TECHNICAL SPECIFICATION FOR 33KV OUTDOOR TYPE VACUUM CIRCUIT BREAKER

1 . SCOPE :

This Specifications intended to cover the design, manufacture, assembly and Testing at manufacturer‟s works of 33 KV, 3 Ph., 50 C/S, 1250A, 25KA, Outdoor Type Porcelain Clad, Vacuum Circuit Breaker for efficient and trouble-free operation as specified hereunder.

The Circuit Breakers are required complete with structures, operating mechanism and all associated accessories and auxiliaries.

2 . STANDARDS :

The Vacuum Circuit Breaker and accessories covered by this specification shall comply with the requirement of the latest edition of the following standards unless otherwise stated in this Specification.

IS / IEC	Title
IEC : 62271-100/200	: Specification for HV Switchgear and Controlgear
IS : 13118	: Specification for HV AC Circuit Breaker
IS : 2099	: Specification for HV porcelain bushings.
IS : 5621	: Specification for porcelain hollow insulator.
IS : 8603	: Specification for Dimension for Porcelain Transformer Bushing for use in heavily polluted area.
IS : 3347	: Specification for Dimension for Porcelain Transformer Bushing for use in normal and lightly polluted area.
IS : 2633	: Specification for method for testing uniformity of coating On Zinc coated articles.
IS : 5561	: Specification for Electrical Power Connectors
IS : 2147	: Specification for Degree of Protection

Equipments meeting the requirement of any other authoritative standards other than ISS which ensure equal or better quality shall also be acceptable. The salient points of difference between the standard opted and the ISS standard given shall be brought out in the tender along with a copy of relevant portions of the said standard.

3 . DEVIATION :

Normally the offer should be as per Technical Specification without any deviation. But any deviation felt necessary to improve performance, efficiency and utility of Equipment must be mentioned in the Deviation Schedule with reasons of such deviation. Such deviation suggested may not be accepted. Deviations not mentioned in Deviation Schedule will never be considered.

4 . GENERAL CLIMATIC AND ISOCERAUNIC CONDITION OF SITE :

The climatic and isoceraunic conditions at site are given below :

(a)	Max. Ambient temp	: 45 ^{0}C
(b)	Minimum ambient temp.	: 4 ^{0}C
(c)	Maximum relative humidity	: 100%
(d)	Average number of thunderstorm day per annum.	: 75
(e)	Max. No. of rainy days/annum	: 120 days

(f) Average Rainfall : 1000 mm. to 3000 mm.
(g) Max. Wind pressure/wind speed : 150 Kg. Per Mtr. sq
(h) Height above sea level (m)not exceeding : 1000
(i) Earthquake acceleration horizontal seismic co-efficient : As per IS:1893(1984) For Class-III & IV Zones.

The Equipment offered shall be suitable for heavily polluted atmosphere.

The Equipment to be furnished under this Specification shall be packed for shipment so as to meet the weight and space limitations of transport facilities, specifically along with Rail, Road, right of way.

The Equipment covered by this Specification shall be complete in all respects. Any material or accessory which may not have been specifically mentioned, but is essential or necessary for satisfactory and trouble free operation and maintenance of the Equipment shall be furnished without any extra charge to the purchaser.

The Equipment shall be supplied with all accessories listed in this Specification with such modifications and alternations as to safeguard the Technical requirements.

5 . <u>DESIGN CRITERIA</u> :

5.1 The Equipment will be used in non effectively neutral grounded System with fault level of 20 KA at highest system voltage of 36 KV.

5.2 Continuous current rating shall be 1250 Amp. Maximum temperature attained by any part of the Equipment at specified rating should not exceed the permissible limit as stipulate in the relevant standards. Equipment shall be designed taking 40 ^{0}C as maximum ambient temperature.

5.3 The circuit breakers and their components shall be capable of withstanding the mechanical forces and thermal stresses of the short circuit current of the system without any damage or deterioration of material.

5.4 The circuit breakers shall have motor wound spring charged trip free mechanism with antipumping feature, and shunt trip. In addition, facility for manual charging of spring, shall be provided.

5.5 Each breaker shall be provided with manual close & open facility, mechanical ON-OFF indication, an operation counter and Spring charge/discharge indicator.

5.6 For motor wound mechanism, spring charging shall take place automatically after each breaker closing operation. One open-close-open operation of the circuit breaker shall be possible after failure of power supply to the motor. A visual mechanical indicating device will also be provided to show the position of the spring.

5.7 All controls shall be suitable for 85%, to 110% for closing & 70% to 110% for tripping of 30V D.C. The A.C. supply shall be available 400 Volt +/- 10%, 50 Hz. 3 phase 4 wire system.

5.8 The operating duty of the Breaker will be 0-0.3 sec-CO-3 min-CO.

5.9 There shall be no radio interference when the Equipment is operated up to maximum service voltage.

5.10 The minimum safe clearance of all live parts of the Equipment shall be as per relevant

standards. Clearances of 33 KV Low Level bus of our switchyard are :

a) Phase to Phase : 1200 mm
b) Bus to ground level of supporting structure : 4000 mm
Please note that usually our plinth height is 300 mm.

5.11 All electrical and mechanical interlocks which are necessary for safe and satisfactory operation of the Breaker shall be furnished. The interlocking device shall be of proven quality.

5.12 The condition of Breaker and its contacts shall be intact even under conditions of phase opposition that may arise due to faulty synchronisation or otherwise. Bidders should confirm in this regards.

5.13 The Breaker shall be capable of smooth and rapid interruption of current under all conditions, completely suppressing the undesirable phenomenon even under the most severe and persistent rated short circuit conditions. There will be no abnormal voltage rise subsequent to the switching ON/OFF a capacitor bank within the rated capacity.
The total make and break time (in m sec/cycle) for the breaker throughout the range of their operating duty shall be indicated and guaranteed.

5.14 The breaker shall be suitable for interrupting low inductive currents without generation of abnormal over voltage.

5.15 The breaker shall be capable of interrupting rated breaking current with recovery voltage equal to maximum line Service Voltage and at all inductive power factor of the Circuit equal to or exceeding 0.15.

5.16 The Circuit Breaker shall be capable to withstand power frequency over Voltage 70 KV for 1 minute.

5.17 The tenderer may indicate in his offer the methods adopted for limiting over voltage.

5.18 The Circuit Breaker with its galvanized steel structure shall be suitable for mounting on concrete foundation. The height of the supporting structure will be such that it will be able to maintain clearance as indicated in clause 5.10 above.

5.19 The detail of steel structure, foundation design and erection drawing shall be given. In GA/Structure drawing please indicate the location of CB., point of application of dynamic load and its amplitude, dead load etc.

6.0 CONSTRUCTION :

Each vacuum Circuit breaker shall comprise of three identical poles linked together electrically and mechanically for synchronous operation.

Vacuum Interrupter

The vacuum interrupter, consisting of fixed contact and moving contact, shall be interchangeable among the same type interrupter. Short circuit capacity of vacuum bottle should be 25 KA and design life should be 100 nos. operation at rated short circuit level i.e. at 25 KA.

6.1 Constructional features of the vacuum chamber along with its functional arrangements are to be shown in a drawing submitted along with tender documents.

6.2 The gap between contacts of the Circuit Breaker inside interrupter should be capable of withstanding 1.5 time voltage to neutral at one atmospheric pressure at normal ambient condition within Breaker in the event of vacuum pressure drop due to leakage.

7 .0 MAIN CONTACTS :

7.1 In vacuum interrupter the contact configuration, contact area, contact pressure will be sufficient for carrying rated current and short time rates current, without any abnormal phenomena.

7.2 Complete details of main contacts shall be furnished. The material of contacts and coating of the contacts shall be suitable for vacuum Breaker technology. Evaporation of metal during arcing and deposition of the same in the inner surface of vacuum interrupter should be restricted by adopting suitable material. Tenderer shall furnish the justification of using the materials for contacts.

7.3 Complete details of main contacts and arc quenching device, if any with sectional drawings shall be furnished at the time of offer. Measures taken to free the contacts from vibration during closing shall be clearly explained in the drawing, support by tests results.

7.4 The contact erosion should be limited upto 3 mm for useful life.

7.5 The vacuum pressure within interrupter shall be adequate to interrupt the fault current. Precaution shall be taken so that there will be no flush over on outside of the vacuum interrupter inside the porcelain insulator.

7.6 Design of the vacuum bottle and its insulator encasing should be suitable for outdoor use, taking care of required creepage distance considering possibility of moisture condensation if any, in the annular space between the vacuum bottle and insulator enclosure.

7.7 Type test with similar bottle with similar encasing arrangement shall be done and accordingly Report shall be submitted along with tender document.

vacuum bottle with its insulator encasing chamber shall be hermetically sealed. Free passage of air in the chamber with or without provision of circulation of hot air is not accepted.

Tripping/Closing Coil burden of Equipment should not be more than 250 watts at 30 V D.C. Electrical Tripping Scheme to be designed considering two nos Trip Coil.

8.0 OPERATING MECHANISM :

8.1 The operating mechanism shall be suitable for rapid closing and tripping. The opening and closing energy shall be obtained from spring charge mechanism. The spring charging may be done by either motor operation with facility for manual charging when required or by other suitable trouble free mechanism. Local arrangement for operating breakers both electrically and mechanically shall be provided in addition to remote operation.

8.2 The mechanism shall have anti pumping circuitry and will be trip free electrically and mechanically. The antipumping arrangement shall be initiated through normally „NO" type, direct auxiliary contact of circuit breaker and shall be of self hold type. Plug-in type relay/Contactor for Antipumping Relay will not be acceptable.

8.3 Spring operated mechanism will be complete with opening spring, closing spring, limit switch and all necessary accessories to make the mechanism a complete operating unit.

8.4 Contactor used for antipumping relay shall be of reputed make.

8.5 There shall be mechanical ON/OFF indicator, spring charge/discharge indication and operation counter for each Breaker and also provision for remote indication.

8. 6 The operating mechanism box shall be fixed at a working height from ground level. View glass shall be provided on hinged door at the front side.

8.7 Spring charging LS shall have sufficient no. of spare contact.

9.0 COMMON CONTROL CUBICLE :

A free standing outdoor type weather proof, dust and vermin proof cubicle shall be provided to house the operating mechanism and all other accessories except those which must be located in the pole box.

9.1 The cubicle shall be of 3.00 mm thick sheet steel and shall have hinged doors at front and rear for access to the mechanism. Doors should be of proper design for smooth opening and closing with pad locking arrangement.

9.2 A removable gland plate of 3 mm thickness shall be provided at the bottom of the cubicles for purchasers Cable entry. Glands of sizes suitable for entry of 1 no. 12 core, 2 nos. 8 core and 2 nos. 4 core Cables for Control etc.

9 . 3 Terminal blocks for AC & DC shall be kept separate. Terminals shall be suitable for at least 2X 2.5 sq.mm copper leads. All wiring shall be of 1100 V grade PVC.

9.4 Thermostat controlled heaters shall be provided to prevent condensation within cubicle. Cubicle illumination Lamp with switch and a 230 V., 15A, 3 pin socket with a Control Switch shall be provided.

All controls, alarms, indications and interlocking devices furnished with breaker shall be wired up to the terminal Black in the common control cubicle. Not more than two wires shall be connected to one terminal.

All wires shall be identified at both ends with same ferrule marking in accordance with approved wiring diagram.

Terminal blocks shall have compression type multi-way terminals with bonding screws and washers. At least 15% spare terminal shall be provided.

Scheme diagram on a durable sticker shall be fixed on inside door of Control Cubicle.

10.0 INSULATORS :

Porcelain supports, interrupter housing of adequate mechanical and dielectric strength with suitable creepage distance shall have to be used. All Support/Interrupter Housing of identical ratings shall be interchangeable. Each Interrupter-Housing shall be provided with terminal stud/pad.

The porcelain used in interrupter housing shall be made from wet process and shall be homogeneous, free from laminations, caustics and other flaws which may impair its mechanical or dielectric strength and shall be glossy, tough and impervious to moisture.

The porcelain supports, interrupter –housing insulation shall be coordinated with that of Circuit Breaker. The puncture strength of the bushings shall be greater than the dry flashover value.

When operating at rated voltage, there shall not be any electrical discharge between live terminal and earth. No Radio disturbance shall be caused by the support insulators when operating up to the maximum System Voltage. It shall also be free from corona.

All iron parts shall be hot dip galvanised. The nuts, bolts, washers etc. shall also be hot dip galvanised steel or stainless steel.

Each Circuit Breaker shall be provided with Bi-metallic terminal stud/pad suitable for connection of pipe bus/ACSR Conductor.

11.0 AUXILIARY CONTACTS :

a) Breaker shall be provided with 6 NO & 6 NC spare auxiliary contacts in addition to the auxiliary contacts required for Breaker's own operational requirements. Contact Multipliers has to be provided if required.

b) These contacts shall have continuous current rating of at least 10A. The breaking capacity shall be adequate for the circuits controlled, or at least 12A at 30 V DC with a circuit time constant of minimum 20 ms.

c) All these contacts shall be wired up to terminal block in the control cubicle. Auxiliary

contacts which are to be installed on the frame of Circuit Breaker shall be suitably protected against accidental arcing from main circuit. Insulating materials of contacts shall be ceramics or other non-tracking materials.

12.0 GROUNDING :

Circuit Breaker shall be provided with two grounding pads with 2 nos. tapped holes for M10 bolts and spring washers for connection of purchasers grounding conductor (50x6 mm G.I. strips).

13.0 PAINTING :

External surfaces shall be given a coat of high quality red oxide or other suitable primer and shall be finished with two coats of synthetic enamel paints of shade 631 of I.S.S. Such painting should be able to withstand tropical climate as stipulated in Sl.No.4 of this Specification.

14.0 EQUIPMENT FOUNDATION AND STEEL STRUCTURE :

a) The Circuit breaker etc. shall be furnished complete with base frame, anchor/foundation bolts and hardware. Details structure assembly drawing, mentioning part no. of each member and also indicating cross sectional area of member used with supporting calculations. The point of C.B., dynamic load and its amplitude, dead load etc. shall be mentioned.

b) To enable the purchaser to proceed with design of Equipment foundation, the successful tenderers shall furnish necessary foundation/anchor details with designed loads within 30 (thirty) days from the date of issue of letter of intent/purchase order.

c) Similar grounding pad as mentioned against Sl.No.9 are also to be provided.

TENDER DRAWING, MANUALS AND TYPE TEST CERTIFICATES :

The following drawings and manuals shall be furnished for information purpose with each copy of the tender.

General Arrangement Drawings indicating all dimensions, electrical clearness and distance of each piece of Equipment showing constructional features and dispositions of various fittings and accessories and also static dead load at point of application.

Technical leaflets/manuals on each piece of Equipment explaining the function of various parts, principle of operation and special features. Technical leaflets/manuals for offered type of vacuum bottle etc.

Type Test Certificates as per IEC/relevant IS carried out on Similar Breaker from reputed/recognised laboratory shall be furnished.

CONTRACT DRAWING AND CATALOGUE :

After placement of order, six (6) copies of various drawings data and manuals as mentioned below shall be submitted to the Chief Engineer, P & CD, Vidyut Bhavan, Salt Lake, Calcutta-700 091 for approval.

Dimensional General Arrangement drawing showing all dimensions and disposition of fittings and space requirement and mounting arrangements.

Sectional views of contact assembly, operating mechanism and arc extinguishing chamber.

Transport/shipping dimensions with weights.

Foundation and anchor details including dead-load and impact load with direction and also point of application.

Assembly drawing for erection at site with part numbers and schedule of materials.

Electrical schematic and wiring diagram with explanatory notes, if any.

Schematic diagram for spring charged operating mechanism schematic layout drawings.

Name plate drawing and any other relevant drawing and data necessary for erection, operation and maintenance.

Outline drawings of bushings, terminals and terminal connectors.

i) After approval,the supplier shall submit Ten (10) sets of approved drawings and manuals to the Chief Engineer, P & CD. Instruction manuals and data sheets for each rating of Equipment shall be submitted. The manuals shall clearly indicate the installation methods, checkups and tests to be carried out for testing the Equipment and maintenance procedure.

ii) In all drawings, manuals etc., reference no. of purchase order no. shall be indicated.

iii)Two sets complete in all respects with required bindings should be sent directly to the Chief Engineer (P&E-Dist.), WBSEDCL, Vidyut Bhaban (2nd Floor), Kolkata- 700 091.

TEST REPORTS AND TYPE TESTS :

The bidder shall submit complete test reports of all tests (including Type Test) as stipulated belowwith Complete identification, date and serial no., carried out in CPRI/ NABL accredited/ Government recognized Test House or Laboratory on tendered item/items of identical design.

COPIES OF FOLLOWING TYPE TEST REPORT AS PER LATEST IS/IEC, CARRIED OUT WITHIN FIVE (5) YEARS, FROM DUE DATE OF TENDER, FROM CPRI, NABL ACCREDITED/ GOVT. RECOGNISED TEST HOUSE OR LABORATORY SHALL BE SUBMITTED ALONG WITH TENDER DOCUMENTS AS PRE-REQUISITES. FAILING WHICH THEIR OFFER MAY NOT BE TECHNICALLY ACCEPTABLE.

a)Single capacitor bank breaking test

b)Short time withstand and peak withstand

current test

c) Wet Power Frequency Withstand Voltage test

d)Lightning impulse voltage withstand test

e)Temperature rise Test

f)Mechanical Endurance Test(M2 Class)
g) Degree of Protection test of Control Cubicle

SPECIFIC LIMIT OF AUXILIARY SUPPLY VOLTAGE :

i) The auxiliary supply voltage shall be 85% to 110% of the rated 30 V in supply for closing coil and the same shall be 70% to 110% for tripping coil.

ii) The operating voltage for motor operated spring charged mechanism shall be 400V A.C., 3 phase, 50 Hz or 230 mV. 1-phase, 50 Hz. The motor shall operate at a voltage variation of 85% to 110% of the supply voltage.

NAME PLATE :

i. Rated voltage/Maximum voltage
ii. Rated insulation level
iii. Type/Model No./Sl.No./Year of manufacture.
iv. Rated current
v. Rated frequency.
vi. Rated short Circuit Breaking Current.
vii. Rated transient recovery voltage for terminal fault.
viii. Rated short circuit making current.
ix. Rated operating sequence.
x. Rated short time current.
xi. Rated line charging/breaking current
xii. Rated Cable charging current.
xiii. Rated single capacitor bank charging/breaking current.
xiv. Rated small inductive breaking current.
xv. Rated Supply Voltage of auxiliary circuits(ac & dc).
xvi. Applicable standard.

RECOMMENDED SPARES :

The Bidder shall quote item-wise price of recommended spares for 5 (five) years normal operation. Purchaser will decide the actual quality of spare to be procured on the basis of the List.

ACCESSORIES :

Each Breaker shall be furnished complete with fittings and accessories as listed below (The list is illustrative & not exhaustive).

i. Clamp-type terminal connectors for ACSR Conductor
ii. Base frame and foundation/anchor bolts.
iii. Operating mechanism, two nos trip and one no close coils.
iv. Auxiliary Contacts and Relays/Contacts.
v. Local/Remote selector Switch and Close/Trip Control Switch.
vi. Manual close and trip devices.
vii. Mechanical ON/OFF indicators.

viii. Operation counter.

ix. Weatherproof Control cubicle and operating mechanism boxes, with locking arrangement.

x. Set of Switch-Fuse/MCB/MCCB units for A.C. & D.C. Supply.

xi. Pipings of Inert Gas System, if any.

xii. Space heaters with thermostat and switch.

xiii. Cubicle illumination Lamp with Switch.

xiv. Terminal blocks and internal wiring.

xv. G.I. conduits and accessories for connection between Central Control Cubicle and operating mechanism boxes where applicable.

xvi. Other standard accessories which are not specified, but are necessary for efficient and trouble free operation shall be supplied.

TEST AT FACTORY AND TEST CERTIFICATES

All Acceptance tests shall be carried out at manufacturer‟s works in presence of the WBSEDCL‟s and Contractors‟ representatives. In addition to above, all routine tests are also to be carried on the breakers as per relevant IS. The entire cost of acceptance and routine test that to be carried out as per relevant IS‟ shall be treated as included in the quoted price of breakers. The contractor shall give at least 21(twenty one) days advance notice intimating the actual date of inspection and details of all tests that are to be carried out from the date when the tests will be carried out.

Routine tests on all breakers shall be carried out as per IEC-56 or IS-13118 and test reports shall be submitted along with respective inspection offer to Chief Engineer, P & CD, WBSEDCL

Six (6) copies of test reports duly signed by the inspecting officers, shall be submitted to the Chief Engineer,P & CD,, Bidyut Bhavan (4^{th} floor) Salt Lake, Kolkata -700091.

TYPE TESTS after issuance of order:

Besides submission of Type test Report, carried out within five years as per tender specification, Type Test at the discretion of Ordering authority, shall have to be arranged by the successful contractor from any lot offered for inspection, sample chosen at random after successful routine test by our inspection team, as per relevant ISS from CPRI/ NABL accredited/ Government recognized Test House or Laboratory in presence of WBSEDCL‟S representative.

However the necessary cost of the type test Charges will be reimbursed to the party on production of necessary supporting documents.

Documents to be submitted at the time of physical delivery at consignee stores:

The following documents to be submitted by the vendors to the consignee, Stores at the time of despatch to stores by the vendors:-

a) Copy of Purchase order.
b) Copy of Despatch Instruction.

c) Inspection Test Certificate.
d) Guarantee Certificate .
e) Proforma Invoice.
f) Calculation Sheet for Price Variation on the basis of IEEMA/ CACMAI etc., wherever applicable with base date of order.
g) Seal list and packing list.
h) Challan in triplicate.
i) Way bill, if applicable.

Mandatory particulars of 33 KV Out Door VCB

1.	**Vacuum Circuit Breaker**	
	Type	Porcelain Clad, Structure mounted Out Door VCB
	Reference Standard	IEC 62271-100, IEC 62271-200
	Arc quenching medium	Vacuum
	No. of break / phase	One
	Rated voltage	33 KV
	Highest voltage	36 KV
	Frequency	50 Hz
	Rated normal current	1250A
	Breaking Capacity	25 KA for 3 sec
	Making Capacity	62.5 KA
	STC for 3 Sec.	25 KA
	Insulation level	36 KV/70 KV/170 KV(P)
	Minimum Creepage distance	900 mm
	Temperature rise	As per IEC
	Operating duty cycle	0-0.3 sec – CO-3min-CO
	First pole to clear factor	1.5
	Single phase capacitor breaking capacity	As per IEC.
	Cable charging breaking capacity	As per IEC.
	Minimum Pole to Pole clearance	700 mm.
	Closing time	< 100 milli sec.
	Opening time	< 60 milli sec.
	Mechanical Endurance Capacity	M2 Class

	Electrical Endurance Capacity	E2 Class
	Operating mechanism	Motor wound spring charged stored energy.
	Number of Trip coil	Two
	DC Aux. voltage	30 volt.
	AC Aux. voltage	230 volt.
	No. of spare contacts Aux Switch (NO & NC)	6 NO+6NC (As per scheme requirement)
	No. of spare contacts in Limit Switch (NO & NC)	4 NO + 4NC(As per scheme requirement)
	Contact multiplier	To be provided, if required for scheme requirement.
	Space heater	230 V AC, 80 Watt, Thermostat control.
	Illuminating lamp	230 V AC, 100 Watt
	Anti pumping Relay	To be provided rated for 30 V DC
	Breaker control switch	3 Position, 4 Ways spring return to Neutral type. Angular movement 45º - 45º.
	Local Remote switch	Two position, eight ways stay put type. Angular movement 90º, Current rating 16 Amps.
	Spring charging motor	Voltage rating 230 Volt AC
	Degree of Protection of control cubicle	IP 55
	Sheet thickness of control cubicle	3 mm.
2.	**Vacuum Bottle**	
	Make	SEIL / CGL / ABB / Siemens / BEL
	Rated Voltage	33 KV
	Normal Current	1600 Amps.
	Breaking Capacity	25 KA

	Making Capacity	62.5 KA
	STC for 3 sec	25 KA
	Minimum Mechanical life in no. of operations	30000
	Minimum Electrical life in no. of operations at rated current	20000
	Minimum Electrical life in no. of operations at 25 KA	100 no.
	Dry Power Frequency withstand voltage for 1 min.	70 KV
	Impulse withstand voltage	170 KVp
	Contact Material	Copper Chromium Alloy
	Type of plating	Silver
3.	**Low Voltage Terminal connector**	
	Make	Elmex / Connectwel / Phoenix
	Type	Locking Stud
	Size	Suitable for 2.5 sq. mm control wire.
4.	**Primary Terminal Connector**	
	Material	Extruded Aluminum
	Size	Suitable for Panther ACSR.
	Continuous current rating	800 Amps
	Nuts, bolts & washers	MS hot dip galvanised.
	Reference Standard	IS 5561
	Number of connector per VCB	Six number
5.	**Trip & Close coil**	
	Voltage & Wattage of Closing coil	30V DC, 200 Watt.
	Voltage & Wattage of Trip coil	30V DC, 200 Watt.

6.	**Control wire**	
	Make	KEI/Relicab/Polycab
	Voltage grade	750V
	Size	2.5 sq.mm
	Colour	DC Circuit : Grey AC Circuit : Phase : Red, Neutral : Black. Earth circuit : Green.
7.	**Earthing Terminal**	
	Material	Copper
	Shape	Rectangular
	Size	50 mm x 6 mm
	Current Rating	Adequate to carry fault current.
8.	**Painting details**	
	Surface cleaning process	7 Tank process.
	Paint thickness	60-80 micron
	Paint shade	RAL 7032
9.	**Accessories**	
	Spring charging handle	1 no. per set.
	VCB operating handle	1 no per Set.
10.	**Name Plate details**	
	Manufacturer	To be provided
	Type of VCB	To be provided
	Rated voltage	33 KV
	Rated current	1250 Amps
	Rated frequency	50 Hz
	Insulation level	36 KV / 70 KV / 170 KV(p)

	Short Circuit Breaking Current	25 KA
	Short Circuit withstand Current & duration	25 KA for 3 Sec.
	Short Circuit Making Current	62.5 KA (p)
	Operating sequence	O - 0.3 Sec – CO - 3 min - CO.
	Make and Model of Vacuum Interrupter	To be provided
	Aux. DC voltage	30 Volt
	Aux. AC voltage	230 Volt
	Total weight	To be provided
	Serial number	To be provided
	Purchase Order reference	To be provided
11.	**Property Plate**	‘’PROPERTY OF WBSEDCL’ ‘’VCB SUPPLIED WITH TERMINAL CONNECTORS’ ‘’GUARANTEE FOR FIVE YEARS’
12.	**Guarantee**	5 years

GTP of 33 KV Out Door VCB

(To be submitted by the bidder)

1.	**Vacuum Circuit Breaker**	
	Type	
	Reference Standard	
	Arc quenching medium	
	No. of break / phase	
	Rated voltage	
	Highest voltage	
	Frequency	
	Rated normal current	
	Breaking Capacity	
	Making Capacity	
	STC for 3 Sec.	
	Insulation level	
	Minimum Creepage distance	
	Temperature rise	
	Operating duty cycle	
	First pole to clear factor	
	Single phase capacitor breaking capacity	
	Cable charging breaking capacity	
	Minimum Pole to Pole clearance	
	Clearance between lower Live part of VCB to Ground Level	
	Clearance between lower Live part of the VCB and Upper Surface of the Metallic Structure	

	Closing time	
	Opening time	
	Mechanical Endurance Capacity	
	Electrical Endurance Capacity	
	Operating mechanism	
	Number of Trip coil	
	DC Aux. voltage	
	AC Aux. voltage	
	No. of spare contacts Aux Switch (NO & NC)	
	No. of spare contacts in Limit Switch (NO & NC)	
	Contact multiplier	
	Space heater	
	Illuminating lamp	
	Anti pumping Relay	
	Breaker control switch	
	Local Remote switch	
	Spring charging motor	
	Degree of Protection of control cubicle	
	Sheet thickness of control cubicle	
2.	**Vacuum Bottle**	
	Make	
	Model No(Supporting Literature to be enclosed)	
	Rated Voltage	
	Normal Current	
	Breaking Capacity	

	Making Capacity	
	STC for 3 sec	
	Minimum Mechanical life in no. of operations	
	Minimum Electrical life in no. of operations at rated current	
	Minimum Electrical life in no. of operations at 25 KA	
	Dry Power Frequency withstand voltage for 1 min.	
	Impulse withstand voltage	
	Contact Material	
	Type of plating	
3.	**Low Voltage Terminal connector**	
	Make	
	Type	
	Size	
4.	**Primary Terminal Connector**	
	Material	
	Size	
	Continuous current rating	
	Nuts, bolts & washers	
	Reference Standard	
	Number of connector per VCB	
5.	**Trip & Close coil**	
	Voltage & Wattage of Closing coil	
	Voltage & Wattage of Trip coil	

6.	**Control wire**	
	Make	
	Voltage grade	
	Size	
	Colour	
7.	**Earthing Terminal**	
	Material	
	Shape	
	Size	
	Current Rating	
8.	**Painting details**	
	Surface cleaning process	
	Paint thickness	
	Paint shade	
9.	**Accessories**	
	Spring charging handle	
	VCB operating handle	
10.	**Name Plate details**	
	Manufacturer	
	Type of VCB	
	Rated voltage	
	Rated current	
	Rated frequency	
	Insulation level	
	Short Circuit Breaking Current	

	Short Circuit withstand Current & duration	
	Short Circuit Making Current	
	Operating sequence	
	Make and Model of Vacuum Interrupter	
	Aux. DC voltage	
	Aux. AC voltage	
	Total weight	
	Serial number	
	Purchase Order reference	
11.	**Property Plate**	
12.	**Guarantee**	

Signature of Bidder :

Name of the Company :

Date :

Office Seal