

SCHEDULE -1

GUARANTEED TECHNICAL PARTICULARS OF 36 kV INDOOR SWITCHGEAR

Sr. No.	Description	Unit	Particulars
A General			
1.0	Name of manufacturer and country		
2.0	Applicable standards		
3.0	Short-time current withstand and time	kA/sec	
4.0	Dynamic rating	kAp	
5.0	Rated Voltage	kV	
6.0	<u>Clearances</u>		
6.1	Phase to phase	mm	
6.2	Between live parts and earth	mm	
7.0	Rated short duration power frequency withstand voltage	kV	
8.0	<u>Thickness of sheet steel (hot or cold rolled)</u>		
8.1	Frame	mm	
8.2	Door	mm	
8.3	Covers	mm	
9.0	<u>Dimensions (W x D x H)</u>		
9.1	Circuit breaker cubicle	mm	
9.2	Cable/VT cubicle	mm	
10.0	Drawout space required in front	mm	
11.0	Clear space required at the rear	mm	
12.0	Total weight of cubicle		
B Circuit Breaker			
1.0	Name of Manufacturer		
2.0	Type of breaker	Vacuum/SF6	
3.0	Rated current inside cubicle under site conditions	A	
4.0	Rated short-circuit breaking current	kA	
5.0	Impulse withstand voltage	kVp	
6.0	One minute power frequency withstand voltage	kV	
7.0	Rated operating duty		
8.0	<u>Time rate of contact travel</u>		
8.1	On closing	m/sec	
8.2	On tripping	m/sec	

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Sr. No.	Description	Unit	Particulars
9.0	Type of contacts		
10.0	Material of contacts		
11.0	Rated line-charging breaking current	A	
12.0	Type and material of interphase barriers		
13.0	<u>Method of tripping</u>		
13.1	Normal		
13.2	Emergency		
14.0	Type of closing mechanism		
15.0	Normal voltage of closing mechanism	V	
16.0	Power required to operate closing mechanism at normal voltage	W	
17.0	Type of tripping mechanism		
18.0	Normal voltage of tripping mechanism	V	
19.0	Power consumption of trip coil	W	
20.0	<u>Spring charging motor details</u>		
20.1	Output rating	kW	
20.2	Rated voltage	V	
20.3	Class of insulation		
20.4	Spring charging time	Sec.	
21.0	Applicable standards		
C	Bus Bars		
1.0	Material		
2.0	Cross section	mm x mm	
3.0	Type of insulation		
4.0	<u>Minimum clearance</u>		
4.1	Between phases	mm	
4.2	Phase to earth	mm	
5.0	Continuous current rating	A	
6.0	Short-time current rating (1 sec.)	kA	
7.0	Temperature rise over design ambient temperature	°C	
D	Current Transformers		

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1.0	Name of manufacturer and country		
2.0	Applicable standards		
3.0	Class of insulation		
4.0	Temperature rise of winding over design specified ambient	□C	
5.0	Impulse withstand voltage	kVp	
6.0	One minute power frequency withstand voltage	kV	
7.0	Rated short-time current withstand (1 sec)	kA	
8.0	Whether ratio, taps, burdens, accuracies etc. are as per enclosed drawings	Yes/No	
9.0	Rated extended primary current	%	
E Voltage Transformers			
1.0	Name of manufacturer and country		
2.0	Applicable standards		
3.0	Overvoltage factor		
4.0	Class of insulation		
5.0	Temperature rise of winding over design ambient temperature	°C	
6.0	One minute power frequency withstand voltage	kV	
7.0	Impulse withstand voltage	kVp	
8.0	Whether ratio, burdens, accuracies etc. are as per enclosed drawings	Yes/No	
F. Relays Provided in the Breaker			
General			
1.0	Name & Country of Manufacturer.		
2.0	Required Auxiliary Power supply	± V AC/DC	
3.0	Standards to which the relays conform.		
4.0	All tests as specified shall be carried out.	Yes / No	
5.0	Operating temperature range	± °C	
6.0	Tropicalisation provided	Yes / No	
7.0	All auxiliary relays required with main protection relay schemes included.	Yes / No	
8.0	<u>Minimum rating of contacts for auxiliary and output relays :</u>		
	(a) Voltage	V, DC	
	(b) Continuous current	A, DC	
	(c) Make & carry for 1 sec.	A, DC	

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Sr. No.	Description	Unit	Particulars
	(d) Breaking capacity (i) Resistive (ii) Inductive	Watts W	
9.0	Auxiliary CT / VT provided for input to all static relays and wherever required for electro-magnetic relays.	Yes / No	
10.0	Protection of the Relay: Over current, Earth fault and other protection		
	a) 50 - Definite time overcurrent protection	Yes / No	
	b) 51- Inverse time overcurrent protection	Yes / No	
	c) 67 - Three phase directional overcurrent	Yes / No	
	d) 49 - Thermal overload	Yes / No	
	e) 37 - Three phase undercurrent	Yes / No	
	f) 46 - Negative sequence overcurrent	Yes / No	
	g) 50N - Earthfault protection	Yes / No	
	h) 51N - IDMTL earth-fault	Yes / No	
	i) 50BF - Circuit breaker failure detection	Yes / No	
	j) 46BC - Broken conductor detection I2/I1	Yes / No	
	k) 86 - Output relay latching	Yes / No	
11.0	<u>Transformer Differential Unit</u>		
11.1	(a) Manufacturer's type / designation (b) Numerical/Static/Electromagnetic		
11.2	Rated current or (&) Voltage		
11.3	(a) Operating principles (b) Literature / Write-up enclosed	Yes / No	
11.4	Protection of Relays		
	a) 87 - High Impedance three phase differential protection	Yes / No	
	b) 87G - Restricted earth fault protection	Yes / No	
	c) 50 - Definite time overcurrent protection	Yes / No	
	d) 51- Inverse time overcurrent protection	Yes / No	
	e) 49 - Thermal over load protection	Yes / No	
	f) 59 - Over voltage Protection	Yes / No	
	g) 27 - under voltage Protection	Yes / No	
	h) 81 - Under frequency protection	Yes / No	
12.0	<u>Tripping Relays</u>		DEVICE NO. 86
12.1	(a) Manufacturer's type / designation (b) Static / Electromagnetic		
12.2	Rated voltage	V, DC	
12.3	(a) Operating Principles (b) Literature / Write-up enclosed.	Yes / No	
12.4	Adequate no. of relays provided to complete the scheme	Yes / No	
13.0	<u>Trip Circuit Supervision Relays</u>		
13.1	(a) Manufacturer's type / designation (b) Static or Electromagnetic		
13.2	Rated voltage	V, DC	
13.3	(a) Operating principles		

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Sr. No.	Description	Unit	Particulars
	(b) Literature / Write-up enclosed	Yes / No	
13.4	Monitoring of breaker trip coil in both close & open position provided	Yes / No	
13.5	Safety resistors provided to limit the current if the relay coil is short-circuited	Yes / No	
14.0	<u>Indicating Lamps</u>		
14.1	Type		
14.2	Ratings		
	(a) Voltage	V	
	(b) Wattage	W	
14.3	Series resistors are provided	Yes / No	
14.4	Series resistors - ohms - W		
14.5	Life of lamp in burning hours	Hrs.	
15.0	<u>Annunciators</u>		
15.1	Make		
15.2	Dimensions of each window (L x W x H)	Mm	
15.3	No. of lamps per window		
15.4	Lamps - V - W		
15.5	Initiating contact requirements		
	(a) Making current	A	
	(b) Impulse duration	ms	
16.0	<u>Indicating Meters</u>		
16.1	Make		
16.2	Type of movement		
16.3	Type designation		
16.4	CT / VT sec. current / Volt	A, V	
16.5	Burden :		
	(a) Current coil	VA	
	(b) Voltage coil	VA	
16.6	Details of shunt, if any		

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Sr. No.	Description	Unit	Particulars
(a)	Rated current	A	
(b)	Rated voltage drop	V	
16.7	Accuracy class & standard.		
16.8	Total deflection angle	Degrees	
16.9	Total scale length	mm	
16.1	Suitable for specified reference operating conditions	Yes / No	
17.0	<u>Multifunction meter</u>		
17.1	Make		
17.2	Type of measurement (3 phase, 3 wire unbalanced power / 3 phase, 4 wire unbalanced power)		
17.3	Measuring range in primary watts.		
17.3.1	CT ratio	A/A	
17.3.2	VT ratio	V/V	
17.4	Accuracy and standard to which meter conforms :		
17.5	Burden		
(a)	Current coil	VA	
(b)	Voltage coil	VA	
17.6	No. of digits in the meter		
17.7	Impulse contact for remote summation or printing provided or connectivity with the plant computer provided		
17.8	Details of impulse contacts		
(a)	Impulse frequency	No. per sec.	
(b)	Duration	ms	
(c)	Contact rating	W,V	
17.9	Mounting details		
17.10	Literature with connection diagram furnished	Yes / No	
18.0	<u>Deviations</u>		
	All deviations from specifications submitted separately.	Yes / No	
	Compliance will be taken for granted if the deviation is not specifically mentioned.		

Signature of Bidder _____

SCHEDULE -2

GUARANTEED TECHNICAL PARTICULARS OF CABLES

Sr. No.	Description	Unit	Particulars
1.0	Name of manufacturer and country		
2.0	Applicable standards		
3.0	Rated voltage	V	
4.0	<u>Conductor</u>		
4.1	Material		
4.2	Cross sectional area	mm ²	
4.3	Whether stranded	Yes/No	
5.0	<u>Insulation</u>		
5.1	Material		
5.2	Thickness	mm	
6.0	<u>Inner sheath</u>		
6.1	Material		
6.2	Whether extruded or wrapped ?		
6.3	Thickness	mm	
7.0	<u>Outer Sheath</u>		
7.1	Material		
7.2	Thickness	mm	
8.0	Material of armour		
9.0	Whether round wire or tape ?		
10.0	Details of screen, if any		
11.0	Total overall diameter of cable	mm	
12.0	DC resistance at 20°C	ohms/km	
13.0	<u>Test voltage</u>		
13.1	One minute power frequency withstand voltage	kV	
13.2	Impulse withstand voltage	kVp	

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GUARANTEED TECHNICAL PARTICULARS OF CABLES

Sr. No.	Description	Unit	Particulars
13.3	Water immersion test voltage	kV	
14.0	Type of cable end sealing		
15.0	<u>Cable drums</u>		
15.1	Dimensions	mm	
15.2	Weight	kg	
15.3	Nominal length per drum	m	

Bidder shall furnish the above data for each rating/size of MV/ LV Cable and control cable

Signature : _____