

VH1F

12kV 800...2000A 25kA
**FIXED VCB AIR INSULATED
SWITCHGEAR**

Safe | Reliable | Compact



The New Age Sustainable Solution For Electrical Switching

The switchgear specialist

www.tamco.com.my

TAMCO

Introducing VH1F up to 12kV 2000A 25kA fixed type Air Insulated Switchgear with vacuum circuit breaker, VH1F offers the flexibility higher reliability of GIS type but with air insulation. It has ample termination space, high air clearances yet has the most compact dimensions.

VH1F is designed for high operational safety, minimal maintenance with an impressively small footprint. VH1F's modular design provides a perfect platform for building reliable distribution network in a compact substation space.

SMALL FOOT PRINT

VH1F family has a modular design with compact foot-print and rigid design.

Modern fixed Circuit Breaker's greatly reduce maintenance needs and provide civil cost savings by reducing space requirement up to 35%.

CUSTOMISABLE DESIGN

TAMCO has designed the VH1F switchgear keeping in mind the customer's flexibility for cable termination either from front or rear with cable entry option from top or bottom.

ENVIRONMENT FRIENDLY

VH1F is based on ecofriendly vacuum technology and uses natural air as insulation medium.

EASE OF OPERATION

Mimic diagrams and directly driven position indicators to guide the operators for operation with any detailed training. Additionally this reduces the chance of any undesired operation.

SAFE OPERATION

VH1F offers all mandatory interlocks and padlocks for fool proof operation. Extensive operational safety interlocks like PERMISSIVE interlock, PROOF OF EARTH, POINT OF ISOLATION etc. are incorporated in the product.

MAXIMUM RELIABILITY

VH1F has less movable parts and the time proven TAMCO's mechanism having field experience of more than 40 years, designed for high service life and offers a reliable switching operation.

EASE OF INSTALLATION

Installation and commissioning at site is very easy due to the option of sending 5 coupled units from factory, which have been wired & fully inter-connected including busbar, earthing etc. This simplifies the planning and reduces the installation time.

MAINTENANCE FREE

The circuit breaker is fixed type with no racking mechanism, no withdrawable isolating contacts, no shutter and fewer switchgear components with no associated maintenance required.

COMPLIANCE WITH

- IEC 62271 - 100 : High Voltage Circuit Breakers (1 kV - 52 kV)
- IEC 62271 - 200 : High Voltage Metal Enclosed Switchgear (1 kV - 52 kV)
- IEC 62271 - 102 : High Voltage Disconnectors & Earthing Switches
- IEC 62271 - 1 : High Voltage Switchgear and Controlgear - Common Specifications
- IEC 60137 : Insulated Bushing
- IEC 60529 : Degree of Protection

DELIVERING PEACE OF MIND

INTRODUCTION

The foundation of TAMCO's Air Insulated Switchgear is built around innovation, technology, intelligence and flexibility, combined with the highest quality, it satisfies all the latest international standards. VH1F your power needs are satisfied by our promise to optimum results; enhanced safety, greater reliability, operating cost efficiencies, effective use of capital, and superior performance.

VH1F offers modular compact design and equipped with the safety interlocks like Proof of Isolation, Proof of Earth, and Permissive Interlocks that is required for making a safe and reliable network system with an ease of installation in minimum floor space.

KEY FEATURES

- Most compact foot print with rigid structure
- Reduced substation dimensions saving civil and land costs
- Option for front, rear and dry type cable termination with cable entry from bottom and top
- Safe, positive and fool proof interlocks
- Cable door & VCB interlocked
- Pad-lockable VCB & 3-position isolator duly interlocked
- Fully modular design with extension on both sides
- Fixed VCB with motorised mechanism for switching
- Front cable entry & no rear clearance required
- Position of 3 position switch directly and easily visible without opening any cover in addition to the indicator



CUSTOMER BENEFITS

- Reduces cubicle space requirement and therefore saving in civil and land cost
- Mechanical endurance (M2) 10000 operations
- Safe operation behind close door
- Internal Arc classifications AFLR 25kA 1 sec
- Voltage detection system (VDS) as standard offering
- Cost optimised solution for distribution networks
- Peace of mind with very less maintenance
- Option of fixed VT with draw out primary fuses
- Flexibility of accommodating higher numbers CT's
- Ease of operation with direct and self exploratory interlocks/indicators



GENERAL

NORMAL SERVICE CONDITIONS

Temperature: -5°C to 40°C.

Installation Altitude: Normally up to 1000m. At higher installation altitudes, the reduced voltage endurance must be considered.

Air Pollution: The ambient air must be free of dust, smoke, corrosive or combustible gases, steam and salts.

Air Humidity:

- The average air humidity measured over a period of 24 hours, must not exceed 95%.
- The average vapour pressure, measured over a period of 24 hours, must not exceed 22 mbar.

- The average air humidity measured over a period of one month, must not exceed 90%.

The average vapour pressure, measured over a period of one month, must not exceed 18 mbar. Condensate may form in case of sudden temperature fluctuations due to excessive ventilation, increased air humidity or hot air. Such condensate formation can be avoided by a suitable arrangement of the room or the building (suitable ventilation, air dehumidifier, heating etc.)

APPLICATIONS

- Primary substation
- Distribution substation
- Industries
- Airports, Seaports
- Railway networks distribution stations
- Large infrastructures
- RMU applications
- Compact substation
- Mobile substation

For special cases and requirements, please contact the TAMCO Sales personnel nearest in your region.



TECHNICAL DATA

ELECTRICAL CHARACTERISTIC

GENERAL

Standards		IEC62271-200
Rated Voltage	kV	12
Rated frequency	Hz	50
Rated normal current	A	800 / 1250 / 2000
Rated insulation level	kV-peak	75/95
	kV-rms	28/38
Rated short time withstand current	kA	25
Rated duration of short time current	sec	3
Rated symmetrical short time breaking current	kA	25
Rated short circuit making current	kA	63
Internal Arc	kA/1sec	25
Rated cable charging current	A	25
Rated line charging current	A	10
Capacitor switching current	A	400

VACUUM CIRCUIT BREAKER (VCB)

Standards		IEC62271-100
Rated voltage	kV	12
Type of circuit breaker		Vacuum
Rated short circuit breaking current	kA	25
Rated short circuit making current	kA	63
Breaking time	maximum (m sec)	60
Type mechanism		Motor charged spring stored energy
Operating sequence		O-0.3sec – CO -15s - CO

ISOLATOR

Standards		IEC62271-102
Rated voltage	kV	12
Rated short circuit current	kA	25
Operation		Manual

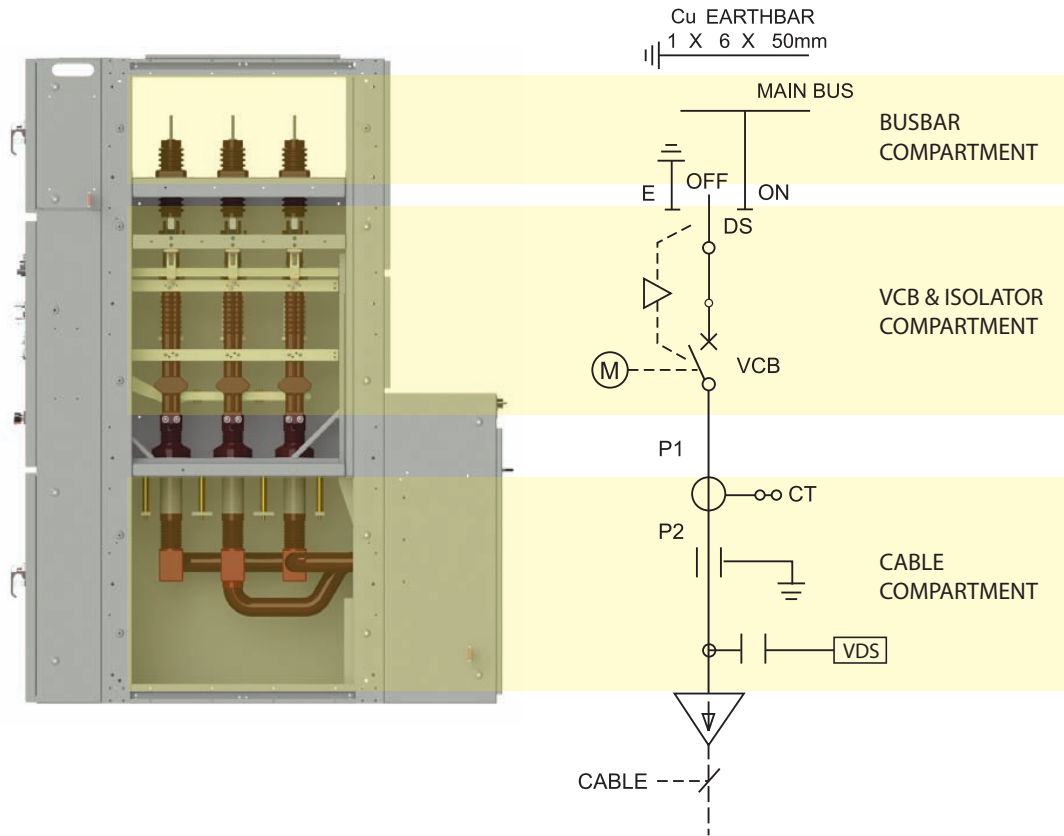
DESIGN CHARACTERISTIC

Standards				
Rated voltage	kV	12		
Rated normal current	A	800	1200	2000
Width	mm	450		700
Depth	mm	1300/1700**		
Height	mm	2300**		
Rated Frequency	Hz	50		
Approx. Weight (excluding CT, VT, LV)	Kg	550	600	800
Internal arc classification		AFLR		
Partition class		PM		
Ingress protection class		IP4X		
Classification		E2 C2 M2		

* Higher BIL for specific application.

** Height and depth may vary for different configuration.

DESIGN



CUBICLE

Made of high grade pickled-&-oiled mild steel sheets, cut and folded on numerically controlled machines, the cubicle parts are painted by an advanced Cathode Electro Deposition (CED) process which provides optimum protection against corrosion and weathering.

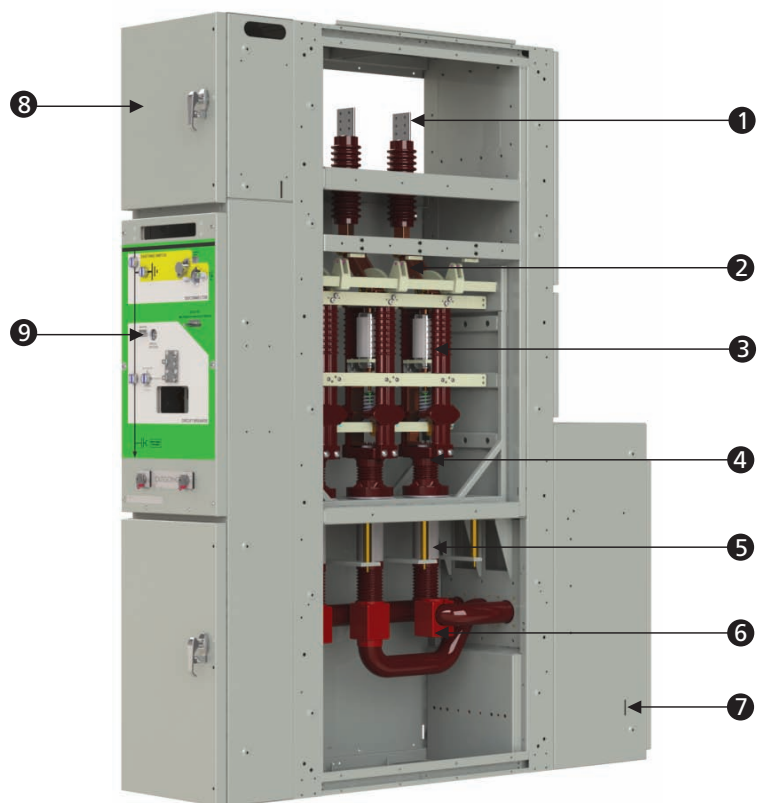
The paint work is tested to withstand 1000 hours in a 5% salt spray, in accordance with Japanese standard JIS-Z-2371.

The cubicle parts are riveted/ bolted together to form a rigid enclosure with fully segregated:

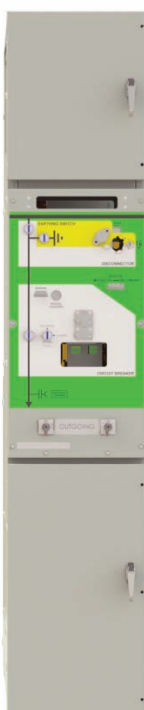
- Cable compartment with option of cable entry from front, rear or top.
- Fixed VCB compartment with user friendly operation facia.
- Both side extensible busbar compartment.



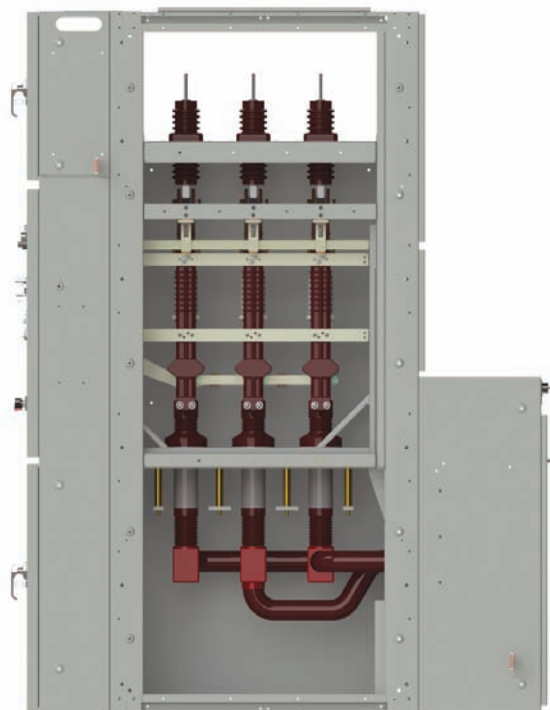
DESIGN



1.	Busbar Bushing
2.	No load Isolator
3.	Vacuum Interrupter
4.	Circuit Breaker Module
5.	CT Bushing
6.	Cable Bushing
7.	Earth Bar
8.	LV Compartment
9.	Operating Facia



FRONT

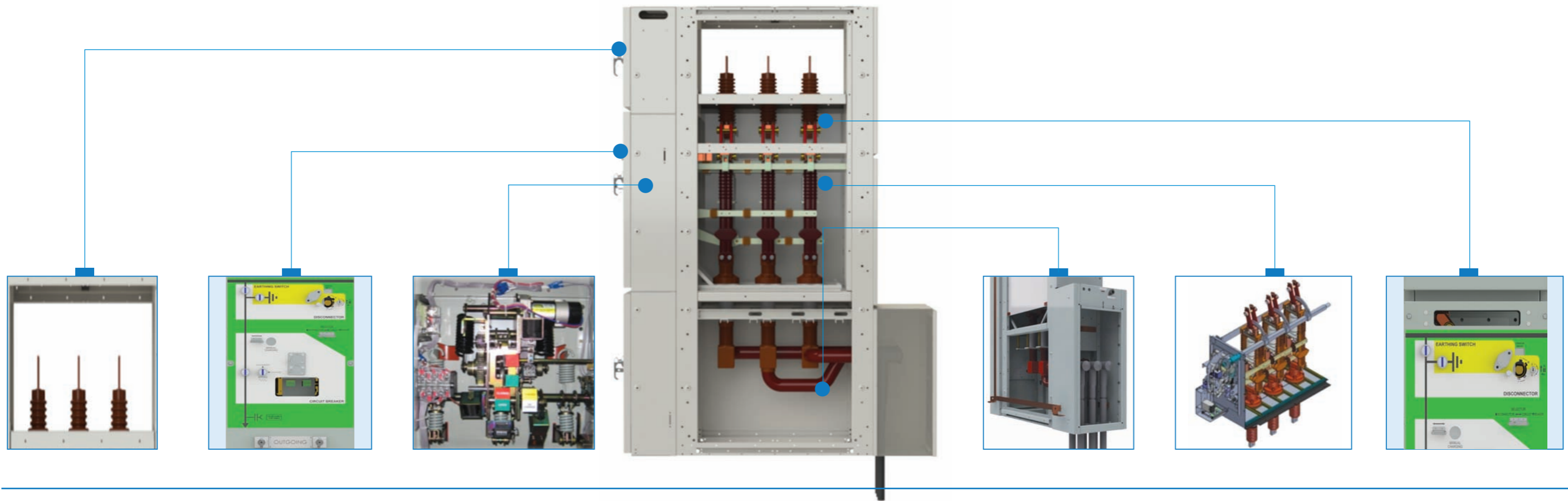


SIDE



REAR

COMPONENTS



BUSBAR COMPARTMENT

The busbars are fully coated with epoxy insulation. Busbar joints are shrouded with specifically designed Class C rated removable silicon boots.

CUBICLE INTERFACE

The mechanical control facia is located at an ergonomically convenient height and arranged in a recessed position on the switchgear front.

VCB OPEARTING MECHANISM

Stored energy spring type reliable TAMCO mechanism with field experience of more than 28 years. Lesser number of parts in the main link ensuring a higher MTBF. Built in anti-pumping feature.

CABLE COMPARTMENT

Ample cable termination height with option of front termination rear bottom cable termination and top cable entry.

VACUUM CIRCUIT BREAKER

The fixed type Vacuum Circuit Breaker is connected to an epoxy coated connection to cable compartment on one side and an epoxy coated connection to isolator on the other side.

THREE POSITION SWITCH

The disconnecting switch (DS) provided in the panel is of a 3-position operator independent type. The whole driving mechanism is accessible from the front panel.

SAFETY

VH1F is designed to maximise safety in installation, operation and maintenance. It complies with the latest IEC standards and fitted with all mandatory interlocks and padlocks as recommended by the international standards.

INTERLOCKS

VCB/DISCONNECTOR INTERLOCK

- Disconnector can be operated only when VCB is in "OFF" condition.
- VCB can't be operated, either mechanically or electrically, when Isolator is accessed.

PROOF OF EARTH

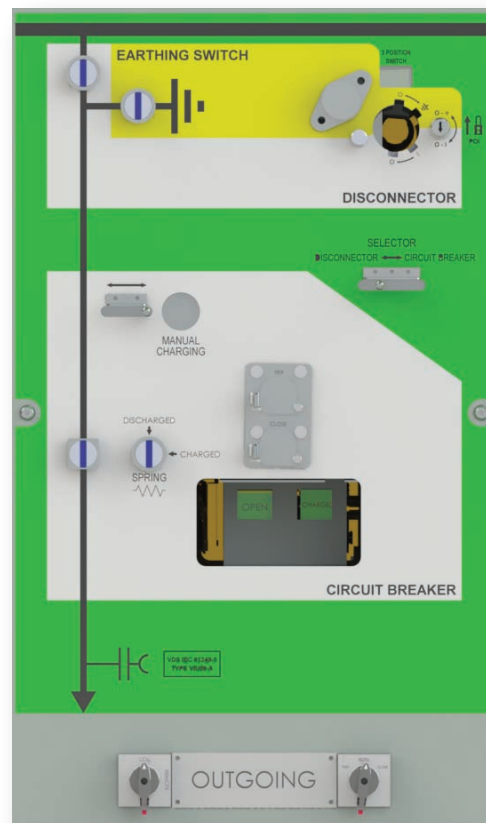
- Key can't be removed in any position other than when cables have been connected to "EARTH".
- Allows operation of Isolator from "EARTH" to "OFF" only when key is trapped.

POINT OF ISOLATION*

- Restricts the Isolator to be moved to "ON" position if the POI is established (i.e. closed).

CABLE ACCESS

- The Cable access cover can't be open unless the cable is connected to "EARTH".
- Disconnector operation is not possible if the cable access cover is "OPEN".



* Optional features available upon customer request

SAFETY

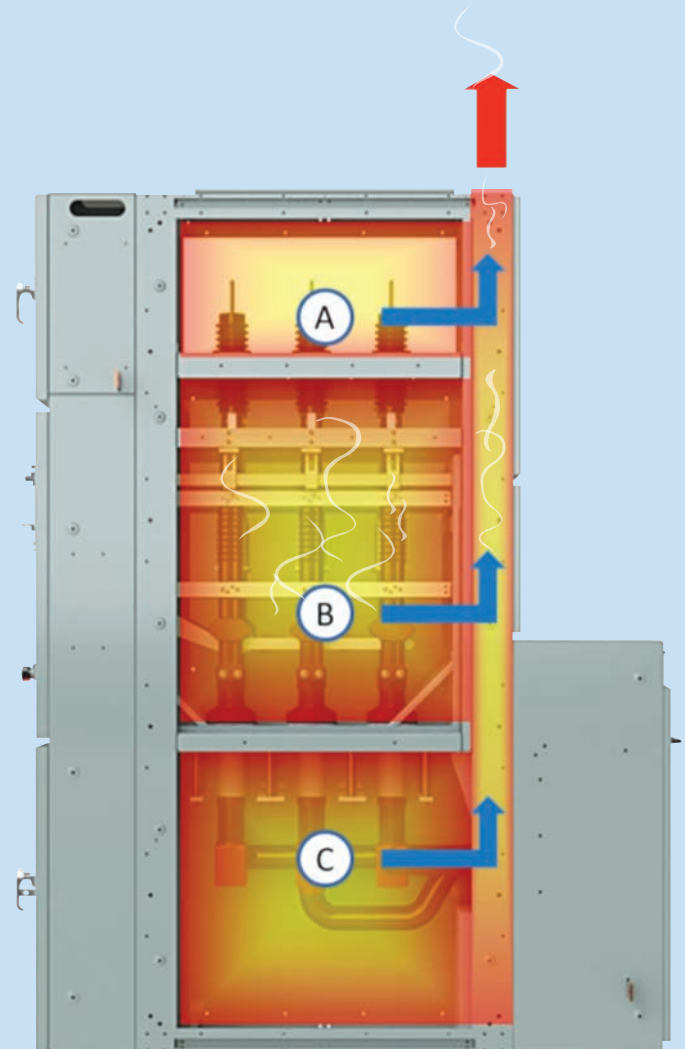
INTERNAL ARC SAFE DESIGN

Arc faults are a type of short circuit with a huge energy level and very high temperature and pressure could result in personnel injury extensive damage, and monetary loss if not withstood correctly by the switchgear.

When an internal arc fault occurs, the mechanical parts are subjected to considerable amount of stress due to development of high pressure in the enclosure.

To avoid the destruction of switchgear assembly it is necessary to integrate over-pressure relief systems. Besides this, the people close to the switchgear are also at high risk during the internal arc fault. The safety of operators against hot gases, radiation and fragmentation of the enclosure must be ensured.

VH1F are tested at 25kA for 1 second as per the latest IEC-62271-200 standards to ensure safety during unlikely event.



- Ⓐ Busbar Compartment
- Ⓑ Breaker Compartment
- Ⓒ Cable Compartment

EARTHING

Proper earthing of switchgear ensures safe working condition. In VH1F the earthing of switchgear components are achieved by moving the disconnector to "EARTH" position. The VCB needs to be switched ON after moving the disconnector to EARTH position as earthing is done through VCB.

Cable, VCB earthing are achieved by connecting the disconnector earth bar to cubicle body. In cable compartment the cubicle body is connected to the main earth bar running through the panel board.

ISOLATION

The disconnector (Isolator) have three distinct positions viz. ON, OFF and EARTH.

Physical separation ensures foolproof electrical isolation and absolute safety of the operator. All the three positions are achieved with the door closed.

Internal arc vented through dedicated duct for complete operator safety.

SAFETY

TYPE TESTS

VH1F have undergone all the mandatory, supplementary and additional type tests requested by different clients as per latest IEC standards.

TAMCO has performed all the type tests at international laboratories at CESI, KEMA, IPH etc. Additional type tests have been carried out on VH1F to prove its robustness, reliability and safety.

ROUTINE TESTS

To ensure quality and reliable products delivered to its customers, TAMCO performs the following routine tests on each of its product before delivery:

- Visual inspection and checks
- Power frequency test
- Partial discharge
- Mechanical and electrical operation sequence
- Measurement of main circuit resistance
- SF₆ Leak detection test



PRODUCTS VARIANTS

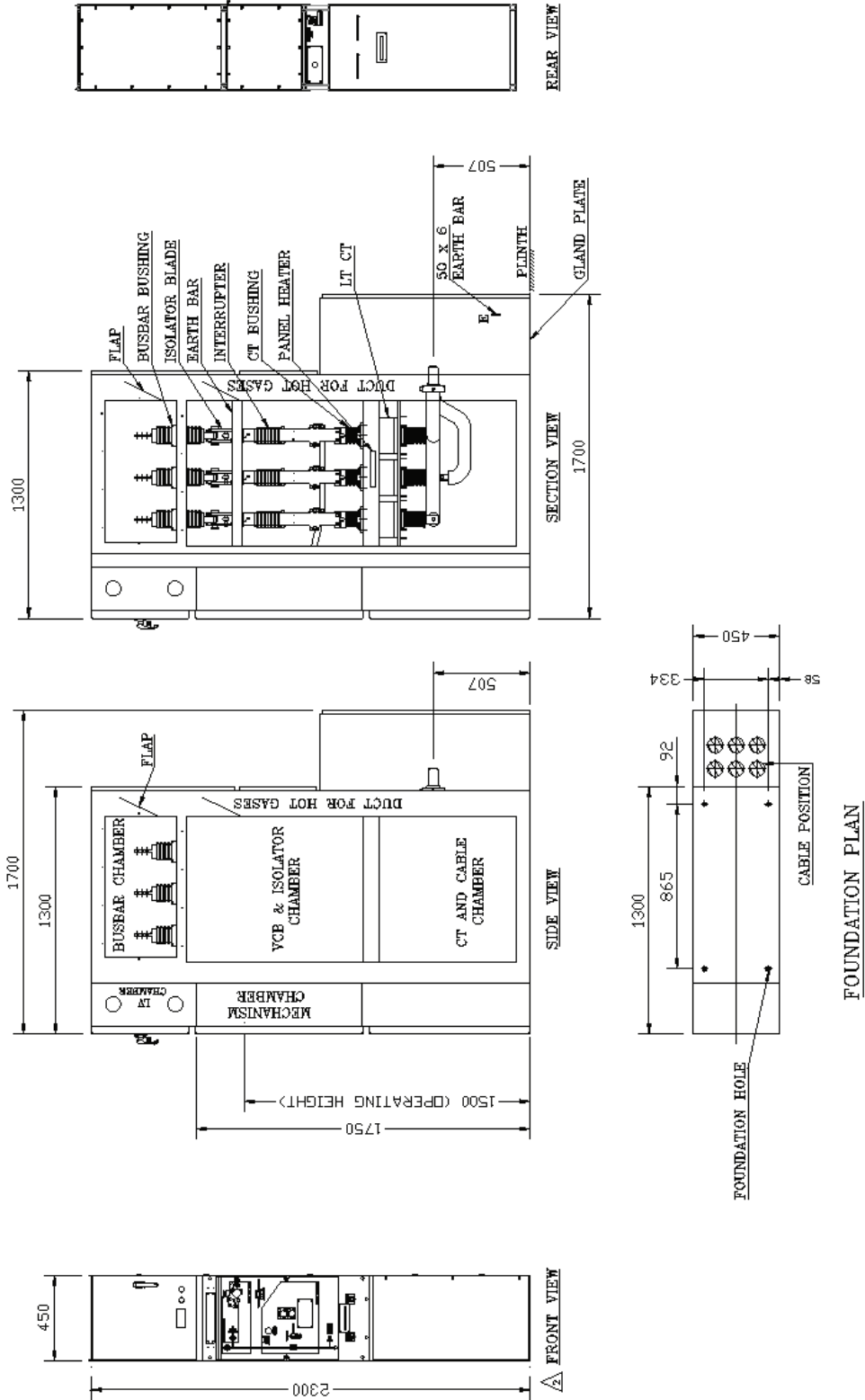
	Feeder/Incomer	Feeder with Line VT
Typical Single Line Diagram		
Width (mm)	450 / 700	700
Depth (mm)*	1300 / 1700	1300 / 1700
Height (mm)*	2300	2300

	Bus Transition Panel	Busbar VT Panel
Typical Single Line Diagram		
Width (mm)	450+450 / 750+450	700
Depth (mm)*	1300 / 1700	1300
Height (mm)*	2300	2300

* Depth, Height and Weight may vary depending on the configuration.
 Note: Current transformers are offered based on customer.

GENERAL ARRANGEMENT

800A FEEDER



TAMCO is a part of Larsen & Toubro conglomerate. We design, manufacture and market a wide range of medium voltage electrical systems, control and automation systems, electrical products and metering and protection systems.

VH1F is Tamco's fixed VCB air insulated switchgear range designed to match international standards of quality. It makes your applications safe, uses space economically and diminishes hazards. VH1F saves your time and energy, enhancing cost optimisation. Used in a wide range of application, this is the eco-friendly choice.



VH1F: Building safe, reliable and efficient electrical networks

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We believe tomorrow is not just the extension of today. Its a whole new era. An era where innovation revolutionizes the thoughts. ”

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TAMCO



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TAMCO Switchgear (Malaysia) Sdn Bhd

Sublot 24, Lot 16505, Jalan Keluli 1, P.O.Box 2100, Kawasan Perindustrian Bukit Raja Seksyen 7
40802 Shah Alam, Selangor Darul Ehsan, MALAYSIA.

Tel: +603-3361-8200 Fax: +603-3341-6200 Email: sales@tamco.com.my Web: www.tamco.com.my

Global Network Offices: Malaysia / Australia / Indonesia / KSA / UAE / Qatar / Oman / India

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