# <u>VH2</u>

## 24kV 630A...2500A up to 31.5kA AIR INSULATED SWITCHGEAR

Safe Reliable Compact



The New Age Sustainable Solution For Electrical Switching



The switchgear specialist

www.tamco.com.my

Tamco's VH2 Air Insulated Switchgear has established a global reputation for reliability across applications over the decades. It incorporates eco-friendly vacuum technology and offers a number of advantages including superior arc fault containment, fail-safe and positive interlocks, compactness, greater versatility in application and minimal need for maintenance.

### **SAFETY & INTERLOCKS**

VH2 is Internal Arc Fault tested up to 31.5 kA for 1 sec. This offers the highest safety levels in the unlikely event of internal arc faults.

The detailed instructions about operations & interlocks are screen printed on the VCB compartment door for convenience.

### **CUSTOMISABLE DESIGN**

TAMCO has designed the VH2 switchgear keeping in mind the customer's flexibility for various VT options ie fixed type, draw out type and swing out type.

### **ENVIRONMENT FRIENDLY**

VH2 is based on eco-friendly vacuum technology and uses natural air as insulation medium.

### **EASE OF OPERATION**

VH2 incorporates a "single handle" operation for easy latching during opening and closing of the VCB door, eliminating the need for fasteners and allowing quick and easy operation.

### **SMART ADDITION**

VH2 Panel coupling at site is made simple and safe through easily accessible busbar connections and links. It also offers all mandatory interlocks and padlocks for fool proof operation.

### **STAY CONNECTED**

The movement of VCB within the cubicle is independent of floor surface condition. VH2 has option of cassette type VCB without any major alterations in panel

### **MORE SPACE MORE CAPABILITIES**

Ample space is provided for terminating power cables to allow higher bending radius and reduced tension on terminal palms.

### **EFFECTIVE CUSTOMER SUPPORT**

Dedicated executives and aftersales personnel cater to your installation, commissioning and maintenance needs.

### COMPLIANCE WITH

Products are tested at International labs such as CESI (Italy), KEMA (Netherlands) as per:

- 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





## 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. With VH2, the power needs are met with enhanced safety, greater reliability, operating cost efficiencies, effective use of capital, and superior performance.

### **KEY FEATURES**

- Breaker movement inside panel is independent of floor conditions
- Reduced substation dimensions saving civil and land costs
- Sufficient cable termination height
- Safe, positive and fool-proof interlocks
- Cable door & VCB interlocked
- Option Separate VT compartment (e.g. fixed type, swing type and draw-out type)
- Optional motorised rack-in & rack-out
- Readily extensible
- All operations behind close door
- Solid insulated busbars and spouts
- Gas duct or deflector type design available as option



### **CUSTOMER BENEFITS**

- Reduces cubicle space requirement
- Mechanical endurance (M2) 10000 operations
- Safe operation behind close door
- Internal Arc certified (IAC) 31.5 kA 1 sec
- Peace of mind with very less maintenance.
- Ease of operation with mechanical operator interface
- Ease of installation
- Readily extensible on both sides
- Minimal operator training required





## **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 vapor 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
- Oil & Gas
- Mining
- Material Handling
- Industries
- Airports, Seaports
- Railway networks distribution stations
- Large infrastructure

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





## **TECHNICAL DATA**

### **ELECTRICAL CHARACTERISTIC**

GENERAL					
Standards		IEC62271-200			
Rated Voltage	kV	24			
Rated frequency	Hz	50			
Rated normal current	А	800 / 1250 / 2000 / 2500			
Rated insulation level	kV-peak	125			
	kV-rms	50			
Rated short time withstand current	kA	25 / 31.5			
Rated duration of short time current	sec	3			
Rated symmetrical short time breaking current	kA	25 /31.5			
Rated short circuit making current	kA	63 / 79			
Internal Arc	kA/1sec	25 / 31.5			
Rated cable charging current	A	31.5			
Rated line charging current	A	10			
Capacitor Switching current	A	400			

### VACUUM CIRCUIT BREAKER (VCB)

Standards		IEC62271-100			
Rated voltage	kV	24			
Rated normal current	А	800 / 1250 / 2000 / 2500			
Type of circuit breaker		Vacuum			
Rated short circuit breaking current	kA	25 / 31.5			
Rated short circuit making current	kA	63 / 79			
Breaking time	cycle	3			
Type mechanism		Motor charged spring stored energy			
Operating sequence		O-0.3sec – CO-3 min-CO			

### DESIGN CHARACTERISTIC

Standards							
Rated voltage	kV	24					
Rated normal current	A	800	2500				
Width	mm	820 1000					
Depth	mm	2015 / 2360*					
Height	mm	2100*					
Rated Frequency	Hz	50					
Approx. Weight (excluding CT, VT, LV)	Kg	700 / 800					
Internal arc classification		AFLR					
Partition class		PM					
Ingress protection class		IP4X					
Classification		E2 C2 M2					

\* Height and depth may vary for different configuration.



## DESIGN

TAMCO's VH2 Switchgear is based on decades of experience of catering to a wide variety of customer requirements ranging from cassette or truck mount single or double tier, manual or motorised type of switchgears. This experience enables TAMCO to offer versatile, safe and end user friendly products.

VH2 comprises PM class medium voltage switchgear assemblies up to 24kV and features a cubicle width only 820mm for ratings up to 2000A and fault levels 31.5kA for 3s. VH2 is robustly designed and built to perform even the most adverse environments.

The switchgear is absolutely safe and designed to work in a wide range of applications including utility, industrial infrastructure and complies with the latest IEC standards.

- IEC62271-100
  High Voltage Circuit Breakers (1 kV 52 kV)
- IEC62271-200 High Voltage Metal Enclosed Switchgear (1 kV - 52kV)
- IEC62271-102 High Voltage Disconnector & Earthing Switches
- IEC62271-1 High Voltage Switchgear and Control Gear: Common Specifications
- IEC60137 Insulated Bushing
- IEC60529 Degree of Protection





## DESIGN

### **VH2 FEATURES**





### CUBICLE

Tamco offers standard and customised cubicle variants available for customers depending on requirements for CTs, VTs and power cable termination.





### VACUUM CIRCUIT BREAKERS

Optional cassette type as well as floor rolling VCB.





### COMPONENTS

Option for either swing-out VT or trolley VT.



BOTTOM TROLLEY VT



2015mm



## ΤΑΛΛΟ

## **COMPONENTS**



The LV compartment is fitted with indicators and mimic diagram for ease of operation.

LV COMPARTMENT



### VCB

The VCB can be either floor rolling or cassette type based on customer requirements. The lower portion of the VCB remains static at TEST position whilst the upper portion engages with the SERVICE position, making the rackin and rack-out process independent of floor.





### **BUSBAR SYSTEM**

Generous electrical clearances for main busbars and tee-off busbars and associated connections provide unmatched safety.



### **PROTECTIVE SHUTTER**

The earthed metallic, spring operated shutters ensure protection against accidental contact even when VCB is isolated or withdrawn. The independent operation and padlocking of the busbars and cable shutters enhances safety during maintinance.



### EARTH SWITCH

Safety of operating personnel is achieved by a make proof earthing switch for cable side earthing during routine maintenance.





**CABLE COMPARTMENT** The cable termination height is generally more than 750mm from the floor level which provides a generous space for terminating power cables.



## ΤΑΛΛΟ

## SAFETY

VH2 is designed to maximize 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 AND EARTH SWITCH INTERLOCKS**

- For operation of the VCB, the umbilical plug and socket must be connected.
- VCB can be racked –in and racked-out only in the OFF position
- VCB can be closed only in the TEST and SERVICE position
- VCB cannot be racked -in if the VCB door is open.
- Once the VCB truck moves away from the TEST position, the front door cannot be open.

### **EARTH SWITCH INTERLOCKS**

- Earth Switch can be closed only when VCB is in TEST position.
- VCB can be racked-in only when the earth switch is OFF.

### **CUSTOMISED INTERLOCKS**

- Rear Cable access cover can't be open unless the cable is connected to "EARTH".
- Magnetic coil based & castle key based interlocks option available.





## SAFETY

### **INTERNAL ARC SAFE DESIGN**

Arc fault is a type of short circuit which generates a huge energy level and very high temperature and pressure. It could result in personnel injury, extensive damage to the surrounding and monetary loss.

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. VH2 are tested up to 31.5kA for 1 second as per the latest IEC-62271-200 standards to ensure:

- Correctly secured doors, covers do not open
- Parts of assembly which may cause a hazard do not fly off
- Indicators do not ignite
- Protective circuit is still effective
- The assembly is capable of confining the arc to the defined area where it ignited and there is no propagation of arc to other compartments within the assembly.





# SAFETY FIRST

Option for gas duct or deflector design for internal arc available



## SAFETY

### **TYPE TESTS**

VH2 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 VH2 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





## **PRODUCTS VARIANTS**

### **VH2 – CONFIGURATIONS**

VH2 offers wide range of switchgear configurations to meet application as well as substation civil layout requirements. The illustrations show the panel types with their respective basic equipment.



## τανισο

## **GENERAL ARRANGEMENT**

![](_page_12_Picture_2.jpeg)

FRONT VIEW

![](_page_12_Picture_4.jpeg)

X must be higher than 100mm and depends on customer requirements.

SIDE VIEW

![](_page_12_Picture_7.jpeg)

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.

VH2 is TAMCO's Air Insulated Switchgear designed to match International standards of safety & quality. It is designed to deliver safe switching even under adverse environmental conditions. It is highly reliable, uses space economically, and eliminates hazard. VH2 is highly customisable and thereby saves your time and energy, enhancing cost optimisation.

![](_page_13_Picture_2.jpeg)

# VH2: Building safe, reliable and efficient electrical networks

### "

Sale may be the conclusion of a transaction. But it is also the beginning of a relationship. At TAMCO we are committed to an association that encompasses product life cycle and support. We provide services that go beyond the sale.

![](_page_14_Picture_0.jpeg)

![](_page_14_Picture_1.jpeg)

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![](_page_14_Picture_6.jpeg)

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Manufacturer has a right to make changes in course of technical development and to meet specific requirements. As the standard and specification can subject to change please take confirmation of information provided in the publication.