TAMCO™

VH3 / VH3D

36kV Vacuum Metalclad Switchgear

VH3 / VH3D

Tamco 36kV VH3 single - busbar and VH3D double - busbar air insulated metalclad vacuum switchgear have been proven reliable over the last 17 years.

- *Up to 36kV Rated Voltage*
- *170kVp Impulse Withstand Voltage*
- *Up to 2000A Normal Current*
- *25kA or 31.5kA, 3 Seconds, Short-circuit Current*
- *40.5kV/185kVp model also available*

Designed and tested to IEC 298 amd IEC 56, and short-circuit proven at KEMA.

Tamco operates an ISO 9001 quality system.

Tamco has unparalleled experience manufacturing medium voltage switchgear in the tropics for the tropics. The wealth of experience has put the company in a leading position in designing and manufacturing switchgear for reliable service under harsh tropical environments.

VH3 Single - Busbar

Key Features

- Metalclad, fully compartmentalized
- Horizontal isolation, horizontal withdrawal
- Comprehensive safety interlocks
- Internal arc fault proven
- Simple installation
- Minimal maintenance
- Fused isolatable potential transformer
- Readily extensible

VH3D Double-Busbar

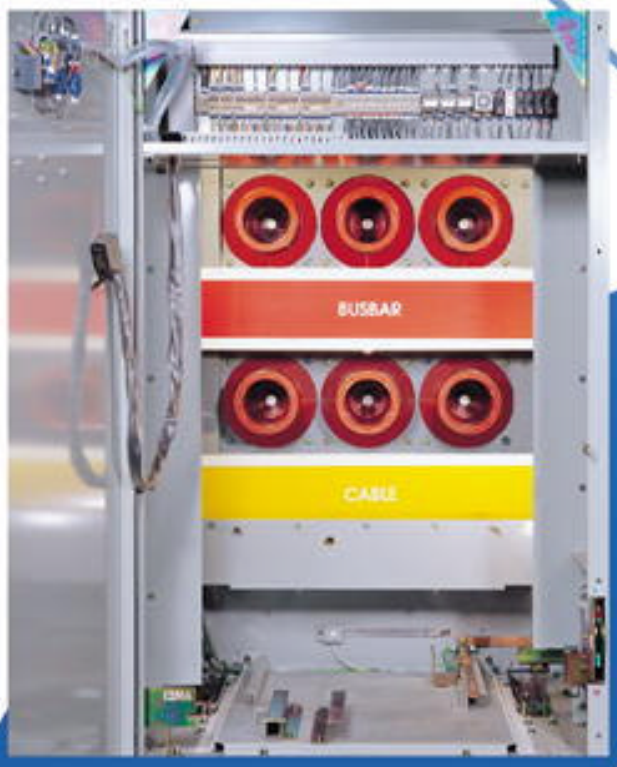
Cubicle

Made of high grade mild steel sheet, cut and folded on numerically controlled machines, the cubicle parts are painted by an advanced Cathodic 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-2-2371.

The cubicle parts are riveted/bolted together to form a rigid enclosure with fully segregated busbar compartments, VCB compartment, circuit compartment and low voltage compartment. The cubicle construction complies fully with the requirements of metalclad switchgear as defined in IEC 298.

The minimum degree of ingress protection is IP3X as defined in IEC 144. Higher IP classes are available on request.



Other Key Features

Front Door - The VCB compartment is fitted with a padlockable front door which not only provides a flush frontage to the switchboard line-up, but also upholds the integrity of the declared IP rating, even with the VCB in the isolated position.

Safety Shutters - Safety shutters will automatically close to cover the live parts when the VCB is isolated. The shutters can be padlocked independently.

Busbars - Although classified as air-insulated, the busbars are covered with solid insulation throughout their length including the joints, to enhance insulation security.

Cabling Space - The cable termination height is more than 700mm above floor level, and generous space is provided for cable terminations. This feature is much appreciated by cable jointers and operating personnel.

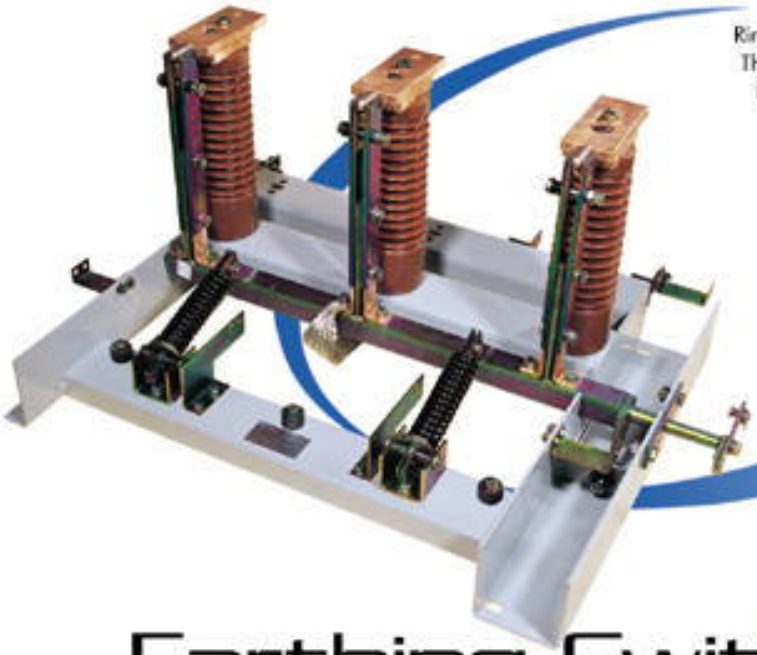
Transformers

POTENTIAL TRANSFORMERS

Another proven design feature is the use of fused isolatable potential transformers, which is a safe and efficient way to isolate the PT without having to interrupt the power supply. Isolation is provided by a swing-out fuse assembly.

CURRENT TRANSFORMERS

Ring type CTs are mounted on earthed condenser bushings. This mounting arrangement not only provides cost benefits but also enables CTs to be changed with relative ease. Wound primary CTs can also be accommodated.



Earthing Switch

Circuit earthing is achieved through a fault-making earthing switch interlocked with the circuit breaker and proven to be safe, simple and reliable.
The switch is tested to IEC 129 and proven at KEMA to have the same short-circuit rating as the VCB. Busbar earthing is available on request.

Control & Protection

Local control of the circuit breaker is provided at the front of the cubicle. It is normal practise to mount protection relays and instruments on a remote control panel, which will also incorporate a control mimic diagram. Relays can also be mounted on the cubicle in the single busbar version.

Safety Interlocks

Tamco VH3/VH3D feature a comprehensive set of safety interlocks:

- *VCB cannot be engaged or withdrawn unless it is in the open position*
- *VCB can only be closed or opened if it is in the engaged or isolated position (and not in-between)*
- *VCB cannot be inserted into the engaged position if the control plug is removed*
- *VCB cannot be engaged when the earthing switch is closed*
- *Earthing switch cannot be closed when the VCB is in the engaged position*

Optional key interlocks are provided to meet specific operational requirements.

Vacuum Circuit Breaker

The VCB design emphasises insulation integrity, robustness and compact size. The circuit breaker is truck mounted, and adopts the proven horizontal isolation/ horizontal drawout principle.

The trend in interrupter design is to continuously reduce the vacuum envelope size and enhance short-circuit capability at the same time. Tamco's VCB designs are continuously reviewed and upgraded to keep up with the latest developments in vacuum technology.

Mechanisms - Taking advantage of the low mechanical energy levels required to operate VCB's, Tamco has developed simple and light weight operating mechanisms which can be manufactured to close tolerances, and which will perform consistently throughout the circuit breaker's life-span without the need for periodic adjustments.

Maintenance - The VCB requires minimal maintenance. Its design life-span is 20 years or 10,000 operations.
Nomenclature - The model numbers of Tamco VCBs observe the following nomenclature:

VY - 30 A ## A

VY	30	A	##	A
Model Reference	36kV	M = 1250A P = 2000A	25 = 25kA 32 = 31.5kA	Blank - Single-busbar D - Double busbar

A motor charged spring, stored energy mechanism with manual and electrical release is offered as standard. Standard control voltage is 110V DC.
In the double-busbar models, the VCB assembly is mounted on a lifter which raises and lowers the VCB to engage on to "Reserve" or "Main" busbars by means of a "lackscrew" built into the VCB truck. The VCB has to be withdrawn to the "Disconnected" position before it can be raised or lowered, thus effectively eliminating any possibility of operator error.

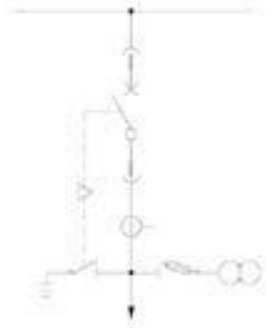
VCBs Data and Specifications

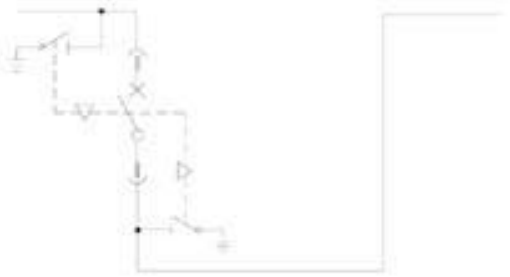
Model VY		SINGLE BUSBAR				DOUBLE BUSBAR	
		30M25	30P25	30M32	30P32	30M25D	30P25D
RATED	Voltage (kV)	36 ~ 40.5*					
	Insulation level: Impulse withstand (kVp) 1-min Power Frequency	170 ~185* 70 ~ 95*					
	Frequency (Hz)	50/60					
	Normal current (A)	1250	2000	1250	2000	1250	2000
	Short - circuit Breaking Current (kA)	25		31.5		25	
	Transient Recovery Voltage (kVp)	62					
	Short - circuit Making current (kAp)	63		80		63	
	Operating Sequence	O - 0.3sec - CO - 3 Min - CO					
	Duration of short - circuit (Sec)	3					
Opening Time (mSec)		20					
Breaking Time		< 3 cycles					
Closing time at No Load (mSec)		50					
Closing Voltage (V d.c.) Current (A)		110 3.5					
Tripping Voltage (V d.c.) Current (A)		110 3.5					
Full Load Switching Life (no. of operations)		10,000					
Number of Available Auxillary Contacts		4a + 4b					
Approx. Weight (kg)		330	350	380	400	470	500

*Note : (*) available on request*

Cubicle Dimensions & Weights

Type	VH3	VH3D
Cubicle Width (mm) Depth (mm) Height (mm)	1200 3080 2300	1200 3200 2400
Additional Width for Bus-section (mm)	1200	
Approx Weight (kg) Feeder without P.T.	1150	1350 / 1650
Potential Transformer	275	

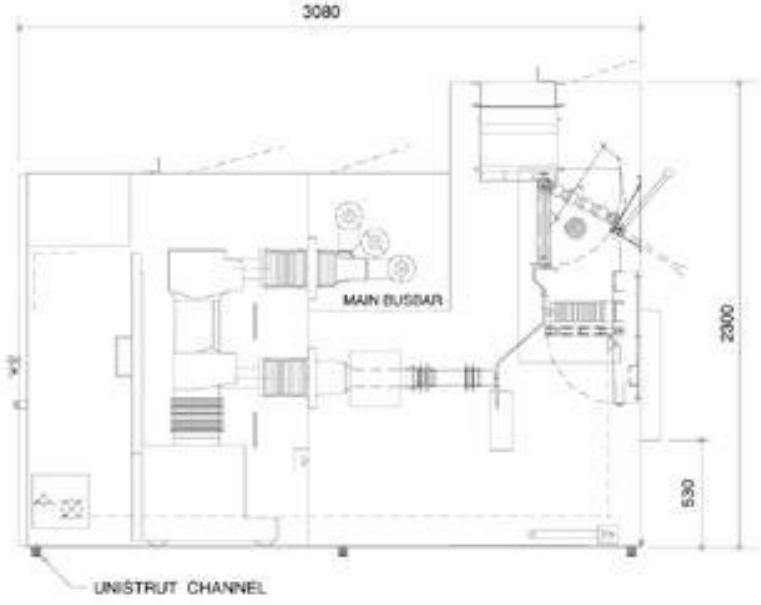




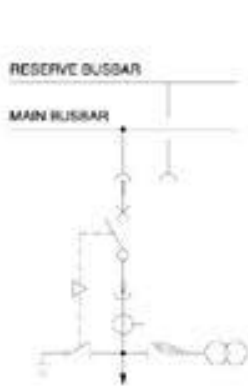
FRONT VIEW

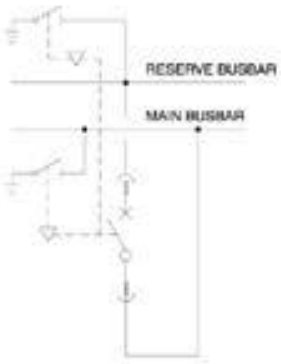
FRONT VIEW

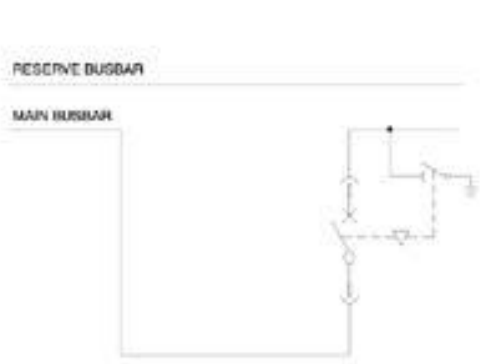
FOUNDATION PLAN



TYPICAL VH3 SECTIONAL VIEW







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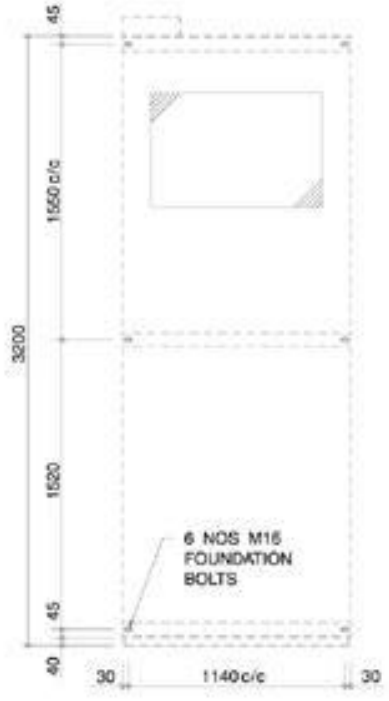

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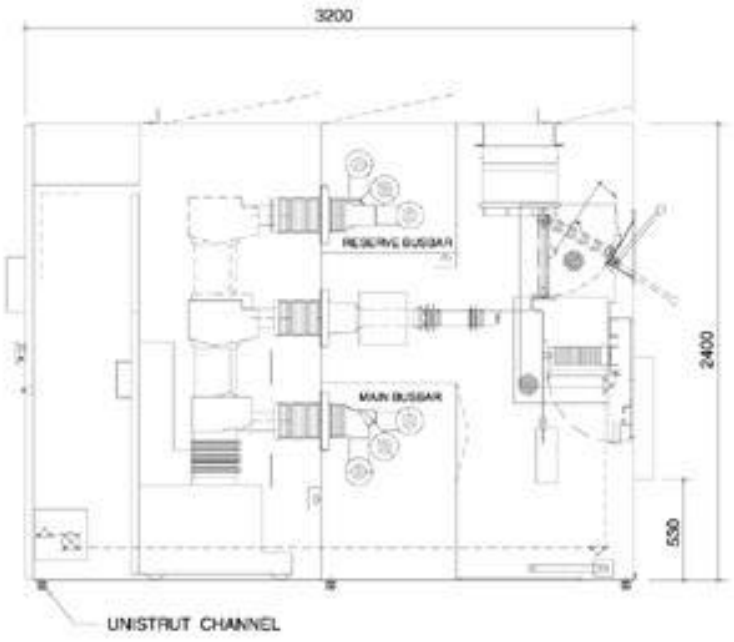

TYPICAL VH3D SECTIONAL VIEW

Manufactured using state-of-the-art laser and robotic technology
Independently tested at KEMA

MS ISO 9001 REG. NO AR 0435

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