

<b>TECHNICAL SPECIFICATION</b>				
PROJECT NAME:				
<b>"SABANOUR CHP 20KV SUBSTATION"</b>				
EQUIPMENT:20 KV METAL CLAD SWITCHGEAR				
<b>Item</b>	<b>Description</b>	<b>Particular</b>	<b>Unit</b>	<b>Offer</b>
<b>A</b> <i>SERVICE CONDITIONS</i>				
1	Min./Max. absolute ambient temperature	-20 / + 65	°C	
2	Altitude above sea level	1850	m	
3	Relative humidity(Max./Min)	110 / 50	%	
4	Pollution level	Heavy		
<b>B</b> <i>PARTICULARS OF SYSTEM</i>				
1	Nominal/ Highest service voltage	20 / 24	kV (rms)	
2	Rated frequency	50	Hz	
3	Number of phases	3	-	
4	System neutral earthing	Non Effectively	-	
<b>C</b> <i>PARTICULARS OF THE INSTALLATION AND ITS COMPONENTS</i>				
1	Installation (Indoor/Outdoor)	Indoor	-	
2	Number of busbars	1(3 PH)	-	
3	Rated voltage	20	kV (rms)	
4	Rated insulation level (power freq./impulse)		kV	
5	Minimum Clearances (phase to phase \ phase to earth)	210	mm	
6	Rated normal current at standard conditions:			
6.1	For Busbar	1250	A (rms)	
6.2	For Incoming	1250	A (rms)	
6.3	For Outgoing	1250	A (rms)	
6.4	OUTGOING DELTA/STAR FURNACE	1250		
6.5	For Capacitor	1250	A (rms)	

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7	Rated short time withstand current			
7.1	For Busbar	25	kA (rms)	
7.2	For Incoming	25	kA (rms)	
7.3	For Outgoing	25	kA (rms)	
7.4	For Capacitor	25	kA (rms)	
8	Rated duration of short circuit	3	sec.	
9	Rated peak withstand current	50	kA (peak)	
10	Degree of protection			
10.1	With the door closed	IP4X	-	
10.2	Between LV compartments and HV compartments	IP4X	-	
10.3	Between HV compartments	IP4X	-	
11	color	RAL 7032	-	
12	Type of painting	Electrostatic	-	

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<b>D</b>	<b>POWER CIRCUIT BREAKERS</b>			
1	Fix or drawable	Drawable	-	
2	Type (SF6/Vacuum)	VACUUM	-	
3	Number of trip/close coils	1 / 1	-	
4	Rated normal current at standard conditions			
4.1	For Busbar	1250	A (rms)	
4.2	For Incoming	1250	A (rms)	
4.3				
5	Rated short circuit breaking current	25	kA (rms)	
6	Rated short time withstand current(3 sec)	25	kA	
7	Rated short circuit making current	62.5	kA (peak)	
8	Operating sequence	<b>O-0.3S-CO-3min-CO</b>	-	
9	Opening time	40 - 47	ms	
10	Closing time	50 - 58	ms	
11	Break time	55 - 68	ms	
12	First pole to clear factor	1.5	-	
13	Type of operating mechanism	spring-motorized		
14	Rated power supply for operation	110	V(DC)	
15	Rated power of motor	100	W	
16	Trip coil max./ min.rated voltage	85-140	V(DC)	
17	Close coil max./ min.rated voltage	100-140	V(DC)	
18	Trip/Close coil control current	2	A	
19	Type & number of aux. Contact	7 N.O.+ 7 N.C.		
20	Rated supply pressure	N.A.	Bar	

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<b><i>E</i></b>	<b><i>EARTH SWITCH</i></b>			
1	Earth switch type of mechanism	Manually		
2	Earth switch type of interlock for Incoming & Bus Section	Elec. & Mech.		
3	Earth switch type of interlock for Outgoing	Mechanical		
4	Earth switch number & type of aux. Switch in each position	2No+2Nc for open & 2No+2Nc for close		
<b><i>F</i></b>	<b><i>CURRENT TRANSFORMERS</i></b>			
1	Type	Dry with epoxy resin insulation	-	
2	Rated primary current (for different taps)			
2.1	For Incoming feeder	600-800	A (rms)	

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Item	Description	Particular	Unit	Offer
2.2	For Coupling	400-600	A (rms)	
2.3	For Outgoing	200-100	A (rms)	
3	Rated secondary current	1	A (rms)	
4	Number of secondary core's			
4.1	For Incoming& Coupler feeder	2	-	
4.2	For Outgoing &CAPACITOR	2	-	
5	Accuracy class & burden for Incoming &Coupler feeder *			
5.2	Core #2, for protection	5P20 , 20VA	Class/VA	
5.3	Core #3, for metering	0.2 FS 5 ,20VA	Class/VA	
6	Accuracy class & burden for Outgoing * And Capacitor			
6.1	Core #1, for protection	5P20 , 20VA	Class/VA	
6.2	Core #2, for metering	0.2 FS 5 ,20VA	Class/VA	
8	Rated continuous thermal current ( % of primary current )	120	%	
9	Rated short time thermal current	25	kA	
10	Rated duration of short circuit	3	sec.	
11	Max. temperature rise at rated continuous thermal current	Acc. To IEC	K	
<b>G</b>	<b>VOLTAGE TRANSFORMER CHARACTERISTICS</b>			
1	Type	Dry with epoxy resin insulation	-	
2	Fix or drawout	Fix	-	
3	Rated primary voltage	20 / $\sqrt{3}$	kV (rms)	

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4	Rated secondary voltage	$110 / \sqrt{3}$	V (rms)	
5	Number of secondary windings	2	-	
6	Accuracy class	0.5+3P, 20VA	Class/VA	
7	Rated voltage factor			
7.1	Continuous	1.2	-	
7.2	For 8 hours	1.9	-	
8	Short circuit impedance	1	$\Omega$	

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9	Ferroresonance damping winding provided?(Yes/No)	Yes		
10	Primary H.V fuses	6.3	A	
11	Secondary L.V fuses	6	A	
<b>H</b>	<b>QUANTITY</b>			
<b>1</b>	<b>Incoming feeder (s) from power transformer(s),1250A, 25 kA, 3 Sec. , Each one equipped complete with the followings:</b>	<b>2</b>	<b>No.</b>	
1.1	Indoor type,Withdrawable ,Metal Clad cubicle,Three phase, 20 KV with busbars,supports, insulators, interlocking , operating facilities, wiring, connections, fittings, neon indicator lamp, controls, mimics, MCB's discrepancy & other switches, push buttons indicators, mimic diagram, heater, thermostats	1	Set	
1.2	Circuit Breaker, vacuum type,1250A, 25 kA, 3 Sec. ,Truck-mounted, Withdrawable, three phase, with operating mechanism, one trip coil, local & remote control, mechanical position indicator, wiring, auxiliary switch	1	Set	
1.3	Three phase, 20 KV Earthing facility for incoming cable, complete with appropriate interlocks	1	Set	
1.4	Bus-bar chamber, rated1250A complete with "tee" connections and orifice or plug bushings to circuit breaker compartment, automatic shutters, operating equipment and padlocking	1	Set	
1.5	Single Phase, 20 KV, Current transformer, 3core, multi-ratio, with rating and accuracy class stated	3	Set	

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<b>Item</b>	<b>Description</b>	<b>Particular</b>	<b>Unit</b>	<b>Offer</b>
1.6	Single phase,Voltage transformer, Fix, with fuse(6A,HRC), with rating,burden and accuracy class stated,	3	Set	
1.7	Cabel box, suitable for termination of at least 3 cables per phase to be installed? (Yes/No)	Yes	-	
1.8	Supporting framework with circuit breaker positioning gear, wiring interlocks multi-core cable glands, secondary terminals lables and accessories,complete	1	Set	
1.9	Neon indicator	3	Set	



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Item	Description	Particular	Unit	Offer
2	<b>20 KV Outgoing feeder(s), rated1250A 25kA, 3 Sec., complete, each feeder equipped with followings :</b>	<b>6</b>	<b>No.</b>	
2.1	Indoor type, Withdrawable, Metal Clad cubicle, Three phase, 20 KV with busbars, supports, insulators, interlocking, operating facilities, wiring, connections, fittings, neon indicator lamp, controls, mimics, MCB's discrepancy & other switches, push buttons indicators, mimic diagram, heater, thermostats	1	Set	
2.2	Circuit Breaker, vacuum type , rated1250A 25kA, 3 Sec., Truck-mounted, Withdrawable, three phase, with operating mechanism, one trip coil, local & remote control, mechanical position indicator, wiring, auxiliary switch	1	Set	
2.3	Three phase, 20 KV Earthing facility for outgoing cable, complete with appropriate interlocks	1	Set	
2.4	Bus-bar chamber, rated1250A complete with "tee" connections and orific or plug bushings to circuit breaker compartment, automatic shutters, operating equipment and padlocking		Set	
2.5	Single Phase, 20 KV, Current transformer, 2core, multi-ratio, with rating and accuracy class stated	3	Set	
2.6	Neon indicator	3	Set	
4	<b>20 KV Bus-section(Coupler), rated1250A, complete with the following:</b>	<b>1</b>	<b>No.</b>	
4.1	Three phase, indoor type , bus duct with supports , busbars , insulators , couplers , bus angle couplers , metal case covering , etc. complete as per chapters BUS & HVT and drawings.	1		

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4.2	Indoor type, Withdrawable, Metal Clad cubicle, Three phase, 20 KV with busbars, supports, insulators, interlocking, operating facilities, wiring, connections, fittings, neon indicator lamp, controls, mimics, MCB's discrepancy & other switches, push buttons indicators, mimic diagram, heater, thermostats	1	Set	
4.3	Circuit Breaker, vacuum type,1250A , 25kA/3 sec,Truck-mounted, Withdrawable, three phase, with operating mechanism, one trip coil, local & remote control, mechanical position indicator, wiring, auxiliary switch (Acc to chapter D)	1	Set	
4.4	Single Phase, 20 KV, Current transformer, 3core, multi-ratio, with rating and accuracy class stated	3	Set	
4.5	Single phase,Voltage transformer, Fix, with fuse(6A,HRC), with rating,burden and accuracy class stated	3	Set	
4.6	Three phase, 20 KV Earthing facility for bus bar complete with appropriate interlocks	1	Set	

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5	<b>Bus riser&amp;metering cubicle rated1250A, Fixed type, Three phase, with facilities, wiring, connections, heater, control and mimics, each one equipped with the followings:</b>	<b>1</b>	<b>No.</b>	
5.1	Three phase, 20 KV Earthing facility for bus bar, complete with appropriate interlocks	1	Set	
5.2	Bus-bar chamber, rated1250A complete with "tee" connections and orific or plug bushings to voltage transformer compartment, automatic shutters, operating equipment and padlocking	1	Set	
5.3	Single phase,Voltage transformer,Fixed,with fuse(6A,HRC), with rating,burden and accuracy class stated, (specification at chapterG)	3	Set	
5.4	Supporting framework with wirings interlocks secondary terminals labels and accessories,complete	1	Set	
5.5	Neon indicator	3	Set	

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Item	Description	Particular	Unit	Offer
<b>J</b>	<b>ACCESSORIES</b>			
1	Anti-condensation heater for L.V.(60w) & M.V. compartments(80w) provided?(Yes/No)	Yes		
2	H.V&L.V. compartment lighting (tunnel type 60w)& related door switch provided? (Yes/No)	Yes		
3	Local Spring charge/discharge indicator provided?(Yes/No)	Yes		
4	Remote Spring charge/discharge indicator(contact type) provided?(Yes/No)			
5	Type & size of L.V. compartment terminals	Polyamid suitable for 6mm <sup>2</sup> cross section stranded wire		
6	Heating & lighting circuit protection (2 pole , 6A)	230 VAC M.C.B		
7	Motor circuit protection (2 pole , 6A)	110 VDC M.C.B		
8	Control circuit protection	110 VDC M.C.B		
9	Protection circuit protection (2 pole , 6A)	110 VDC M.C.B		
10	Plug for connection of truck To L.V. compartment:			
10.1	For Incoming & Bus Section	1*48 Pin Plug		
10.2	For Outgoing&Capacitor	1*24 Pin Plug		
11	Suitable stopper for L.V. compartment door provided? (Yes/No)	Yes		

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12	Suitable 25*125mm beveled mica(RAL7035) with black engraving lables for front&rear of each panel provided? (Yes/No)	Yes		
13	Suitable 15*60mm with lettering 4mm high for all accessories mounted on the front of each panel provided? (Yes/No)	Yes		
14	Earth bar 40*3mm for M.V.& L.V compartment provided?(Yes/No)	Yes		
15	Position indication (semaphor) for earthing switch provided? (Yes/No)	Yes		
16	Control turn-push-turn discrepancy switch with 1 N/O contact for each close,open position,close&open command provided?(Yes/No)	Yes		
17	Local/Remote selector switch with 1 N/O contact for each position provided?(Yes/No)	Yes		

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Item	Description	Particular	Unit	Offer
18	Disconnectable & Shortable current terminal provided?(Yes/No)	Yes		
19	Lamp test push button with 2 N/O provided?(Yes/No)	Yes		
20	Hand type spring charging & non electrical close/open facility provided with operation counter for C.B. ?(Yes/No)	Yes		
21	Number of contacts for indication of service,test,withdrawable position of C.B.	min.3 contacts for each position		
22	Position indication (semaphor) for service , test & out of service position of breaker provided? (Yes/No)			
23	Duct & rail mounting ,auxiliary relays,terminals provided?(Yes/No)	Yes		
24	Internal wiring in each cubicle & external wirnig between cubicles provided?(Yes/No)	Yes		
25	Mimic diagram provided?(Yes/No)	Yes		
26	Eye bolts for transportation provided?(Yes/No)	Yes		
27	Gland & gland plate for cable compartment & L.V. compartment provided?(for M.V cable compartment shall be of non-ferrus material)	Yes		
28	Mechanically Operated Operations Counter For CB Provided?	Yes		
29	Requirement of the connection area of C.B. fingers & bus-bar	Silver plated conductive grease		

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30	<b>BRANDS:</b>			
31	<b>For: Braker</b>	<b>ABB</b>		
32	<b>For: Protection Relays</b>	<b>Siemens</b>		

**CUBICLES** : Safety explosion outlet shall be provided on top of each cubicle to avoid overpressure due to arcing --- Panel shall be bolted together, not welded --- 50~60 micron thickness of final paint .

**BREAKERS** : Mechanical interlocking to ensure that the CB cannot be drawn while the breaker is in the closed position --- anti-pumping circuit and controls.

**Note** : FINAL SPECIFICATION OF CURRENT TRANSFORMER(Class&VA) WILL BE GIVEN AFTER C.T. CALCULATION