipment shall be interchangeable with each other.

26. Spares:

You shall supply any spares required for the equipment that will be supplied under this order, whenever called upon to do so at fair prices and at the TSTransco's standard terms of payment within a period not exceeding the deliveries accepted therein.

27. Progress Reports:

You shall furnish the program of works and progress reports on the manufacture of equipment to this office every month in triplicate till the supplies are completed.

28. Correspondence:

a) Your acknowledgement of this order and all correspondence of general or technical nature shall be addressed to the Chief Engineer/P&MM, TSTransco, Vidyut Soudha, Hyderabad –500 082.

b) All correspondence regarding dispatches, payments and any other field matters shall be addressed to the concerned paying officer. Copies of such correspondence shall be marked to the concerned Superintending Engineer and to the Chief Engineer/P&MM, TSTransco, Vidyut Soudha, Hyderabad –500 082. Copies of the correspondence regarding payments should also be marked to the Executive Director/Finance, TSTransco, Vidyut Soudha, Hyderabad –500 082.

c) You shall submit invoices for materials directly to the paying officer.

29. Jurisdiction:

All and any disputes or differences arising out of or touching this order shall be decided only by courts or tribunals situated in Hyderabad or Secunderabad cities. No suit or other legal proceedings shall be instituted elsewhere.

30. Supervision of erection, testing and commissioning:

You have to provide services of qualified personnel for supervision of erection, testing at site and commissioning of the equipment wherever required. The above services, if requested for, should be provided at free of Cost.

31. Guarantee for Interrupter:

You shall give a special guarantee for interrupter for 5 years from the date of supply or commissioning whichever is later. Free replacement, if fails during five years period.

32. Acknowledgement:

Please acknowledge the receipt of this purchase order with your confirmation of its acceptance by you and the extra copy enclosed may please be returned with your signature in token of your acceptance.

Encl: GTP.

Yours faithfully,

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

WE ACCEPT THE TERMS AND CONDITIONS OF THIS PURCHASE ORDER

SIGNATURE OF THE CONTRACTOR
WITH SEAL AND DATE

Copies to:
The Chief Engineer/Transmission/TSTransco/Vidyut Soudha/Hyderabad.*
The Superintending Engineer/Transmission/TSTransco/Vidyut Soudha/Hyderabad.
The Superintending Engineer/OMC/Metro-Central/TSTransco/2nd Floor,132kV NIMS GIS SS premises/Erramanzil/Panjagutta/Hyderabad -82
The Executive Director/Finance/TSTransco/Vidyut Soudha/Hyderabad.
The Superintending Engineer/QC/TSTransco/Vidyut Soudha/Hyderabad
The SAO/Pay & accounts/TSTransco/Vidyut Soudha/Hyderabad along with Form-40.
The SAO/Metro-Central/TSTransco/2nd Floor, 132kV NIMS GIS SS premises/ Erramanzil/ Panjagutta/Hyderabad -82.
The Divisional Engineer/Transmission & Stores/Metro/Erragadda/ Hyderabad, 500 045.
The AEE/Construction Stores/TSTransco/Erragadda/Hyderabad.
This order is placed against the indents indicated below:

Sl. No.	Indent Reference	Qty (Nos.)	Required for
1	U.O. No. CE(Tr)/SE(Tr)/DE-SS/ADE-2/F.TR.SS.A2.199/20/ D.No.644/20, dt:08.02.2021	01	Augmentation works at 132kV SS Mylardevpally.
2	U.O. No. CE(Tr)/SE(Tr)/DE-SS/ADE-2/F.1759/2020/D.No. 345/ 20, dt:14.10.2020	04	Augmentation works at 132kV SS Dharmaram, 132kV SS Purdur, 132kV SS Kathalapur & 132kV SS Chippalapally.
3	U.O. No. CE(Tr)/SE(Tr)/DE-SS/ADE-2/F.TR.SS.A2-2174/ 2019/D.No.173/20, dt:30.06.2020	01	Augmentation works at 400kV SS Narsapur.
4	U.O. No. CE(Tr)/SE(Tr)/DE-SS/ADE-2/F.TR.SS.A2-2174/ 2019/D.No.157/20, dt:23.06.2020	02	Augmentation works at 220kV SS Manthani &132kV SS Kataram.
5	U.O. No. CE(Tr)/SE(Tr)/DE-SS/ADE-2/F.TR.SS.A2.6884/ 19/D.No.11/20, dt:06.04.2020	01	Augmentation works at 132kV SS Thirumalaipally / 132kV SS Geesukonda.
6	UO No. CE (Tr.)/SE (Tr.)/DE-SS/ADE-2/D.No.469/19, Dt: 09.07.2019.	01	Augmentation works at 220kV SS Gachibowli.
7	UO No. CE (Tr.)/SE (Tr.)/DE-SS/A-4/F.2556/19/ABT Metering OCM/ D.No.790/19, Dt: 26.11.2019.	04	DC-Works at 132kV SS OCM(2 Nos.), 132kV SS Mandamarry (2 No.)
8	UO No. CE (Tr.)/SE (Tr.)/DE-SS/ADE-1/F.RMI 20-21/ D.No.282/20, Dt: 21.09.2020	33	RMI 2020-21
	Total	47	

Annexure

GUARANTEED TECHNICAL PARTICULARS of 132kV Circuit Breakers

Sl. No.	Description	M/s. Siemens Ltd.
1	a) Maker's name country of manufacture.	Siemens Ltd., India
	b)Manufacturer's type designation.	3AP1-FG
2	Applicable Technical Standards	IEC 62271-100
3	a) Rated voltage (kV)	145
	b) Rated Frequency (Hz)	50
4	Number of Poles	3
5	Class (C1/M1, C2/M2)	C2 & M2
6	Rated normal current:	
	a) Under site conditions (Amps)	1600A
	b) Rated (Amps)	1600A
7	Rated short circuit breaking current:	
	a) R.M.S. value of AC. component of rated short circuit current (kA)	31.5
	b)Percentage DC component	43%
	c) Asymmetrical breaking current (including DC component)	46.8kA
	d) Certificate or report no.	19271 Bs-0
	e) Oscillogram No.	19271 Bs-0
8	Rated short circuit making current (kA)	78.75kA
9	First Pole to clear factor	1.5
10	Rated transient recovery voltage for terminal faults (kV peak) i. at 100% ii. at 60% iii. at 30% iv. at 10%	 249 kVp 266 kVp 273 kVp 272 kVp
11	Rated characteristics for short line faults.	L75: 30kA/ TRV 154kVp (source side) 47.4kVp (line side) L90: 36kA/ TRV 161kVp (source side) 18.9kVp (line side)
12	Rated operating sequence.	O-0.3sec - CO -3min-CO
13	Rated duration of short circuit (sec.)	3 sec
14	Rated out of phase breaking current (kA)	7.875
15	Opening time (ms)	28+/-8
16	Arcing time (ms)	
	a) At 10% rated breaking current	<21ms
	b) At 25% rated breaking current	
	c) At 50% rated breaking current	
	d) At 100% rated breaking current	

Sl. No.	Description	M/s. Siemens Ltd.
	e) Maximum Arcing time at lowest fault currents	
17	Break time (ms)	
	a) At 10% rated breaking current	<60ms at rated control voltage
	b) At 25% rated breaking current	
	c) At 50% rated breaking current	
	d) At 100% rated breaking current	
	e) Maximum break time at lowest fault current	
18	Closing time (ms)	<80 ms at rated control voltage
19	Maximum Pole discrepancy time:	
	a) Opening (ms)	≤= 5 @ 50Hz
	b) Closing (ms)	≤= 3.3 @50Hz
20	Rated line charging breaking current (kA)	50A
21	Maximum cable charging current	
	a) On supply side	160A
	b) On line side	
22	Rated small inductive breaking current (kA)	0.5 to 20A
23	Max. rise of temperature over ambient temperature for current rating under clause 6.	39.9 deg (Within the specified limits of IEC 62271-1 Table 14)
24	Interrupting capacity based on duty cycle as per clause 11.	
	a) AC Component (kA)	31.5kA
	b) Percentage DC Component	43% at 50Hz
25	Latching current (kA)	78.75
26	No of breaks in series per pole	One
27	Length of contact travel (mm)	120
28	Total length of break per pole (mm)	-
29	Rate of contact travel :	
	a) At tripping (meters/sec.)	2.3 ± 0.4(degree / m sec) or 4.6 +/- 0.8m/s
	b) At closing (meters/sec.)	1.8 ± 0.3 (degree / m sec) or 3.6 +/- 0.6m/s
30	Type of devices, if any, used to obtain uniform voltage distribution between breaks	NA
31	Recovery voltage distribution between breaks in percent of rated voltage:	NA
	a) Single line to ground fault	
	b) Interruption of short lines	
	c) Switching off an unloaded Transformers	
32	Type of main contact	Multilam, heat cylinder, Contact
33	Type of arcing-contacts and/or arc control device	Pin and contact finger
34	Material of contacts	
	a) Main	Main contact - Multiam-St.

Sl. No.	Description	M/s. Siemens Ltd.
	b) Arcing	strip with Cu louvers, Heat Cylinder - Al Silver plated, Contact fingers - Cu silver plated, contact Finger(Tulip) - Cu tungsten
	c) Auxiliary	
35	Whether contacts are silver plated	Yes, main contacts
36	Thickness of silver coating (mm)	Adequate to maintan the temperature rise within the limits of IEC
37	Contact pressure (kg/sq. mm.)	As per design requirement
38	Insulation level of the breaker :	
	a) 1 minute power frequency withstand voltage (kV rms)	275
	b) Switching surge withstand test voltage (kV peak)	NA
	c) Impulse withstand test voltage (kV peak)	+/-650
	d) Max. dynamic p.f. over voltage withstand (kV peak)	As per IEC
39	Minimum clearance in Air (mm)	
	a) Between Phases (live parts)	1385mm (Min in air)
	b) Between live parts and earth	1250mm Live part to Earth Potential
	c) Centre to centre distance between phases	1700mm
	d) The safety boundaries during a breaking operation for circuit breakers with an external exhaust for ionized gases or flames	Within limits
40	Whether the circuit breaker is suitable for fixed trip operation or trip free operation and whether it is provided with a lock-out device preventing closing of the breaker	Trip free
41	Method of closing	
	a) Normal	Electrical / Mechanical
	b) Emergency	Mechanical
42	Type of closing mechanism	Spring
43	a) Normal voltage of closing	110V or 220V DC
	b) Pick up range, (volts)	85-110%
	c) Power at normal voltage of closing mechanism, (watts)	Max 330W
	d) Power at 85% of normal voltage, (watts)	Max 272W
45	Type of tripping mechanism	Spring
46	Normal voltage of tripping coils, (volts)	110V or 220V DC
47	a) Power at normal voltage for tripping coils, (watts)	Max 330W
	b) Power at 70% normal voltage for tripping coils, (watts)	Max 224W
48	Arc duration at 100% (ms) Interruption capacity:	
	a) Opening Arcing time No. of loops and time including resistor current duration (cycle)	Max 21 msec
	Resistor current duration, (cycle)	Not applicable
	Total length of the arc, (mm)	77 mm

Sl. No.	Description	M/s. Siemens Ltd.
	Max. length of the arc, (mm)	77 mm
	Total interrupting time measured from instant of trip coil energisation to arc extinction of resistor current (cycles).	Max 60 msec Break time
	b) Closing time measured from instant of application of power to closing device up to arcing contacts touching, (cycles).	Less than 80 ms at rated control voltage
49	Critical current (current giving the longest arc when a break takes place) (kA)	31.5kA
50	a) Recovery voltage when circuit breaker tested at 100% rated breaking capacity, (kV inst.)	249kVp
	b) Rate of rise of re-striking voltage at breaking	
	i) for 30% breaking capacity, (kV/Micro. sec.)	5 kV/micro sec
	ii) for 100% breaking capacity, (kV/Micro. sec.)	2 kV / micro sec
	c) Maximum over voltage factor of the circuit breaker when switching off.	
	i) Unloaded transformers.	<2.5 p.u.
	ii) Loaded transformer	<2.5 p.u.
	iii) Open circuited lines	<2.5 p.u.
51	When switching of synchronous systems:	
	a) Max. current (kA)	7.875kA
52	No. of openings the circuit breaker is capable of performing without inspection, replacement of contacts or other main parts.	
	a) at 50% rated current	upto 6000 nos.
	b) at 100% rated current	upto 6000 nos.
	c) at current corresponding to 50% rated breaking capacity	80 nos. @ 50% of 31.5kA
	d) at current corresponding to 100% rated breaking capacity	18 nos. @ 31.5kA
53	a) Weight of complete circuit breaker (kg.)	1300kg (approx) (without structure)
	b) Impact loading for foundation design, to include deed load plus impact value on opening at maximum interrupting ratings, in terms of equivalent static load, (kg.)	In vertical direction 15kN(Up)/- 20kN (down) per pillar
	c) Overall dimensions:	
	Height (mm)	Approx 6021 mm
	Width (mm)	-
	Length (mm)	Approx 3800 mm
54	Porcelain:	
	a) Make	ABIL/MODERN/WSI/ IEC/Prathamesh/Fushun Hi-tech/Equivalent
	b) Type	Hollow porcelain
	c) Descriptive pamphlet No.	
	d) Weight (kg.)	Part of breaker

Sl. No.	Description	M/s. Siemens Ltd.
	e) Transport dimensions (mm)	Chamber:1400x325x325 Support: 1500x400x400
	f) Height above floor required to remove porcelain, (mm)	3000mm
	g) Insulation class	C-120
	h) One minute dry power frequency withstand, kV (r.m.s.)	275kV rms
	i) One minute wet power frequency withstand, kV (r.m.s)	275kV rms
	j) Flash over voltage (kV)	In line with CB
	k) Full wave impulse withstand voltage kV(peak)	650kVp
	l) Switching surge withstand voltage kV (peak)	NA
	m) Corona discharge voltage, (kV r.m.s.)	<=92kV
	n) Nature of the dielectric	SF6 Gas
	o) Creepage distance total protected (mm)	25 mm/kV (3625 mm)
	p) Volume of insulating medium per porcelain, (liters)	SF6 Gas, 6.6 kg/CB
	q) Permissible safe cantilever loading on installed porcelain (kgm)	1702
55	Operating mechanism :	
	Mechanically operated or pneumatically or hydraulically operated.	Spring - Spring
	For stored energy mechanism :	Spring
	1. Spring charging motor	
	i) Rating kW	500W
	ii) Voltage V	220 V DC
	iii) Power frequency withstand voltage kV.	2kV for 1 minute
	iv) Time required for the motor to charge the spring fully (secs.)	15 sec max
	v) Power required at the normal control voltage to charge the spring - Watts.	365W approx.
	vi) Specification reference.	IS 996.
	2.Spring closing/opening	
	i) Number of springs	Closing-1; Opening-2
	ii) Type	Compression
	iii) Number of turns	Less than 10
	iv) Guage	Less than 30mm
	v) External diameter mm.	Less than 180mm
	vi) Stiffness	Proprietary information
	vii) Material	Spring steel
	viii) Force developed in full charged position.	Proprietary information
	ix) Specification reference.	DIN 2096
56	Rated pressure of SF_6 gas in the circuit breaker (kg/sq.cm)	6.11 kg/cm sq@ 20 deg.C
57	Rated pressure of SF_6 gas in the gas cylinders (kg./sq.cm.)	>25
58	Quantity of SF_6 gas required per single pole unit (kg.) (3 pole unit for 145 kV)	2.2
59	Quantity of SF_6 gas per cylinder (kg.)	9
60	Weight of empty cylinder (kg.)	As per std. cylinder available

Sl. No.	Description	M/s. Siemens Ltd.
61	Quantity of absorbent required per pole (grams.)	0.5
62	Recommended interval for renewal of absorbent in case of outdoor circuit breakers operating in tropical conditions.	Up to 6000
63	Chemical composition of absorbent	MOS 13X
64	Quantity of absorbent covered in the scope of supply (including spare quantity) (kg.)	Part of breaker
65	Limits of gas pressure for pressure operation of circuit breaker (kg./sq.cm.)	>=5.3 kg/sq.com @20degC
66	Pressure and temperature at which the temperature compensated gas pressure switch	
	a) alarm (kg./sq.cm., ^{o} C)	<=5.3kG/Sq.cm @ 20degC
	b) Cut off (kg/sq.cm. ^{o} C)	<=5.09kG/Sq.cm @ 20degC
67	Name of SF6 supplier and country of origin	Solvay Fluor, Honey Well, Stallion Enterprise, KPL international, Bagamati Oxygen, Equivalent
68	Quantity of SF6 gas supplied for	
	a) Actual use in breakers (kg.)	6.6kg
	b) As spare (kg.)	20% of actual qty
69	Chemical composition of gas:	
	a) Qty. of air by weight (ppm)	<=150ppm
	b)Qty. of H20 by weight (ppm)	<=0.65ppm
	c)Qty. of CF4 by weight (ppm)	<=50ppm
	d) Qty. of free acid by weight (ppm)	<=0.3ppm
70	No. of auxiliary contacts provided	
	a) Those close when breaker is closed.	20
	b) Those open when breaker is closed.	19
	c) Those adjustable with respect to the position of main contacts.	Auxiliary switch is rotary type and all above contacts are pre-adjusted in the factory.
	d) Continuous rating of contacts.	10A
	e) Breaking capacity of contacts.	220V DC- 2.5A(Resistive load) & 2.0A (Resistive-Inductive load); 110V DC - 5.0 A (Resistive load) & 4.0 A (Resistive-Inductive load)
71	Whether the equipment covered by this Bid have been fully type tested and if so, whether the copies of the type test cert. enclosed to the bid offer.	Yes

SD/-

Chief Engineer/P&MM