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WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED
(A Govt. of West Bengal Enterprise)
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CIN- U40109WB2007SGC113473, website: www.wbsedcl.in GSTIN No.19AAACW6953H1ZX

Technical Specification Of 12KV, 400A, 18.4.0 KA Floor Mounted totally enclosed Ring Main Unit consisting of 2 nos Vacuum Interrupting Incoming Unit and one no Series Trip Metering Switchgear with Vacuum Circuit Breaker as Feeder Unit (with C.T. Ratio 100-50/5-5A & 50-25/5-5A)

PART –A

1.0	**SCOPE**				
1.01	This Specification covers the design, manufacture, assembly of components, testing at Manufacturer's Works, supply and delivery by Road Transport to different sites **12KV, 400A,18.4 KA Floor Mounted Indoor type totally enclosed Ring Main Unit consisting of 2 nos Vacuum Interrupting Incoming unit and one no. Series Trip Metering Switchgear with Vacuum Circuit Breaker** including all accessories for Indoor Installation.				
2.0	**APPLICABLE STANDARDS :**				
2.01	The offered equipment including all accessories shall conform to latest versions of following standards.				
	1.	Circuit Breaker		IS	13118/IEC-56
	2.	Potential Transformer		IS	3156
	3.	Current Transformer		IS	2705
	4.	Painting		IS	5
	5.	Connection & Wiring		IS	375
3.0	**CLIMATIC CONDITIONS :**				
3.01	For the purpose of designing, following climatic conditions shall be considered.				
	1.	Elevation above Mean Sea level.	1000 M		
	2	Maximum ambient air temperature.	50^0C		
	3.	Minimum ambient air temperature.	3 ^{0}C		
	4.	Relative Humidity	95 %		
	5.	Pollution Level	Heavily Polluted		
	6.	Seismic Consideration.	The sites fall within seismic zones : (iii) or (iv) as classified in the IS 1983		
4.0	**APPLICATION :**				
4.01	The equipment shall be installed on floor in indoor locations towards the following applications :				
	1	To looping in and looping out of H.T. underground cable through Incoming Unit			
	2	To open or close vacuum interrupter under no load or rated load condition.			
	3	To close vacuum interrupter of Incoming Unit under fault condition.			
	4.	Testing and earthing of H.T. underground cable.			
	5.	To protect WBSEDCL's Distribution System for Fault in Consumer's Installation.			
	6.	To protect and isolate 11KV Bulk Power Supply Feeder from Fault in Outgoing System.			
	7.	To automatic Tripping of Switchgear Feeder Unit in case of fault in Feeding System.			
	8.	To open or close Incoming Switchgear Unit under no load, rated load, fault condition.			
	9.	To effect Service Connection to High Voltage Bulk Power Consumer.			
	10.	To measure Current, Voltage, Energy & Power Factor of Feeding System.			
	11.	To indicate fault in the Ring Cables through Flag Type E/F Relay connected with CBCT in Incomer Unit.			
5.0	**TECHNICAL PARAMETERS** :				
5.01	For the purpose of designing, following technical parameters shall be considered :				
	1	Rated Voltage	12 KV		
	2	Phase	3		
	3	Frequency	50 Hz		
	4	Rated Current	400 A		
	5	Rated Short Circuit Current	18.4 K.A. Symmetrical for 3 seconds.		
	6	Insulation Level :			
		(a) Power Frequency Withstand Voltage	28 KV for 1 minute.		
		(b) Impulse Withstand Voltage	75 KVp at 1.2 x 50 micro second wave crest.		

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	7.	System Earthing	H.T. System is effectively earthed.
6.0	**SPECIFIC REQUIREMENT :**		
6.01	**RING MAIN UNIT ARRANGEMENT:** The basic Ring Main Unit shall comprise of two nos vacuum interrupting Incoming unit and one no Feeder Unit having Series Trip Metering Switchgear with Vacuum Circuit Breaker housed in separate steel sheet compartment, bus bar chamber, cable entry boxes, operating mechanism, Cable testing facility, Incoming unit shall be vacuum interrupting type and shall be floor mounted stationary self-supporting, horizontal isolation, horizontal draw out type. The equipment shall be provided with mechanical ON & OFF facility by operating suitable closing and opening devices. The Incoming units shall be provided with mechanical ON & OFF indicator. The switch shall have three position: **SERVICE, ISOLATED & WITHDRAWAL** position marked. Mechanical safety interlocks shall be provided in the Feeder unit as mentioned in clause no.3.05 of the enclosed Technical Specification for Series Trip Metering Switchgear with Vacuum Circuit Breaker. Automatic tripping facilities for incoming unit are not required. Hence CTs, PTs, shall not be provided in Incoming Unit. However each Incoming Unit should be fitted with Core Balance CTs having Ratio 50/5A Class-5P and Flag Type Earth Fault Relay to facilitate detection of Cable fault in the Incoming Main Circuit. Trip coils are to be provided in Incoming unit VCB so that it can be interchanged with Feeder Unit. The Feeder unit shall have Series Trip Metering Switchgear with Vacuum Circuit Breaker and fixed type Potential Transformer. The Feeder Unit shall have protection tripping facility as detailed in clause no.6.0 of the Technical Specification of Series Trip Metering Switchgear with Vacuum Circuit Breaker. The Switchgear of the Feeder Unit should be as per the Technical Specification of Series Trip metering Switchgear with VCB enclosed in Part-B. **All Vacuum interrupters shall be rated for 100 nos. operation at interrupting capacity of 26.3 KA.**	
6.02	**BUSBAR AND CURRENT CARRYING PARTS.** Bus Bar and all current carrying parts shall be made of high conductivity electrolyte copper sufficient to carry rated normal current and short circuit current.		
6.03	**SWITCH OPERATION**; The vacuum interrupter Incoming Unit and Circuit Breaker of Feeder Unit shall be provided with manually charged spring closing mechanism trip free nature. One hand charging/operating device, shall be provided with each equipment. The Incoming Unit and Feeder Unit shall have mechanical indicator for "Spring Charged" and "Spring Discharged"		
6.04	**SEALING ARRANGEMENT.** The equipment shall have provision for sealing arrangement of Incoming units and Feeder unit as detailed in clause no.19.00 of Technical specification for series Trip Metering Switchgear with VCB enclosed in Part-B.		
6.05	**PADLOCKS:** Any of the switches shall be padlocked in the "ON", "OFF" and "EARTH" position. The padlock lugs should be the integral features of the switch mechanism.		
6.06	**CABLE TESTING FACLITY :** Provision shall be made for testing Incoming Cables and Feeder Cables.		
6.07	**CABLE ENTRY BOXES:** Standard cable boxes to be provided in the Incoming Unit and Feeder Unit shall be suitable for entry of 3-Phase.,11 KV XLPE cable of sizes up to 300 sq.mm.		
6.08	**GROUND BUS :** A grounding bus made of Electrolytic Copper rated to carry rated fault current shall be provided along with the full length of the RMU. All Units shall be provided with external studs for Earthing connections.		

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6.09	TROPICAL FINISH : The Ring Main Unit shall be tropical finished for long use in open air indoor condition.
6.10	PAINTING :
	Modern method of painting as per provision in the standards shall be followed for painting all interior and external surfaces of Ring Main Unit including Mounting Stand.
6.11	**NAME, RATING, MARKING, PROPERTY PLATE, CIRCUIT LABEL,CONNECTION DIAGRAM AND OPERATION INSTRUCTION.**
	1. Name & Rating Plate to be provided in Ring Main Unit shall contain all information as per provision in the Standards.
	2. Property Plate mentioning 'PROPERTY OF WBSEDCL' shall be provided.
	3. Circuit label incorporating identification of Incoming and Feeder unit, Incomong Cables and outgoing Cable shall be provided.
	4. Connection Diagram Plate shall be provided as per provision in the standards.
	5. All terminals including Earthing terminal shall be properly marked.
6.12	**TEMPERATURE CATEGORY :** The Ring Main Unit shall be suitable for upper limit of temperature category as specified in thestandards
7.0	**TYPE TESTS & TEST REPORTS :** The Bidder shall have to submit complete Test Reports of all tests (including Type Test) as stipulated in the relevant IS carried out in any NABL accredited /Govt. recognised Test House or Laboratory on 12 KV, 400A, 18.4 KA, Floor Mounted, Indoor Type, Totally Enclosed, Series Trip Metering Switchgear with Vacuum Circuit Breaker Unit of identical design. The submitted Test Reports shall amply prove that the Tests have been carried out within 5 years from the date of submission of Tender.
7.01	**ROUTINE & ACCEPTANCE TESTS :** The equipment shall be subjected to Routine and Acceptance Tests in accordance with provisions of relevant standards. Acceptance Test shall have to be performed in presence of WBSEDCL without any extra cost.
8.0	**PERFORMANCE CERTIFICATE :**
8.01	Copies of Performance Certificates of similar equipment supplied to various organisation shall be furnished along with the tender.
9.0	**CREDENTIALS :**
	Tenderer shall furnish document in support of supply & delivery of similar equipment indicating thereon Name of the Organisation, quantity ordered, quantity supplied along with the tender.
10.0 10.01	**DRAWINGS, DATA AND MANUALS** : The following Drawings & Details shall have to be furnished with the Tender :
	1.G.A Drawing including foundation plan describing dimension, constructional features & technical arrangement.
	2. Cross Sectional views of the individual item with list of parts.
	3. Connection details of individual item.
	4. Schematic diagram with mention of individual component.
	5. Mounting arrangement drawing showing details of fixtures.
	6. Manuals for installation, operation and maintenance procedures.
	7. Technical leaflets of individual component describing design and construction features.

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10.02	Three copies of above mentioned drawings, data and manuals of offered equipment shall have to be submitted for approval to CE, P&CD.
10.03	In addition to above, each crate containing mentioned equipment shall also accompany in water proof folder and set of approved drawings, data and manuals as mentioned above.
10.04	Before starting manufacture of the equipment, the supplier shall have to take approval of the design drawings from WBSEDCL.
11.00	**SPARES :**
11.01	While quoting, the supplier shall furnish the recommended list of spares.
12.00	GUARANTEED TECHNICAL PARTICULARS :
12.01	Tenderer shall furnish Guaranteed Technical Particulars of equipment offered as per enclosed SCHEDULE-A of Guaranteed Technical Particulars.
13.00	**DEVIATION :**
13.01	All deviations from the specification shall be recorded in the 'Deviation Sheet' with reference to respective Clauses of the Specification by drawing specification for the same. Unless deviations are recorded in the Deviation Sheet and submitted with the offer, it will be taken for granted that the offer is made in conformity with the specification.
14.0	**TYPE TESTS : (after issuance of order)** :
14.1	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.**
15.0	**DOCUMENTS TO BE SUBMITTED AT THE TIME OF PHYSICAL DELIVERY TO THE CONSIGNEE STORES:** The following documents to be submitted by the Vendors to the Consignee Stores at the time of physical delivery :- 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 with base date of order. g) Seal list and packing list. h) Challan in triplicate. i) Way bill, if applicable.

PART-B

1.00	**SPECIFIC REQUIREMENT FOR SERIES TRIP FEEDER UNIT :**
1.01	The equipment shall be indoor type, metal enclosed, floor mounted Series Trip, Triple Pole, Metering Switchgear with Vacuum Circuit Breaker, horizontal isolation and horizontal draw out facility. The maximum dimensions are H : 2200 mm, D : 1800 mm and W : 700 MM.
1.02	The equipment shall be totally enclosed, metal clad for indoor application.
1.03	Vacuum interrupter shall be rated for 100 nos operation at interrupting capacity of 26.3 KA.

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1.04	Before despatching equipment all external holes shall be blocked suitably so that no foreign element may enter into it.	
1.05	The equipment furnished under this specification shall be suitably packed for transportation maintaining space and weight limitations.	
2.00	**CONSTRUCTION** :	
2.01	The equipment shall consist of stationary type, self supporting sheet steel cubicle and series trip metering switchgear with horizontal isolation and horizontal draw out type circuit breaker and fixed type Potential Transformer.	
2.02	The Indoor Panel including Circuit Breaker and Cubicle shall have structural frame work enclosed on all sides and top by sheet steel of minimum thickness 2 mm. Fire retardant non-hygroscopic anti tracking insulating sheet barrier & cover shall be provided for Circuit Breaker truck assembly. Supporting insulator, if required, shall be of adequate strength made of resin cast component.	
2.03	The Vacuum Circuit Breaker truck shall be horizontal isolated from the operator by use of additional thick metal sheet protective cover in front of VCB track.	
2.04	The Cubicle shall have a front access door with a removable back cover.	
2.05	The Circuit Breaker, Bus Bar, Instrument Transformer shall be installed in separate compartments within the cubicle. The compartments shall be so constructed that failure of one device of equipment does not affect the device of other compartment.	
2.06	Ammeter Meters, Lamps, Switches shall be flush mounting type and shall be installed in easy accessible position within the appropriate chamber on the front of the cubicle. Three nos Ammeters to be installed at the topmost position in the panel.	
2.07	Suitable vent shall be provided for circulation of air.	
2.08	All fixing bolts, screws etc. appearing on the panel shall be so arranged as to present a neat appearance. Door hinges shall be concealed type.	
3.00	**CIRCUIT BREAKER : TYPE & RATING :**	
3.01	Circuit Breaker shall be vacuum interrupting type.	
3.02	Circuit Breaker shall be floor/plinth mounted stationary, self supporting horizontal isolation, horizontal draw out type, self aligning primary and secondary disconnectors.	
3.03	The equipment shall be provided with mechanical 'ON' and 'OFF' facility by operating suitable closing and opening devices. Circuit Breaker shall be provided with mechanical and electrical 'ON' and 'OFF' indicators.	
3.04	The Breaker shall have (3) three positions : service, isolated/ withdrawal positions marked.	
3.05	Mechanical safety interlocks shall be provided so that it is not possible for a circuit breaker :	
	1.	To be put into the cubicle unless the VCB is secured in position.
	2.	To be withdrawn or inserted in the fixed housing unless it is at the isolated and withdrawal position.
	3.	To be operated in service position unless the primary and secondary isolating contacts are fully engaged.
3.06	Automatic Safety Shutters shall be provided to completely cover the female contact primary disconnected when the breaker is withdrawn. Provision shall be made for padlocking spout shutters independently.	
3.07	The Circuit Breaker rocking equipment can be padlocked in any position.	
3.08	The normal continuous current rating of Circuit Breaker shall be 400 Amps. at rated Voltage.	
3.09	Protection tripping of the Circuit Breaker shall be effected by A.C. operated trip coils as specified in this specification.	
3.10	The Vacuum Circuit Breaker shall be provided with operation counter.	
3.11	Vacuum Interrupter of VCB shall have provision for making of contact erosion with limit.	
3.12	Circuit Breaker shall be provided with Name Plate and Rating Plate as per provision in I.S.	
4.00	**BUS BAR & RISER** :	
4.01	The main Bus Bar and Riser shall be of high conductivity Silver / Tin plated electrolytic copper liberally sized and normal continuous current rating shall be 800 Amps. at rated voltage for Bus Bar and 600A for Risers.	
4.02	All end connections shall be suitably supported to withstand stresses due to maximum short circuit current to absorb operational shock and also to take care any thermal expansion.	

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4.03	Three Phase Bus and Riser shall be adequately insulated with fire retardant non-hygroscopic anti-tracking sleeve for rated voltage.
4.04	All insulating spacer/ barrier shall be made of fibre glass adequately insulated for rated voltage.
4.05	Necessary provision shall be made for testing current transformer primary by removing insulated tapping portion of the joints without any difficulty.

5.0	**CIRCUIT BREAKER CLOSING MECHANISM :**	
5.01	The Circuit Breaker shall be provided with manually charged spring closing mechanism trip free in nature. One hand charging/operating device, if required, shall be provided with each equipment. The Breaker shall have mechanical indicators for spring "CHARGED" and spring "DISCHARGED".	
6.0	**PROTECTION TRIPPING ARRANGEMENT :**	
6.01	Protection Tripping of Circuit Breaker for Phase fault shall be effected by A.C. Operated 2 nos. Trip Coils connected in series in the Red & Blue phases of C.T. Secondary shunted by time limit fuses. Protection tripping of Circuit Breaker for ground fault shall be effected by A.C. operated 1 no. Trip Coil without any shunt fuse in residual path of C.T. Secondary. Protection tripping coils should be available in both the Incoming and Feeder VCB so that the VCB parts are interchangeable.	
6.02	Trip Coils and time Limit Fuses for phase fault protection shall be of 2.5 Amps rating and Trip Coil for ground fault protection shall be of 1.0 Amp rating.	
6.03	Provision shall be made for adjusting over current setting from 50 to 200% and earth fault setting from 10 to 40%	
6.04	T.L. Fuses of Trip Circuit shall be provided in a Fuse Box having sealing facility. The Fuse Box shall be located in such an accessible position so that the Fuse can be replaced without opening the door of the cubicle.	
7.0	**CURRENT TRANSFORMER:**	
7.01	The equipment shall be provided with 3 (three) nos. dual core dual ratio Current Transformer(C.T.) having following particulars :	
	1. Ratio	100-50/5A and 50-25/5A
	2. No. of Core	2 Core, Core I for Metering & Core II for Protection
	3.Accuracy Class	5 P 15 for Protection Core & 0.5S for Metering Core with ISF less than equal to 5 at lower ratio.
	4.V.A. Burden	10 VA for Metering Core & 15 VA for Protection Core.
	5. Short time Current	18.4 KA for 1 second
7.02	C.T. shall be resin-cast and shall be free from absorption of moisture.	
7.03	C.T. shall be connected at outgoing side with P1 at Bus side.	
7.04	C.T. shall be rated to carry normal current as that of Circuit Breaker.	
7.05	C.T. shall be suitably supported to withstand stresses due to maximum short circuit current to absorb operational shock and also to take care any thermal expansion.	
7.06	C.T. shall be easily replaceable by removing cover of the equipment.	
7.07	Secondary Terminals of C.T. shall be easily accessible to facilitate easy replacement/removal and testing of C.T. at site without dismantling.	
7.08	C.T. ratio change over link shall be provided on the Terminal Board at the front side of the terminal Point.	
7.09	One of the Secondary Terminal of each C.T. shall be shorted and earthed at terminal point.	
7.10	C.T. shall be provided with terminal marking, wiring diagram and rating plate as per provision in I.S.	
	Remarks : One Metering Switchgear of RMU will be with C.T. Ratio: 100-50/5A and other Metering Switchgear will be with C.T. Ratio : 50-25/5A	

8.0	**POTENTIAL TRANSFORMER** :
8.01	The equipment shall be provided with Three phase Five Limb or Three no. Single Phase Potential Transformer (P.T.) having following particulars.

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	1	No. of Phase	3 (Three)
	2	Ratio	11000/ 110 Volts √ 3 √ 3
	3	Vector Group	Star / Star with neutral earthed in both Primary and Secondary side.
	4	Accuracy Class	0.5
	5	VA Burden	50 VA / Phase
	6	Over voltage factor	1.2 continuous & 1.9 for 8 hours
	7.	Protection of H.V. & L.V.	H.R.C. Fuses

8.02	P.T. should be 3 phase, 5 Limb or 3 single phase unit with Star Connection made to form 3 phase PT having Star point Earthed for both type of PT in HV & LV side.
8.03	P.T. shall be dry or resin-cast type.
8.04	P.T. shall be connected at Bus side of Feeder Unit.
8.05	P.T. shall be non-draw out fixed type.
8.06	P.T. shall be mounted on top of the Unit.
8.07	P.T. shall be provided with suitable H.R.C. Fuses both at H.V. & L.V. sides which shall be easily accessible without dismantling.
8.08	P.T. shall be suitably supported to absorb operational shock and also to take care any thermal expansion.
8.09	P.T. Secondary Fuse Boxes shall be provided with sealing arrangement.
8.10	P.T. shall be suitable for use in effectively earthed system.
8.11	P.T. shall be provided with terminal marking, wiring and vector diagram and rating plate as per provision in I.S.
Remark : 1 (One) No. P.T shall be provided for each set of RMU.	
9.0	**METERS & METERING ACCESSORIES :**
9.01	Ammeter : Three no. analog Ammeters (One in each phase) shall be provided in the upper most position of the equipment panel. The size of the Ammeter shall be 96 X 96 mm with class of accuracy 1.0. and flush mounted type. The Ammeter shall be suitable for direct reading and shall be suitably calibrated according to dual ratio C.T. of the unit. Ammeter shall be connected from the protection cores of C.T. Secondary
9.02	Test Terminal Block : Standard 3-Phase 4 Wire Test Terminal Block with cover having Sealing Arrangement shall be provided in metering circuit of equipment panel for connection to Energy Meter. Metering Core of CT to be used for this purpose.
9.03	Space & Wiring for Energy Meter : Necessary space shall be provided in the equipment panel for housing projected mounted type Energy Meter. Provision shall be made for detaching this portion of panel having space of 300 mm. (height) & 250 mm.(width) for Energy Meter. Necessary wiring shall be drawn from Test Terminal Block for connection to Energy Meter. Space at man height to be provided for Energy Meter.
10.0	**SPACE HEATER AND CUBICLE PLUG & SWITCH** :
10.01	60W 230V A.C. Space Heater with thermostat and toggle switch shall be provided in the cubicle close to interrupting chamber.
10.02	A 230 Volts A.C. operated 6 amps. 3-Pin Plug & Toggle Switch shall be provided inside the instrument chamber of panel for working in the panel.
10.03	External 230 Volts A.C. supply shall be arranged in the multi core cable end box by the user
10.04	Necessary wiring shall be provided for cubicle plug and switch circuit from the multi core cable end box through a set of fuse and link.
11.0	**PROVISION FOR FUTURE REMOTE ARRANGEMENT :**
11.01	Necessary provision shall be made for Future Remote status indication facility for "CB ON & CB OFF" and 1 no. N/C potential free contacts of auxiliary switch up to multi core cable end box.
12.0	**BOARD TERMINAL BLOCKS** :
12.01	Necessary provision shall be made for Future Remote status indication facility for "CB ON & CB OFF" and " Spring Charged & Spring Discharged" by way of wiring from 1 no. N/O and 1 no. N/C potential free contacts of auxiliary switch up to multi core cable end box.

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12.02	The Terminal Blocks shall have at least 25% spare terminals.
12.03	The Terminal shall be bolted type, robust, rust free and suitable for connection of at least 2 nos. 4.0 sq.mm. copper wires per terminal.
13.0	**SECONDARY & SMALL WIRING :**
13.01	The bidder shall furnish and install all wiring for the equipment and devices located in the Switch Board and wiring shall be complete in all respect so as to ensure proper functioning of control, protection, metering and indications.
13.02	Fuses shall be provided to enable individual circuit to be isolated from bus wire without disturbing the other circuits.
13.03	All wiring shall be done with flexible heat resistant Switch Board coloured wires P.V.C. insulated with standard copper conductor suitable for 1100 volts service.
13.04	Size of wire shall be 4.0 sq.mm. for CT Circuits and 2.5 sq.mm for other Circuits.
13.05	The colour of wires shall be as follows : For CT & PT circuit : Red, Yellow, Blue, Black and Green for R Y B Phase, Neutral and Earth respectively. For AC Circuit : Red and Black for Phase & Neutral respectively. For other Circuit : Gray.
13.06	Each wire shall be identified at both ends with wire designation in accordance with stipulation in I.S. Inter Locking type plastic ferrules shall be used for identification
13.07	The wires shall be suitably grouped in bunches by non-metallic wiring cleats or bands with each bunch adequately supported along its run to prevent sagging due to flexibility or vibration conforming to I.S.
13.08	All wiring shall be done in such a way that it will have sufficient clearance from H.V. System.
13.09	Other than L.T. PT Fuse, no Fuse shall be provided in energy metering circuit carrying voltage source from P.T. Secondary.
15.0	**AUXILIARY SWITCH :**
15.01	Auxiliary Switches having sufficient number of normally open and normally closed contacts properly rated and robust in nature shall be provided for following functions

Function	Type & No of Contact
1. C.B. ON Remote Indication.	1 N/O
2. C.B. OFF Remote Indication	1 N/C
3. Spare (for future use)	1 N/C +1 N/O

15.02	Necessary wiring shall have to be provided for connecting Auxiliary Switches upto Board Terminal/Multi Core Box/Device Terminals via Secondary Isolating Contacts as the case may be.
16.0	**GROUND BUS:**
16.01	A grounding bus rated to carry rated fault current shall be provided along the full length of the RMU. The Kiosk Unit shall be provided with external studs for earthing connection.
17.0	**MULTI CORE CABLE END BOX :**
17.01	A weather proof and water proof Indoor Type Multi Core Cable End Box shall be provided in a suitable location at the rear upper portion of Switchgear to connect user's Multi Core Cable for following functions :
17.02	External 230 Volts A.C. Incoming Supply.
17.03	Terminals of potential free 1 N/O and 1 N/C spare contacts of Auxiliary Switches for remote indication.
18.0	**Power CABLE TERMINATION ARRANGEMENT :**
18.01	The Incoming H.T. Power Cable shall enter from the rear side of Incoming Unit. The size of H.T. XLPE Power Cable shall be up to 3C x 300 sq.mm.
18.02	The Outgoing H.T. Power Cable shall enter from the rear side of Feeder Unit. The size of H.T. XLPE Power Cable shall be up to 3C x 300 sq.mm.
19.0	**SEALING PROVISION:**
19.01	The equipment shall have provision for sealing the followings :
	1. C.T. and P.T. Chamber.

	2. P.T. Fuses.
	3. T.L. Fuse Box of Trip Circuit.
	4. All Fuses and Links.
	5. Board Terminal Block
	6. Instrument/Metering Chamber
20.0	**PROCEDURE FOR SEALING WILL BE AS MENTIONED BELOW :**
	1. The back cover of the Switchgear shall be provided with sealing arrangement both at the upper side and at the lower side at 2 diagonally opposite corners. This arrangement shall be made with sheet metal strips having holes of 4 to 6 mm. dia and welded at proper places of the cubicle and back cover.
	2. P.T. shall be provided with similar sealing arrangement by extension pieces welded at appropriate places of the P.T. with the stationary portion of Switchgear so that P.T. cannot be displaced when it is in racked in position. The P.T. and Secondary Fuse Unit fitted over the top of the P.T. /Cubicle shall be provided with sealing arrangement by a common steel sheet of sufficient rigidity and with suitably hinged at one side, so that after the said unit is sealed, no part of the fuse grips and connections become accessible from outside for displacement of the same.
	3. The front door of Switchgear Panel where meters to be installed shall be provided with sealing arrangement with similar extension pieces welded at appropriate placed one at the upper side and another at lower side of the cubicle and door.
	4. The multiway terminal block and ratio change over link blocks inside the cubicle where all the secondary leads from the C.T. & P.T. will terminate shall be covered with insulated transparent cover having suitable sealing arrangement for preventing access to those terminals for manipulation or connections or loosening the same.
	5. Test terminal block of metering circuit shall be covered type having suitable sealing arrangement
	6. All other sealing arrangement will be as per provisions in the Technical Specification.
21.0	**TROPICAL FINISH :**
21.01	The equipment i.e. Kiosk Unit shall be tropical finished for long use in open air indoor condition
22.0	**PAINTING:**
22.1	Modern method of painting as per provision in the standards shall be followed for painting all interior and external surfaces of the equipments.
23.0	**NAME, RATING, MARKING, PROPERTY PLATE, WINDING & VECTOR DIAGRAM :**
23.1	Name & Rating Plate to be provided in Circuit Breaker and CT & PT shall contain all information as per provision in the Indian Standards
23.2	Property Plate mentioning 'PROPERTY OF WBSEDCL' and " Guaranteed for Five years" shall be provided.
23.3	Connection Diagram Plate shall be provided as per provision in the standards
23.4	All terminals including earthing terminal shall be properly marked.
23.5	Winding Diagram Plate shall be provided in C.T. & P.T.
23.6	Vector diagram plate shall be provided in P.T.
24.0	**TEMPERATURE CATEGORY** :
24.1	The Indoor Panel Board Unit shall be suitable for upper limit of temperature category as specified in the standards.
25.0	**SCHEMATIC CIRCUIT DIAGRAM** :
25.1	A tender purpose schematic circuit diagram is enclosed for reference purpose.

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ANNEXURE –C

Legend of Symbol to be used in Schematic Circuit Diagram

Symbol_reference	Description of Device
52	V C B
52a & 52b	NO & NC Contact of Breaker Auxiliary Switch.
S.I.C.	Breaker Secondary Isolating Contact.
C.T.	Current Transformer
P.T.	Potential Transformer
52T - R	Over Current Series Trip coil in Red Phase
52T - B	Over Current Series Trip coil in Red Phase
52T - N	Earth Fault Trip coil.
TLFS	Time Limit Fuse in Trip Circuit
F1, F2, F3	H.T. P.T. Fuse
FS1 – FS6	L.T. Fuse
LK1 – LK4	Link
RCL1, REL2	C.T. Ratio changing link.
T.T.B.	Test Terminal Block
T.V.M.	Energy Meter
A.	Ammeter
T.S.	Toggle Switch
C.I.L.	Cubical illumination lamp
H	Heater
H.S.	Heater Switch
TH	Thermostat
E	Earth / Ground Terminal

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ANNEXURE – 'B'

GENERAL TECHNICAL REQUIREMENTS

Sl No		
A.	**General** :	
1.	Applicable Standard.	IEC : 62271, IS : 13118
2.	Type	11 KV Metal-Clad Series Trip Metering Panel with VCB.
3.	Type of Isolation	Horizontal
4.	Rated Voltage.	11000 Volts
5.	Phase	Three Phase
6.	Frequency.	50 Hz.
7.	Rated Normal Current.	400 Amps.
8.	Rated Short Circuit Current Capacity.	18.4 KA for 3 Sec.
9.	Rated Making Current.	46 KA (P)
10.	Insulation Level : a) Power Frequency Withstand Voltage b) Impulse withstand Voltage 1.2x50 micro seconds wave crest	 28 KV 75 KV (P)
11.	Dimension (H X W X D) (For each Incomer & Feeder Unit)	2200 X 700 X 1800 mm (Max. limit)
12.	Degree of Protection	IP 5X & IP 4X for LV & HV compartment respectively
13.	Guarantee of the complete equipment	5 (five) years from the date of last despatch of any integral part of the equipment as per Clause No. 5(b) of GCC.
B.	**Circuit Breaker**	
1.	Make	Panel Manufacturer should be the VCB Manufacturer
2.	Type	Indoor Series Trip Metering Panel with VCB
3.	Normal Voltage	11 KV
4.	Highest System Voltage	12 KV
5.	Frequency	50 Hz
6.	No. of Poles	Three
7.	Rated Current	400 Amps
8.	Short Time Current	18.4 KA for 3 Sec.
9.	Breaking Capacity	18.4 KA
10.	Making Capacity	46 KA
11.	Single Phase Capacitor Breaking Capacity	400 A rms
12.	Line Charging Breaking Capacity	10 A rms
13.	Cable Charging Breaking Capacity	25 A rms
14.	Duty Cycle	O – 3 Min – CO – 3 Min - CO
15.	Closing time	< 100 milli Sec
16.	Breaking time	< 80 milli Sec
17.	No. of Contacts in Auxiliary Switch (spare)	4 NO + 4 NC
18.	Minimum phase to phase Clearance	110 mm
19.	Minimum phase to ground clearance	90 mm
20	Type of operating mechanism	Spring charge stored energy type
21.	Mechanical Safety Interlock	To be provided
22.	No of Break per Phase	One
	Mechanical Endurance Capacity	2000 operation (M1)
C.	**Current Transformer**	
1.	Make	Plastofab, BMC, Pragati, ECS, Kappa

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2.	Type	Resin cast
3.	Voltage Grade	12 KV
4.	Reference Standard	IS : 2705
5.	Class of Insulation	Class E or better
6.	Frequency	50 Hz
7.	Ratio	100-50 / 5-5A & 50-25 / 5-5A
8.	Class of Accuracy	Metering core : 0.5S Protection core : 5P15
9.	Rated burden	Metering core : 10 VA Protection core : 15 VA
10.	Accuracy Limit Factor	15
11.	Instrument Security Factor	≤5 at lower ratio
12.	Short Time Current Rating	18.4 KA for 1 Sec.
D.	**Potential Transformer**	
1.	Make	Plastofab, BMC, Pragati, Audio Vision, ECS
2.	Type	Dry/Resin Cast
3.	Reference Standard	IS :3156
4.	Rated Primary Voltage	11000 Volts.
5.	Rated Secondary Voltage	110 Volts
6.	Frequency	50 Hz
7.	Voltage Factor	1.2 Continuous & 1.9 for 8 Hrs.
9.	Winding Connection	Star Star with both side neutral earthed
10.	Core Connection	3 Phase 5 Limb or Three no. Single Phase
11.	Burden/ Phase	50 VA
12.	Accuracy Class	0.5
13.	Primary & Secondary side protection	HRC Fuse
14.	Class of Insulation	Class E or better
15.	Primary and Secondary fuse	HRC
16.	Installation	Fixed Type and Mounted on the top of the panel
E.	**Bus Bar**	
1.	Material	Silver / Tin plated electrolytic copper
2.	Shape	Rectangular
3.	Current Density	Maximum 1.6 Amps per sq. mm
4.	Minimum clearance (Phase to Phase)	110 mm
5.	Minimum clearance (Phase to Ground)	90 mm
6.	Current Rating	800 Amps for Bus, 600A for Riser
7.	Type of Insulation	Full voltage sleeved with shrouds on joints
F.	**Vacuum Interrupter**	
1.	Make	CGL, ABB, BEL, Siemens, Schneider.
2.	Current Rating	More than 400A
3.	Breaking Capacity	26.3 KA
4.	Mechanical Endurance Capacity	2000 Operation
5.	Minimum Electrical Life	100 nos full Short Circuit Operation at 26.3 KA
G.	**Small Wiring**	
	CT Circuit	4 sq. mm
	Other Circuit	2.5 sq. mm
H.	**Ammeter**	
1.	Make	KAYCEE, RECEM, RISHAV, SECURE
2.	Type	Analog

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3..	Accuracy Class	1.0
4.	Size	96 mm x 96 mm
I.	**Flag type Earth Fault Relay with Core Balance CT**	Core Balance CT with CTR: 50/5A, Class-5P alongwith Flag Type Earth Fault Relay to be provided in Incomer Panels
J.	**Accessories**	
1.	Spring Charging Handle	One no to be supplied with each unit
2.	VCB operating handle	One no to be supplied with each unit

ANNEXURE-D

BILL OF MATERIALS

Sl No.	Item / Equipment	Quantity
1.	11 KV Series Trip Panel	1 Set
2.	Vacuum Circuit Breaker (3 phase)	3 Nos
3.	11 KV CT	3 Nos
4.	11 KV PT	1 Set
5.	Ammeter (96mm x 96 mm)	3 No.
6.	Space for energy meter	250 mm (W) X 300 mm (H)
7.	Test Terminal Block (3 phase 4 wire, Link type)	1 No.
8.	LED Type Indicating Lamp (a) Circuit Breaker ON (b) Circuit Breaker OFF (c) Spring Charged	 1 No. (Red colour) 1 No. (Green colour) 1 No. (Green colour)
9.	16 Amps, 2 Poles MCB for AC Incoming Circuit	1 No.
10.	Time Limit Fuse (Red & Blue Phase)	2 Nos
11.	Earth Fault Relay with Core Balance CT	2 Sets
12.	Fuse & Links	As required
13	Space Heater	3 Sets
14.	Thermostat with switch	3 Sets
15.	Power Plug with Switch	1 Set
16.	Manual Spring Charging Handle	1 No.
17.	VCB Operating Handle	1 No.
18.	O/C & E/F Trip Coil	3 Sets

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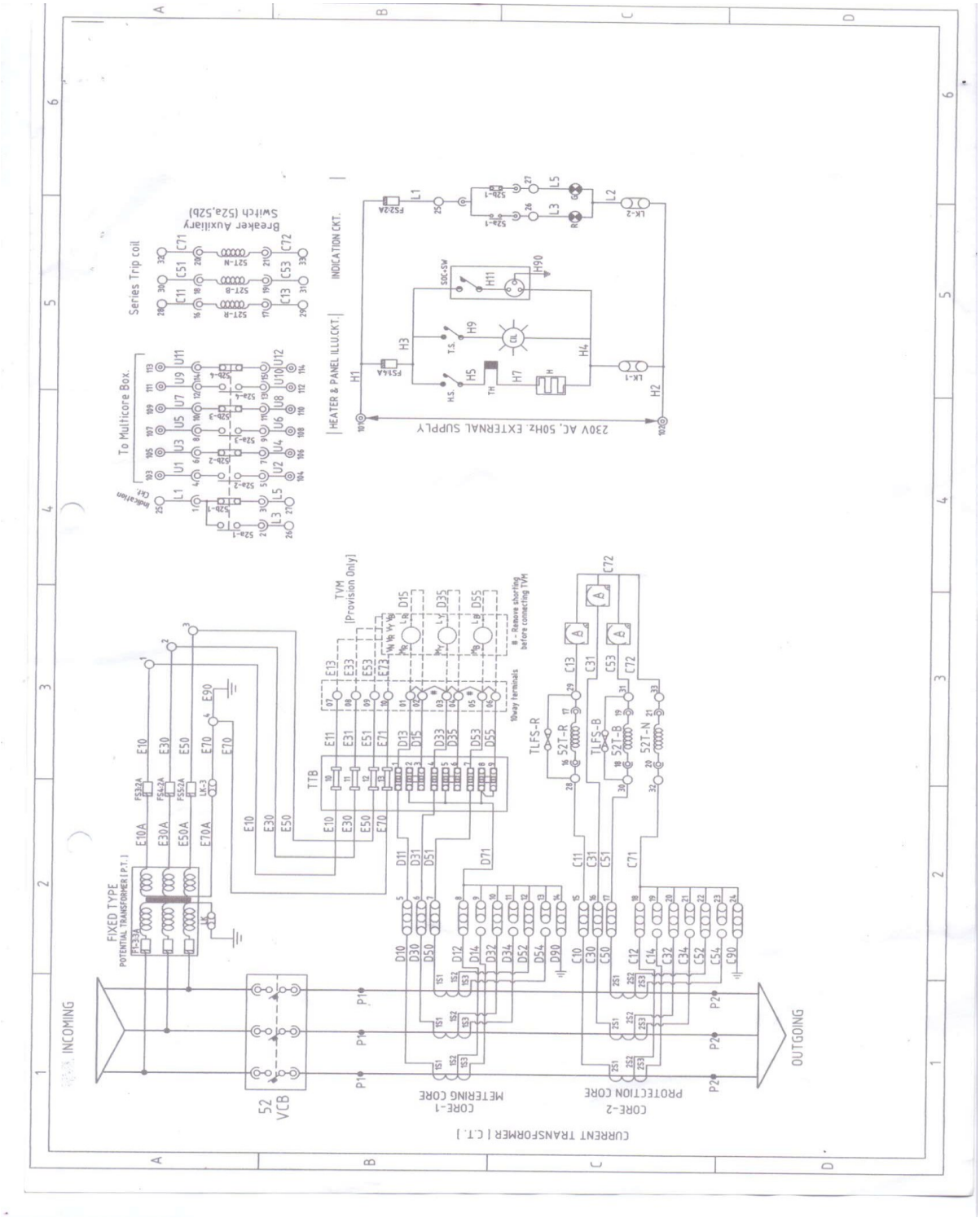
ANNEXURE – E
TENDER PURPOSE ELECTRICAL CIRCUIT DIAGRAM



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ANNEXURE-A

GURANTEED TECHNICAL PARTICULARS (To be submitted by the Bidder)

1.	**General :**			
	Name of the Company			
	Office address			
	Factory address			
	Email:			
	Telephone No.			
2.	**Panel**			
	Type & Designation			
	Application Standard			
	Rated Voltage (KV)			
	Highest Voltage (KV)			
	Normal Current (Amps.)			
	Frequency (Hz)			
	STC for 3 Sec. (KA/ 3 Sec)			
	Breaking Capacity (KA)			
	Making Capacity (KAp)			
	Power frequency withstand voltage (KV rms)			
	Impulse withstand voltage (KVp)			
	Material and thickness of sheet			
	Dimension in mm (H x W x D)	Height	Width	Depth
3.	**Bus Bar**			
	Material			
	Shape			
	Size			
	Cross sectional area (Sq. mm)			
	Type of plating			
	Normal Current currying capacity (Amps)			
	STC for 3 Sec. (KA/3 Sec)			
	Temp. Rise over ambient at normal current			
	Current density (Amps/ sq. mm)			
	Phase to Phase clearance (mm)			
	Phase to ground clearance (mm)			
	Type of insulation			
4.	**Bus support insulator**			
	Material			
	Dry Power frequency Withstand Voltage for one minute			
	Wet Power frequency Withstand Voltage for one minute			
	Impulse Withstand voltage			
	Creepage distance			

5.	**Vacuum Circuit Breaker**	
	Make	
	Type	
	Reference Standard	
	Rated voltage	
	Highest voltage	
	Frequency	
	Normal Current	
	Breaking capacity	
	Making capacity	
	STC for 3 Sec.	

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	Temp. Rise over ambient at normal current	
	Operating duty cycle	
	Single Phase Capacitor Breaking capacity	
	Three Phase Capacitor Breaking capacity	
	Line Charging Breaking capacity	
	Cable Charging Breaking capacity	
	Closing time	
	Opening time	
	Mechanical Endurance capacity	
	Electrical Endurance capacity	
	Operating mechanism	
	Type of isolation	
	Details of mechanical interlock provided	
	Current required for O/C Tripping	
	Current required for E/F Tripping	
	No. contacts in Aux. Switch (NO &NC)	
	No. contacts in Limit Switch (NO &NC)	
6.	**Vacuum Interrupter**	
	Make	
	Rated voltage	
	Type and model no.	
	Normal current	
	Breaking capacity	
	Making capacity	
	STC for 3 Sec.	
	Maximum contact separation length	
	Minimum Mechanical life in no. of operation	
	Minimum Electrical Life in no. of operation at rated normal current	
	Minimum Electrical Life in no. of operation at rated full short circuit current	
	Power frequency withstand voltage (dry)	

	Impulse withstand voltage	
	Contact material	
	Type of plating	
	Contact pressure	
7.	**Current Transformer**	
	Make	
	Reference Standard	
	Insulation level	
	Ratio	
	Class of accuracy	
	Burden	
	STC for 1 Sec.	
	ALF of Protection core	
	ISF of Metering Core at lower ratio	
8.	**Potential Transformer**	
	Make	
	Reference Standard	
	Whether Fixed Type (Yes/No)	
	Insulation level	
	Winding connection	
	Type of Core connection	
	Ratio	

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	Class of accuracy	
	Burden per Phase	
	Over Voltage Factor for 8 hrs.	
	Installation Position	
	Primary Fuse rating	
9.	**Ammeter**	
	Make	
	Type	
	Size	
	Accuracy class	
10.	**Terminal connector**	
	Make	
	Type	
	Size	
11.	**Time Limit Fuse**	
	Make	
	Continuous Current Rating	
	Fusing Current Rating	

12.	**Trip coils**			
	Number of Over Current Coil			
	Current required for O/C Tripping			
	Current required for E/F Tripping			
13	**Control wire**			
	Make			
	Size			
	i) CT Circuit			
	ii) Other Circuit			
14.	Whether Flag type Earth Fault Relay with Core Balance CT provided in both Incomer Panels(Yes/No)			
15.	**Earth Bus**			
	Material			
	Shape			
	Size			
16.	**Painting Details**			
17.	**Shipping dimension of equipment (mm)**	Height	Width	Depth
18.	**Accessories**			
	Spring Charging Handle (no.)			
	VCB Operating Handle (no.)			
20.	**Guarantee of the complete equipment (in years)**			

Date :
Place :

Signature :
Name :
Designation :

Company stamp