

**TAMCO 11kV METALCLAD
WITHDRAWABLE SWITCHGEAR: SCHEDULE OF TECHNICAL DATA**

Item no.	Description Ratings & Electrical Requirements	Unit	Performance Data*			
1	General Details					
	Manufacturer's Name Typical Layout and sectional Drg of Switchgear supplied to Australian environment Switchgear Model No Type		TAMCO REFER DRG NO CC/11AIS/08/2008 VHIH METALCLAD			
2	Applicable Standards					
	Enclosure		IEC 62271:200			
	Circuit Breaker		IEC 62271:100			
	Current Transformers		AS 60044.2			
	Voltage Transformers		AS 60044.2			
3	General Performance					
	Rated Frequency	Hz	50			
	Rated Voltage	kV (RMS)	11			
	Highest Voltage	kV	12			
	Rated Insulation Level: One minute power frequency withstand voltage Impulse withstand	kV (RMS) kV (Peak)	28 95			
	Rated Current (Options)	A	630	1250	2000	3150
			√	√	√	√
	Rated Short Time Current (Options)	kA (RMS)	20	25	31.5	40
			√	√	√	√
	Rated Duration of Short Circuit	Sec	3			
	Internal Arc Fault Performance (Options)	kA (RMS) Sec	25kA 0.1s	25kA 0.5s	25kA 1s	
			√	√	√	
	Rated Fifteen-Minute DC Withstand Voltage of Parts Directly Connected to Power Cables: Between Phases Between All Phases and Earth	kV DC kV DC	25 25			
	Operating Cycle		0-0.3S -CO-3 min-CO			
4	Circuit Breakers					
	Rated Operating Sequence Rated Short Circuit Making Current	kA (Peak)	50	62.5	79	100
			√	√	√	√
	Rated AC Component Short Circuit Breaking	kA (RMS)	20	25	31.5	40
			√	√	√	√
	Rated Transient Recovery Voltage (in accordance with IEC62271:200):					



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	TRV Peak Value for Terminal Faults at Rated Short Circuit Breaking Current (u_c)	kV	20.6			
	Time Co-ordinate (t_3)	μ s	60			
	Time Delay (t_d)	μ s	9			
	Voltage Co-ordinate (u^1)	kV	6.0			
	Time Co-ordinate (t^1)	μ s	29			
	Rate of Rise (u_c/t_3)	kV/ μ s	0.34			
	First-Pole-to-Clear Factor		1.5			
	Rated Power Frequency Recovery Voltage	kV (RMS)	12			
	Small Inductive Breaking Current:					
	Rated Small Induction Breaking Current	A (RMS)	20			
	Maximum Instantaneous Value of Current chopped by Circuit Breakers when breaking Small Inductive Currents	A (RMS)	5			
	Cable-Charging Breaking Current:					
	Rated Cable-Charging Breaking Current	A (RMS)	25			
	Maximum Instantaneous Value of Current chopped by Circuit Breakers when breaking Cable Charging Currents	A (RMS)	5			
	Maximum TRV when Breaking Cable-Charging Current up to rated Value:					
	On Supply Side of Circuit Breaker	kV (Peak)	12			
	On Load Side of Circuit Breaker	kV (Peak)	26			
	Opening Time	ms	25			
	Maximum Arching Time	ms	15			
	Rated Maximum Total Break Time	ms	< 60			
	Closing Time	ms	50			
	Rated Normal Current	A (RMS)	REFER OFFER SPECIFICS			
	Voltage Drop Across Terminal of a Pole at Rated Normal Current	Milli-Volts	4.2			
	Length of Each Break	mm	7			
5	Earthing Devices					
	Rated Short Circuit Making Current	kA (Peak)	50	62.5	79	100
			√	√	√	√
	Rated Peak Short Circuit Current	kA (Peak)	50	62.5	79	100
			√	√	√	√
6	Busbars and Connectors					
	Rated Normal Current	A (RMS)	1000	1250	2000	3150
	Main Busbar		√	√	√	√
	Circuit Connectors	A (RMS)	630	1250	2000	3150
			√	√	√	√



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	Resistance of Main Contacts for VCB Truck	Micro-Ohms	11	12	18	19
			√	√	√	√

7	Cubicle		Behind Closed Door Operation
	Whether separate metal compartments are provided for circuit breakers, fuse switches, busbars, current transformers, voltage transformers, cable boxes, i.e. whether switchgear is metalclad		SEPARATE METAL COMPARTMENTS ARE PROVIDED FOR CIRCUIT BREAKER, BUSBAR AND CABLE CHAMBER
	Whether switchgear is extensible		YES
	Degree of Protection		IP42
	Whether Space Heater is provided in the Switchgear		YES
8	Circuit Breakers		
	Rating	A	630 /800/ 1250/2000/3150
	Type of Circuit Breaker		VACUUM
	Vacuum Interruptor (Manufacture/Country of Origin)		EATON or TOSHIBA
	Number of Breaks per Pole		SINGLE BREAK PER POLE
	Length of Each Break	mm	7 (Minimum)
	Material Of Current Carrying Conductors		COPPER
	Type of Main Current Contact/Material		BUTT./COPPER ALLOY
	Type of Arching Contacts/Material		N/A
	Type of Arc Control Devices		VACUUM
	Thickness of Vacuum Circuit Breakers Shell Circuit Breaker Pole Chamber	mm	7.2
	Whether any separate Switch Trucks or Handles required for Circuit Breaker Transfer		NOT NECESSARY
	Method of Isolation (i.e. whether Circuit Breaker is horizontally isolated)		HORIZONTALLY ISOLATED
	Type of Isolating Contacts: On Circuit Breaker On Fixed Portion Material of Contacts		FINGER BAR COPPER
	Whether any Seal provided for the Orifice		METAL SHUTTER
	Whether it is possible to locate the Circuit Breaker in the following position: Service position Disconnected position Test position Removed position (Maintenance position) Circuit Earth position		YES YES YES YES N/A – SEPARATE EARTH

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			SWITCH PROVIDED ON LOAD SIDE OF VCB
9	Interlocks		
	Type of Interlocks provided for Switchgear (i.e. Electrical or Mechanical)		MECHANICAL (BETWEEN CB & E/S). FORTRESS KEY INTERLOCKS OPTIONAL.
10	Earthing		
	Whether the following Earthing Facilities are provided: Earthing of Circuits Earthing of Busbar		YES YES (OPTIONAL)
	Method of Earthing Through Circuit Breaker Whether Integral Earthing		N/A SEPARATE INTEGRAL EARTH SWITCH WITH MECHANICAL INTERLOCK)
11	Durability		
	Operating Design Life (Rated Current)	Times	10,000
	Contact Life at Rated Interrupting Capacity	Times	30
	Type of Power Closing Devices		MOTORISED SPRING CHARGED OPERATION
	Method of Opening Devices		SHUNT TRIP COIL
	Time Required to charge Spring in a Spring Closed Breaker	sec	≈ 8
12	Recommended Maintenance Intervals		
	Recommended Life Expectancy	Years/Ops	25/10,000
	Operating Mechanism	Years/Ops	5/500
	Contacts & Interrupting Mechanisms	Years/Ops	5/500
	Control & Ancillary gear	Years/Ops	5/1000
13	Operational Aspects		
	Whether Circuit Breaker can be Closed whilst the Closing Spring is being charged		NO
	Whether Closing Spring can be Charged with the Circuit Breaker in the Closed Position		YES
	Whether Locking Facilities are provided for the Manual Tripping of the Circuit Breaker		YES
	Whether the following Position Indicators are provided: For Circuit Breaker Spring Charged Spring Free "ON" "OFF" Earth "ON"		YES YES



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	Earth "OFF"		YES			
14	Insulation					
	Minimum Clearance of any Live Parts w/o Insulating Material:					
	Circuit Breaker					
	Between Phases	mm	115 (95kV BIL)			
	Live Part to Earth	mm	115 (95kV BIL)			
	Type of Solid Insulating Material for:					
	Busbars		EPOXY			
	Busbars to Circuit Breaker		POLYURETHANE (P.U.)			
	Circuit Breaker Isolating Contact Orifices		POLYURETHANE (P.U.)			
	Circuit Breaker to Cable Box Connectors		POLYURETHANE (P.U.)			
	Circuit Breaker Contact Arms		PLUG-IN CONTACT			
	Current Transformers		RING TYPE CT - PVC TAPE			
			WOUND TYPE CT - EPOXY			
	Voltage Transformers		EPOXY			
15	Busbar and Connectors					
	Material of Busbar and Connector		PU Insulated COPPER			
	Cross-sectional area of Busbars and Connector Conductors:					
	Main Busbar	mm	1-10x75 (1000A)			Tinned
			1-10x75 (1250A)			Tinned
			1-10x150 (2000A)			Tinned
			2-10x150 (3150A)			Tinned
	Connectors	mm	1-10x75 (630/1250A)			Tinned
			3-10x75 (2000/3150A)			Tinned
	Type of Busbar and Connector Insulating Materials and whether Condenser Bushings used		PVC – DIP MOULD FOR JOINTS			
16	Dimensions and Weights					
	Panel Width	mm	700 (630A)	800 (1250/ 2000A)	1000 (3150A)	1000 (1250/ 2000A)
	Panel Depth	mm	√	√	√	√
	Panel Height	mm	1648 (Typical)			
	Cubicle Weight	Kg	1926 (Typical)			
	Weight with VCB	Kg	350 SINGLE BUS- FEEDER		500 DOUBLE BUS- FEEDER	



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			450 SINGLE BUS- FEEDER	600 DOUBLE BUS- FEEDER
17	Cable Termination			
	Whether Cable Box is provided		INTEGRAL PART OF REAR OF PANEL	
	Type of Cable Termination		HEAT SHRINK OR EQUIVALENT	
	Cable Gland Plates Provided		YES	
18	Voltage Transformers			
	Whether 3 Phase or Single Phase VTS Provided where required		SINGLE REFER OFFER FOR SPECIFICS	
	Highest Working Voltage	kV	1.2 TIMES	
	Whether Primary of VTS are Protected with Fuse Links		YES	
	Rated Voltage Factor/Duration		1.9 FOR 10 SECONDS	
	Whether VTS are installed on Load Side of Circuit Breaker		YES	
	Type of Core Material		SILICON STEEL	
	Whether it is Withdrawable Type		YES	
19	Neon Indication			
	Type of Neon Potential Indicators		VOLTAGE TAPED FROM BUSHING ON WHICH RING CT'S ARE MOUNTED OR FIXED VOLTAGE TERMINAL ON WOUND BAR CT	
20	Switchgear Metal Enclosure			
	Thickness of Enclosure Metal Panels	mm	2.0	
21	Earthing Bars			
	Cross Sectional Area of Copper Main Earth Bar for Switchboard	mm	180	
	Cross Sectional Area of Copper Subsidiary	mm	180	
22	Locks and Locking Facilities			
	Whether Locking Facilities are provided for:		YES	
	Shutter on the Busbar Orifice		YES	
	Shutter on the Circuit Orifice		YES	
	Circuit Breaker in its Service Position		YES	
	Circuit Breaker in its Earth Position		N/A: EARTHING IS VIA INTEGRAL EARTHING SWITCHES AND IS PADLOCKABLE	