

# 24KV MEDIUM VOLTAGE SWICHGEAR

METAL CLAD HI-POWER V24



METAL ENCLOSED GSH V20

## INSTRUCTION

Based on abundant experience in the field of Electrical Switchgear through advanced technology, **LS-VINA Industrial Systems Co., Ltd** always satisfy each of customers by providing zero-defect products.



### CERTIFICATE

The TÜV CERT Certification Body  
of TÜV Industrie Service GmbH, TÜV Rheinland Group  
certifies in accordance with TÜV CERT procedures that

**LG-VINA INDUSTRIAL SYSTEMS CO., LTD.**

**Dong Anh, Hanoi City, Vietnam**

has established and applies a quality management system for the scope of

**Design / Development, Manufacturing  
and After Sales Service of Electrical Power  
Distribution and Control Systems**

An audit was performed, Report No. **056887**

Proof has been furnished that the requirements are fulfilled according to the standard

**DIN EN ISO 9001:2000**

The certificate is valid until **2008-04-04**  
Certificate Registration No. **01 100 056887**



TÜV Rheinland Group

Taget, 2008-06-14  
First certification 2002

TÜV CERT Certification Body of  
TÜV Industrie Service GmbH

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# AGE SWITCHGEAR

Designed and manufactured to satisfy various standards such as those of IEC, BS, ANSL and based on strict quality control, the **Metal Clad HI-POWER V24** and **Metal Enclosed GSH V20** have high work-stability and safety. With rated normal current levels: 630/ 1250/ 2000/ 2500/ 3150A they are widely used for power generation and transmission and distribution facilities used by power companies, industrial plants, building and switchgear facilities installed at water treatment plants.



METAL ENCLOSED GSH V20



METAL CLAD HI - POWER V24



# METAL CLAD

## FEATURES

### METAL CLAD HI-POWER V24

Metal Clad HI-POWER V24 supplies Stabilized Electric Power Source and Maximization of Energy Efficiency.

Power V24 Systems Switchgear using a Pro-MEC Vacuum Circuit Breaker (VCB) is Metalclad type in compliance with IEC, BS and ANSI standards, and is designed for general power distribution systems with rated voltage up to 24 kV.

#### Compact and simple design

- Standard module for each circuit.
- Human engineering for measuring and indication.

#### Safety design

- Compartments are divided by grounded metal partitions.
- Quick make earthing switches are used for earthing and withstand of making capacity.
- Type tested in accordance with IEC 60298/ 62271 - 200
- Removable circuit breaker with mechanical interlocks to prevent mal-operation.
- Pressure relief device is available on request.

#### Maintenance and inspection

- VCB is maintenance free
- Minimized maintenance and simplified inspection work are realized allowing easy and fast cable connection.
- Tightly sealed enclosure protects the equipment from ingress of contamination and vermin.



# HI-POWER V24



## STANDARD RATINGS

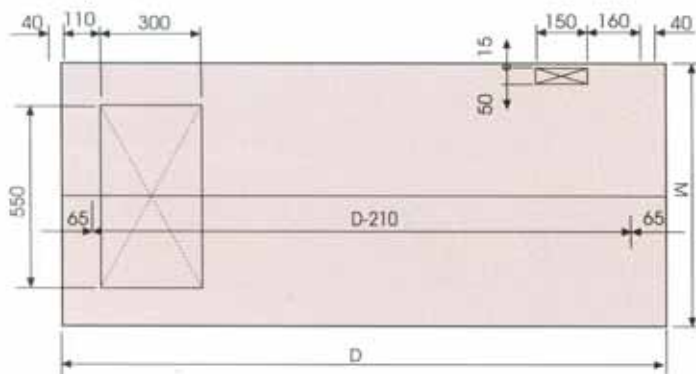
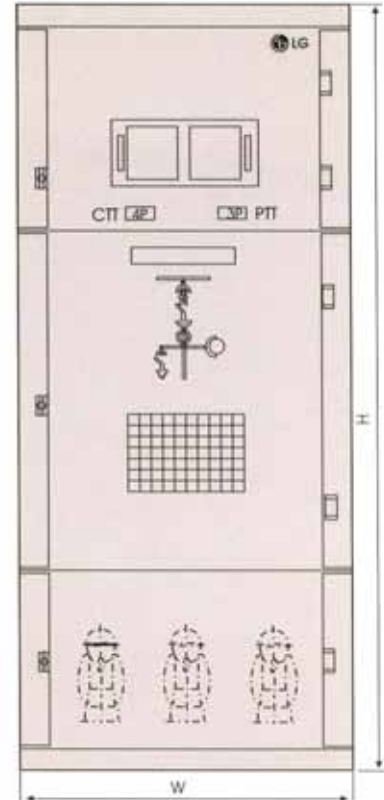
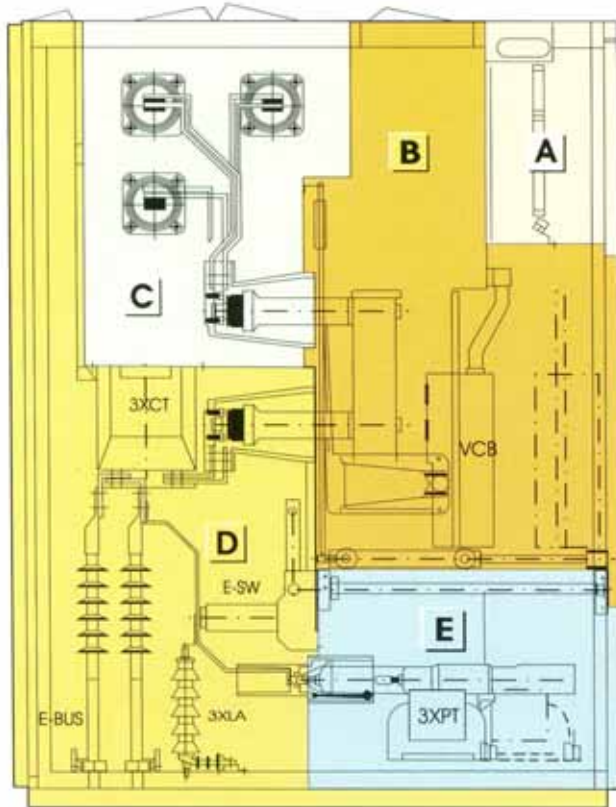
Description		Standard rating
Type		HI-POWER V24
Rated voltage (kV)		24
Rated Insulation Level (kV)	Power frequency / 1min	50
		125
Rated Frequency (Hz)		50 / 60 Hz
Rated Normal Current for Busbar (A)		630, 1250, 2000, 2500, 3150
Rated Short-time Withstand Current (kA/1s or 3 s)		12.5 / 25
Circuit breaker	Rated Current (A)	630, 1250, 2000, 2500, 3150
	Rated Interrupting Current (kA)	25
	Rated Making Current (kA)	63
Applied standard		IEC60298, IEC62271-200
Degree of Protection	External part	IP4X
	Internal part	IP3X

Note: IP 42, IP 51 could be manufactured according to customer requirement



# METAL CLAD

## C ONSTRUCTION



- A** LOW VOLTAGE COMPARTMENT
- B** C.B. COMPARTMENT
- C** BUSBAR COMPARTMENT
- D** CABLE COMPARTMENT
- E** V.T. COMPARTMENT

Unit: mm

Current Rating	Width (mm)	Depth(mm)	Height (mm)
630A	800	1,800	2,350
1,250A	800	1,800	2,350
2,000A / 2,500A	1,000	1,800	2,350
3150A	800 or 1000	2,000	2,350

**Note:** 1. "H" and "D" could be changed according to the customer's specification.  
 2. 3150A CB panel dimension will be designed special type.  
 3. Above dimension of 3150A will be applied main busbar current rating only.

# HI-POWER V24

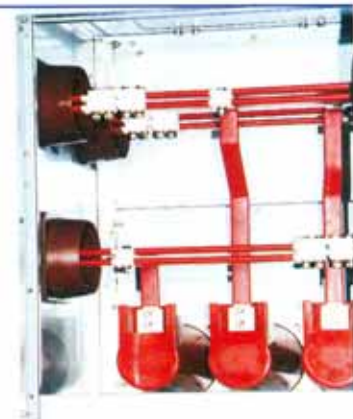
## LOW VOLTAGE COMPARTMENT

- Fully enclosed and separated from the high voltage compartment
- Adequately dimensioned to accommodate all necessary protection and control devices



## BUSBAR COMPARTMENT

- Busbar is hard-drawn high conductive copper supported by epoxy resin insulator wall bushing
- Busbars are designed for sufficient mechanical strength against short time current



## CB COMPARTMENT

- Can be drawn in and out CB without opening the door
- Installment of viewing window
- Stable structure of hinge and locker
- Shutter padlock facility is available
- Installment of IP cover in front of CB

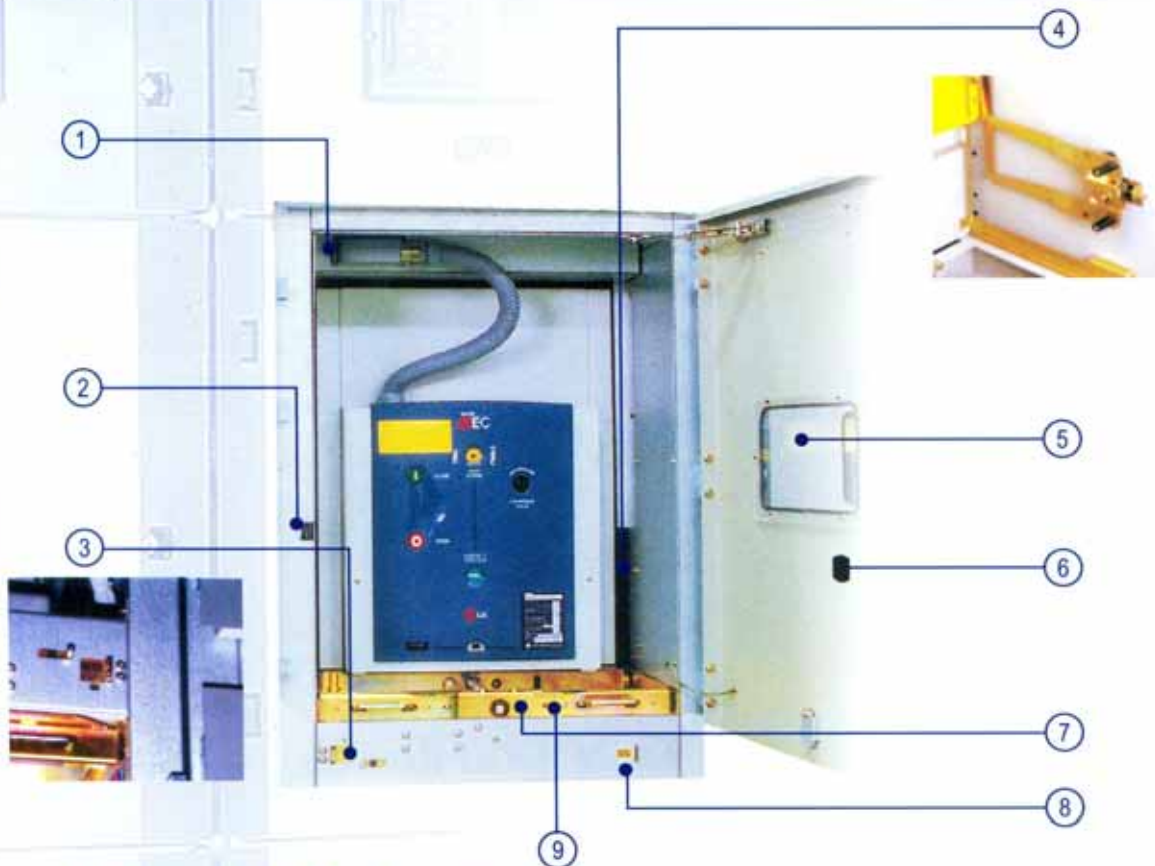


## CABLE COMPARTMENT

- Sufficient spaces are provided for cable termination and entry
- Current transformer, cabling and supporting brackets are composed at cable compartment







### 1 - Connector for Auxiliary circuits

When the CB is service position, jack terminal cannot be removed

### 2 - Interlocking device between door and CB

When the CB is service position, customer cannot open the door without releasing the interlock key.

### 3 - Earthing switch padlock

Prevent the accident in case of carelessness earthing switch operation.

The locking of the earthing switch is available when the switch is in 'OFF' position

### 4 - Shutter padlock

The hole to lock the shutter (load and line side) in close position, to increase the safety during the maintenance of a VCB draw- out position.

### 5 - Viewing Window

Through the viewing window status of C.B. can be checked without opening the door.

### 6 - Emergency Trip device

C.B. can be tripped by trip device without opening the door

### 7 - Draw in and out device

C.B. can be drawn in and out with the door close.

### 8 - Mechanical position indicator

Indicate the service test position of C.B.

### 9 - VCB position padlock

The hole to prevent the draw in and out of a VCB from the present position (Run of Test)

Standard option in the interlock level of the E, F class draw- out of type VCB.



# HI-POWER V24

**LS Pro-MEC VCB** is user friendly to give more convenience and safety by providing high speed interrupting time (3 Cycles), adopting the rapid autoreclosing method, and having wide range of accessories.



## Optional Accessories (For G class out-draw type only)



### Earthing Switch

For the safety during the maintenance of a VCB panel, discharge the charging current in the load side of the VCB with this earthing switch.



### Mechanically Operated Cell Switch (MOC)

The auxiliary switch (3a4b), which indicates the "ON" or "OFF" condition of a VCB but operated only when the VCB is in "Run" state.  
(Installed in the bottom of the cradle).



### Truck Operated cell Switch (TOC)

The auxiliary switch (3a4b), which indicates the "run" state of a VCB and is operated by the movement of a VCB frame.  
(Installed in the bottom of a cradle)



### Position switch of earthing switch

Indicating the "ON" or "OFF" condition of the earthing switch (5a5b)



### Locking coil of earthing switch

To prevent in the accident through carelessness earthing switch operation, the earthing switch can be change in to "ON" position after releasing the lock by magnetizing the coils.

### Code Plate (mis insertion prevention)

To prevent miss insertion of VCB to a cradle

TYPE			LVB-20□-13□	LVB-20□-25□
Rated voltage (kV)			24	24
Rated current (A)			630, 1250	630,1250,2000
Rated frequency (Hz)			50 / 60	50 / 60
Rated breaking current (kA)			12.5	25
Rated breaking capacity (MVA)			520	1000
Rated short-time current (kA/3s)			12.5	25
Rated closing current (kA)			31.5	63
Rated breaking time (cycle)			3	3
Rated opening time (sec)			≤ 0.04	≤ 0.04
No-load closing time(sec)			≤ 0.06	≤ 0.06
With stand voltage	Power frequency(1min)		50	50
Standard test duty		Rapid re-closing type	0-0.3s-CO-3min-CO	
Life time (times)	Mechanical	Without maintenance	20,000	20,000
		Maintenance	30,000	30,000
	Electrical	Maintenance	20,000	20,000
		Without maintenance	30,000	30,000
Auxiliary Switch			4a4b,10a10b	4a4b,10a10b
Installing - method	Fixed type		■	■
	Draw-Out type	E-type	■	■
		F-type	■	■
		G-type	■	■
Weight (kg)	VCB	E-type	160	160
		F-type	160	160
		G-type	187	187(630/1250A) 218(2000A)
	Cradle	E-type	80	80
		F-type	82	82
		G-type	120	120(630/1250A), 130(2000A)
Applied Standard			IEC62271-100	IEC62271-100
Test laboratory		KERI	■	■
		CESI	■	■

**Note:** For switchgear with rated current over 2500A will be installed the other type of CB (VCB or GCB)

# METAL CLAD

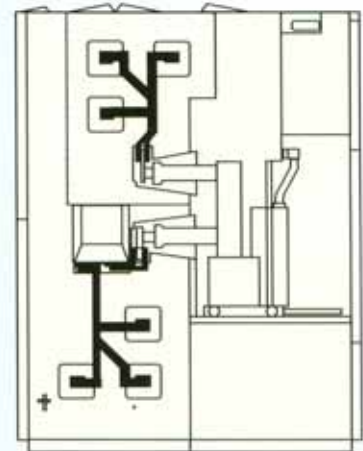
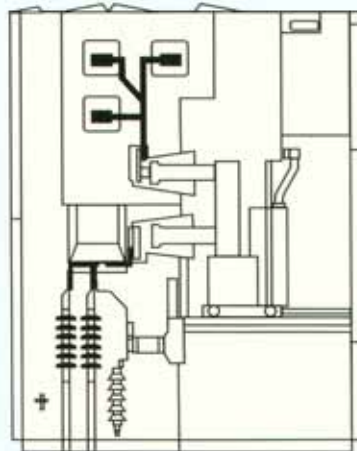
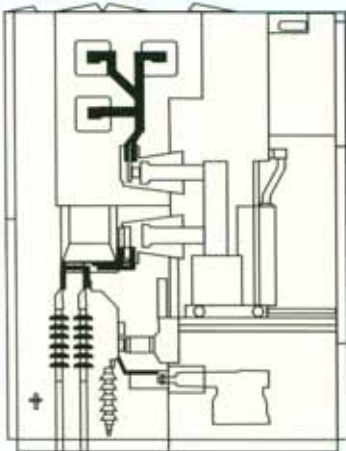
## TYPICAL ARRANGEMENT

**INCOMING PANEL**  
(With-drawable VTS)  
IC

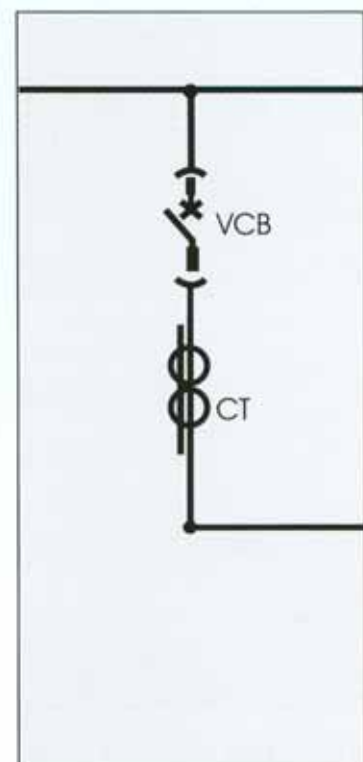
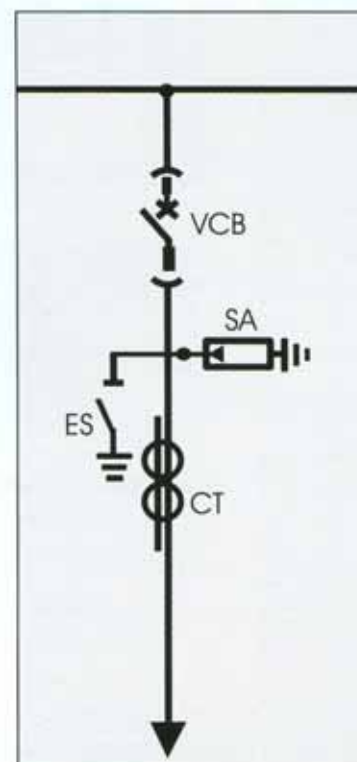
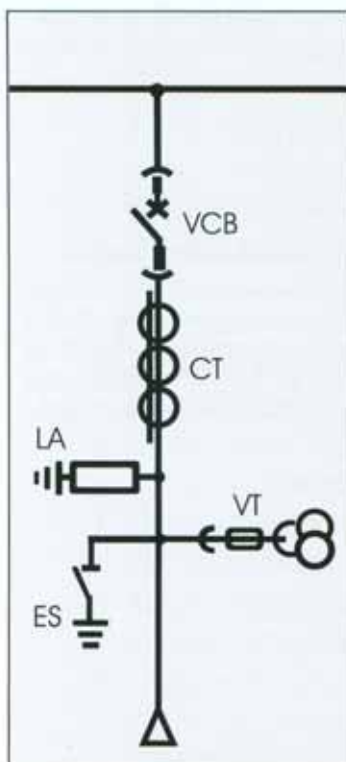
**FEEDER PANEL**  
FD

**BUS-TIE PANEL**  
BT

**Section view**



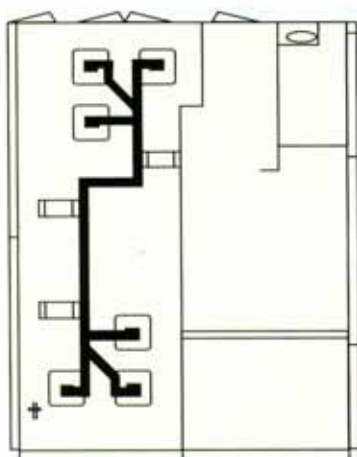
**Skeleton diagram**



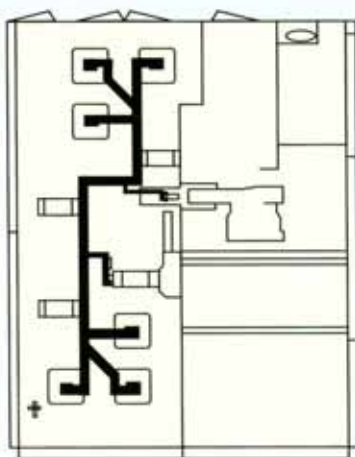


# HI-POWER V24

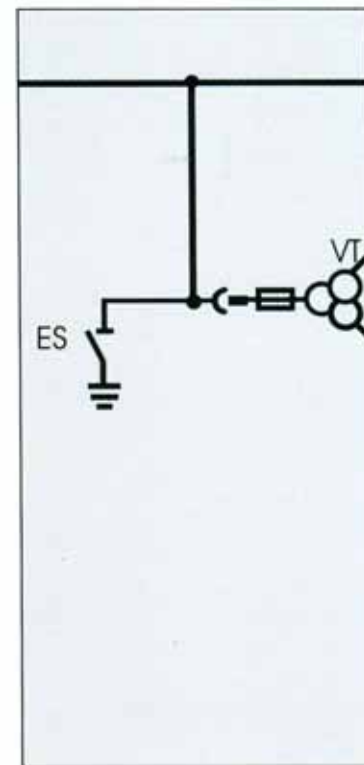
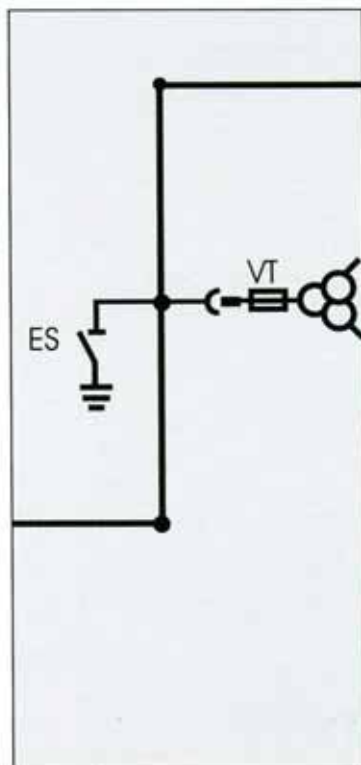
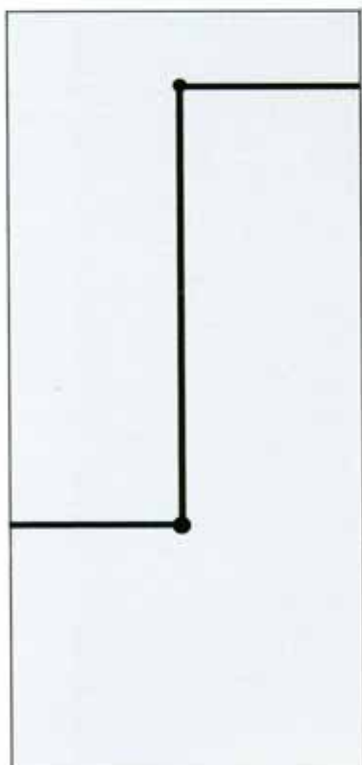
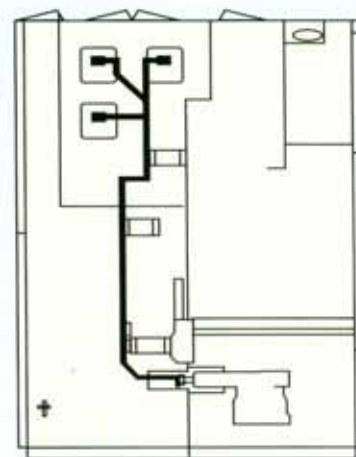
**BUS-RISER PANEL  
BR**



**BUS-RISER PANEL  
(With-drawable VTS)  
RP**



**BUS-PT PANEL  
BP**



## FEATURES & CONSTRUCTION

### METAL ENCLOSED GSH V20

#### Feature

- GSH-V20 is designed and manufactured in accordance with JEM, IEC
- GSH-V20 can apply VCB, GCB and MOCB but our standard is VCB
- GSH-V20 can be applied to a single bus system or double bus system.

#### Construction

- GSH-V20 has separated 3 compartments: VCB compartment, LV compartment and Bus & Cable compartment.
- Applied equipment and parts are interchangeable
- Cubicle is classified to E, F2 and G type in accordance with JEM
- Automatic safety shutters of busbar and circuit spouts are provided to prevent accidental contact with live parts.
- Provisions are made to allow future addition of cubicles at either end of the switchgear.

#### Specifications

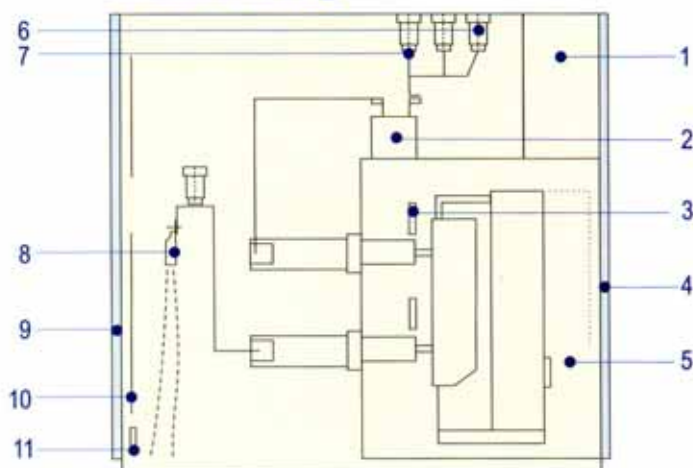
Description	Steel plate
Frame	2.3t or 3.2t
Front door	2.3t - 3.2t
Rear cover	1.6t - 2.3t
Top Plate	1.6t
Bottom plate	1.6t - 2.3t
Internal barrier	1.6-3.2t
Side Cover	1.6t





# LOSED GSH V20

## Structuring



1. Low voltage compartment
2. Current transformer
3. Shutter
4. Front door
5. CB compartment
6. Epoxy insulator
7. Main busbar
8. Terminal
9. Rear door
10. Protection panel
11. Earthing bus



## STANDARD RATING

Description		GSH V20
Circuit breaker		VCB
Rated Voltage(kV)		24
Rated insulation Level	Power frequency/1 min	50
	Impulse/ 1x 40s (kV)	125
Rated Frequency (Hz)		50 / 60
Rated Normal Current for Busbar		400, 600, 800, 1200, 1500, 2000
Rated short time Withstand current (kA/1sec or 3sec)		12, 16, 25
Rated Peak Withstand current (kA)		2.4 times of rated short time current
Circuit Breaker	Rated current(A)	600, 1200, 2000
	Rated Interrupting Current (kA)	12.5, 16, 25
	Rated Making Current(kA)	31.5, 40, 63
Applied Standard		JEM 1425, IEC 298
Type (JEM, 1425)		CW, MW (G), PW (G)



- 1 - Operation counter
- 2 - Contact position indicator
- 3 - Tripping button
- 4 - Closing button
- 5 - Interlock

### Vacuum Circuit Breaker

The draw out type VCB installed in GSH-V20 switchboard has the following three positions within the compartment:

- **Run (connected) position:**  
Main isolating contacts and auxiliary circuit are connected.
- **Test position:**  
Main isolating contacts are disconnected and auxiliary circuit is connected
- **Disconnected position:**  
Main isolating contacts and auxiliary circuits are disconnected

### Safety Interlock

The flowing mechanical interlocks are provided for safety:

- The circuit breaker cannot be withdrawn or inserted to from the service position while it is closed
- The circuit breaker can not be close while it is being withdrawn or inserted.

### Operating mechanism

The operating mechanism is mechanically and electrically trip free. The motor operated spring charged type closing mechanism and shunt trip coil are provided with an anti- pumping device.

### Stable Breaking Performance

The excellent insulation recovery characteristics of vacuum interrupter allows a quick reaction to both small and massive short circuit current.



# LOSED GSH V20



TYPE		LVB-20□-13□	LVB-20□-25□
Rated voltage	(kV)	24	24
Rated current	(A)	630, 1250	630, 1250, 2000
Rated frequency	(Hz)	50 / 60	
Rated breaking current	(kA)	12.5	25
Rated breaking capacity	(MVA)	520	1000
Rated short-time current	(kA/3s)	12.5	25
Rated closing current	(kA)	31.5	63
Rated breaking time	(cycle)	5	3.5
Rated opening time	(sec)	0.04	
No-load closing time(sec)		0.1	
With stand voltage	Power frequency(1min)	50	
Standard test duty	Rapid re-closing type	O-0.3s-CO-3min-CO	
Life time (times)	Mechanical	10000	
	Electrical	10000	
Shudent prevent (Source DC 110V)(A)	Dinamo	5	
	Coil magnetism	2.5	
Electric Interrupt (Source DC 110V)(A)		2.5	
Substitute conector		4a4b	10a10b
Weight (Kg)		260 (630A)	280 (1250A)
		280 (630A)	280 (1250A) 350 (2000A)
Applied Standard		IEC62271-100	IEC62271-100

## Safety Shutter

Busbar and circuit spout orifices are fitted with automatically operates safety shutters of resin and close orifices by withdraw of the breaker. For testing and inspection, each shutter can be individually operated by hand and locked with a latch mechanism will be automatically restored, when the circuit breaker is inserted to the service position.

## Ground

The circuit breaker is automatically grounded through a ground bus directly. The ground shoe ensures the grounding between the test and service position of the breaker.

## Mechanical Indicator and Facilities

The circuit breaker has the following mechanical indicators and facilities:

- Open/ Close indicator showing closed or open condition of the circuit breaker.
- Spring charged/ Spring free for closing spring
- Operation counter
- Open/ Close push button
- Contact wear indicator viewable from the front of the circuit breaker

## L.V. COMPARTMENT & BUSBAR COMPARTMENT

### L.V. Compartment

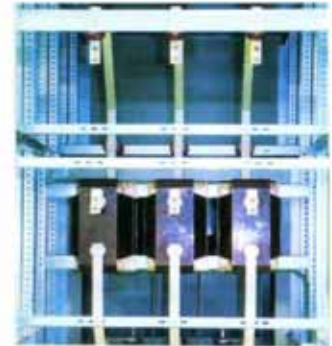
L.V. Compartment is equipped with a hinged front door on top of the breaker compartment. Indicating meter, protection relays, switches and lamps etc, are mounted on the door and terminal blocks

Aux relay and aux. devices are mounted in the compartment.

### Auxiliary Wiring

Auxiliary wiring sized 2.0mm<sup>2</sup> and 3.5mm<sup>2</sup> are 600 V grade PVC insulated wire (KIV)

Wiring method is as follows



Description		Standard Spec
Wiring method		PVC Duct Wiring
Used wiring		600V, KIV
Size	General	2.0mm <sup>2</sup>
	CT, PT, 2 <sup>nd</sup> , 3 <sup>rd</sup>	3.5mm <sup>2</sup>
Color	General	Gray
	Ground	Green
Termination	Ring type lug	
	Numbered ferrule	
	Color ring	

### Other Accessories

Description	Standard Spec
Space heater	AC 110V/ 220V 80W
Lighting Fixture	Only at LV compartment
Special Tool	1 set for 1 line-up ground
Bolts & Nuts	Necessary Quantity

### Busbar compartment

- The Busbars are of hard-draw high conductivity copper.
- Busbars have sufficient strength against rated short time current.

### Current transformer

CTs are the epoxy resin molded type and, have various types in accordance with customer's request.

### Cable termination

- Sufficient space is provided for cable termination and entry.
- Access for maintenance working can be obtained by opening rear door.
- Bus compartment and cable compartment and cable compartment can be divided by customer's request.

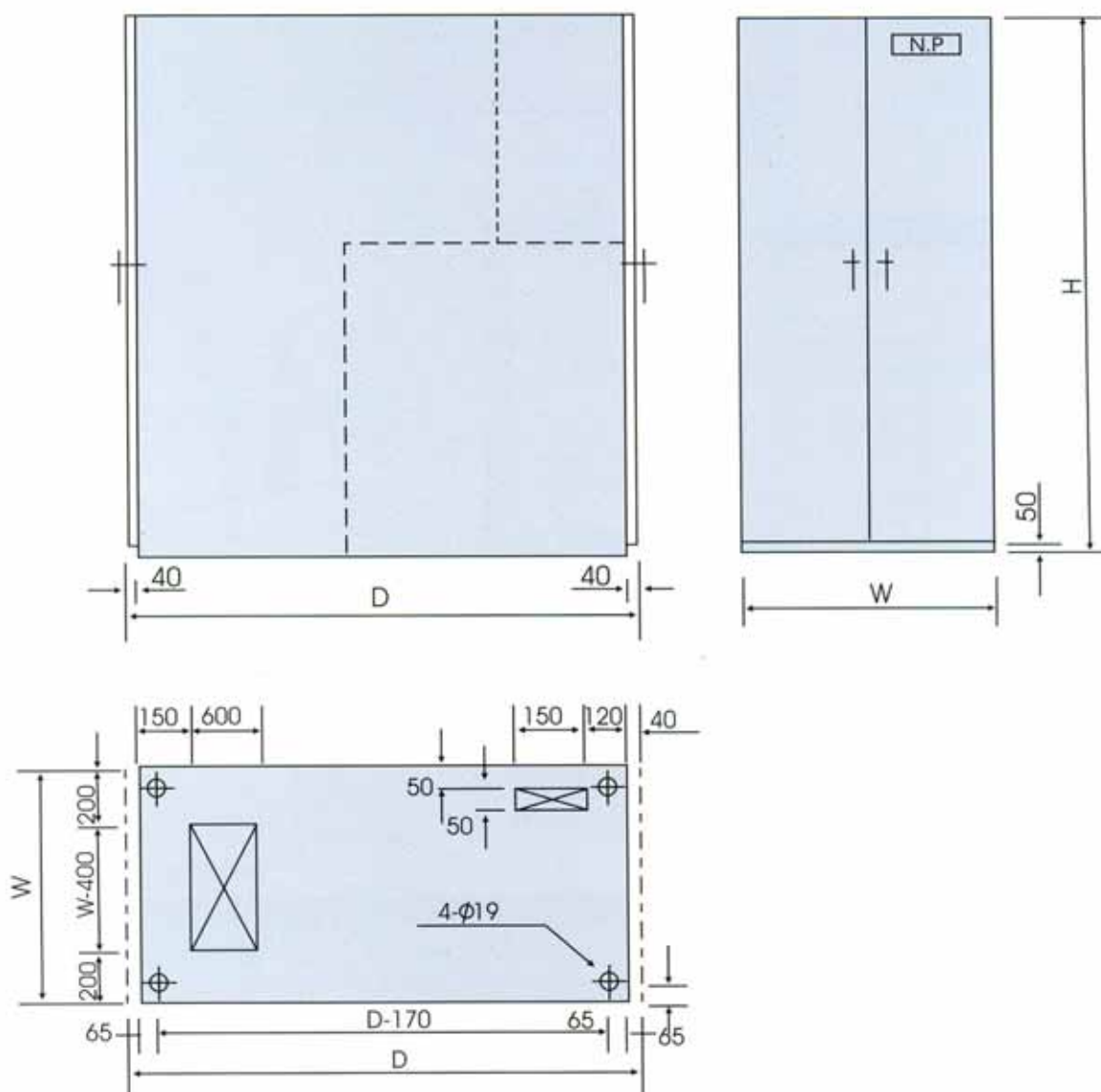
### Phase and Polarity of Control Operating Cable

Item	Standard Specification					
	AC				DC	
	Phase R (A)	Phase S (B)	Phase T (C)	Neutral	Positive	Negative
Color Distinction	Red	Yellow	Blue	Black	Red	Blue



## DIMENSIONS

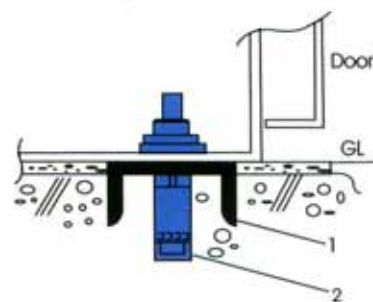
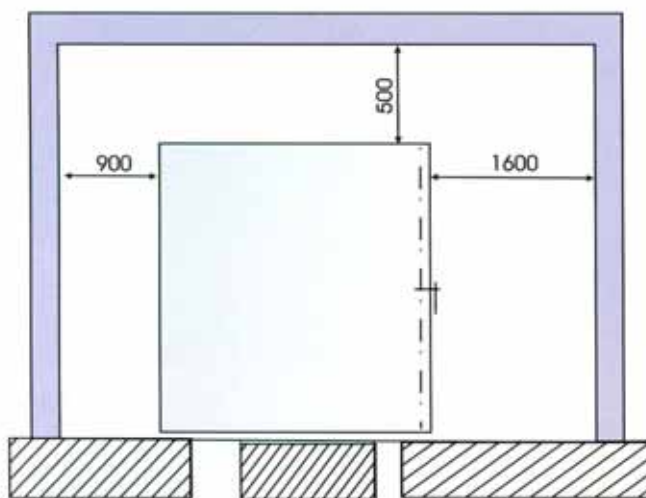
Unit : mm



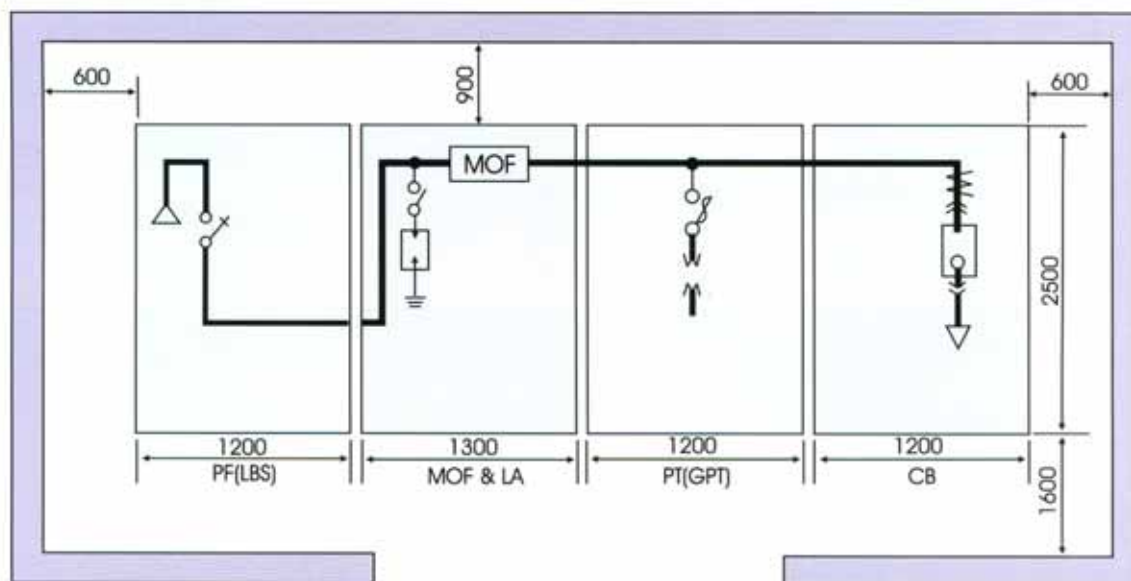
	Rated Voltage (kV)	Rated Short-time current (KA)	Dimention(mm)					
			Width(W)				Depth(D)	Height(H)
			PF(LBS)	MOF & LA	PT(GPT)	VCB		
GSH-V20	24	12.5 25	1200 (1300)	1300	1200	1200	2500	2350

## MINIMUM INSTALLATION SPACE

Unit: mm



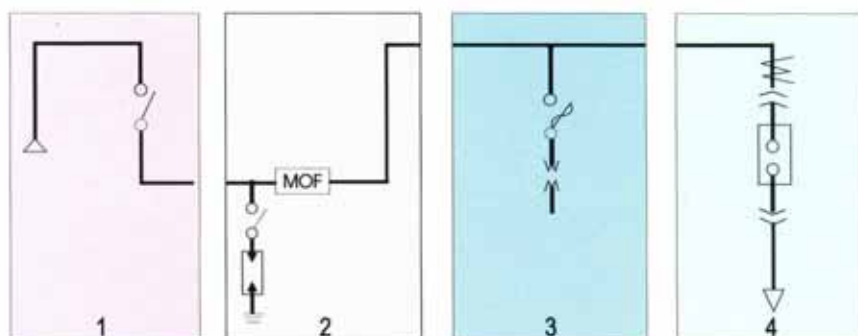
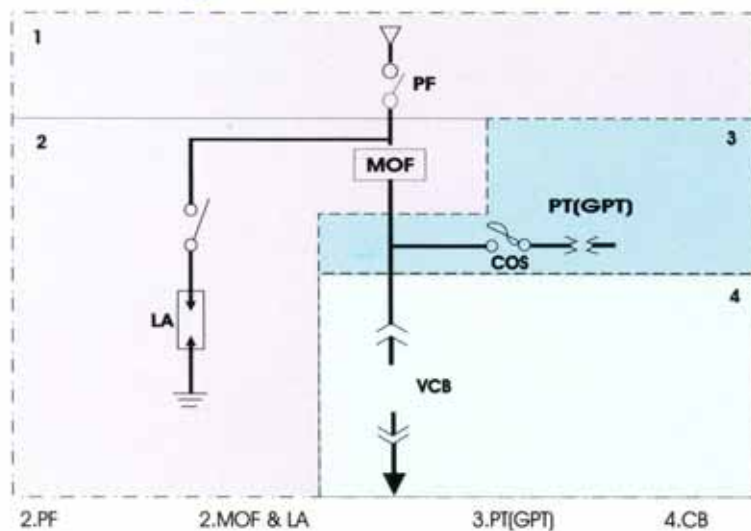
1. Foundation Channel (user supply)
2. Anchor Bolt (1 1/2" 100mm)





## SYSTEM CONFIGURATION EXAMPLE

Skeleton diagram



Section view

