

### 33 KV OPEN TERMINAL SWITCHGEAR

33 kV OPEN TERMINAL SWITCHGEAR		UNIT	DATA	
			REQUIRED	OFFERED
	33KV Circuit Breaker			
	General			
1.1	Manufacturer			
1.2	Place of manufacturing			
1.3	Type designation for breaker		Vacuum Type	
1.4	Type designation for operating mechanism			
1.5	Type of operation mechanism		Spring Charge motor operated	
1.6	Type of interrupting chamber			
1.7	Applicable standard		IEC 62271-200, 62271-102, 62271-1, 62155, 61869-1, 61869-	
1.8	Rated voltage	kV	36	
1.9	System Voltage	kV	33	
1.10	Rated current at maximum site temperature	A		
1.10.1	For Transformer feeder		Acc. to SLD	
1.10.2	For Bus Section		Acc. to SLD	
1.10.3	For Diameter		N.A.	
1.10.4	For Bus Coupler feeder		N.A.	
1.10.5	For Bus Section		Acc. to SLD	
1.10.6	For reactor feeder		N.A.	
1.10.7	For Line feeders		Acc. to SLD	

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1.11	Rated frequency	Hz	50	
1.12	Media of breaking chamber		Vacuum	
1.13	Single pressure, low pressure or others			
1.14	Quantity of poles per breaker		3 Poles	
1.15	Rated operating sequence		O -0.3 sec- CO - 3 min - CO	
1.16	Single pole or three pole operation			
1.16.1	For Transformer feeder		3 pole operated	
1.16.2	For Bus Section		3 pole operated	
1.16.3	For Diameter		N.A	
1.16.4	For Bus Coupler feeder		N.A	
1.16.5	For Bus Section		3 pole operated	
1.16.6	For reactor feeder		N.A	
1.17	Number of interrupting chambers per pole			
1.18	Class (indoor / outdoor)		Outdoor	
1.19	Circuit breaker type (live tank / dead tank)		Live tank	
1.20	Type of system earthing		Effective	
1.21	Withstanding in load combinations of earthquake, wind , short circuit , etc as mentioned in Technical Specification	(Yes/ No)	Yes	
1.22	Maximum and Minimum ambient temperature for design	°C	Acc. to section 1	
1.23	Design altitude above sea level	m	Acc. to section 1	

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1.24	Pollution level	mm/kV	Acc. to section 1	
1.25	Design seismic acceleration	g	Acc. to section 1	
	Insulation Rating			
1.26	Type of Insulator (porcelain/silicon rubber)		porcelain	
1.27	Basic Insulation level (at site condition)	kV peak		
1.27.1	Common value (Phase-phase, Phase-ground)		250	
1.27.2	Across the isolating distance		290	
1.28	One minute power frequency withstand voltage (at IEC condition)	kV rms		
1.28.1	Common value (Phase-phase, Phase-ground)		95	
1.28.2	Across isolating distance		110	
1.29	Switching Impulse Withstand Voltage at IEC conditions	kV peak		
1.29.1	Phase to ground and across open switching device		N.A.	
1.29.2	Phase to phase		N.A.	
1.29.3	Across isolating distance		N.A.	
1.30	Rated transient recovery voltage for terminal faults	kV peak	62	
1.31	Rated transient recovery voltage	kV peak		
1.31.1	Amplitude factor			
1.31.2	Rate of rise	kV/ $\mu$ s		
1.32	Rate of rise of restriking voltage			

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1.32.1	For 30% breaking capacity	kV/ $\mu$ s		
1.32.2	For 60% breaking capacity	kV/ $\mu$ s		
1.32.3	For 100% breaking capacity	kV/ $\mu$ s		
1.33	Maximum recovery voltage on breaking a synchronous system	kV		
1.34	Rated characteristics for short line faults	kV rms		
1.35	First pole to clear factor		1.5	
1.36	Whether circuit breaker is restrike free?		Yes	
1.37	Maximum overvoltage factor on any switching duty	pu	2.3	
1.38	Maximum overvoltage factor when interrupting rated line/cable/capacitor	pu	2.3	
1.39	Maximum overvoltage factor when switching small inductive/reactor	pu	2.3	
1.40	Maximum total break time (trip initiation to final arc extinction)	ms	<60	
	Current Ratings			
1.41	Rated short time withstand current & duration	kA rms/sec	25/1	
1.42	Rated short circuit making current	kA peak	2.5*25	
1.43	Rated out of phase breaking current	kA rms	10	
1.44	Rated small inductive breaking current	A rms	Acc. To IEC	
1.45	Rated capacitive breaking current			
1.45.1	Rated line-charging breaking current	A rms	Acc. To IEC	
1.45.2	Rated cable charging breaking current	A rms	Acc. To IEC	

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1.45.3	Rated Single/Back to Back Capacitor bank breaking current	A rms	Acc. To IEC	
1.46	Rated short circuit breaking current			
1.46.1	AC component	kA rms	25	
1.46.2	DC component	%	Acc. To IEC	
1.47	Maximum current on breaking asynchronous system	kA peak		
1.48	180° out of phase switching duty as a percentage of rated breaking current	%		
	Other Characteristics			
1.49	Voltage drop across MV terminals of one pole at 100 A dc	mV		
1.50	Maximum temperature rise at normal current over maximum	°C		
1.51	Opening time (from trip contact closing to the primary contacts separation in			
1.51.1	Without current	ms		
1.51.2	With 100% rated breaking current	ms		
1.52	Opening time from trip contact closing to primary contact separation	μs		
1.53	Closing time (from energization of close coil to latching of circuit breaker	μs		
1.54	Rated break or interrupting time (opening time plus arcing time)	μs		
1.55	Making time (energization of close coil to contact touch)			
1.55.1	Without current	ms		

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1.55.2	100% making current	ms		
1.56	Maximum break time	ms	<60	
1.57	Maximum close time	ms	<120	
1.58	Dead time (during auto-reclosing)	ms		
1.59	Reclosing	ms		
1.60	Arcing time	ms		
1.61	Maximum time interval between opening of first and last phase of three	ms		
1.62	Maximum time interval between opening of interrupters of one phase	µs		
1.63	Maximum time interval between closure of interrupters of one phase	µs		
1.64	Minimum time from extinction of main arc to contact make during auto-	ms		
1.65	Closing time from energisation of close coil to latching of circuit breaker in fully	ms		
1.66	Making time (energisation of close coil to contact touch)			
1.66.1	Without current	ms		
1.66.2	100% making current	ms		
	Operating Mechanism			
1.67	Type of spring		spring operated	
1.68	Motor type		DC Motor charged.	
1.69	Motor			
1.69.1	Rated voltage	V	110 VDC	

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1.69.2	Power demand	W		
1.69.3	Full-load current	A		
1.69.4	Maximum starting current	A		
1.69.5	Speed	rpm		
1.69.6	Required time by motor to charge the spring completely	s		
1.69.7	Type of protection of motor			
1.70	Hand operating facility	Yes/No	Yes	
1.70.1	Manual spring charging facility to be accessible from ground respectively platform to be provided	Yes/No	Yes	
1.70.2	Manual spring release (suitably positioned to avoid accidental	Yes/No	Yes	
1.70.3	Manual mechanism charging torque	Nm		
1.71	Mechanical on/off indicator	Yes/No	Yes	
1.72	Mechanical spring charge/discharge indication	Yes/No	Yes	
1.73	Charging time	S	≤12	
1.74	Number of trip coils per breaker		2	
1.75	Number of close coils per breaker		1	
1.76	Reclosing suitable for 1 pole and/or 3 pole		As protection diagram	
1.77	Whether circuit breaker is trip free or others?		Yes	
1.78	Number and type of spare auxiliary reversible contacts		6NO+6NC (min.)	
1.79	Opening and closing nominal control voltage	V dc		

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1.80	Control cabinet			
1.80.1	Power Socket in Control cabinet		British Standard	
1.80.2	cabinet Light (Compact LED)	Yes/No	Yes	
1.80.3	Number, type & power of cabinet heater			
1.80.4	cabinet space heaters (thermostat Controlled)	Yes/No	Yes	
1.80.5	Degree of protection (IP) of control cabinet		IP55	
1.80.6	Minimum thickness of steel control cabinet	mm	2	
1.81	Tripping and closing coils			
1.81.1	Number of closing coils		1	
1.81.2	Number of tripping coils		2	
1.81.3	Tripping coil current	A, DC		
1.81.4	Closing coil current	A, DC		
1.81.5	Rated power of trip coil	W		
1.81.6	Rated power of close coil	W		
1.81.7	Tripping and closing coils' nominal control voltage	V, DC	110	
1.81.8	Variation of closing / opening coils' operating voltage	%	85-110 / 70-110	
1.81.9	Minimum voltage for proper operation of trip & close coils	%	40	
1.81.10	- Pick up range of control voltage			
1.82	Whether antipumping device is provided?	Yes/No	Yes	
1.83	Whether operating counter is provided?	Yes/No	Yes	



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1.84	Whether emergency trip is provided?	Yes/No	Yes	
1.85	Whether circuit breaker is equipped with Local/ remote/ maintenance	Yes/No	Yes	
1.86	Whether circuit breaker is equipped with manually spring charge facilities?	Yes/No	Yes	
1.87	Whether Pre-insertion resistor is provided?	Yes/No	No	
1.87.1	Closing resistor value	$\Omega$		
1.87.2	Insertion time	ms		
1.88	Whether Switching Control Relay is provided?	Yes/No	No	
1.89	Pole discrepancy feature	Yes/No	Yes	
	Insulating Medium			
1.90	Insulating medium		Vacuum	
1.91	Rated pressure SF6 at 20°C	NA		
1.92	Limits of gas pressure for correct operation of breaker	NA		
1.93	Signal loss of SF6 at 20°C	NA		
1.94	General lockout at 20°C	NA		
1.95	Leakage rate of SF6 at rated pressure per annum	NA		
1.96	Type and material of gasket used to gas tightening the joints			
1.96.1	Metal to metal joints			
1.96.2	Metal to porcelain joints			
1.97	Supplier of SF6 gas			
1.98	Supplier of Density meter			

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1.99	Toxicological test			
1.100	Storage capacity of each gas cylinder	NA		
1.101	Whether sufficient gas plus 20% supplied for first filling?	NA		
1.102	Mass of gas stored cylinder	NA		
1.103	Time required to fill the circuit breaker with SF6 gas ready for operation	NA		
1.104	Time required to empty gas of the circuit breaker	NA		
1.105	Total mass of transportable gas handling equipment	NA		
1.106	Whether SF6 is stored as gas or liquid?	NA		
	Insulator Columns			
1.107	Manufacturer			
1.108	Type			
1.109	Color			
1.110	Creepage distance phase to ground	mm	1256	
1.111	Creepage distance between terminals of one pole	mm		
1.112	Protected creepage distance (90° shadow)	mm		
1.113	Clearance (phase to phase )	mm		
1.114	External striking distance			
1.114.1	Phase to ground	mm		

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1.114.2	Phase to phase	mm		
1.115	Ultimate strength of columns			
1.115.1	Cantilever	N		
1.115.2	Tension	N		
1.115.3	Torsion	N.m		
1.115.4	Compression	N		
1.116	Permissible force at MV terminals			
1.116.1	Static at any direction	N		
1.116.2	Dynamic at any direction	N		
1.117	Washable in service	Yes / No	Yes	
	Miscellaneous			
1.118	Mechanical life of CB and mechanism in No. of operations	time	10000	
1.119	Electrical contact life in number of operations at:			
1.119.1	Rated current	time	10000	
1.119.2	Breaking current	time	≥ 30	
1.119.3	Cumulative ampere rating	time		
1.120	Whether a lock out device for preventing circuit breaker to close is	Yes / No		
1.121	Whether Switching Control Relay is provided?	Yes/No		
1.122	Number and type of free auxiliary contacts for main contact monitoring		>10NO+ >10NC	
1.123	Number and type of free auxiliary contacts for SF6 gas pressure		>10NO+ >10NC	

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1.124	Number and type of free auxiliary contacts for local/remote selector		>10NO+ >10NC	
1.125	Whether circuit breaker is equipped with rings?	Yes/No		
1.126	Whether circuit breaker is equipped with grading capacitors?	(Yes/No)	Yes	
1.127	Mechanical on/off indicator	Yes/No	Yes	
1.128	Gas supervision	Yes/No	Yes	
1.129	Circuit breaker Operating platform (from ground level)	Yes/No	Yes	
1.130	Type and material for main contacts			
1.131	Material of MV conductor		Aluminum	
1.132	Whether contacts are silver plated?	Yes / No	Yes	
1.133	Un-galvanized metal parts shall primed, undercoated and finished with	Yes/No	Yes	
1.134	Galvanizing parts accordance with ISO 1461 standards		As per ISO-1461	
1.135	CB weight			
1.135.1	Weight of single pole breaker	kg		
1.135.2	Total weight of complete circuit breaker	kg		
1.135.3	Maximum weight of package ready for shipment	kg		
1.136	CB main dimensions			
1.136.1	Overall height of assembled circuit breaker	mm		
1.136.2	Phase spacing	mm		
1.136.3	Minimum vertical distance between upper and lower terminal of the circuit	mm		

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1.136.4	Minimum vertical distance between lower side of the circuit breaker and	mm		
1.137	Mechanical endurance class		M2	
1.138	Electrical endurance class		E2	
1.139	Restrike probability class due to capacitive current breaking		C2	