



# HG-VCB

## Vacuum Circuit Breakers



## Essential for Today, Potential for Tomorrow

HD Hyundai Electric solely pursues the growth of our customers' business. From power generation to power distribution, we focus on developing and commercializing products and solutions aimed at increasing the efficiency of energy equipment as well as at proactively monitoring and controlling assets in an integrated manner to improve our customers' productivity and management efficiency. We are well aware that our efforts add to the driving force behind our customers' growth and contribute to the creation and maintenance of a more dynamic world. We focus on achieving innovation and strive to evolve continuously to shape a better tomorrow based on today's technological advancement

INTEGRICT

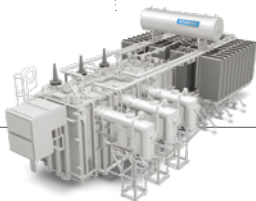
**Energy Solution** Energy solution business refers to the business of designing, procuring and establishing a system that enables the efficient use of power energy through integrated management of the production, consumption, sales and operation.

**Asset Management Solution** Asset management solution is a business that maximizes the overall business efficiency by systematically managing the performance, risk, maintenance cost and others as well as by providing an asset management solution suitable to the customer's circumstance depending on the product lifecycle (PLC) of various products.

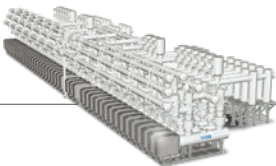
Generation(step-up)

Power Plants

- Supplied to more than 70 countries around the world for the past 45 over years since 1978
- Satisfies the various demands of customers through the acquisition of quality certifications from international accredited institute
- Participates in the world's key technical committee such as GIGRE and others, pioneering the establishment of technology standard related to power network

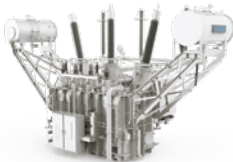


**Power Transformer**  
· up to 800 kV, 1,500 MVA



**Gas Insulated Switchgear**  
· up to 800 kV

- Can be installed in spaces smaller than the open type of substation by using SF<sub>6</sub> gas with outstanding insulation and arc extinguishing characteristics
- Manufacturing advanced products that are resistant to external environment and climate effects through the sealing at the charge part
- Extensive project experiences around the world
- Reduces installation period and cost due to simple installation and transportation, convenient maintenance
- Design considering the safety of the workers as priority



**ECO Transformer**  
· up to 500 kV, 1,000 MVA

- Eco-friendly oil (Natural/Synthetic)
- Dynamic Pressure Resistant System(DPRS)
- Guarantees excellence in safety

Transmission

Primary Substation/Secondary Substation



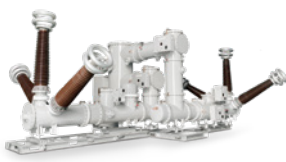
**Gas Insulated Switchgear**  
· up to 800 kV



**Power Transformer**  
· up to 800 kV, 1,500 MVA



**Shunt Reactor**  
· up to 765 kV, 300 Mvar



**SF<sub>6</sub> Free Gas Insulated Switchgear**  
· GIS for 170 kV 50 kA 60 Hz  
· ECO GIS for 72.5 kV, 145 kV

- Korea's first solely developed technology
- Eco-friendly Novec mixture gas instead of SF<sub>6</sub> gas

Distribution



**Cubicle GIS**  
· up to 40.5 kV  
· IEC, ANSI, GOST, UL

- Produces high quality products using angle-less type
- Multi-functional digital protection relay (HiMAP) applied
- High reliability secured, provides various operation information such as protection, measurement and control
- Firm external box, size and compact, making it safe
- Maintains high quality through stringent quality control system and continuous research and development

Motor & Generator



**Synchronous Generator**  
· Rated Output: < 50 MVA  
· Rated Voltage: < 15 kV  
· Ploes: > 2P



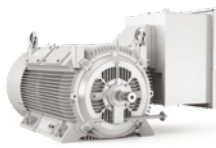
Marine

Marine Solution

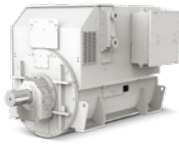
- Production of high quality marine devices satisfying the regulations and standards of key marine associations (LRS, ABS, DNV, GL, BV, NK etc.) and world's renowned institutes
- High quality safety secured through the latest equipment and stringent quality control system
- Realization of optimal high efficiency by converging SWGR, Generator, Motor, Telecom, Automation, Intelligent Motor Control Unit and others



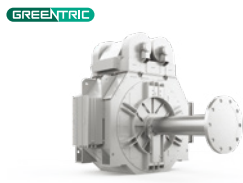
Marine Switchgear



Marine Motor



Generator



Shaft Generator



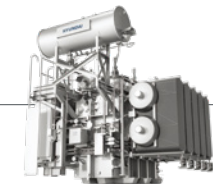
Metal Clad Switchgear

- up to 38 kV
- IEC, ANSI, UL



Low Voltage Switchgear & Motor Control Center

- H8PU : 480 V, 3,200 A, 65 kA
- H5600 : 480 V, 1,200 A, 65 kA
- HiMCC : 480 V, 5,000 A, 100 kA



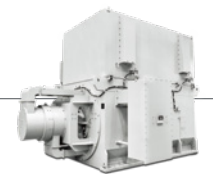
Distribution Transformer

- up to 36 kV, 50 MVA



Cast Resin Transformer

- up to 36 kV, 20 MVA



Synchronous Motor

- Rated Output: < 40 MW
- Rated Voltage: < 15 kV
- Ploes: > 2P



MV&HV Induction Motor

- Rated Output: < 35 MW
- Rated Voltage: < 15 kV
- Poles: 2P-30P



VCB

- IEC, ANSI, UL
- up to 36/38 kV, 50 kA, 4,000 A



ACB

- AC : up to 150 kA, 6,300 A
- DC : up to 60 kA, 4,000 A



VC

- up to 12 kV, 400 A



Switch-Disconnect

- DC : up to 100 kA/1 s, 4,000 A



HGMAP

- HGMAP Series



HGCAM

- HGCAM Series



MCCB

- AC : up to 150 kA, 1,600 A
- DC : up to 100 kA, 800 A



ELCB

- up to 85 kA, 800 A, 1,000 mA



MCCB / ELCB

- up to 10 kA, 100 A, 100 mA



MS / MC

- up to 800 A



Distribution Box

- Up to 36 ways
- Surface/Flush type



MCB

- up to 15 kA, 125 A



RCCB / RCBO

- up to 100 A, 500 mA



Isolator

- up to 125 A



Electronic Circuit Breaker

- up to 20 A



Fuse Links & Switches

- up to 1,250 A

- Can be applied to various places of demand due to various domestic and international certifications and marine certifications
- Full HG-Series line-up established
- High standard of breaking capacity and various product line offers production in any load environments
- Increased reliability with reinforced breaking performance of high-breaking MCCB
- Reinforced usage stability through internal reliability verification



SPD

- up to 200 kA
- AC, DC



HGDM



EOCR

- up to 60 A



MMS

- up to 100 kA, 80 A



Installation Contactor

- up to 63 A



LV Motor

- Rated Output: < 750 kW
- Rated Voltage: < 690 V
- Poles: 2P-12P

- Enhanced reliability and secured safety with production of products based on the world's best equipment and stringent quality system
- Realized high efficiency by selecting slot based on FEM
- Realized small and lightweight with optimal design based on FEM analysis method
- Satisfies the quality standards of international accredited institutes (IEC, IEEE, CSA, NEMA, API etc.)



# HG

## Vacuum Circuit Breakers

|                                     |                                  |     |
|-------------------------------------|----------------------------------|-----|
| <b>Overview and Characteristics</b> | HGV                              | 4   |
|                                     | HVF                              | 7   |
|                                     | HVG                              | 8   |
|                                     | UVC                              | 12  |
|                                     | VI                               | 15  |
| <b>Technical Data</b>               | HGV Structure                    | 18  |
|                                     | HGV Operation Structure          | 20  |
|                                     | HGV Cradle Structure             | 22  |
|                                     | HVF Cradle Structure             | 24  |
|                                     | HGV Pushing/drawing              | 26  |
|                                     | UVC Structure                    | 27  |
|                                     | UVC Technical Data               | 28  |
| <b>Model Selection Table</b>        | Model Selection Table            | 32  |
|                                     | Ratings and Specifications       | 34  |
|                                     | Ratings and Specifications (UVC) | 42  |
|                                     | Ratings and Specifications (VI)  | 43  |
| <b>Attachments</b>                  | Attachments (HGV)                | 44  |
|                                     | Attachments (HVF/HVG)            | 59  |
|                                     | Attachments (UVC)                | 67  |
| <b>Dimensions</b>                   |                                  | 71  |
| <b>Circuit Diagram</b>              |                                  | 122 |
| <b>Order Code</b>                   |                                  | 130 |
| <b>Operating Environment</b>        |                                  | 139 |
| <b>Maintenance Inspection List</b>  |                                  | 141 |
| <b>Acquired Standards</b>           |                                  | 142 |

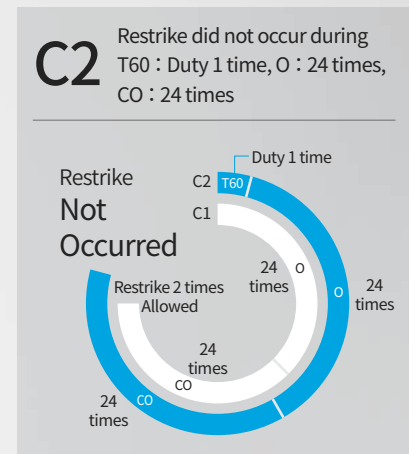
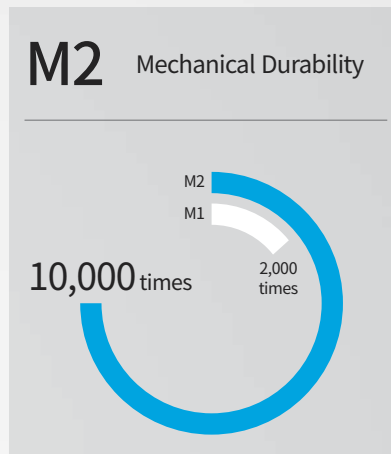
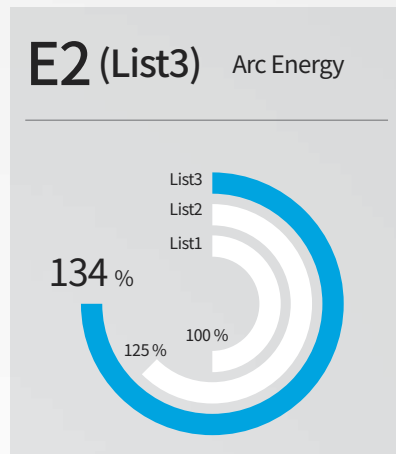
## HG Series

# Vacuum Circuit Breakers

New system solution with better selection and user convenience!



## Standards and Certification



## Draw-Out Type Breaker & ES/FS-Type Cradle

FS is an ES cradle with a safety shutter.

## Draw-Out Type Breaker & GS-Type Cradle

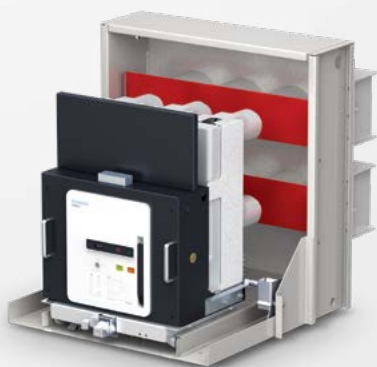
GS-type is a high-end cradle for MCSG, to which mold bushing and metal shutter are applied.

GE is equipped with earthing switch.

## Draw-Out Type Breaker & MS-Type Cradle

MS-type is a cell-type cradle and complete implementation of circuit breaker board of panel.

It includes every application of GS-type and can be equipped with various options based on door requirements.



Draw-Out Type Breaker & ES/FS-Type Cradle



Draw-Out Type Breaker & GS-Type Cradle



Draw-Out Type Breaker & MS-Type Cradle

## Overview and Characteristics (HGV)

### Features

- Hyundai Electric vacuum circuit breaker is composed of vacuum interrupter which is manufactured independently based on our 30 years of manufacturing experience ensuring the lowest leak rate and high reliability for long-lasting lifetime.
- HG-Series vacuum circuit breaker is for installation under high pressure and very high pressure switchboard (7.2 ~ 25.8 kV) as a circuit breaker for entrance or branching. It is used for control, line protection, transformer protection and motor protection. In addition, it has a fully open architecture unlike existing closed or half-closed ones, and is free of the insulating method relying on closed or half-closed-type insulating material but employed an ideal insulation method based on insulation by air/surface distance expansion to endure withstanding voltage which is 1.3 times greater than rated voltage even in the event of destruction of auxiliary insulating material.

In particular, with its optimized flow path of the conductive part which naturally suppresses temperature rise, it enables stable operation of the system.

#### Vacuum Circuit Breaker (VCB)



#### Vacuum Interrupters (VI)



### Standards and Certification

HG-Series vacuum circuit breakers were tested and certified by a recognized testing agency which is a member of STL in accordance with IEC 62271-100 (2012) and can be installed and applied to the environment and conditions allowed by the standard.

#### Applied Standards

##### **IEC 62271-1 (2008)**

High-Voltage Switchgear and Controlgear  
- Part 1 : Common Specifications

##### **IEC 62271-100 (2012)**

High-Voltage Switchgear and Controlgear  
- Part 2 : Alternating-Current Circuit Breaker

#### Certification

##### **ACCREDIA**

Product certification issued by the Italian accreditation body for base models and derived models

##### **STL**

Test certificate issued only if tested and evaluated based on STL Guide by STL member test agency

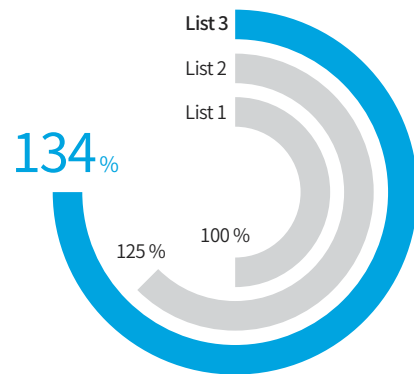
## Electrical Endurance Rating : E2 (List3)

E2 grade is the highest among electrical endurance grades specified in IEC 62271-100. There are three test operation obligations of List1, List2 and List3, out of which one has to be picked.

For specifications, List 1 is recommended ; however, List3 which emerged for the first time in the 2008 revision has lower cases of breaking of T10 and T30 when compared with Lists 1 and 2. However, greatly increased breaking testing times of T60 resulted in the same test equality but the arc energy on the breaker is like follows : when list 1 is 100 %, list 2 is 125 % and list 3 134 %, making the test environment harsh.

To HG-Series VCB, E2 grade List3 is applied.

## E2 (List3) | Arc Energy



## Mechanical Endurance Rating : M2

The IEC standard specifies mechanical endurance ratings so that customers can select and use product performance and quality levels. Out of the M1 and M2 mechanical endurance, the M2 level is applied to HG-Series vacuum circuit breaker.

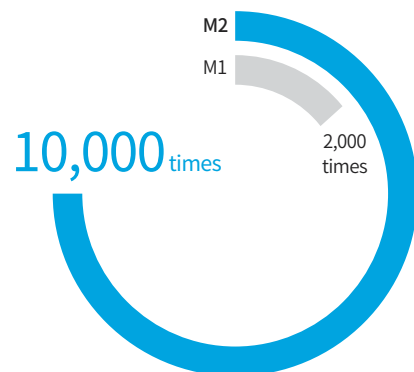
### M1

- Pre-test (Characteristic, Insulation and Resistance)
- Confirmation test after 2,000 times are completed (Characteristic, Insulation and Resistance)

### M2

- Pre-test (Characteristic, Insulation and Resistance)
- Confirmation test after every 2,000 times of test are completed (Characteristic, Insulation and Resistance)
- Confirmation test after 10,000 times are completed (Characteristic, Insulation and Resistance)

## M2 | Mechanical Durability



## Make and Break Rating of Cable Charging Current : C2

The over-voltage higher than usual is applied to contacts when charging current is interrupted, which increases the chance of restrike. In the event of restrike, there is a possibility of breaking insulation due to high surge voltages.

Therefore, cable charging current make and break tests are divided into C1 and C2 in order to separate stability level. Also, C2 level has been applied to HG-Series vacuum circuit breaker.

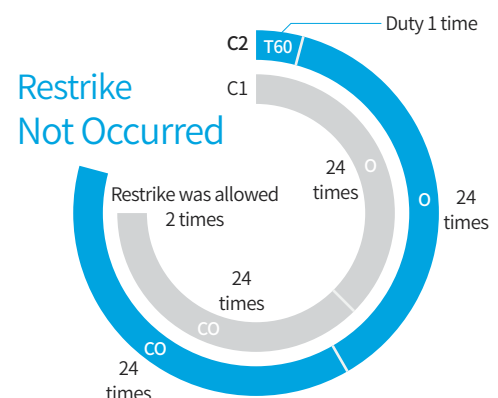
### C1

Restrike were allowed two times among "O" 24 times, "CO" 24 times

### C2

Restrike did not occur among "T60" Duty 1 time, "O" 24 times, "CO" 24 times

## C2 | T60 : Duty 1 time, O : 24 times, CO : Restrike did not occur during 24 times



## Overview and Characteristics (HGV)

### Convenience of Panel Configuration

It offers the convenience of panel production ensuring stability and prevention of spreading accidents by isolated metal structure and breaker boundary compartment of M-type cradle

- Completely isolated structure by metal : Prevention of spreading accidents and securing stability
- Improved ease of operation by access truck
  - Panel doors (door) is implemented to allow pushing/drawing only when panel doors are closed
  - Location indicator during pushing/drawing
- Equipped with safety devices and accessory devices
  - Control power connecting interlock
  - Grounding switch and interlock
- Panel manufacturing convenience : Units were assembled based on breaker boundary compartment

VCB in the Cradle



Cradle Empty



MS Type  
Cradle

Cradle Front



Cradle Back





## Overview and Characteristics (HVF)

### Features

- With the technology and know-how which manufactured the largest number of VCB models and based on the newer and more stabilized machine unit and breaker units, high reliability and quality tested by new standard of IEC 62271-100
- By adopting electro motion spring mechanism with faster and more reliable mechanical features, 3 cycles of breaker time is implemented for all models
- Implementation of full moldization which inserts breaker unit to insulating material container to minimize the human and material damage in the event of an accident
- Reduced the size of vacuum interrupters using the optimal arc control technology to ensure higher rated breaking current

### Structure and Operation

HVF-type VCB is of the structure in which electric motion spring-type operation and control machine unit is installed inside operation control box and vacuum interrupting unit. Also electric current unit are installed inside insulation frame which is on the rear side of operation control box.

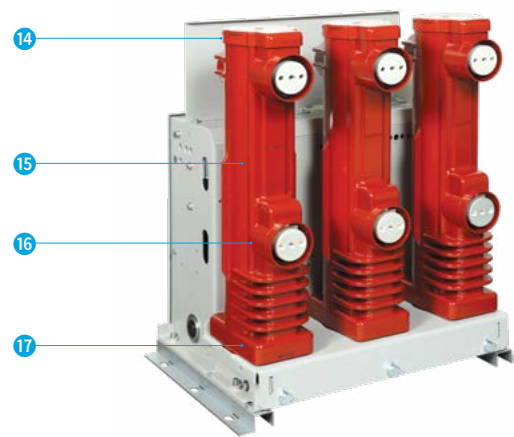
Insulation Frame of epoxy material is designed to be a closed-type in order to have sufficient mechanical strength and dielectric strength and to minimize the impact of dust and dirt during use.

In addition, it helps solidly fixing vacuum circuit breaker unit, upper and the lower terminal unit and flexible terminal installed inside insulation frame to well withstand various electrical and mechanical shock and to adapt to temperature rise during the conducting of rated current.

Contacts of VI unit were designed to be a special shape using special materials sintered with Cu and Cr in an appropriate ratio, thus they have a superior performance in the short-circuit current and various load current cut-off, and are completely sealed in a vacuum state to be safely used for a long time.



HVF Type VCB Front



HVF Type VCB Rear

#### HVF Type VCB

- |                                      |                                     |                         |                         |
|--------------------------------------|-------------------------------------|-------------------------|-------------------------|
| 1 Control Circuit Connecting Unit    | 4 Breaker Operating State Indicator | 8 Electric Current Unit | 13 Nameplate            |
| 2 Manual Charging Hole               | 5 Counter                           | 9 Cradle (G Grade)      | 14 Upper Insulating Cap |
| 3 Closing Spring Condition Indicator | 6 Draw-Out Mechanism Unit           | 10 Manual Feed Button   | 15 Vacuum Interrupter   |
|                                      | 7 Shutter                           | 11 Housing Box          | 16 Lower Terminal       |
|                                      |                                     | 12 Manual Trip Button   | 17 Insulating Frame     |

## Overview and Characteristics (Compact HGV)

### Features

- Compact HGV has a compact size minimizing installation footprint
- Simple structure and ease operation. Test completed by the new standard of IEC 62271-100 with 3-cycle breaker
- Easy inspection and maintenance for current conducting. Mechanism unit can be easily maintained by opening the front cover

### Structure and Operation

Electric motion spring system was adopted for operation of breaker, with main components of motor, closing spring, trip spring, contact pressure spring, closing solenoid, solenoid trip, auxiliary switch, reclosing-preventing contactor, vacuum breaker unit and the like.

Operation control machine unit consists of the mechanism of electric motion spring operating method and should make breaker maintain stable switching features during long hours of usage.

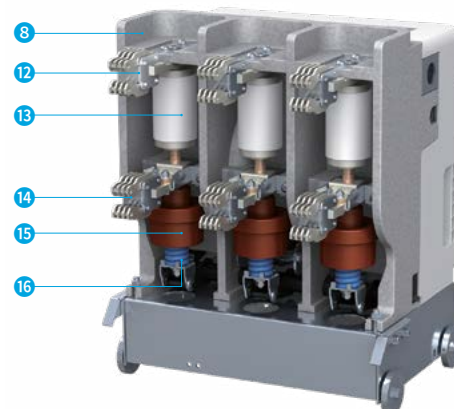
Current breaker and conducting units consist of vacuum circuit breaker unit and upper and the lower insulation units installed within insulation frame. In addition, breaker and conducting units are securely fixed to withstand various electrical and mechanical shock within insulation frame. Insulation frame of unsaturated

polyester material (BMC) has a sufficient insulating dielectric strength.

When the control circuit of the circuit breaker are connected and voltage is applied to the control circuit, the closing spring is tensioned making the breaker always ready for closing. Once the breaker closes, the closing spring immediately gets recharged and the contacting spring is to provide appropriate pressure to the vacuum circuit breaker unit. At this time, the trip spring has been accumulating energy for the trip. Closing and trip solenoid control in operation control machine unit is commanded to perform electrical open/close in order to operate operation control machine unit; breaker can be manually operated by manual operation handle, manual ON button and manual trip button.



Compact HGV Type VCB Front



Compact HGV Type VCB Rear

#### Compact HGV Type VCB

- |                                      |                                   |                           |                           |
|--------------------------------------|-----------------------------------|---------------------------|---------------------------|
| ① Manual Charging Hole               | ⑤ Interlock Lever                 | ⑩ Manual Opening Button   | ⑯ Contact Pressure Spring |
| ② Closing Spring Condition Indicator | ⑥ Conducting Unit                 | ⑪ Draw-Out Mechanism Unit |                           |
| ③ Breaker Operating State Indicator  | ⑦ Control Circuit Connecting Unit | ⑫ Upper Terminal          |                           |
| ④ Counter                            | ⑧ Housing Box                     | ⑬ Vacuum Interrupter      |                           |
|                                      | ⑨ Manual Closing Button           | ⑭ Lower Terminal          |                           |
|                                      |                                   | ⑮ Insulation Rod          |                           |

## Overview and Characteristics (HVF)

### Application of VCB

#### Applied Standards

Designed and tested in compliance with all the requirements of the International Standard IEC 62271-100 and can be applied to ANSI C37 standard based on breaker rating.

#### High-Speed Load Switchover and Operation Responsibilities

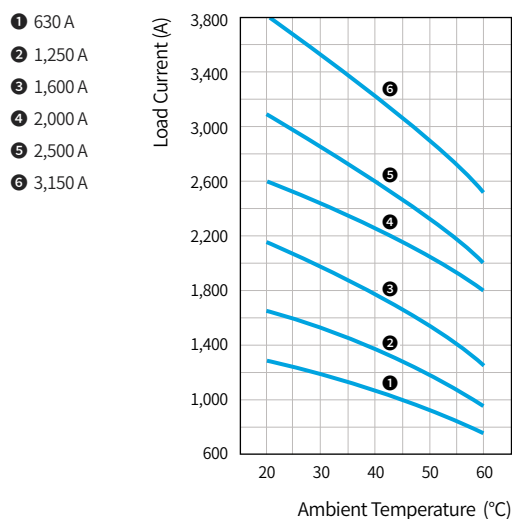
As closing and opening time of the circuit breaker is short, thus it is suitable for high-speed load transfer which requires input power switchover without stopping operation of load and can be used as a circuit breaker for high reclosing applied to avoid transient deviation such as lightning, temporary earth fault, etc. Operating responsibilities of the breaker are classified and verified as follows in accordance with related standards such as IEC 62271-100, making it available for various-type of operating conditions :

- O-0.3 sec-CO-3 min-CO (For High Speed Reclosing)
  - CO-15 sec-CO (Standard)
- (O : Opening, C : Closing, CO : Closing soon after opening)

#### Capacity of Conducting Current

Can be operated at - 5 °C ~ + 40 °C. Rating current of circuit breaker is determined at an ambient temperature of + 40 °C based on IEC standard. When the breaker is used at a different temperature it should be calibrated for the load current. The figure below displays load current at various temperatures. However, this figure should only apply to open switchgear and load current is reduced when applied to closed switchboard.

Vacuum Circuit Breaker Load Characteristic Curve



#### Machining Line and Cable Opening/Closing

Cutting off cable current and machining line during no load poses no over-loading and restriking risks due to line charging current.

#### Cutting off Short-Circuit Current with High Recovery Voltage Rising Rate

In case of short-circuit current occurs at the back end of current limiting chalk, transformer or generator, recovery voltage rising rate exceeds the value regulated by IEC 62271-100, and can have a value higher than 10 kV/μs, but Hyundai Electric vacuum circuit breaker can be in such adverse conditions.

#### Opening and Closing Electrically

Frequent opening/closing and relatively less opening/closing surge makes it suitable for electric usage. However, for safer usage, special consideration is necessary for the maintenance and opening/closing surge of the breaker, thus make sure to contact us for application.

#### No-Load Transformer Opening/Closing

Chopping current ranges 4 ~ 5 A when cutting off inductive low current using contacts of special materials and no hazardous overvoltage when cutting off no-load transformer current. Some dry-type transformer models may have lower dielectric strength compared to general transforms. Thus make sure to check dielectric strength of transformer to use and protect it using surge absorber when needed.

#### Capacitive Load Opening/Closing

Designed to be suitable for use for capacitive circuit no hazardous over-voltage and restriking at the time of capacitive load opening/closing such as condenser bank, etc. It can be used to capacitive load currents of up to 400 A (Except for VCB below 7.2 kV 20 kA) and for further details, make sure to contact us.

#### Motor Opening/Closing

Frequent electrical opening/closing and relatively less opening/closing surge in rate current makes it especially advantageous for opening/closing of high capacity motors with frequent opening/closing. For low-dose motor with low dielectric strength of 600 A or less starting current, installation of appropriate surge absorber is recommended to more reliably protect the system and load facilities.

## Overview and Characteristics (HVF)

### Operation and Control Voltage

#### Electric Motion Spring Charging Method

Motor is used for charging the closing spring in the vacuum circuit breaker of the electric motion spring system. For current consumption during motor operation, refer to <Table 1>. <Table 1> shows the maximum current consumption of the motor, the starting current which is generated during the initial operation can be ignored as they lasts very short amount of time.

#### Rated Specifications of Auxiliary Contacts

- Opening/Closing Capacity : 200 W (Inductive Load at 220 V DC),  
200 W (Resistive Load in DC)
- Closing Current : 30 A
- Continuous Current : 10 A
- Opening/Closing Current : 2 A (DC 220 V at T = 20 ms)
- Operating Voltage : 250 V AC/DC

#### Solenoid

Solenoids detect electrical control signal and enable operating mechanism inside the breaker to operate according to a control signal.

For current consumption of closing and trip-controlling solenoid, refer to <Table 1> whose values are based on the peak current.

#### Auxiliary contacts and wiring

Wiring of control jack for operation and control can be configured with 'fixed jack' method whose jack is installed and fixed on the breaker body and 'draw-out jack' method whose jack is installed on the end of lead cable connected to the body.

Specifications and wiring of auxiliary contacts are as follows :

#### HVF Type

- 4NO + 4NC & Fixed Jack : Fixed Standard (2.2 m) - A-Type
- 4NO + 4NC & Draw-Outs Jack (Lead Cable : 0.8 m) :  
Draw-Out-Type Standard - C-Type
- 7NO + 7NC & Fixed Jack (2.2 m) - B-Type
- 10NO + 10NC & Draw-Outs Jack (Lead Cable : 0.8 m) - D-Type



Photo when Fixed Jack  
was Applied



Photo when Draw-Out Jack  
was Applied

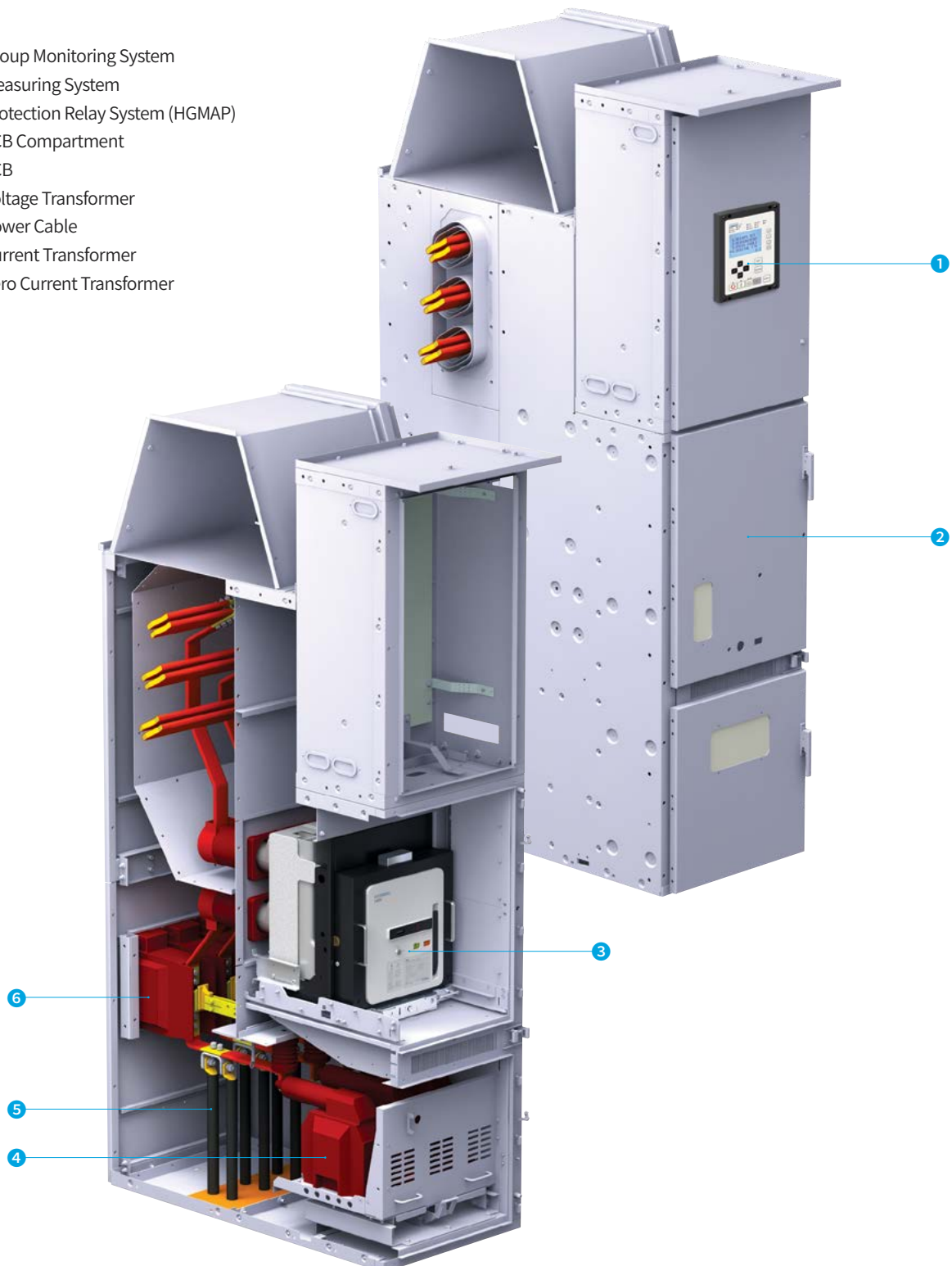
<Table 1> Fluctuation of Operation and Control Voltage & Current Consumption

| Rated Voltage | Current Consumption (A) |          |             | Voltage Range (Based on IEC)                                                                                                                                                                                          |
|---------------|-------------------------|----------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | Motor/Condenser         | Closing  | Trip (Open) |                                                                                                                                                                                                                       |
|               | HVF Type                | HVF Type | HVF Type    |                                                                                                                                                                                                                       |
| 48 V DC       | 20                      | 2.7      | 6.2         | Motor : 85 ~ 110 %<br>Closing Control : 85 ~ 110 %<br>Trip Control : 70 ~ 110 %<br>(85 ~ 110 % for AC Control Voltage)<br><br>※ Voltage range of ESB standard applied breaker<br>complies with the ESB specification. |
| 110 V DC      | 8                       | 1.3      | 2.7         |                                                                                                                                                                                                                       |
| 125 V DC      | 8                       | 1.5      | 2.4         |                                                                                                                                                                                                                       |
| 220 V DC      | 4                       | 0.7      | 1.4         |                                                                                                                                                                                                                       |
| 110 V AC      | 10                      | 1.3      | 2.7         |                                                                                                                                                                                                                       |
| 220 V AC      | 6                       | 0.7      | 1.4         |                                                                                                                                                                                                                       |

## Overview and Characteristics

### Application of VCB Compartment

- ① Group Monitoring System  
Measuring System  
Protection Relay System (HGMAP)
- ② VCB Compartment
- ③ VCB
- ④ Voltage Transformer
- ⑤ Power Cable
- ⑥ Current Transformer  
Zero Current Transformer



## Overview and Characteristics (UVC)

### Operation Overview

#### Operation Time and Current

| Item            |                   | Closing Current (A) |      | Holding Current (A) |      | Trip Current (A) |      | Closing Time (ms) | Trip Time (ms) |
|-----------------|-------------------|---------------------|------|---------------------|------|------------------|------|-------------------|----------------|
|                 |                   | 3.6/7.2kV           | 12kV | 3.6/7.2kV           | 12kV | 3.6/7.2kV        | 12kV |                   |                |
| Continuous-Type | AC/DC 100 ~ 125 V | 3.0                 | 13.0 | 0.5                 | 0.9  | -                | -    | Less than 110     | Less than 40   |
|                 | AC/DC 200 ~ 230 V |                     |      |                     |      |                  |      |                   |                |
| Latch-Type      | AC/DC 100 ~ 125 V | 3.0                 | 13.0 | -                   | -    | 4.0              | 4.0  | Less than 110     | Less than 25   |
|                 | AC/DC 200 ~ 230 V |                     |      |                     |      |                  |      |                   |                |

※ For latch-type, closing current flows only for 170 ms.

#### Operating Voltage

| Item             | Contents                    |
|------------------|-----------------------------|
| Closing Voltage  | 85 ~ 110 % of Rated Voltage |
| Trip Voltage     | 70 ~ 110 % of Rated Voltage |
| Drop Out Voltage | AC/DC 25 V                  |

#### Rating of Auxiliary Contacts

| Item              | Contents |          |
|-------------------|----------|----------|
| Voltage           | AC 110 V | AC 220 V |
| Operating Current | 5 A      | 2 A      |

### Fuse Selection

Hyundai Electric does not produce fuse. Thus refer to fuse catalog to select and purchase one to attach it to our high-voltage vacuum contactor. Following diagram is fuse selecting methods for customers' convenience based on some fuse makers. Make sure to refer to fuse maker catalogs.

#### Fuse Attaching-Type

- Fuse only cuts off short-circuit current exceeding cut-off current of vacuum circuit breakers and uses protective relay for over-current.
- Fuse melting detector is an option and supplied at the request of user. However, for systems without protector against single-phase earth fault, single-phase short-circuit, use fuse melting detector to configure circuit to trip in the event of vacuum contactor incident.

#### Rated Current Selection

Compare operating conditions and time-current characteristics of fuse to select rated current values meeting each item below by referring to fuse maker catalog.

- Rated current value shall be higher than full load current.
- Must be a fuse with sufficient rated current whose fuse element does not deteriorate due to allowed overload.
- Select fuse rated current value whose starting current (Magnetizing inrush current)-time characteristics fall within current-allowed time characteristics of fuse so that magnetizing inrush current or starting current may not deteriorate fuse elements.

#### Fuse Non-Attaching-Type

- For draw-out-type, the part to be connected with fuse is replaced with bus bar, thus it can change into fuse-attached draw-out-type.
- Fuse non-attached-type is limited in circuit breaking, thus breaker should be installed on the front end.

#### Rated Breaking Current Selection

Figure out short-circuit current of the circuit and select fuse with higher rated breaking current.

| Item                          | Contents          |       |       |       |
|-------------------------------|-------------------|-------|-------|-------|
| Rated Insulation Voltage (kV) | 3.6               |       | 7.2   |       |
| Rated Operating Voltage (kV)  | 3.3               |       | 6.6   |       |
| Rated Current (A)             | 200               | 400   | 200   | 400   |
| Maximum Load Capacity         | Motor (kW)        | 750   | 1500  | 1500  |
|                               | Transformer (kVA) | 1,000 | 2,000 | 2,000 |
|                               | Condenser (kVAR)  | 750   | 1,200 | 1,500 |

※ Select the rated current value for each rated voltage from the table above, depending on the secondary axle load and capacity.

## Fuse Selection Table based on Load Conditions

This table is based on the condition when operation was carried out for less than 15 seconds and about 2 times per hour for 3-phase motor load of SIBA company product. For other loading conditions, refer to the fuse maker catalog.

| Load                   |           | 3Ø Motor (kW) |           |        |             | 3Ø Transformer (kVA) |      |        |       | 3Ø Condenser (kVAR) |     |        |       |
|------------------------|-----------|---------------|-----------|--------|-------------|----------------------|------|--------|-------|---------------------|-----|--------|-------|
|                        |           | 3.3 kV        |           | 6.6 kV |             | 3.3 kV               |      | 6.6 kV |       | 3.3 kV              |     | 6.6 kV |       |
| Fuse Maker             |           | SIBA          | LS        | SIBA   | LS          | SIBA                 | LS   | SIBA   | LS    | SIBA                | LS  | SIBA   | LS    |
| Fuse Rated Current (A) | 6.3 (5)   | -             | -         | -      | -           | -                    | -    | -      | 15    | -                   | -   | -      | -     |
|                        | 10        | -             | -         | -      | -           | -                    | 15   | -      | 30    | -                   | 10  | -      | 25    |
|                        | 16        | -             | -         | -      | -           | -                    | -    | -      | -     | -                   | -   | -      | -     |
|                        | 20        | -             | 37 ~ 75   | -      | 75 ~ 160    | 50                   | 30   | 100    | 75    | 30                  | 30  | 60     | 50    |
|                        | 25        | -             | -         | -      | -           | -                    | -    | -      | -     | -                   | -   | -      | -     |
|                        | 31.5 (30) | -             | -         | -      | -           | 80                   | 75   | 160    | 150   | 50                  | 50  | 100    | 100   |
|                        | 40        | -             | -         | -      | -           | 100                  | 100  | 200    | 200   | 75                  | 75  | 150    | 150   |
|                        | 50        | 90            | 90 ~ 200  | 160    | 185 ~ 400   | 125                  | 150  | 250    | 300   | 100                 | 100 | 200    | 200   |
|                        | 63        | 100           | -         | 200    | -           | 160                  | -    | 315    | -     | 125                 | -   | 250    | -     |
|                        | 80 (75)   | 125           | -         | 250    | -           | 200                  | 200  | 400    | 500   | 150                 | 150 | 300    | 400   |
|                        | 100       | 160           | 220 ~ 400 | 330    | 450 ~ 800   | 250                  | 375  | 500    | 750   | 200                 | 300 | 400    | 600   |
|                        | 125       | 200           | -         | 400    | -           | 315                  | -    | 630    | -     | 250                 | -   | 500    | -     |
|                        | 160 (150) | 275           | 450 ~ 630 | 550    | 900 ~ 1,250 | 400                  | 500  | 800    | 1,000 | 300                 | 400 | 650    | 800   |
|                        | 200       | 315           | 710 ~ 800 | 650    | 1,500       | 500                  | 750  | 1,000  | 1,500 | 375                 | 600 | 750    | 1,000 |
|                        | 250       | 400           | -         | 830    | -           | 630                  | -    | 1,250  | -     | 500                 | -   | 1,000  | -     |
|                        | 315 (300) | 500           | -         | 1,000  | -           | 750                  | 1000 | 1,500  | 2,000 | 600                 | -   | 1,200  | -     |
|                        | 355       | 600           | -         | 1,200  | -           | 900                  | -    | 1,800  | -     | 700                 | -   | 1,400  | -     |
|                        | 2X125     | -             | -         | -      | -           | -                    | -    | -      | -     | -                   | -   | -      | -     |
|                        | 2X160     | 500           | -         | 1,000  | -           | 800                  | -    | 1,600  | -     | 600                 | -   | 1,200  | -     |
|                        | 2X200     | 650           | -         | 1,300  | -           | 1,000                | -    | 2,000  | -     | 750                 | -   | 1,500  | -     |
|                        | 2X250     | 750           | -         | 1,500  | -           | 1,250                | -    | 2,500  | -     | 1,000               | -   | 2,000  | -     |

※ If you are using SIBA fuse under condenser load, it is recommended to select fuse rated voltage one level higher than current voltage under load.

E.g. : If you use the SIBA fuse under 3.3 kV 200 kW motor load, select 125 A.

E.g. : If you are using the SIBA fuse under 6.6 kV 200 kVAR condensor load, it becomes 6.6 kV 50 A but as it is condensor load, select 12 kV 50 A which is one rated voltage higher.

## Precautions per Load

### Motor

- For selection of fuse, make sure to refer to 'Fuse selection table based on load conditions' to avoid damaging fuse by allowed overload and motor starting voltage.
- When using a transformer for control power, controlled power should not drop by 20 % or more by motor starting voltage.

### Capacitor

- For selection of fuse, make sure to refer to 'Fuse selection table based on load conditions' to avoid damaging fuse by inrush current.
- If you are using capacitor load back-to-back, contact us as adverse effect is expected due to high inrush current.

### Transformer

- For selection of fuse, make sure to refer to 'Fuse selection table based on load conditions' to avoid damaging fuse by no-load inrush current.



## Overview and Characteristics (UVC)

### Anti Pumping Function

Anti pumping circuit which triggers closing and trip occur once only when the closing command and tripping command occur at the same time is embedded inside the controller.



### Reducing Current Consumption

- By removing current in the PWM method, power consumption is reduced by 40 % in comparison with other products

### Certification

- Products were developed in compliance with IEC, NEMA standards.
- Acquired the KAS (Korea Electrical Safety Corporation) certified V checkmark, thus KAS recognizes independent test reports, making other acceptance testing not necessary.
- Acquired UL and cUL certification according to UL347, proving reliability for use in the US and Canada.



### Realizing Free Voltage of Operating Power

- Common operating voltage of AC/DC 100 ~ 125 V, AC/DC 200 ~ 230 V.
- Controller used in 2 one voltage ranges is compatible as they are identical parts.

### Noise Removed

- By adopting the solenoid magnetizing method as standard using PWM control, noise is removed.



## Overview and Characteristics (VI)

Vacuum interrupters is a product that places conducting contacts in a sealed vacuum container for stable cutting off and opening/closing in the high-voltage large current.

### High Performance

- High insulation performance in vacuum - able to cut off large current even in short-distance
- Less arc and low contact consumption
- Optimized design - compact and lightweight

### Minimized Maintenance

- Very low leak rate over long period of usage - high reliability
- Special material with very low gas content - long-lasting high-vacuum state

### Eco-Friendly

- Sealed and welded under highly vacuum state not effecting or is affected by surrounding environment

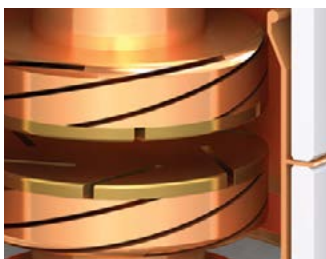
### Compliant with International Standards

- Manufactured in accordance with IEC standard - can be used by various products

#### Compact and Lightweight



#### Excellent Cutting-Off Performance



## Overview and Characteristics (VI)

### Technical Advantages of Vacuum Interrupters

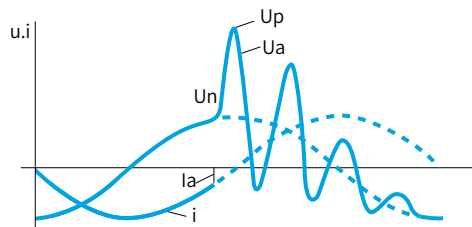
#### High Cutting off Performance

Short circuit performance with a compact size through transverse and axial magnetic field contacts.

#### Low Current Chopping

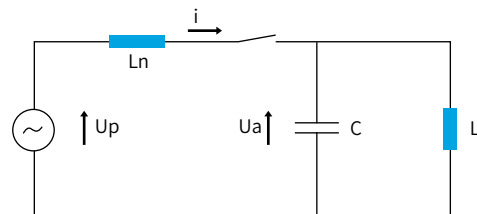
In clearly low current, as shown in Fig.1, the metal vapor arc is interrupted before reaching a current zero point. The current chopping which is generated at the point creates over-voltage and may affect surrounding equipment. Current chopping relies on vacuum interrupter and should be as low as possible. HG-Series vacuum interrupter uses CuCr contact materials to maintain the current chopping under 5 A.

<Fig.1> Over-Voltage by Current Chopping when Cutting off Induced Current



Un : Commercial Frequency Counter Ground Voltage  
 Ua : Load Breaker Terminal Voltage  
 Up : Maximum Over-Voltage at The Loading Unit  
 i : Commercial Frequency Current  
 Ia : Current Chopping

<Fig.2> Single-Phase Equivalent Circuit for Cutting off Induced Current



Un : Commercial Frequency Counter Ground Voltage  
 Ua : Load Breaker Terminal Voltage  
 i : Load Current  
 Ln : Inductance of Power System  
 L : Inductance of Load  
 C : Load Capacity

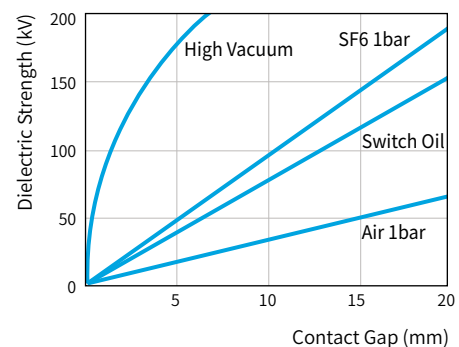
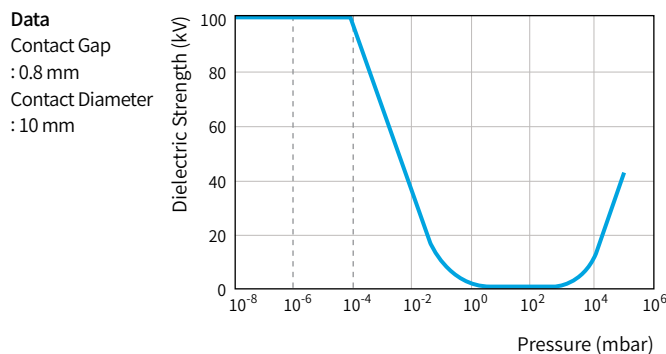
#### High Dielectric Strength

After opening, interrupted current is discharged and exists in a plasma state due to metal vapor between the contacts. Arc is extinguished at a current zero point, the metal vapor loses conductivity in microseconds. When interrupted, dielectric strength in vacuum is recovered in a short time. At a normal state, high vacuum is maintained under  $1 \times 10^{-7}$  mbar. At an opening state, distance between contacts is shorter but is with high dielectric strength.

#### Minimized Contact Consumption

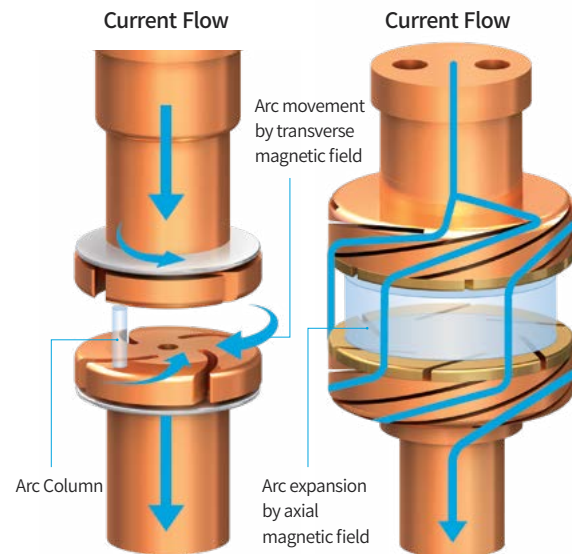
With low arc voltage and short arcing time, contact consumption was minimized to enhance electrical life of vacuum interrupters.

<Fig.3> Vacuum Insulation Strength



## Interrupting Behavior

As for untreated flat contact, when the contact is opened, the hot arc is focused and fixed on the contact center, which is called Pinch Effect. To prevent this from happening, transverse or axial magnetic field methods are applied to rotate or spread the arc so that the focused arc is staying in the gaps. This makes arc energy to be evenly distributed on the contact surface to minimize contact damage.



## Current Interrupting Properties

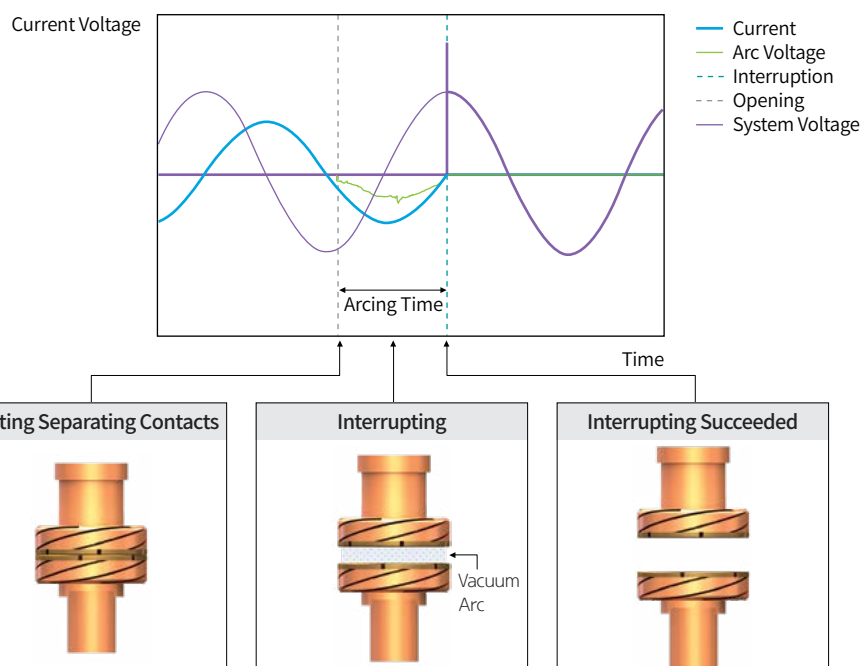
When the contact is opened, arc is generated between the contacts, the arc is then maintained until it reaches the current zero point. At this time, arc melts the contacts generating metal vapor. If the arc is locally focused, a greater amount of metal vapor is generated overheating contacts and will eventually degrade the interrupting performance.

Therefore, in order to enhance the interrupting performance, it is important to prevent local overheating of the contacts. As an arc extinguishing chamber technology to prevent localized overheating of these contact, we applied the transverse and axial magnetic field approaches.

Transverse magnetic field approach generates a magnetic force in the horizontal direction between the contact point rotating arc to prevent local overheating of the contacts, axial magnetic field method is a technique for preventing local overheating through the spread of the arc to generate a magnetic force in the axial direction.

Using the contact to which above technologies are applied enables producing more compact and higher-performance vacuum interrupters.

### Interruption Graph



## HGV Structure

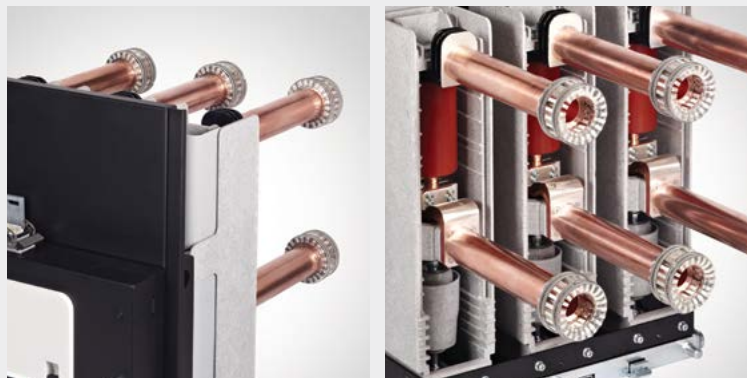
### External Structure

- All components are modular.
- Operation of energy of mechanism is delivered to the VI. Closing spring cannot be electrically or manually charged. Once charging is complete, it automatically hangs on the latch waiting for closing. The breaker performs basic operations with the energy stored in the closing spring.
- Breaker closing operates with the resilience of the spring compressed by a manual button or an electrical signal. By release of closing latch, VI contact is pressurized with an appropriate pressure and at the same time, the trip spring is tensioned to prepare trip. In addition, the discharged closing spring is charged again by motor waiting for the next command. HG-Series Vacuum Circuit Breaker is not only quick in synchronization and load delivery but implements high-speed auto-reclosing function.



#### Slide-in Module

- 1 Connection Unit
- 2 Bushing Cover
- 3 Shutter
- 4 Bushing
- 5 Cradle
- 6 Conducting Unit
- 7 Control Jack
- 8 Breaker (VCB)
- 9 Truck (Pushing/Drawing Device)



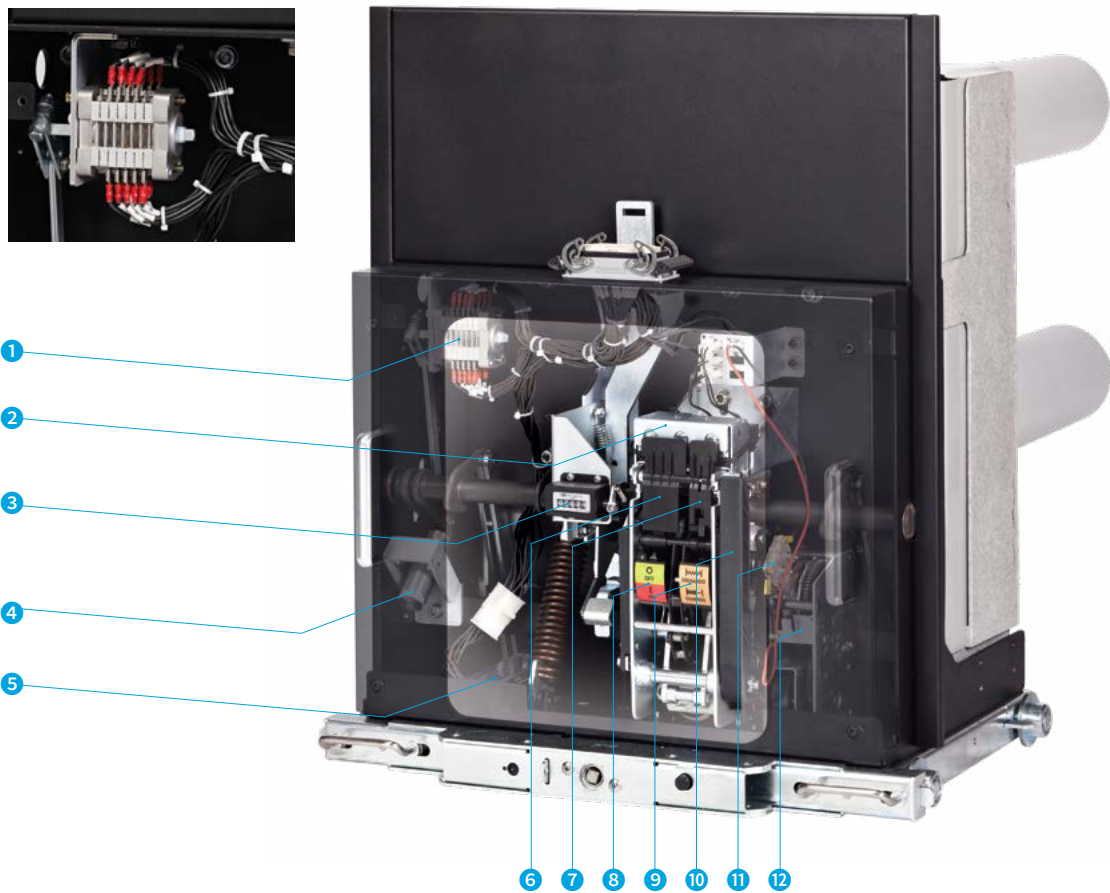
## Internal Structure

### Trip Free Mechanism

- As for closing command given during trip operation, driving force is not delivered to pole unit but offset by driving mechanism Therefore, VCB remains a trip state without a VI movement.
- This feature is included in the mechanism.

### Anti-Pumping Mechanism

- HG-Series Vacuum Circuit Breaker is out of the conventional electrical anti-pumping, but implemented more reliable and mechanical anti-pumping as well.
- This feature is included in the mechanism.

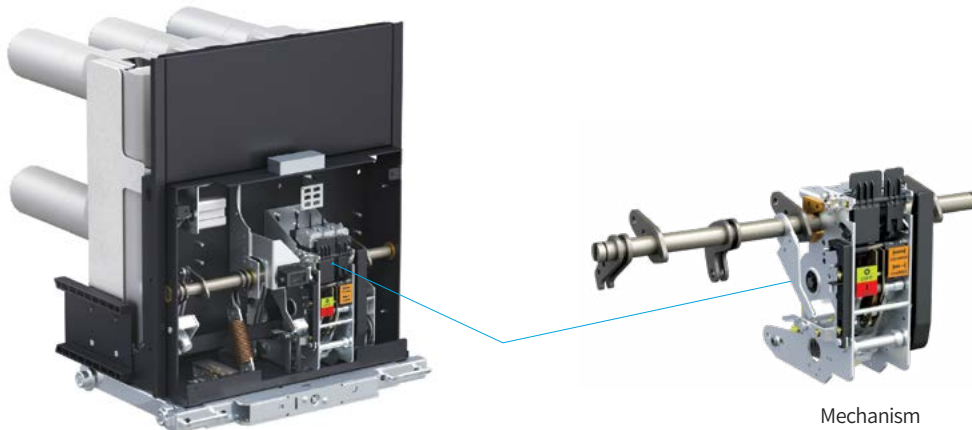


### Circuit Breaker Operating Mechanism

- |                                    |                                |
|------------------------------------|--------------------------------|
| 1 Auxiliary Switch                 | 10 Manual Charging Handle      |
| 2 Closing Coil, Trip Coil          | 11 Spring Charged Limit Switch |
| 3 Operation Count Indicator        | 12 Electric Motor              |
| 4 Oil Dash Pot                     |                                |
| 5 Location Displaying Switch       |                                |
| 6 Manual Trip Button               |                                |
| 7 Manual Closing Button            |                                |
| 8 ON/OFF Status Indicator          |                                |
| 9 Closing Spring Charged Indicator |                                |

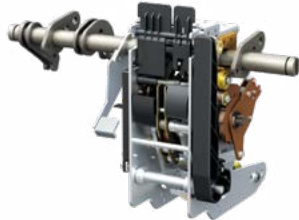
## HGV Operation Structure

### ON/OFF Operation Structure and Features



#### Charging

Once manual handle or motor completes compression of the closing spring, it is fixed onto the latch waiting for closing.



#### Closing

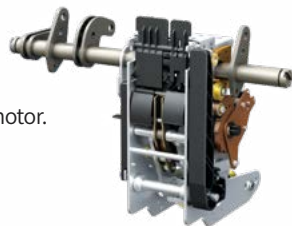
Once closing signal comes in, compression of the closing spring is released, by the force, VI contacts are pressed until it gets enough pressure.

Further, trip spring gets tension at the same time waiting for the next operation.



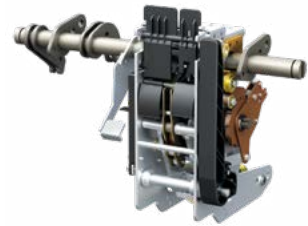
#### Recharging

After closing operation completed, closing spring can be recharged by manual handle or motor. At this time, if the control power is connected, motor recharges automatically. This is to prepare a high-speed reclosing.



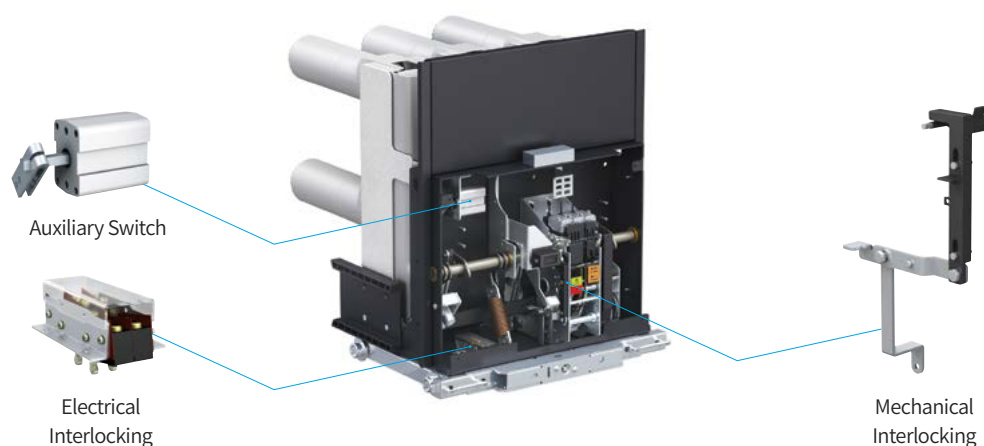
#### Tripping

If trip signal comes in, VI pressurizing force and trip spring is released returning the VI contacts to the trip position.





## Interlocking



### Mechanical Interlocking

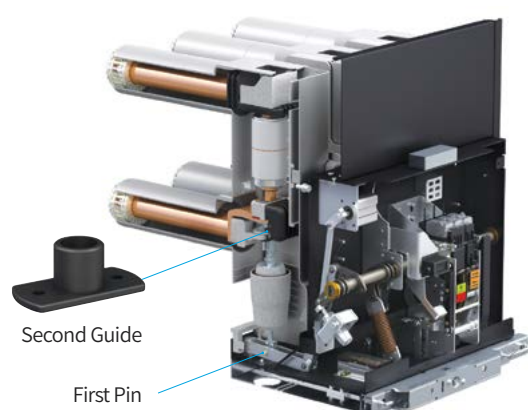
Pushing/drawing vacuum circuit breakers are interlocked to allow inserting of pushing/drawing handle only in an open state. In addition, when the vacuum circuit breaker is in a position apart from service or test position, operation is unavailable (Switching ON/OFF is unavailable).

### Electrical Interlocking

The auxiliary switch of the vacuum circuit breaker is linked to the ON/OFF state and the pushing/drawing location information of the breaker to facilitate the interlocking configuration of the panel. Panel interlock monitors the ON/OFF state of the breaker being able to prevent closing of disconnectors when the vacuum circuit breaker is closing. The system also prevents closing of the vacuum circuit breakers when disconnectors are in an abnormal position.

## Reliability of Mechanical Behavior of VI

During ON/OFF operation, insulating rod connection adds, in addition to the pin first, guide to upper part secondly minimizing changes in eccentricity and straightness of VI contacts for mechanism rotation. Also, by avoiding vibration frequency overlap and energy balance between closing spring and VI pressing spring.



## HGV Cradle Structure

### ES-Type Cradle

- Structure : Basic cradle made of steel structure
- Main Terminal Mounting:  
Fixing busbar of mold bushing shape into insulator
- Pushing/Drawing-Type : Latch (Lever)
- Safty Shutter: Unapplied
- Applying Switchboard : Cubicle-Type MESSG
- Features
  - No direct impact from arc in the event of accident Acropolis.
  - Lightweight, budget cradle
  - Operation is simple and maintenance is easy
  - FS makes modification easy

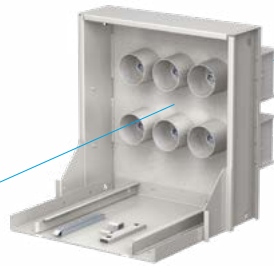
### FS-Type Cradle

- Structure : ES-Type Cradle + Safty Shutter
- Safty Shutter : Applied (Insulating Shutter)
- All application of ES-type are applied
- Features
  - Insulating shutter fully isolates the bus unit and breaker unit resulting in higher protection rate

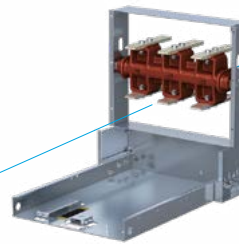
#### ES Type



Body of Breaker



Body of Breaker

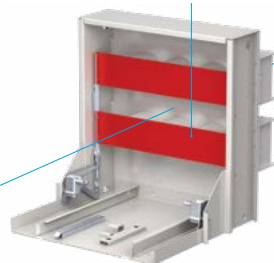


#### Safety Shutter

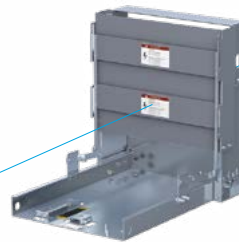
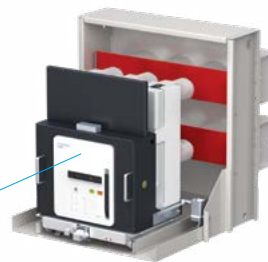
#### FS Type



Body of Breaker



Body of Breaker





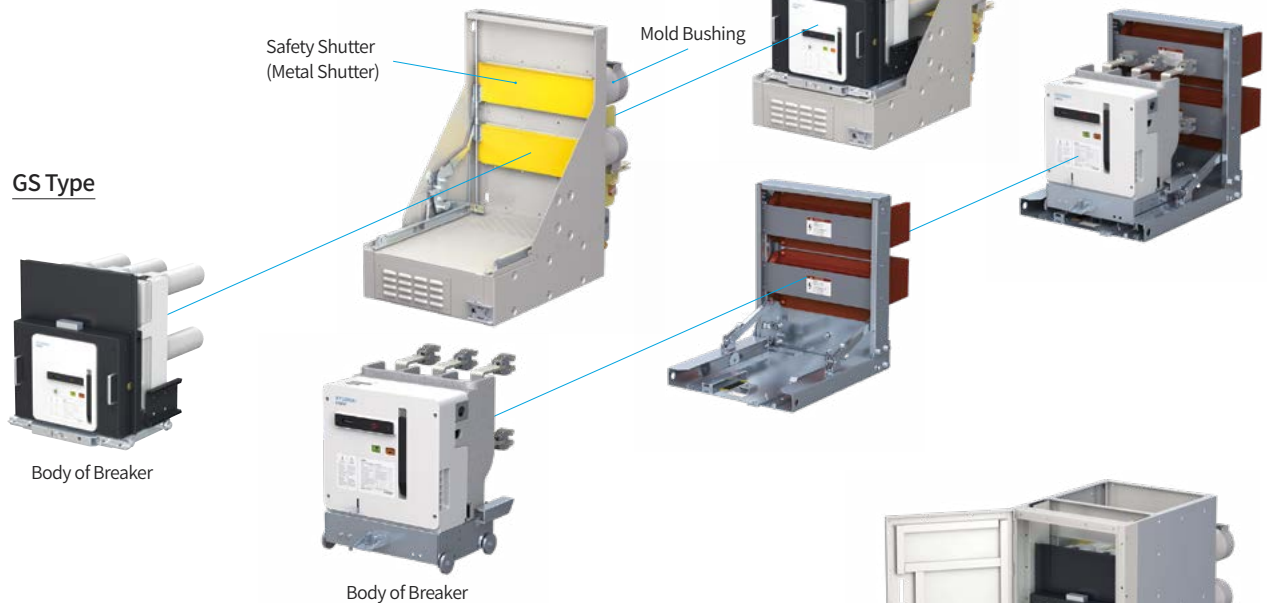
## GS-Type Cradle

- Structure : High-end cradle consisted of an optimized steel structure
- Main Terminal Mounting : Fixing busbar with mold bushing
- Pushing/Drawing-Type : Screw (Breaker location inspection is possible)
- Safety Shutter : Applied (Metal Shutter)
- Applied Switchboard : Closed Switchboard (MCSG)
- Features
  - Bus unit and breaker unit is fully isolated with a steel structure preventing spreading of accident and securing stability
  - When connecting bus, insulating cover is applied to secure clearance between phases and minimize insulation processing cost
  - Application of guide to breaker moving unit increased connection reliability and endurance against external shock
  - Earthing switch and related option can be mounted

## MS-Type Cradle

- Structure : Top-notch cell-type cradle with an attached door
- All application of GS-Type are applied
- Features
  - Full implementation of panel breaker to reduce costs and maximize convenience
  - Breaker operation available with door closed maximizing safety
  - Earthing switch and related option can be mounted

### GS Type



### MS Type



## HVF Cradle Structure

VCB is divided into fixed and draw-out type breaker depending on the mounting method. Draw-out type breaker has main circuit connection terminal, pushing/drawing device to connect or disconnect body unit of breaker to bus unit. It also has interlocking device to prevent pushing/drawing of breaker when closing breaker. And it is provided with drawing unit to suitable mounting and convenient use in accordance with various switchgear-type ; there are following-types of drawing units based on the configuration form of bus unit in main circuit :

### X-Type Cradle

- Fixed-Type

X / ES / FS / SF  
Type Cradle



**X-Type**

### E-Type Cradle

- Shutter Unattached (For Cubicle-Type Switchboard)



**E-Type**

Lever-Type - ES Type



**F-Type**

Lever-Type - FS Type



**F-Type**

Screw-Type - SF Type

## F-Type Cradle

- Shutter Mounted (For a Compartment-Type Switchgear)

## G-Type Cradle

- Bushing Terminal is used/Shutter Mounted (For a Metal-Clad Switchgear)

### IG / GS Type Cradle



### G-Type

Safty Shutter Mounting-Type - IG Type



### G-Type

Metal Shutter Mounting-Type - GS Type



### G-Type

Earthing Switch Mounting-Type - GS Type

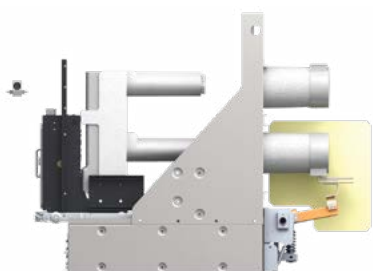
※ However, special breakers for KEPCO hydro and thermal power, MCSG (IEC or ANSI-type) and replacing obsolete breaker are manufactured upon a special order.

For Hyundai Electric's vacuum circuit breakers, various draw-out type VCBs and cradles are designed and manufactured to meet customers' requirements.

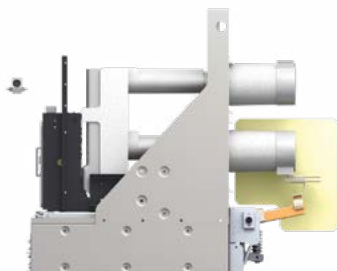
## HGV Pushing/Drawing

The table below shows operation status and function of each position of the vacuum circuit breaker. See what safety functions are available for each status.

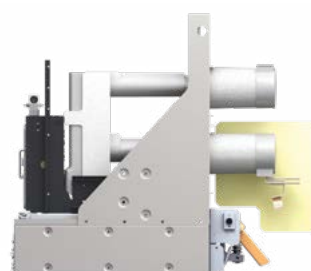
Remove



Test Position



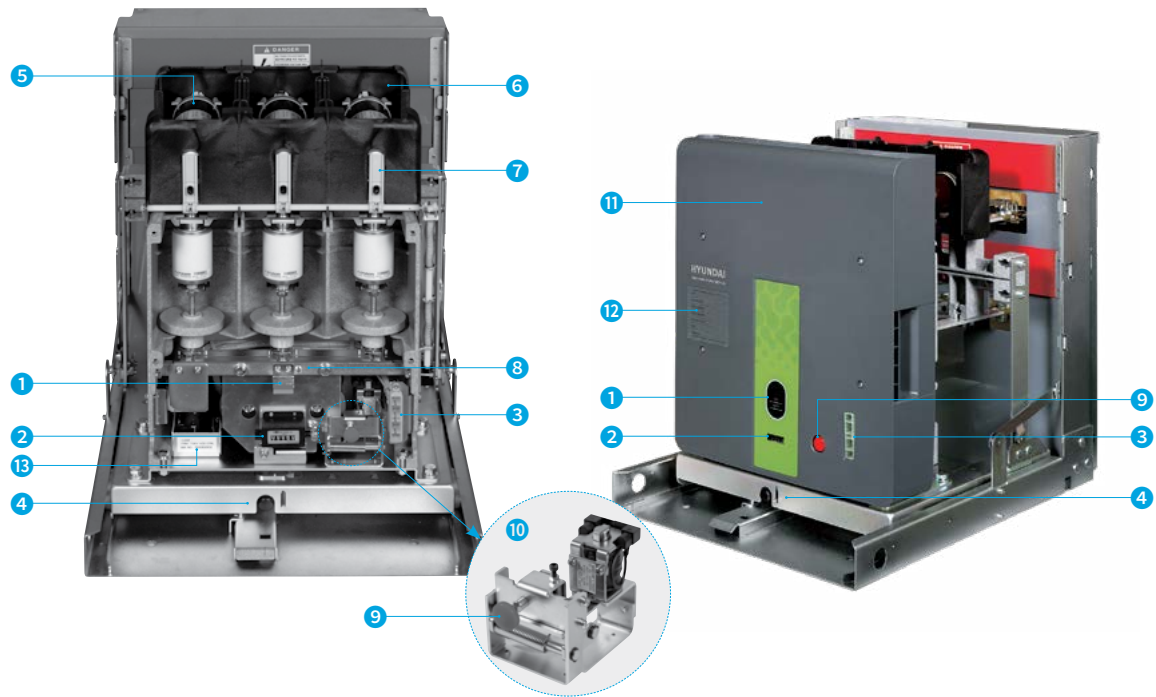
Service Position



| Breaker (VCB)<br>Position | Position |      |                                     |         | Condition                                          | Application<br>Type |
|---------------------------|----------|------|-------------------------------------|---------|----------------------------------------------------|---------------------|
|                           | Removed  | Test | → → → Incoming<br>Drawing Out ← ← ← | Service |                                                    |                     |
| Cradle Shutter            |          |      |                                     |         | Shutter Padlock<br>Unavailable                     | HGV, HVF            |
|                           |          |      |                                     |         | Shutter Padlock<br>Available                       |                     |
| Cradle Door               |          |      |                                     |         | Door cannot<br>Open                                | HGV, HVF            |
|                           |          |      |                                     |         | Door can<br>Open                                   |                     |
| Control Jack              |          |      |                                     |         | Control Circuit<br>Connector Inseparable           | HGV                 |
|                           |          |      |                                     |         | Control Circuit Connector<br>Jack can be Separated |                     |
| Breaker                   |          |      |                                     |         | Closing, Tripping<br>Unavailable                   | HGV, HVF,<br>HVG    |
|                           |          |      |                                     |         | Closing, Tripping<br>Available                     |                     |
| Earthing Switch           |          |      |                                     |         | ES Closing<br>Unavailable                          | HGV, HVF            |
|                           |          |      |                                     |         | ES Closing<br>Available                            |                     |

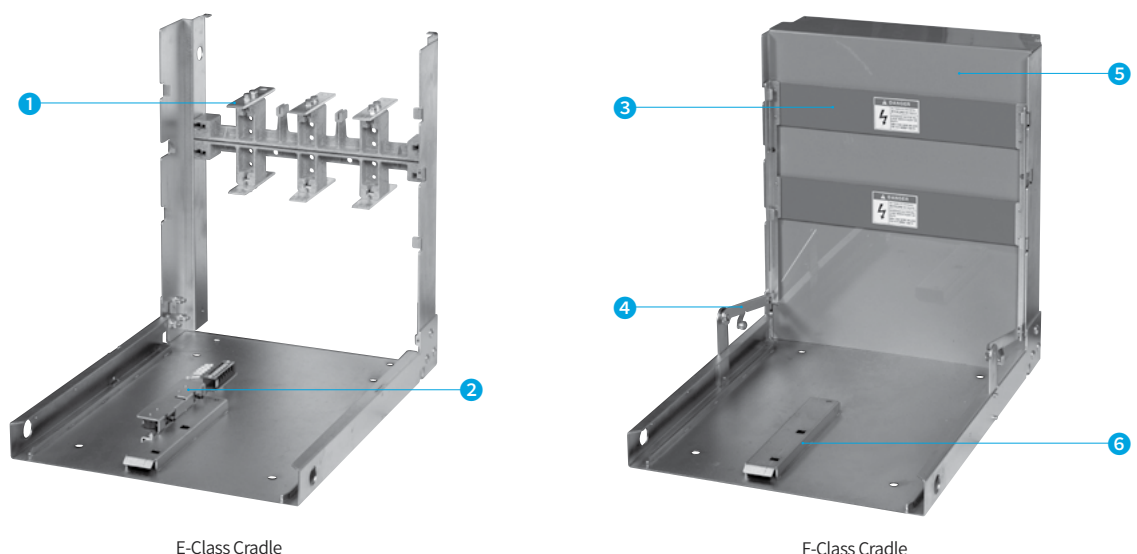
## UVC Structure

### Internal and External Structure



- |                              |                                 |                                             |                |
|------------------------------|---------------------------------|---------------------------------------------|----------------|
| 1 Switching Status Indicator | 5 Fuse                          | 9 Emergency Trip Button<br>(For Latch-Type) | 11 Front Cover |
| 2 Switching Count Indicator  | 6 Fuse Holder                   | 10 Latch Device<br>(For Latch-Type)         | 12 Nameplate   |
| 3 Control Plug               | 7 Fuse Blow Detector (Optional) |                                             | 13 Controllers |
| 4 Pushing/Drawing Button     | 8 Manual Inspection Opening     |                                             |                |

### Cradle Structure



E-Class Cradle

F-Class Cradle

- |                   |                             |           |                  |                |                       |
|-------------------|-----------------------------|-----------|------------------|----------------|-----------------------|
| 1 Cradle Terminal | 2 Position Detecting Switch | 3 Shutter | 4 Shutter Lifter | 5 Rear Barrier | 6 Interlock Supporter |
|-------------------|-----------------------------|-----------|------------------|----------------|-----------------------|

## UVC Technical Data

### Behavior Method Selection

#### Continuous Type, Latch Type

##### Continuous Type

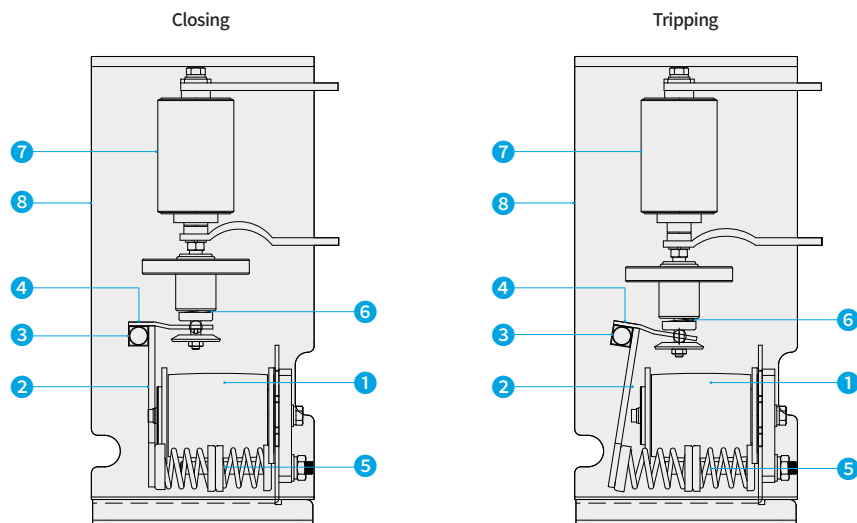
- Long mechanical switching life - suitable for frequent opening and closing.
- If you are using a transformer for control power, it is automatically tripped to protect the load when control power fails to supply.

##### Latch Type

- Shorter switching life compared with the continuous-type.
- It maintains closing status in case of no control power - suitable for systems without continuous control power supply,
- Or loads which needs automatic closing once power is restored.
- As there is a separate trip circuit, use DC power for stable power supply. If you need to use AC power, it is recommended to purchase CTD (Condensor Trip Device) separately for use (See the circuit diagram for connection method)

#### Closing and Tripping

- 1 Closing Coil
- 2 Front Drive Plate
- 3 Shaft
- 4 Drive Plate
- 5 Trip Spring
- 6 Compression Spring
- 7 Vacuum Interrupters
- 8 Insulating Frame



##### Closing

- When closing coil (1) is magnetized, it pulls the front drive plate (2) and at the same time trip spring is compressed (5). Further, with the shaft (3) on the center, top drive plate (4) pushes driving unit of compression spring (6) and vacuum interrupters (7) making it closing status.
- In a continuous-type, once closing completes, controller automatically reduces the current supplied to closing coil.
- In a latch-type, at the time when closing is completes, the latch device installed on bottom of the product mechanically fixes the front drive plate to maintain closing. At this time, control power is automatically disconnected from the controller.

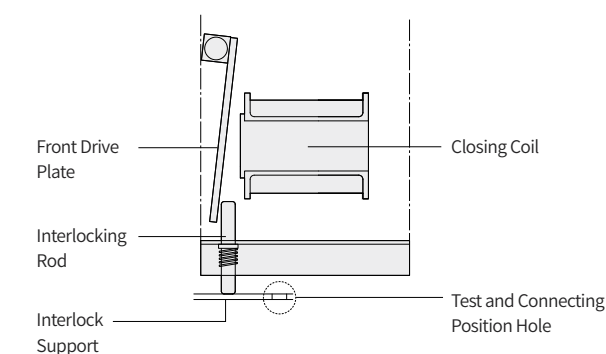
##### Tripping

- For continuous-type, interrupting closing coil (1) control power releases magnetization of the coil, compressed trip spring (5) is recovered and tripped.
- For latch-type, providing power to trip coil releases latch that fixed front drive plate and at the same time, compressed trip spring is recovered and tripped.
- For latch-type, trip can be done by condenser trip device installed separately or by manual trip button even in the event of a power failure.
- With the main power applied, draw-out by interlocking device is unavailable for user's safety, make sure to trip before application.

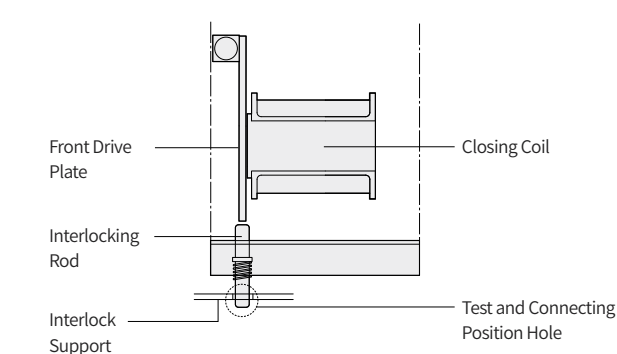
## Interlocking Device

| Interlock Condition                                                                                              | Interlock Information                                                                                  | Interlock Release                                                                       | Remarks                            |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------|
| With high-pressure vacuum contactor closing, pushing to connecting position is unavailable                       | The interlock bar built in the body mechanically interrupts pushing                                    | Turn off high-pressure vacuum contactor                                                 | Standard Specifications            |
| With high-pressure vacuum contactor closing, pushing from connecting position to testing position is unavailable | The interlock bar built in the body is fixed in the cradle interrupting pushing                        | Turn off high-pressure vacuum contactor                                                 | Standard Specifications            |
| In incorrect segments of each intermediate position, closing is unavailable                                      | If the interlock bar built in the body is not in the right position, it does not mechanically operates | Move high-pressure vacuum contactor to testing and contacting positions and close them. | Standard Specifications            |
|                                                                                                                  | Electronically control in order not to supply control power if not in the right position               |                                                                                         | Optional<br>(Electrical Interlock) |
| High-pressure vacuum contactor stops in the test position                                                        | The interlock bar built in the body is fixed in the test position                                      | Press pushing/drawing button                                                            | Standard Specifications            |

### If not at the Test or Contacting Position



### Test and Connecting Positions



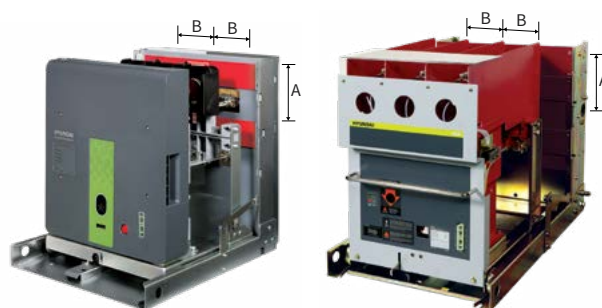
## Easily Removable Fuse

Fuse clip of spring pressure shape which does not require bolting is adopted making removal easy at the time of using DIN-type fuse.



## Compatible with Older Products

The dimensions of main bus connecting parts are same as older products enabling replacement of them. In this case, the terminal number of control circuit lead cable needs a change.



A : Distance between Poles  
B : Distance between Phases



## UVC Technical Data

### Cradle Selection

- High-pressure vacuum contactor is divided into a fixed and draw-out types based on installation method.
- Draw-out has main circuit connection terminal, pushing/drawing device to contact or separate body of the breaker to bus unit, and interlocking device that makes pushing/drawing unavailable at the time of closing. It is provided with a draw-out unit to suitably mount and conveniently use based on various switchgear type ; types of draw-out unit cradles are as follows based on configuration type of main circuit bus unit.



X-Type  
Fixed-Type



E-Type  
Shutter Unattached  
(For Cubicle-Type Switchgear)



F-Type  
Shutter Attached  
(For Compartment-Type Switchgear)



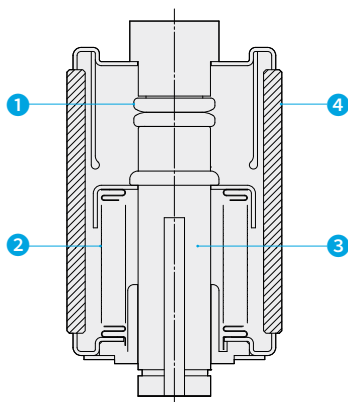
E-Type  
Metal Shutter Attached  
& Bushing

※ Cradle design and production can be customized depending on customer requirements even when they are not in the catalog.

### Vacuum Interrupter

Vacuum interrupter of high-pressure vacuum contactor has the upper and lower stem ③ and contacts ① of conducting unit as well as bellows ② and ceramic insulating material ④ that form a support.

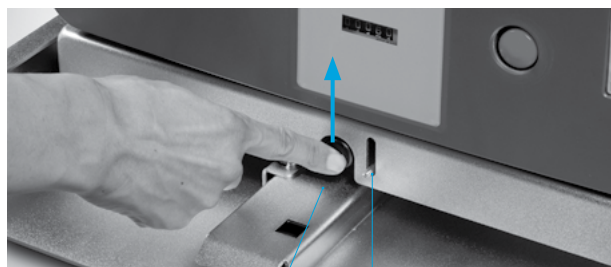
Special contact material enables approximately 1 million operations ; current chopping of 1 A or lower inhibits excessive recovery voltage. Inside of vacuum interrupters is a high degree of vacuum degree of less than  $10^{-6}$  [mbar] and has a long life.



### How to Push/Draw (E & F Cradle)

High-pressure vacuum contactor must be placed precisely on the cradle rail at this time. Make sure to use lift to lift contactor for the sake of safety. Sliding the contactor horizontally blocks interlock rod connected to the pushing/drawing button in the test position, making additional pushing unavailable.

In this position, connecting the control power allows testing the internal circuitry as required. In order to insert it into the connection position, push again the pushing/drawing button and slide it inside. When pulling is completed, main circuit connection terminal is fully inserted inside the cradle terminal and the interlock rod is inserted into the connection position hole and gets bound.



Pushing/Drawing Button

Interlock Releasing Rod



## Model Selection Table

### 7.2 kV(Compact HGV)

| Type                                 |     | HGV1199 | HGV1111 | HGV114□ <sup>1)</sup> |       |
|--------------------------------------|-----|---------|---------|-----------------------|-------|
| Rated Voltage                        | kV  | 7.2     | 7.2     | 7.2                   |       |
| Rated Breaking Current               | kA  | 8       | 12.5    | 25                    |       |
| Breaking Capacity                    | MVA | 100     | 160     | 310                   |       |
| Rated Conducting Current             | A   | 400     | 630     | 630                   | 1,250 |
| Inter-Phase X Inter-Pole Distance mm |     |         |         |                       |       |
| 130×155                              |     | ◆       | ◆       | ●                     | ●     |
| 140×155                              |     |         |         | ●                     | ●     |
| 130×220                              |     | ▼       | ▼       |                       |       |
| 140×223                              |     |         |         | ■                     | ■     |
| Installation Method <sup>2)</sup>    |     |         |         |                       |       |
| Fixed                                | XA  | ◆       | ◆       | ●                     | ●     |
|                                      | ES  | ◆       | ◆       | ●                     | ●     |
| Draw-Out                             | FS  | ◆       | ◆       | ●                     | ●     |
|                                      | GS  | ▼       | ▼       | ■                     | ■     |

### 7.2 kV

| Type                              |        | HGV114□ <sup>1)</sup> |       |       | HGV115□ |       |       |       |       | HGV116□ |       |       |       |       | HGV117□ |       |       |       |       |
|-----------------------------------|--------|-----------------------|-------|-------|---------|-------|-------|-------|-------|---------|-------|-------|-------|-------|---------|-------|-------|-------|-------|
| Rated Voltage                     | kV     | 7.2                   |       |       | 7.2     |       |       |       |       | 7.2     |       |       |       |       | 7.2     |       |       |       |       |
| Rated Breaking Current            | kA     | 25                    |       |       | 31.5    |       |       |       |       | 40      |       |       |       |       | 50      |       |       |       |       |
| Breaking Capacity                 | MVA    | 312                   |       |       | 393     |       |       |       |       | 499     |       |       |       |       | 624     |       |       |       |       |
| Rated Conducting Current          | A      | 630                   | 1,250 | 2,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 |
| Inter-Phase × Inter-Pole Distance |        |                       |       |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 150×205                           |        | mm                    | ●     | ●     |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 150×210                           |        |                       | ■     | ■     |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 165×310                           |        |                       |       |       |         | ★     |       |       |       |         | ★     |       |       |       |         |       |       |       |       |
| 210×310                           |        |                       | △     | △     | △       | △     | △     |       |       |         | △     | △     |       |       |         | △     | △     |       |       |
| 275×310                           |        |                       |       |       |         |       |       | ◆     | ◆     | ◆       |       |       |       | ◆     | ◆       | ◆     |       |       | ◆     |
| Installation Method <sup>2)</sup> |        |                       |       |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| Fixed                             | XA     |                       | ●     | ●     | △       | ★△    | △     | ◆     | ◆     | ◆       | ★△    | △     | ◆     | ◆     | ◆       | △     | △     | ◆     | ◆     |
|                                   | ES     |                       | ■     | ■     |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
|                                   | FS     |                       | ■     | ■     |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| Draw-Out                          | GS, GE |                       | ●△    | ●△    | △       | ★△    | △     | ◆     | ◆     | ◆       | ★△    | △     | ◆     | ◆     | ◆       | △     | △     | ◆     | ◆     |
|                                   | MS, ME |                       | ●     | ●     | △       | ★△    | △     | ◆     | ◆     | ◆       | ★△    | △     | ◆     | ◆     | ◆       | △     | △     | ◆     | ◆     |

### 12 kV

| Type                              |        | HGV214□ <sup>1)</sup> |       |       | HGV215□ |       |       |       |       | HGV216□ |       |       |       |       | HGV217□ |       |       |       |       |
|-----------------------------------|--------|-----------------------|-------|-------|---------|-------|-------|-------|-------|---------|-------|-------|-------|-------|---------|-------|-------|-------|-------|
| Rated Voltage                     | kV     | 12                    |       |       | 12      |       |       |       |       | 12      |       |       |       |       | 12      |       |       |       |       |
| Rated Breaking Current            | kA     | 25                    |       |       | 31.5    |       |       |       |       | 40      |       |       |       |       | 50      |       |       |       |       |
| Breaking Capacity                 | MVA    | 520                   |       |       | 655     |       |       |       |       | 831     |       |       |       |       | 1,039   |       |       |       |       |
| Rated Conducting Current          | A      | 630                   | 1,250 | 2,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 |
| Inter-Phase × Inter-Pole Distance |        |                       |       |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 150×205                           | mm     | ●                     | ●     |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 150×210                           |        | ■                     | ■     |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 165×310                           |        |                       |       |       | ★       |       |       |       |       | ★       |       |       |       |       |         |       |       |       |       |
| 210×310                           |        | △                     | △     | △     | △       | △     |       |       |       | △       | △     |       |       |       | △       | △     |       |       |       |
| 275×310                           |        |                       |       |       |         |       | ◆     | ◆     | ◆     |         |       | ◆     | ◆     | ◆     |         |       | ◆     | ◆     | ◆     |
| Installation Method <sup>2)</sup> |        |                       |       |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| Fixed                             | XA     | ●                     | ●     | △     | ★△      | △     | ◆     | ◆     | ◆     | ★△      | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     |
|                                   | ES     | ■                     | ■     |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
|                                   | FS     | ■                     | ■     |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| Draw-Out                          | GS, GE | ●△                    | ●△    | △     | ★△      | △     | ◆     | ◆     | ◆     | ★△      | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     |
|                                   | MS, ME | ●                     | ●     | △     | ★△      | △     | ◆     | ◆     | ◆     | ★△      | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     |

※ 1) □ : Rated Current (1 : 630 A / 2 : 1,250 A / 4 : 2,000 A / 6 : 2,500 A / 7 : 3,150 A / 8 : 4,000 A)

2) E.g. : If inter-phase × inter-pole distance for HGV1141 is 150×210 (mm), ES or FS type can be selected for installation method.

(◆ : 130×155, ● : 140×155, ▼ : 140×220, ■ : 140×223, ● : 150×205, ■ : 150×210, ★ : 165×310, △ : 210×310, ◆ : 275×310, ☆ : 275×403, ◎ : 275×438)

## 17.5 kV

| Type                              |        | HGV314□ <sup>1)</sup> |       |       | HGV315□ |       |       |       |       | HGV316□ |       |       |       |       | HGV317□ |       |       |       |       |
|-----------------------------------|--------|-----------------------|-------|-------|---------|-------|-------|-------|-------|---------|-------|-------|-------|-------|---------|-------|-------|-------|-------|
| Rated Voltage                     | kV     | 17.5                  |       |       | 17.5    |       |       |       |       | 17.5    |       |       |       |       | 17.5    |       |       |       |       |
| Rated Breaking Current            | kA     | 25                    |       |       | 31.5    |       |       |       |       | 40      |       |       |       |       | 50      |       |       |       |       |
| Breaking Capacity                 | MVA    | 758                   |       |       | 955     |       |       |       |       | 1,212   |       |       |       |       | 1,516   |       |       |       |       |
| Rated Conducting Current          | A      | 630                   | 1,250 | 2,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 | 1,250   | 2,000 | 2,500 | 3,150 | 4,000 |
| Inter-Phase × Inter-Pole Distance |        |                       |       |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 150×205                           |        | mm                    | ●     | ●     |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 150×210                           |        |                       | ■     | ■     |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| 210×310                           |        |                       | △     | △     | △       | △     | △     |       |       |         | △     | △     |       |       |         | △     | △     |       |       |
| 275×310                           |        |                       |       |       |         |       |       | ◆     | ◆     | ◆       |       |       | ◆     | ◆     | ◆       |       |       | ◆     | ◆     |
| Installation Method <sup>2)</sup> |        |                       |       |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| Fixed                             | XA     | ●                     | ●     | △     | △       | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     |
|                                   | ES     | ■                     | ■     |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
| Draw-Out                          | FS     | ■                     | ■     |       |         |       |       |       |       |         |       |       |       |       |         |       |       |       |       |
|                                   | GS, GE | ●                     | ●     | △     | △       | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     |
|                                   | MS, ME | ●                     | ●     | △     | △       | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     | △       | △     | ◆     | ◆     | ◆     |

## 24/25.8 kV

| Type                              |        | HGV611□ <sup>1)</sup> |       |       | HGV614□ |       |       |
|-----------------------------------|--------|-----------------------|-------|-------|---------|-------|-------|
| Rated Voltage                     | kV     | 24/25.8               |       |       | 24/25.8 |       |       |
| Rated Breaking Current            | kA     | 12.5                  |       |       | 25      |       |       |
| Breaking Capacity                 | MVA    | 520                   |       |       | 1,039   |       |       |
| Rated Conducting Current          | A      | 630                   | 1,250 | 2,000 | 630     | 1,250 | 2,000 |
| Inter-Phase × Inter-Pole Distance |        |                       |       |       |         |       |       |
| 210×310                           | mm     | △                     | △     | △     | △       | △     | △     |
| Installation Method <sup>2)</sup> |        |                       |       |       |         |       |       |
| Fixed                             | XA     | △                     | △     |       | △       | △     | △     |
| Draw-Out                          | ES     | △                     | △     |       | △       | △     | △     |
|                                   | FS     | △                     | △     |       | △       | △     | △     |
|                                   | GS, GE | △                     | △     | △     | △       | △     | △     |
|                                   | MS, ME | △                     | △     | △     | △       | △     | △     |

## 24/25.8 kV, 36/38 kV

| Type                              |        | HVF614 <span>□</span> <sup>1)</sup>                                                 |                                                                                     | HVF616 <span>□</span>                                                               |                                                                                     | HVF714 <span>□</span> |       | HVF705 <span>□</span>                                                                 |                                                                                       |                                                                                       |                                                                                       |
|-----------------------------------|--------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------|-------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Rated Voltage                     | kV     | 24/25.8                                                                             |                                                                                     | 24/25.8                                                                             |                                                                                     | 36                    |       | 38                                                                                    |                                                                                       |                                                                                       |                                                                                       |
| Rated Breaking Current            | kA     | 25                                                                                  |                                                                                     | 40                                                                                  |                                                                                     | 25                    |       | 31.5                                                                                  |                                                                                       |                                                                                       |                                                                                       |
| Breaking Capacity                 | MVA    | 1,040/1,120                                                                         |                                                                                     | 1,662/1,787                                                                         |                                                                                     | 1,600                 |       | 2,000                                                                                 |                                                                                       |                                                                                       |                                                                                       |
| Rated Conducting Current          | A      | 2,500                                                                               | 3,150                                                                               | 2,500                                                                               | 3,150                                                                               | 1,250                 | 2,000 | 1,200/1,250                                                                           | 2,000                                                                                 | 2,500                                                                                 | 3,000/3,150                                                                           |
| Inter-Phase × Inter-Pole Distance |        |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                       |       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| 275×310                           | mm     |  |  |  |  |                       |       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| 275×403                           |        |                                                                                     |                                                                                     |                                                                                     |                                                                                     | ☆                     | ☆     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| 275×438                           |        |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                       |       |                                                                                       |  |  |                                                                                       |
| Installation Method <sup>2)</sup> |        |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                       |       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Fixed                             | XA     |  |  |  |  | ☆                     | ☆     |  |  |  |  |
| Draw-Out                          | GS, GE |  |  |  |  | ☆                     | ☆     |  |  |  |  |

※ 1) □ : Rated Current (1 : 630 A / 2 : 1,250 A / 4 : 2,000 A / 6 : 2,500 A / 7 : 3,150 A / 8 : 4,000 A)

2) E.g. : If inter-phase × inter-pole distance for HGV1141 is 150×210 (mm), ES or FS type can be selected for installation method.

(◆ : 130×155, ◎ : 140×155, ● : 150×205, ■ : 150×210, ★ : 165×310, △ : 210×310, ◆ : 275×310, ☆ : 275×403, ◎ : 275×438)

## Ratings and Specifications

| Rating                                                       |          | 7.2 kV(Compact HGV)                                        |         |                       |       |
|--------------------------------------------------------------|----------|------------------------------------------------------------|---------|-----------------------|-------|
| Type                                                         |          | HGV1199                                                    | HGV1111 | HGV114□ <sup>1)</sup> |       |
| Applied Standards                                            |          | IEC 62271-100                                              |         |                       |       |
| Rated Current Ur                                             | kV       | 7.2                                                        |         |                       |       |
| Rated Short-Time Current                                     | kA/s     | 8/3                                                        | 12.5/3  | 25/1                  |       |
| Rated Breaking Current I <sub>sc</sub>                       | kA       | 8                                                          | 12.5    | 25                    |       |
| Rated Closing Current I <sub>p</sub>                         | kA       | 20                                                         | 32.5    | 65                    |       |
| Rated Current                                                | A        | 400                                                        | 630     | 630                   | 1,250 |
| Rated Frequency                                              | Hz       | 50/60                                                      |         |                       |       |
| Breaking Capacity                                            | MVA      | 100                                                        | 160     | 312                   |       |
| Standard Operating Duty                                      |          | O - 0.3s - CO - 15s - CO                                   |         |                       |       |
| Withstand Voltage                                            |          |                                                            |         |                       |       |
| Commercial Frequency Withstand Voltage(1 min) U <sub>d</sub> | kV       | 20                                                         |         |                       |       |
| Impulse Withstand Voltage (1.2X50 μs) U <sub>p</sub>         | kV       | 60                                                         |         |                       |       |
| Opening/Closing Test Ratings                                 |          |                                                            |         |                       |       |
| Mechanical                                                   |          | M2 (10,000 operations)                                     |         |                       |       |
| Electrical                                                   |          | E2 (List3)                                                 |         |                       |       |
| Leading Current Opening/Closing                              |          | C2                                                         |         |                       |       |
| Rated Circuit Opening Time                                   | ms       | ≤40                                                        |         |                       |       |
| Rated Breaking Time                                          | Cycle    | 3                                                          |         |                       |       |
| Rated Closing Time                                           | ms       | ≤65                                                        |         |                       |       |
| Closing Operation Method                                     |          | Electirc Motion Spring System                              |         |                       |       |
| Auxiliary Contacts                                           |          | 4NO + 4NC (Up to 10NO + 10NC)                              |         |                       |       |
| Control Power                                                |          |                                                            |         |                       |       |
| Closing Coil                                                 |          | DC 24V, AC/DC 48 ~ 60V, AC/DC 100 ~ 130V, AC/DC 200 ~ 250V |         |                       |       |
| Trip Coil                                                    |          | DC 24V, AC/DC 48 ~ 60V, AC/DC 100 ~ 130V, AC/DC 200 ~ 250V |         |                       |       |
| Opening/Closing Life                                         |          |                                                            |         |                       |       |
| Mechanical                                                   |          | See Page 39(Table 2)                                       |         |                       |       |
| Electrical                                                   |          | (30,000 operations) <sup>2)</sup>                          |         |                       |       |
| Inter-Phase X Inter-Pole Distance <sup>3)</sup> mm           |          |                                                            |         |                       |       |
| 130×155                                                      |          | ◆                                                          | ◆       |                       |       |
| 140×155                                                      |          |                                                            |         | ●                     | ●     |
| 150×205                                                      |          |                                                            |         |                       |       |
| 130×220                                                      |          | ▼                                                          | ▼       |                       |       |
| 140×223                                                      |          |                                                            |         | ■                     | ■     |
| Installation Method                                          |          |                                                            |         |                       |       |
| Fixed                                                        | XA       | ◆                                                          | ◆       | ●                     | ●     |
|                                                              | ES       | ◆                                                          | ◆       | ●                     | ●     |
| Draw-Out                                                     | FS       | ◆                                                          | ◆       | ●                     | ●     |
|                                                              | GS       | ▼                                                          | ▼       | ■                     | ■     |
| Weight kg                                                    |          |                                                            |         |                       |       |
| Vacuum Circuit Breakers                                      | Fixed    | 35                                                         | 36      | 45                    | 45    |
|                                                              | Draw-Out | 38                                                         | 40      | 50                    | 52    |
| Cradle                                                       | ES       |                                                            |         |                       |       |
|                                                              | FS       |                                                            |         |                       |       |
|                                                              | GS       |                                                            |         |                       |       |

※ 1) □ : Rated Current (1 : 630 A / 2 : 1,250 A / 4 : 2,000 A / 6 : 2,500 A / 7 : 3,150 A / 8 : 4,000 A)

2) 10,000 operations are free of charge but subsequent target life can be realized with maintenance. For maintenance specifications, refer to the instruction manual.

3) ◆ : 130×155, ● : 140×155, ▼ : 140×220, ■ : 140×223

| Rating                                            |          | 7.2 kV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|---------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------------------------|-------|-------|-------|------------------------|-------|-------|-------|-------|------------------------|-------|-------|-------|-------|---------------------|----|----|----|----|---|---|---|----|----|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|---|--|--|--|--|---|--|--|--|--|---|--|--|--|--|--|--|--|--|--|--|---|---|---|---|---|--|--|--|---|---|--|--|--|---|---|--|--|--|--|--|--|--|--|--|--|---|---|---|--|--|--|---|---|---|--|--|---|---|---|
| Type                                              |          | HGV114 □ <sup>1)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |       | HGV115 □ <sup>1)</sup> |       |       |       | HGV116 □ <sup>1)</sup> |       |       |       |       | HGV117 □ <sup>1)</sup> |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Applied Standards                                 |          | IEC 62271-100 (2012)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Current Ur                                  |          | kV 7.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Short-Time Current                          |          | kA/s 25/4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |       | 31.5/4                 |       |       |       | 40/4                   |       |       |       |       | 50/3                   |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Breaking Current Isc                        |          | kA 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       | 31.5                   |       |       |       | 40                     |       |       |       |       | 50                     |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Closing Current Ip                          |          | kA 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       | 82                     |       |       |       | 104                    |       |       |       |       | 130                    |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Current                                     |          | A 630                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1,250 | 2,000 | 1,250                  | 2,000 | 2,500 | 3,150 | 4,000 <sup>3)</sup>    | 1,250 | 2,000 | 2,500 | 3,150 | 4,000 <sup>3)</sup>    | 1,250 | 2,000 | 2,500 | 3,150 | 4,000 <sup>3)</sup> |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Frequency                                   |          | Hz 50/60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Breaking Capacity                                 |          | MVA 312                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |       | 393                    |       |       |       | 499                    |       |       |       |       | 624                    |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Standard Operating Duty                           |          | O-0.3 s-CO-15 s-CO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Withstand Voltage                                 |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Commercial Frequency Withstand Voltage (1 min) Ud |          | kV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       | 20    |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Impulse Withstand Voltage (1.2×50 μs) Up          |          | kV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       | 60    |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Opening/Closing Test Ratings                      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Mechanical                                        |          | M2 (10,000 operations)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Electrical                                        |          | E2 (List3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Leading Current Opening/Closing                   |          | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Circuit Opening Time                        |          | ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       | ≤ 40  |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Breaking Time                               |          | Cycle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | 3     |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Rated Closing Time                                |          | ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       | ≤ 65  |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Closing Operation Method                          |          | Electric Motion Spring System                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Auxiliary Contacts                                |          | 4NO + 4NC (Up to 10NO + 10NC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Control Power                                     |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Closing Coil                                      |          | DC 24 V, AC/DC 48 ~ 60 V, AC/DC 100 ~ 130 V, AC/DC 200 ~ 250 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Trip Coil                                         |          | DC 24 V, AC/DC 48 ~ 60 V, AC/DC 100 ~ 130 V, AC/DC 200 ~ 250 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Opening/Closing Life                              |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Electrical                                        |          | See page 39 (Table 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Mechanical                                        |          | 30,000 operations <sup>2)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Inter-Phase×Inter-Pole Distance <sup>4)</sup>     |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| 150×205                                           |          | <div><table><tr><td rowspan="5">mm</td><td>●</td><td>●</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td>★</td><td></td><td></td><td></td><td></td><td>★</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>△</td><td>△</td><td>△</td><td>△</td><td>△</td><td></td><td></td><td></td><td>△</td><td>△</td><td></td><td></td><td></td><td>△</td><td>△</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>◆</td><td>◆</td><td>◆</td><td></td><td></td><td></td><td>◆</td><td>◆</td><td>◆</td><td></td><td></td><td>◆</td><td>◆</td><td>◆</td></tr></table></div> |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     | mm | ●  | ●  |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   | ■ | ■ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  | ★ |  |  |  |  | ★ |  |  |  |  |  |  |  |  |  |  | △ | △ | △ | △ | △ |  |  |  | △ | △ |  |  |  | △ | △ |  |  |  |  |  |  |  |  |  |  | ◆ | ◆ | ◆ |  |  |  | ◆ | ◆ | ◆ |  |  | ◆ | ◆ | ◆ |
| mm                                                | ●        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    | ●  |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | ■        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    | ■  |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    | ★  |   |   |   |    | ★  |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | △        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    | △  | △  | △  | △ |   |   |    | △  | △ |   |   |   | △ | △ |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       | ◆     | ◆     | ◆                      |       |       |       | ◆     | ◆                      | ◆     |       |       | ◆     | ◆                   | ◆  |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| 150×210                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| 165×310                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| 210×310                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| 275×310                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Installation Method                               |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Fixed                                             | XA       | <div><table><tr><td>●</td><td>●</td><td>△</td><td>★△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td><td>★△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td><td>△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td></tr><tr><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></div>                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     | ●  | ●  | △  | ★△ | △ | ◆ | ◆ | ◆  | ★△ | △ | ◆ | ◆ | ◆ | △ | △ | ◆ | ◆ | ◆ | ■ | ■ |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ■ | ■ |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | ●        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     | ●  | △  | ★△ | △  | ◆ | ◆ | ◆ | ★△ | △  | ◆ | ◆ | ◆ | △ | △ | ◆ | ◆ | ◆ |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | ■        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     | ■  |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| ■                                                 | ■        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Draw-Out                                          | ES       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | FS       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | GS, GE   | <div><table><tr><td>●△</td><td>●△</td><td>△</td><td>★△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td><td>★△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td><td>△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td></tr></table></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     | ●△ | ●△ | △  | ★△ | △ | ◆ | ◆ | ◆  | ★△ | △ | ◆ | ◆ | ◆ | △ | △ | ◆ | ◆ | ◆ |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| ●△                                                | ●△       | △                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ★△    | △     | ◆                      | ◆     | ◆     | ★△    | △                      | ◆     | ◆     | ◆     | △     | △                      | ◆     | ◆     | ◆     |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | MS, ME   | <div><table><tr><td>●</td><td>●</td><td>△</td><td>★△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td><td>★△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td><td>△</td><td>△</td><td>◆</td><td>◆</td><td>◆</td></tr></table></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     | ●  | ●  | △  | ★△ | △ | ◆ | ◆ | ◆  | ★△ | △ | ◆ | ◆ | ◆ | △ | △ | ◆ | ◆ | ◆ |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| ●                                                 | ●        | △                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ★△    | △     | ◆                      | ◆     | ◆     | ★△    | △                      | ◆     | ◆     | ◆     | △     | △                      | ◆     | ◆     | ◆     |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Weight kg                                         |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Vacuum Circuit Breakers                           | Fixed    | 70 70 110 90 130 170 170 170 90 130 170 170 170 135 135 175 175 175                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | Draw-Out | 100 105 130 125 160 200 200 200 125 160 200 200 200 165 165 205 205 205                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | ES       | 55 55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
| Cradle                                            | FS       | 60 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | GS       | 70 70 90 85 90 120 120 120 85 90 120 120 120 90 90 120 120 120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | GE       | 135 135 160 155 160 190 190 190 155 160 190 190 190 160 160 190 190 190                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | MS       | 140 140 160 155 160 190 190 190 155 160 190 190 190 160 160 190 190 190                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |
|                                                   | ME       | 210 210 235 230 235 265 265 265 230 235 265 265 265 235 235 265 265 265                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |       |                        |       |       |       |                        |       |       |       |       |                        |       |       |       |       |                     |    |    |    |    |   |   |   |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |  |  |  |   |   |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |   |   |   |  |  |  |   |   |   |  |  |   |   |   |

※ 1) □ : Rated Current (1 : 630 A / 2 : 1,250 A / 4 : 2,000 A / 6 : 2,500 A / 7 : 3,150 A / 8 : 4,000 A)

2) 10,000 operations are free of charge but subsequent target life can be realized with maintenance. For maintenance specifications, refer to the instruction manual.

3) 4,000 A is met by applying forced circulation method using fan. The fan is driven by a "Thermostat (Temperature Sensors)" and starters except for the fan are not separately provided/sold.

4) ◆ : 130×155, ● : 140×155, ● : 150×205, ■ : 150×210, ★ : 165×310, △ : 210×310, ◆ : 275×310, ☆ : 275×403, ◎ : 275×438

## Ratings and Specifications

| Rating                                            |  | 12 kV                                                          |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
|---------------------------------------------------|--|----------------------------------------------------------------|--|-----------------------|------------------------|-------|--------|-------|-------|------------------------|---------------------|-------|-------|-------|------------------------|---------------------|-------|-------|-------|-------|---------------------|
| Type                                              |  | HGV214 □ <sup>1)</sup>                                         |  |                       | HGV215 □ <sup>1)</sup> |       |        |       |       | HGV216 □ <sup>1)</sup> |                     |       |       |       | HGV217 □ <sup>1)</sup> |                     |       |       |       |       |                     |
| Applied Standards                                 |  | IEC 62271-100 (2012)                                           |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Rated Current Ur                                  |  | kV                                                             |  | 12                    |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Rated Short-Time Current                          |  | kA/s                                                           |  | 25/4                  |                        |       | 31.5/4 |       |       |                        |                     | 40/4  |       |       |                        |                     | 50/3  |       |       |       |                     |
| Rated Breaking Current Isc                        |  | kA                                                             |  | 25                    |                        |       | 31.5   |       |       |                        |                     | 40    |       |       |                        |                     | 50    |       |       |       |                     |
| Rated Closing Current Ip                          |  | kA                                                             |  | 65                    |                        |       | 82     |       |       |                        |                     | 104   |       |       |                        |                     | 130   |       |       |       |                     |
| Rated Current                                     |  | A                                                              |  | 630                   | 1,250                  | 2,000 | 1,250  | 2,000 | 2,500 | 3,150                  | 4,000 <sup>3)</sup> | 1,250 | 2,000 | 2,500 | 3,150                  | 4,000 <sup>3)</sup> | 1,250 | 2,000 | 2,500 | 3,150 | 4,000 <sup>3)</sup> |
| Rated Frequency                                   |  | Hz                                                             |  | 50/60                 |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Breaking Capacity                                 |  | MVA                                                            |  | 520                   |                        |       | 655    |       |       |                        |                     | 831   |       |       |                        |                     | 1,039 |       |       |       |                     |
| Standard Operating Duty                           |  | O-0.3 s-CO-15 s-CO                                             |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Withstand Voltage                                 |  |                                                                |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Commercial Frequency Withstand Voltage (1 min) Ud |  | kV                                                             |  | 28 (42) <sup>4)</sup> |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Impulse Withstand Voltage (1.2×50 μs) Up          |  | kV                                                             |  | 75 (82) <sup>4)</sup> |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Opening/Closing Test Ratings                      |  |                                                                |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Mechanical                                        |  | M2 (10,000 operations)                                         |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Electrical                                        |  | E2 (List3)                                                     |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Leading Current Opening/Closing                   |  | C2                                                             |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Rated Circuit Opening Time                        |  | ms                                                             |  | ≤ 40                  |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Rated Breaking Time                               |  | Cycle                                                          |  | 3                     |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Rated Closing Time                                |  | ms                                                             |  | ≤ 65                  |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Closing Operation Method                          |  | Electric Motion Spring System                                  |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Auxiliary Contacts                                |  | 4NO + 4NC (Up to 10NO + 10NC)                                  |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Control Power                                     |  |                                                                |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Closing Coil                                      |  | DC 24 V, AC/DC 48 ~ 60 V, AC/DC 100 ~ 130 V, AC/DC 200 ~ 250 V |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Trip Coil                                         |  | DC 24 V, AC/DC 48 ~ 60 V, AC/DC 100 ~ 130 V, AC/DC 200 ~ 250 V |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Opening/Closing Life                              |  |                                                                |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Electrical                                        |  | See page 39 (Table 2)                                          |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Mechanical                                        |  | 30,000 operations <sup>2)</sup>                                |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Inter-Phase×Inter-Pole Distance <sup>5)</sup>     |  |                                                                |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| 150×205                                           |  | ●                                                              |  | ●                     |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| 150×210                                           |  | ■                                                              |  | ■                     |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| 165×310                                           |  |                                                                |  |                       |                        | ★     |        |       |       |                        | ★                   |       |       |       |                        |                     |       |       |       |       |                     |
| 210×310                                           |  | △                                                              |  | △                     | △                      | △     | △      |       |       |                        | △                   | △     |       |       |                        | △                   | △     |       |       |       |                     |
| 275×310                                           |  |                                                                |  |                       |                        |       |        | ◆     | ◆     | ◆                      |                     |       |       | ◆     | ◆                      | ◆                   |       |       | ◆     | ◆     |                     |
| Installation Method                               |  |                                                                |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Fixed                                             |  | XA                                                             |  | ●                     | ●                      | △     | ★△     | △     | ◆     | ◆                      | ◆                   | ★△    | △     | ◆     | ◆                      | ◆                   | △     | △     | ◆     | ◆     |                     |
|                                                   |  | ES                                                             |  | ■                     | ■                      |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
|                                                   |  | FS                                                             |  | ■                     | ■                      |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Draw-Out                                          |  | GS, GE                                                         |  | ●△                    | ●△                     | △     | ★△     | △     | ◆     | ◆                      | ◆                   | ★△    | △     | ◆     | ◆                      | ◆                   | △     | △     | ◆     | ◆     |                     |
|                                                   |  | MS, ME                                                         |  | ●                     | ●                      | △     | ★△     | △     | ◆     | ◆                      | ◆                   | ★△    | △     | ◆     | ◆                      | ◆                   | △     | △     | ◆     | ◆     |                     |
| Weight                                            |  |                                                                |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
|                                                   |  | kg                                                             |  |                       |                        |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Vacuum Circuit Breakers                           |  | Fixed                                                          |  | 70                    | 70                     | 110   | 90     | 130   | 170   | 170                    | 170                 | 90    | 130   | 170   | 170                    | 170                 | 135   | 135   | 175   | 175   |                     |
|                                                   |  | Draw-Out                                                       |  | 100                   | 105                    | 130   | 125    | 160   | 200   | 200                    | 200                 | 125   | 160   | 200   | 200                    | 200                 | 165   | 165   | 205   | 205   |                     |
|                                                   |  | ES                                                             |  | 60                    | 60                     |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
|                                                   |  | FS                                                             |  | 65                    | 65                     |       |        |       |       |                        |                     |       |       |       |                        |                     |       |       |       |       |                     |
| Cradle                                            |  | GS                                                             |  | 70                    | 70                     | 90    | 85     | 90    | 120   | 120                    | 120                 | 85    | 90    | 120   | 120                    | 120                 | 90    | 90    | 120   | 120   |                     |
|                                                   |  | GE                                                             |  | 135                   | 135                    | 160   | 155    | 160   | 190   | 190                    | 190                 | 155   | 160   | 190   | 190                    | 190                 | 160   | 160   | 190   | 190   |                     |
|                                                   |  | MS                                                             |  | 140                   | 140                    | 160   | 155    | 160   | 190   | 190                    | 190                 | 155   | 160   | 190   | 190                    | 190                 | 160   | 160   | 190   | 190   |                     |
|                                                   |  | ME                                                             |  | 210                   | 210                    | 235   | 230    | 235   | 265   | 265                    | 265                 | 230   | 235   | 265   | 265                    | 265                 | 235   | 235   | 265   | 265   |                     |

※ 1) □ : Rated Current (1 : 630 A / 2 : 1,250 A / 4 : 2,000 A / 6 : 2,500 A / 7 : 3,150 A / 8 : 4,000 A)

2) 10,000 operations of operation is free of charge but subsequent target life can be realized with maintenance. For maintenance specifications, refer to the instruction manual.

3) 4,000 A is met by applying forced circulation method using fan. The fan is driven by a "Thermostat (Temperature Sensors)" and starters except for the fan are not separately provided/sold.

4) Select B□ option for order to apply it. □ : 1 (Inter-phase 150 mm), 2 (Inter-phase 210 mm, 25 kA), 3 (Inter-phase 275 mm), 4 (Inter-phase 210 mm, 31.5/40/50 kA)

5) ◆ : 130×155, ● : 140×155, ● : 150×205, ■ : 150×210, ★ : 165×310, △ : 210×310, ◆ : 275×310, ☆ : 275×403, ◎ : 275×438





## Ratings and Specifications

### Rating

36 kV

| Type                                              |          | HVF614□ <sup>1)</sup>                                  |       | HVF616□ <sup>1)</sup> |       | HVF714□ <sup>1)</sup> |       |                 | HVF705□ <sup>1)</sup> |                 |                 |
|---------------------------------------------------|----------|--------------------------------------------------------|-------|-----------------------|-------|-----------------------|-------|-----------------|-----------------------|-----------------|-----------------|
| Applied Standards                                 |          | IEC 62271-100                                          |       |                       |       |                       |       |                 |                       |                 |                 |
| Rated Current Ur                                  | kV       | 24/25.8                                                |       |                       |       | 36                    |       |                 | 36/38                 |                 |                 |
| Rated Short-Time Current                          | kA/s     | 25/3                                                   |       | 40/3                  |       | 25/3                  |       |                 | 31.5/3                |                 |                 |
| Rated Breaking Current Isc                        | kA       | 25                                                     |       | 40                    |       | 25                    |       |                 | 31.5                  |                 |                 |
| Rated Closing Current Ip                          | kA       | 65                                                     |       | 104                   |       | 65                    |       |                 | 82                    |                 |                 |
| Rated Current                                     | A        | 2,500                                                  | 3,150 | 2,500                 | 3,150 | 1,200                 | 2,500 | 1,200/1,250     | 2,000                 | 2,500           | 3,000/3,150     |
| Rated Frequency                                   | Hz       | 50/60                                                  |       |                       |       |                       |       |                 |                       |                 |                 |
| Breaking Capacity                                 | MVA      | 1,040/1,120                                            |       | 1,662/1,787           |       | 1,600                 |       |                 | 2,000                 |                 |                 |
| Standard Operating Duty                           |          | O-0.3 sec-CO-3 min-CO / CO-15 sec-CO                   |       |                       |       | O-0.3 sec-CO-3 min-CO |       |                 |                       |                 |                 |
| Withstand Voltage                                 |          |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
| Commercial Frequency Withstand Voltage (1 min) Ud | kV       | 50                                                     |       |                       |       | 70                    |       |                 |                       |                 |                 |
| Impulse Withstand Voltage (1.2×50 μs) Up          | kV       | 125                                                    |       |                       |       | 170                   |       |                 |                       |                 |                 |
| Opening/Closing Test Ratings                      |          |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
| Mechanical                                        |          | M2                                                     |       |                       |       |                       |       |                 |                       |                 |                 |
| Electrical                                        |          | E2                                                     |       |                       |       |                       |       |                 |                       |                 |                 |
| Leading Current Opening/Closing                   |          | C2                                                     |       |                       |       |                       |       |                 |                       |                 |                 |
| Rated Circuit Opening Time                        | ms       | ≤ 40                                                   |       | ≤ 40                  |       | ≤ 50                  |       |                 | ≤ 50                  |                 |                 |
| Rated Breaking Time                               | Cycle    | 3                                                      |       | 3                     |       | 5                     |       |                 | 5                     |                 |                 |
| Rated Closing Time                                | ms       | ≤ 75                                                   |       | ≤ 75                  |       | ≤ 85                  |       |                 | ≤ 70                  |                 |                 |
| Closing Operation Method                          |          | Electric Motion Spring System                          |       |                       |       |                       |       |                 |                       |                 |                 |
| Auxiliary Contacts                                |          | 4NO + 4NC, 7NO + 7NC (Up to 10NO + 10NC + 1W Possible) |       |                       |       |                       |       |                 |                       |                 |                 |
| Control Power                                     |          |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
| Closing Coil                                      |          | AC 110, 220 / DC 48, 110, 125, 220                     |       |                       |       |                       |       |                 |                       |                 |                 |
| Trip Coil                                         |          | AC 110, 220 / DC 48, 110, 125, 220                     |       |                       |       |                       |       |                 |                       |                 |                 |
| Opening/Closing Life                              |          |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
| Electrical                                        |          | See page 41 (Table 3)                                  |       |                       |       |                       |       |                 |                       |                 |                 |
| Mechanical                                        |          | 30,000 operations                                      |       | 20,000 operations     |       | 20,000 operations     |       |                 | 20,000 operations     |                 |                 |
| Inter-Phase×Inter-Pole Distance <sup>3)</sup>     |          |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
| 275×310                                           | mm       | ◆                                                      | ◆     | ◆                     | ◆     |                       |       |                 |                       |                 |                 |
| 275×403                                           |          |                                                        |       |                       |       | ☆                     | ☆     |                 |                       |                 |                 |
| 275×438                                           |          |                                                        |       |                       |       |                       |       | ◎               | ◎                     | ◎               | ◎               |
| Installation Method                               |          |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
| Fixed                                             | XA       |                                                        |       |                       |       | ☆                     | ☆     | ◎               | ◎                     | ◎               | ◎               |
| Draw-Out                                          | GS, GE   | ◆                                                      | ◆     | ◆                     | ◆     | ☆                     | ☆     | ◎ <sup>2)</sup> | ◎ <sup>2)</sup>       | ◎ <sup>2)</sup> | ◎ <sup>2)</sup> |
|                                                   | MS, ME   |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
| Weight                                            |          |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
| Vacuum Circuit Breakers                           | Fixed    | 200                                                    | 200   | 280                   | 280   | 300                   | 300   | 340             | 365                   | 400             | 400             |
|                                                   | Draw-Out | 200                                                    | 200   | 280                   | 280   | 300                   | 300   | 340             | 365                   | 400             | 400             |
| Cradle                                            | GS       |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
|                                                   | GE       |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
|                                                   | MS       |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |
|                                                   | ME       |                                                        |       |                       |       |                       |       |                 |                       |                 |                 |

※ 1) □ : Rated Current (1 : 630 A / 2 : 1,250 A / 4 : 2,000 A / 6 : 2,500 A / 7 : 3,150 A / 8 : 4,000 A)

2) In case of HVF 70 type, GE is unavailable

3) ◆ : 130×155, ◎ : 140×155, ● : 150×205, ■ : 150×210, ★ : 165×310, △ : 210×310, ◇ : 275×310, ☆ : 275×403, ◎ : 275×438

VCB pole unit body inter-phase distance selection table A : 130, B : 140, C : 150, D : 165, E : 178, F : 210, G : 250, H : 254, I : 275, J : 300, K : 350

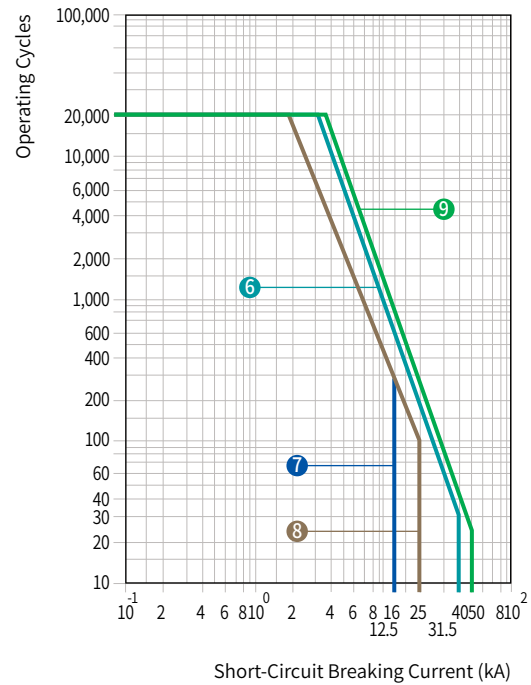
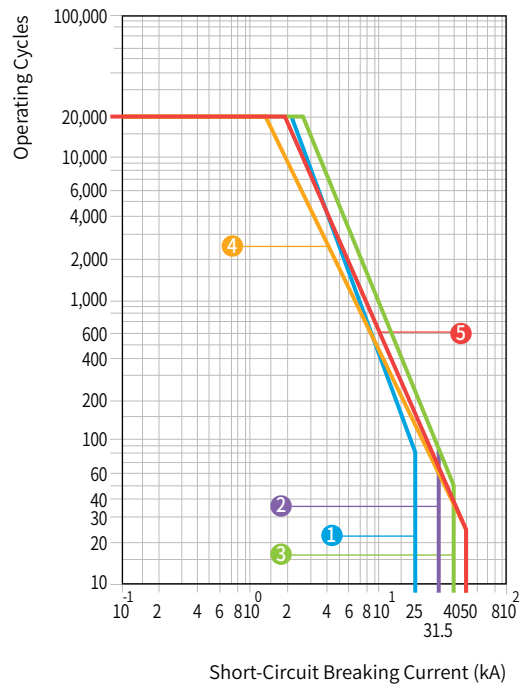
In □ of model name, relevant rated current number is filled.

For order of special VCB, contact us in advance.

Report and plate name of 24 kV VCB are issued based on 25.8 kV.

Mechanical opening/closing life is subject to operating environment. Refer to our instruction manual. (Capable of compliance with maintenance)

## HGV Characteristics Curve



<Table 2> Electrical Opening/Closing Life Curve Number

| Rated Voltage (kV) | Breaking Current (kA) | Characteristic Curve Number by Rated Current |      |        |        |        |        |        |
|--------------------|-----------------------|----------------------------------------------|------|--------|--------|--------|--------|--------|
|                    |                       | 400A                                         | 630A | 1,250A | 2,000A | 2,500A | 3,150A | 4,000A |
| 7.2                | 8                     | 7                                            |      |        |        |        |        |        |
|                    | 12.5                  |                                              | 7    |        |        |        |        |        |
|                    | 25                    |                                              | 1    | 1      |        |        |        |        |
|                    | 31.5                  |                                              |      | 2      | 2      |        |        |        |
|                    | 40                    |                                              |      | 3      | 3      | 3      | 3      | 3      |
| 12                 | 50                    |                                              |      | 4      | 5      | 9      | 9      | 9      |
|                    | 25                    |                                              | 1    | 1      |        |        |        |        |
|                    | 31.5                  |                                              |      | 2      | 2      |        |        | 6      |
|                    | 40                    |                                              |      | 6      | 6      | 6      | 6      |        |
| 17.5               | 50                    |                                              |      | 4      | 5      | 9      | 9      | 9      |
|                    | 25                    |                                              | 1    | 1      |        |        |        |        |
|                    | 31.5                  |                                              |      | 2      | 2      |        |        |        |
| 24 / 25.8          | 40                    |                                              |      | 6      | 6      | 6      | 6      |        |
|                    | 50                    |                                              |      | 4      | 5      | 9      | 9      | 9      |
|                    | 12.5                  |                                              | 7    | 7      |        |        |        |        |
|                    | 25                    |                                              | 8    | 8      | 8      |        |        |        |

## Operating Duty

Operating durability and reliability rating is determined under the condition that the breaker repeatedly uses operation once or twice or more for a regulated interval.

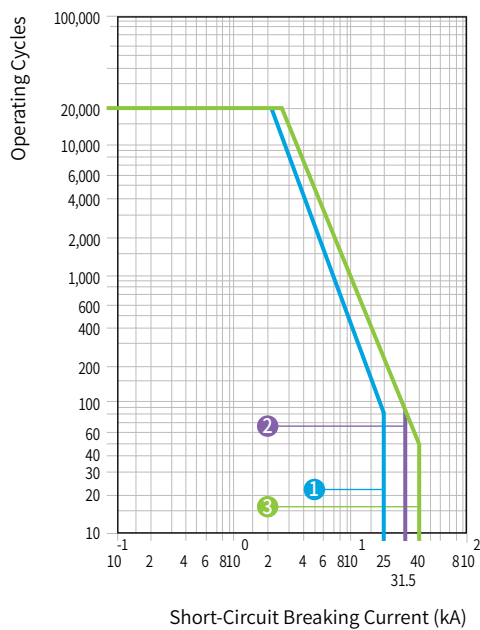
| Division                 | Operation Duty              | Remarks                                                           |
|--------------------------|-----------------------------|-------------------------------------------------------------------|
| Standard Edition         | O - 15 s - CO - 3 min - CO  | O : Opening<br>C : Closing<br>CO : Closing and Repeatedly Opening |
|                          | CO - 15 s - CO              |                                                                   |
| For High-Speed Reclosing | O - 0.3 s - CO - 3 min - CO |                                                                   |
|                          | O - 0.3 s - CO - 15 s - CO  |                                                                   |

# Ratings and Specifications

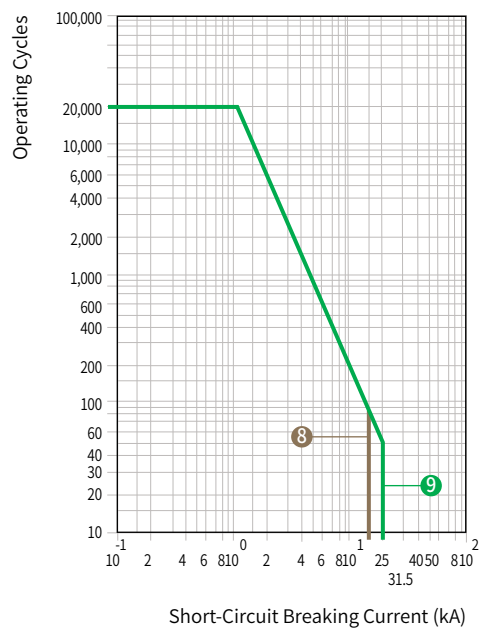
## HVF characteristic curve

With long opening/closing life and easy maintenance, it can be used safely during its lifetime. For details on maintenance, refer to our instruction manual. Electrical opening/closing life is as follows based the rated and breaking current.

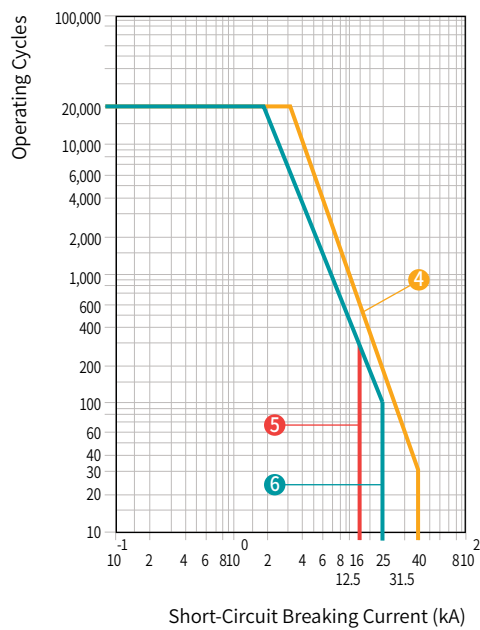
<Fig.4>



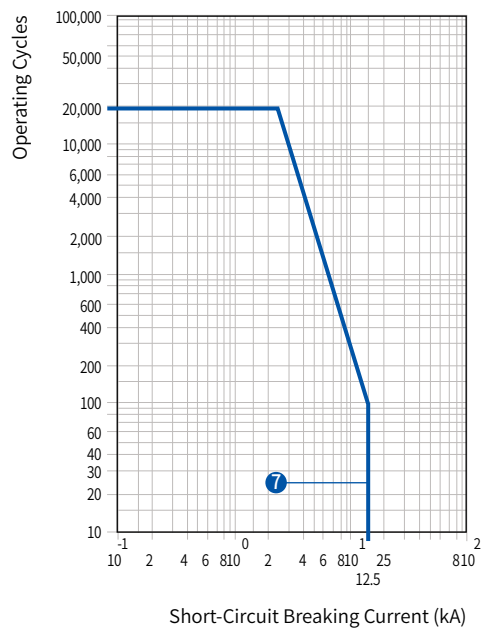
<Fig.5>



<Fig.6>



<Fig.7>



<Table 3> HVF Type Vacuum Circuit Breaker's Electrical Opening/Closing Life Curve Number and Decision

| Model Name                                         |        | HVF |      |    |    |      |    |         |      |    |      |    |    |      |      |    |
|----------------------------------------------------|--------|-----|------|----|----|------|----|---------|------|----|------|----|----|------|------|----|
| Rated Voltage                                      | kV     | 7.2 |      |    | 12 |      |    | 15/17.5 |      |    | 24   |    | 36 |      | 38   |    |
| Rated Breaking Current                             | kA     | 25  | 31.5 | 40 | 25 | 31.5 | 40 | 25      | 31.5 | 40 | 12.5 | 25 | 25 | 31.5 | 31.5 | 40 |
| Characteristics Curve Number at Each Rated Current | 400A   | -   | -    | -  | -  | -    | -  | -       | -    | -  | -    | -  | -  | -    | -    | -  |
|                                                    | 630A   | 1   | -    | -  | 1  | -    | -  | 1       | -    | -  | 5    | 6  | 6  | -    | -    | -  |
|                                                    | 1,250A | 1   | 2    | 3  | 1  | 2    | 4  | 1       | 2    | 4  | 5    | 6  | 6  | 2    | 2    | 4  |
|                                                    | 2,000A | -   | 2    | 3  | -  | 2    | 4  | -       | 2    | 4  | -    | 6  | 6  | -    | 2    | 4  |
|                                                    | 2,500A | -   | -    | 3  | -  | -    | 4  | -       | -    | 4  | -    | -  | -  | 2    | -    | -  |
|                                                    | 3,150A | -   | -    | 3  | -  | -    | 4  | -       | -    | 4  | -    | -  | -  | -    | 2    | 4  |
|                                                    | 4,000A | -   | -    | 3  | -  | 4    | -  | -       | -    | -  | -    | -  | -  | -    | -    | -  |

## Ratings and Specifications (UVC)

### Standards Acquisition

- UL347
- NEMA ICS 3
- IEC62271-106

### Certification Acquisition

- UL
- cUL
- KAS Certified V Checkmark



| Item                                    |               | Division          | Fixed-Type                           |          |          |          |          |          | Draw-Out                                   |          |          |          |          |          |  |  |
|-----------------------------------------|---------------|-------------------|--------------------------------------|----------|----------|----------|----------|----------|--------------------------------------------|----------|----------|----------|----------|----------|--|--|
|                                         |               |                   | X1 Fuse Unattached                   |          |          |          |          |          | B1 B2 Fuse Unattached                      |          |          |          |          |          |  |  |
|                                         |               |                   | A1 A2 A3 Fuse Attached               |          |          |          |          |          | D1 D2 D3 D4 D5 D6 H1 S1 S4 S5 FuseAttached |          |          |          |          |          |  |  |
| Type                                    |               |                   |                                      |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Continuous-Type                         |               |                   | UVC 32C□                             | UVC 34C□ | UVC 62C□ | UVC 64C□ | UVC 82C□ | UVC 84C□ | UVC 32C□                                   | UVC 34C□ | UVC 62C□ | UVC 64C□ | UVC 82C□ | UVC 84C□ |  |  |
| Latch-Type                              |               |                   | UVC 32L□                             | UVC 34L□ | UVC 62L□ | UVC 64L□ | UVC 82L□ | UVC 84L□ | UVC 32L□                                   | UVC 34L□ | UVC 62L□ | UVC 64L□ | UVC 82L□ | UVC 84L□ |  |  |
| Rated Breaking Voltage                  | kV            |                   | 3.6                                  |          | 7.2      |          | 12       |          | 3.6                                        |          | 7.2      |          | 12       |          |  |  |
| Rated Operating Voltage                 | kV            |                   | 3.3                                  |          | 6.6      |          | 11       |          | 3.3                                        |          | 6.6      |          | 11       |          |  |  |
| Rated Frequency                         | Hz            |                   | 60                                   |          |          |          | 50/60    |          | 60                                         |          |          |          | 50/60    |          |  |  |
| Rated Current                           | A             |                   | 200                                  | 400      | 200      | 400      | 200      | 400      | 200                                        | 400      | 200      | 400      | 200      | 400      |  |  |
| Impact Withstand Voltage                | kV            |                   | 60                                   |          |          |          | 75       |          | 60                                         |          |          |          | 75       |          |  |  |
| Commercial Frequency Withstand Voltage  | for 1 min, kV |                   | 20                                   |          |          |          | 28       |          | 20                                         |          |          |          | 28       |          |  |  |
| Control Circuit Withstand Voltage       | for 1 min, kV |                   | 2                                    |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Opening/Closing Capacity Category       |               |                   | AC 4                                 |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Breaking Capacity (O~3 min~CO~3 min~CO) | kA            |                   | 4                                    |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Short-Time Current                      |               | kA                |                                      |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| 1 sec                                   |               |                   | 6.3                                  |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| 30 sec                                  |               |                   | 2.4                                  |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Durability                              |               | 10,000 operations |                                      |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Mechanical                              |               |                   | 100                                  |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Electrical                              |               |                   | 30                                   |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Control Voltage                         | V             |                   | AC/DC 100 ~ 125 V, AC/DC 200 ~ 230 V |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Aux Contacts                            |               |                   | 3a2b                                 |          |          |          |          |          | Max. 5a5b                                  |          |          |          |          |          |  |  |
| Maximum Load Capacity                   |               |                   |                                      |          |          |          |          |          |                                            |          |          |          |          |          |  |  |
| Electric Motor                          | kW            |                   | 750                                  | 1,500    | 1,500    | 3,000    | 3,000    | 6,000    | 750                                        | 1,500    | 1,500    | 3,000    | 3,000    | 6,000    |  |  |
| Transformer                             | kVA           |                   | 1,000                                | 2,000    | 2,000    | 4,000    | 4,000    | 8,000    | 1,000                                      | 2,000    | 2,000    | 4,000    | 4,000    | 8,000    |  |  |
| Condenser                               | kVAR          |                   | 750                                  | 1,200    | 1,500    | 2,000    | 3,000    | 4,000    | 750                                        | 1,200    | 1,500    | 2,000    | 3,000    | 4,000    |  |  |
| Weight                                  | kg            |                   | X1 19                                |          |          |          | X1 40    |          | B1 B2 35                                   |          |          |          | -        |          |  |  |
|                                         |               |                   | A1 A2 28                             |          |          |          | -        |          | D1 D2 D3 D5 38                             |          |          |          | -        |          |  |  |
|                                         |               |                   | A3 33                                |          |          |          | -        |          | D4 D6 H1 43                                |          |          |          | -        |          |  |  |
|                                         |               |                   | -                                    |          |          |          | -        |          | S1 S4 S5 48                                |          |          |          | S1 S5 60 |          |  |  |

※ For VCS of rated voltage 12 kV, contact our sales team.

## Ratings and Specifications (VI)

### VI Vacuum Interrupter

#### High Reliability

High reliability based on 25 years' experience in manufacturing technology

#### Comprehensive Ratings and Application

- 7.2 kV ~ 24/25.8 kV voltage 25 kA breaking performance
- 7.2 kV ~ 17.5 kV voltage 40 kA breaking performance
- Each rating is in compliance with various international standards

#### Compact and Lightweight

Compact and lightweight thanks to the advanced contact and isolation technology

#### Minimized Maintenance

- High reliability and long-lasting lifetime with a very low leakage rate
- Used special material with very low gas content to maintain very vacuum status for a long time



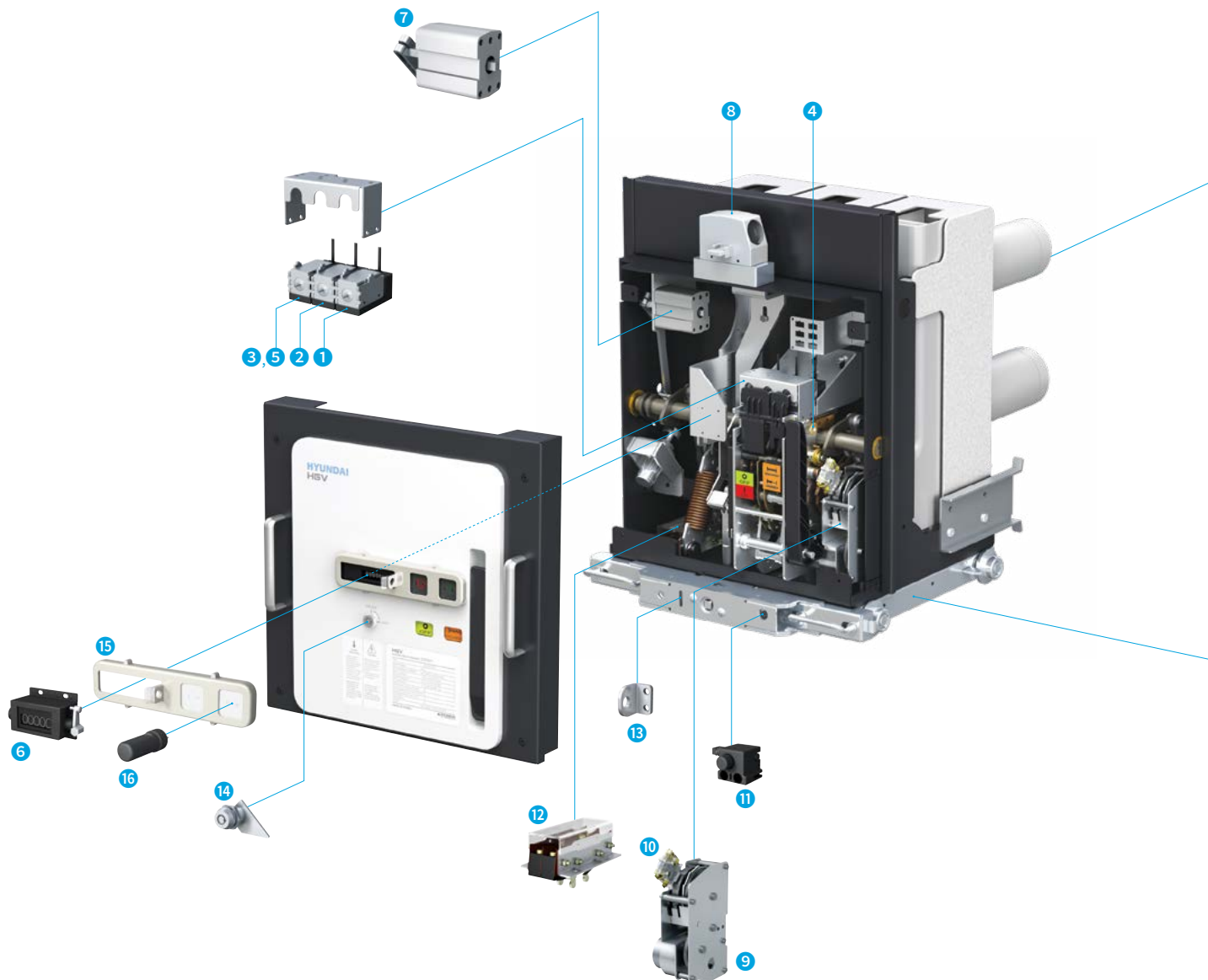
### Rating

| Type                                   |            | HCV 3B            | HCV 3D        | HCV 3E              | HCV 3F        | HCV 3G              | HCV 6A     | HCV 6B            |
|----------------------------------------|------------|-------------------|---------------|---------------------|---------------|---------------------|------------|-------------------|
| Rated Voltage                          | kV         | 7.2, 12, 17.5     | 7.2, 12, 17.5 | 7.2, 12, 17.5       | 7.2, 12, 17.5 | 7.2, 12, 17.5       | 24, 25.8   | 24, 25.8          |
| Rated Current                          | A          | 630, 1,250, 2,000 | 1,250, 2,000  | 2,500, 3,150, 4,000 | 1,250, 2,000  | 2,500, 3,150, 4,000 | 630        | 630, 1,250, 2,000 |
| Rated Breaking Current, symm           | kA         | 25                | 31.5/40       | 31.5/40             | 50            | 50                  | 12.5       | 12.5/25           |
| <b>Electrical Performance</b>          |            |                   |               |                     |               |                     |            |                   |
| Rated Closing Current, peak            | kA         | 65                | 104           | 104                 | 130           | 130                 | 32.5       | 65                |
| Rated Short-Time Current               | kA/s       | 25/4 s            | 31.5, 40/4 s  | 31.5, 40/4 s        | 50/3 s        | 50/3 s              | 12.5/4 s   | 12.5, 25/4 s      |
| Rated Frequency                        | Hz         | 50/60             | 50/60         | 50/60               | 50/60         | 50/60               | 50/60      | 50/60             |
| Commercial Frequency Withstand Voltage | kV/min     | 38 (42)           | 38 (42)       | 38 (42)             | 38 (42)       | 38 (42)             | 60         | 60                |
| Shockwave Withstand Voltage            | kV         | 95                | 95            | 95                  | 95            | 95                  | 125        | 125               |
| <b>Mechanical Performance</b>          |            |                   |               |                     |               |                     |            |                   |
| Contacts Opening Distance              | mm         | 10 ± 1            | 10 ± 1        | 10 ± 1              | 10 ± 1        | 10 ± 1              | 12 ± 1     | 12 ± 1            |
| Max Over Travel                        | mm         | 2                 | 2             | 2                   | 2             | 2                   | 2          | 2                 |
| Maximum Rebound                        | mm         | 2                 | 2             | 2                   | 2             | 2                   | 2          | 2                 |
| Average Opening Speed                  | m/s        | 1.0 ~ 1.2         | 1.0 ~ 1.2     | 1.0 ~ 1.2           | 1.0 ~ 1.2     | 1.0 ~ 1.2           | 1.0 ~ 1.2  | 1.0 ~ 1.2         |
| Average Closing Speed                  | m/s        | 0.9 ~ 1.1         | 0.9 ~ 1.1     | 0.9 ~ 1.1           | 0.9 ~ 1.1     | 0.9 ~ 1.1           | 0.9 ~ 1.1  | 0.9 ~ 1.1         |
| Self-Closing Ability (at full stroke)  | kgf        | 15                | 25            | 35                  | 25            | 35                  | 10         | 15                |
| Contacts Wear Limits                   | mm         | 3                 | 3             | 3                   | 3             | 3                   | 3          | 3                 |
| Contacts Bouncing                      | ms         | 2                 | 2             | 2                   | 2             | 2                   | 2          | 2                 |
| No-Load Opening/Closing Live           | operations | 30,000            | 30,000        | 30,000              | 30,000        | 30,000              | 30,000     | 30,000            |
| Welding Force                          | kgf        | 250 ± 10 %        | 380 ± 10 %    | 380 ± 10 %          | 380 ± 10 %    | 380 ± 10 %          | 150 ± 10 % | 250 ± 10 %        |



## Attachments (HGV)

### Circuit Breaker

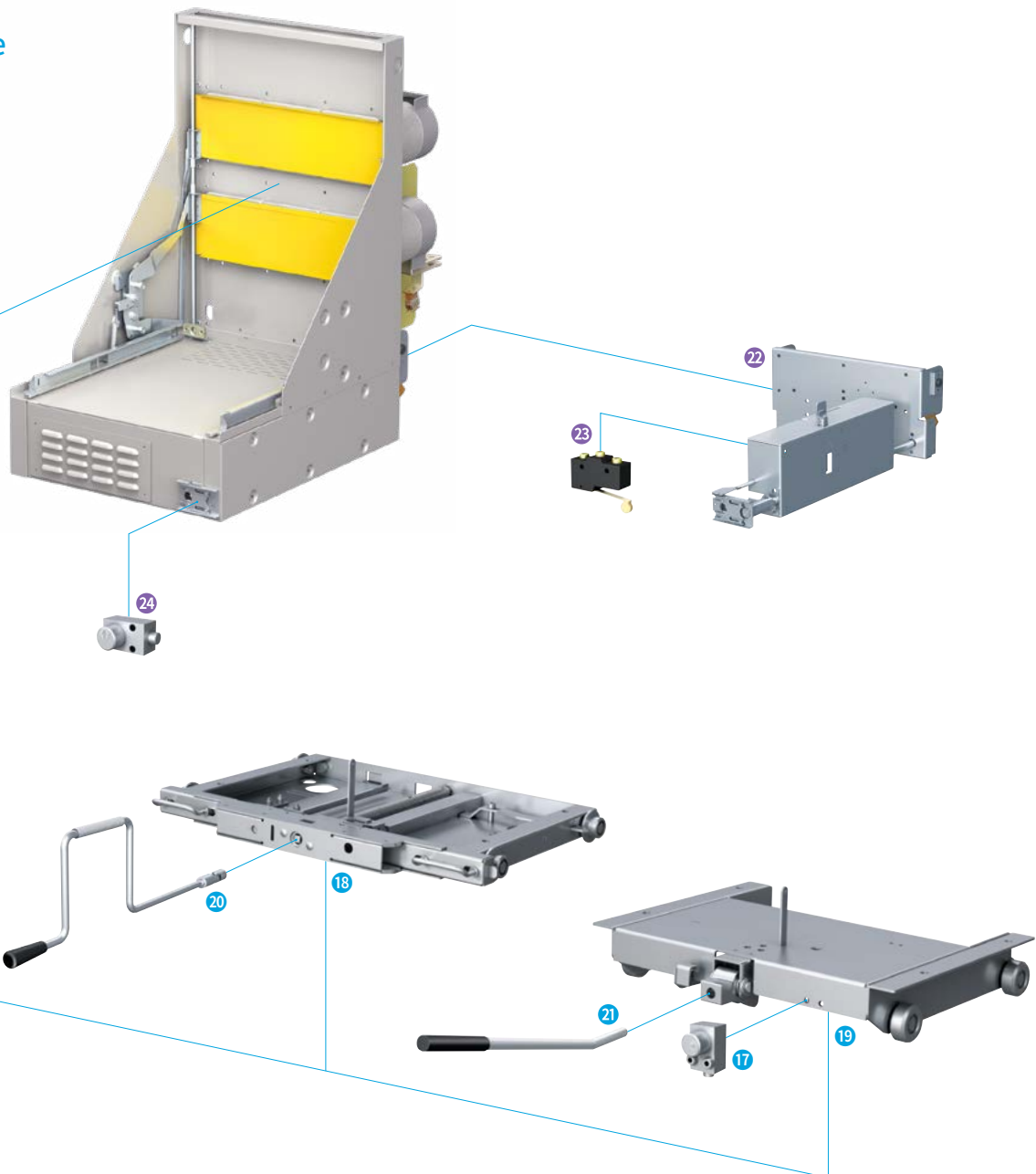


#### Attachments for Circuit

- |                               |                        |                               |
|-------------------------------|------------------------|-------------------------------|
| ① Close Coil                  | ⑤ C.T Operated Release | ⑨ Electric Motor              |
| ② Trip Coil                   | ⑥ Counter              | ⑩ Spring Charged Limit Switch |
| ③ Secondary Trip Coil         | ⑦ Auxiliary Switch     | ⑪ Door Interlock              |
| ④ UVR (Under Voltage Release) | ⑧ Jack Interlock       | ⑫ Position Switch             |

※ ③, ⑤ cannot be applied simultaneously

## Cradle



- 13 Position Padlock (For G/M Type)
- 14 Key Lock
- 15 Button Cover
- 16 Manual Bar
- 17 Position Padlock Kirk Key (For E/F Type)

- 18 Pushing/Drawing Device (For G/M Type)
- 19 Pushing/Drawing Device (For E/F Type)
- 20 Pushing/Drawing Handle (For G/M Type)
- 21 Pushing/Drawing Handle (For E/F Type)

### Attachments for Cradle

- 22 Earthing Switch
- 23 Earthing Switch Monitor Contact
- 24 Earthing Switch Locking Kirk Key

## Attachments (HGV)

### Basic Attachments

#### Pushing/Drawing Handle

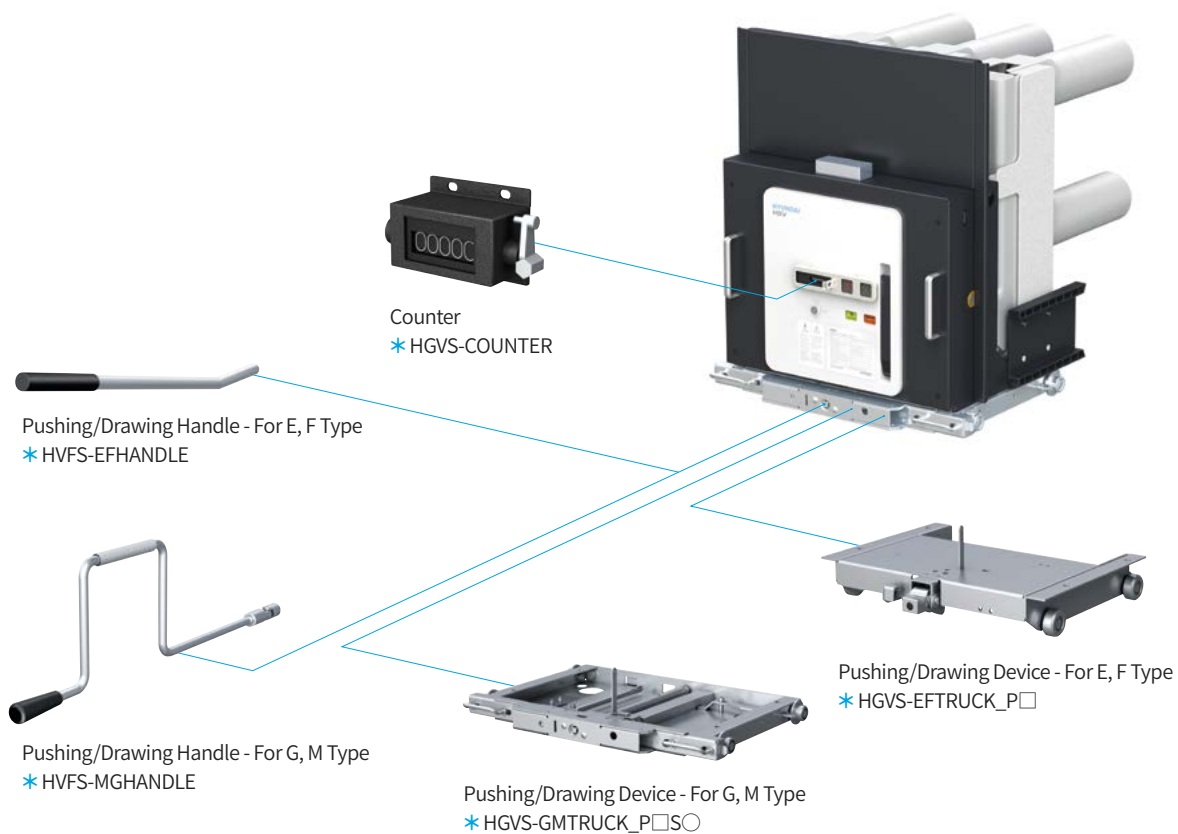
- Used for pushing/drawing of circuit breaker.
- Only one is provided based on the circuit breaker.
- Standard part supplied according to shipment standard at the time of product shipment.

#### Counter

- Displays breaker trip count.
- Displays up to 5 digits by default

#### Pushing/Drawing Device

- Device that moves the breaker into test or service position.
- Default specification is position 2 and only applied to pushing type.
- Relevant pushing/drawing device is attached based on E, F, G and M type of the breaker.



※ \* : Order Number for Separate Purchase

□ : Phase-to-Phase Distance (1 : 150 mm, 2 : 165 mm, 3 : 210 mm, 4 : 275 mm)

○ : Pushing/Drawing Distance (1 : 200 mm, 2 : 300 mm)

## Trip Coil

- Controlling device that trips breaker by input of below external controlling voltage.
- Attached to breaker by default.

## Rating

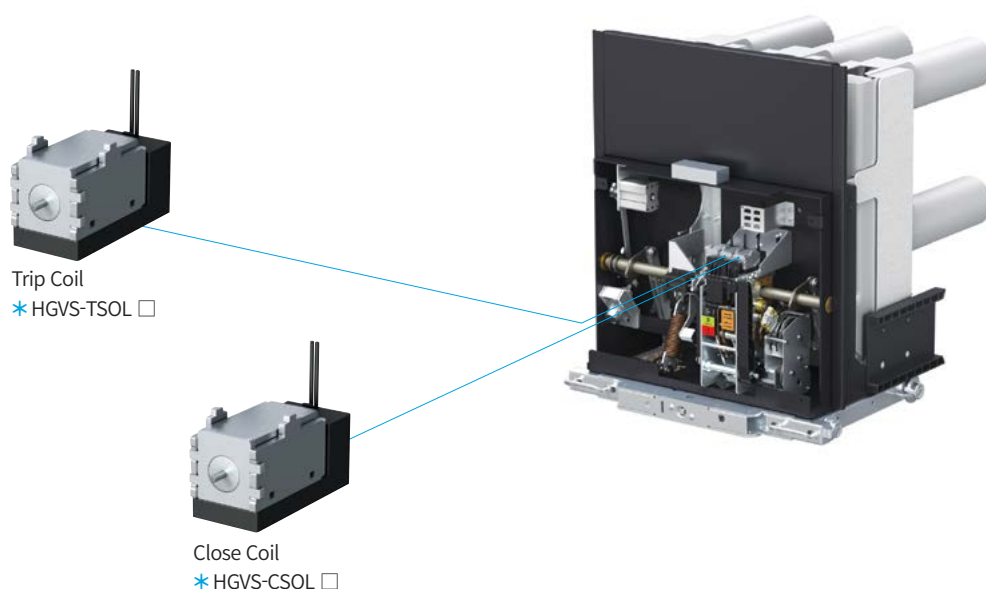
| Item                | Contents                 |                    |                  |
|---------------------|--------------------------|--------------------|------------------|
| Operating Power     |                          | Rated Voltage (Un) | Load Current (A) |
|                     | DC                       | 24 V               | 9.5 A            |
|                     |                          | 48 ~ 60 V          | 5 A              |
|                     | AC/DC                    | 100 ~ 130 V        | 2.5 A            |
|                     |                          | 200 ~ 250 V        | 1.5 A            |
| Range of Motion     | 65 ~ 120 %               |                    |                  |
| Starting Power      | DC = 200 W, AC = 200 VA  |                    |                  |
| Starting Time       | approx. 120 ms           |                    |                  |
| Maintaining Power   | DC = 4 W, AC = 4 VA      |                    |                  |
| Dielectric Strength | 2,000 V 50/60 Hz (1 min) |                    |                  |

## Close Coil

- Controlling device that closes breaker by input of below external controlling voltage.
- Attached to breaker by default.

## Rating

| Item                | Contents                 |                    |                  |
|---------------------|--------------------------|--------------------|------------------|
| Operating Power     |                          | Rated Voltage (Un) | Load Current (A) |
|                     | DC                       | 24 V               | 9.5 A            |
|                     |                          | 48 ~ 60 V          | 5 A              |
|                     | AC/DC                    | 100 ~ 130 V        | 2.5 A            |
|                     |                          | 200 ~ 250 V        | 1.5 A            |
| Range of Motion     | 80 ~ 120 %               |                    |                  |
| Starting Power      | DC = 200 W, AC = 200 VA  |                    |                  |
| Starting Time       | approx. 120 ms           |                    |                  |
| Maintaining Power   | DC = 4 W, AC = 4 VA      |                    |                  |
| Dielectric Strength | 2,000 V 50/60 Hz (1 min) |                    |                  |



※ \* : Order Number for Separate Purchase

□ : Operating Power (1 : DC 24 V, 2 : AC/DC 48 ~ 60 V, 4 : AC/DC 100 ~ 130 V, 6 : AC/DC 200 ~ 250 V)

# Attachments (HGV)

## Basic Attachments

### Auxiliary Switch

- Contact switch used to check on/off status of breaker.
- Electrical signal of breaker on/off is configured with standard contacts of 4NO + 4NC.
- Available up to 10NO + 10NC upon request.

| Item      | Contents                  |
|-----------|---------------------------|
| Name      | Control Circuit Connector |
| Standard  | 4a + 4b                   |
| Selection | 10a + 10b                 |

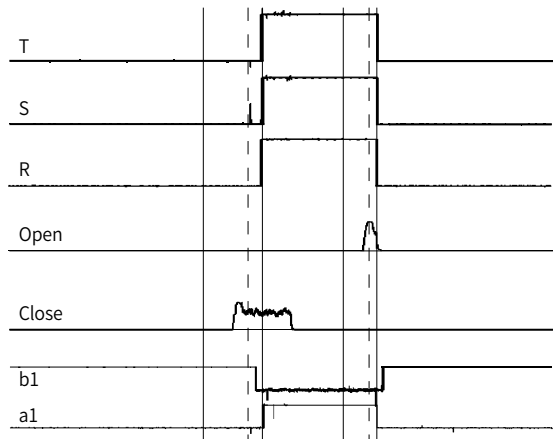
### Rating

| Item                | Contents                 |
|---------------------|--------------------------|
| Rated Voltage (Un)  | AC/DC 24 ~ 250 V         |
| Rated Current (A)   | Ith2 = 10 A              |
| Dielectric Strength | 2,000 V 50/60 Hz (1 min) |
| Resistance          | 3 MΩ                     |

### Rated Current and Breaking Capacity in AC and DC Ranges

| Voltage  | T     | In    | Icu   |
|----------|-------|-------|-------|
| AC 220 V | 15 ms | 2.5 A | 25 A  |
| DC 24 V  | 15 ms | 10 A  | 12 A  |
| DC 60 V  | 15 ms | 6 A   | 8 A   |
| DC 110 V | 15 ms | 4 A   | 5 A   |
| DC 220 V | 15 ms | 1 A   | 1.5 A |

### Time Chart



※ \* : Order Number for Separate Purchase  
□ : Contacts Configuration (4 : 4NO + 4NC, 10 : 10NO + 10NC)

## Electric Motor

- Electric motor that charges close spring.
- Once charging completes, the built-in switch interrupts input control power.
- When control power is connected, it recharges right away once breaker closes.

## Spring Charged Limit Switch

- Provides micro-switch contacts for charges/discharged status of close spring (1NO Provided).

## Rating

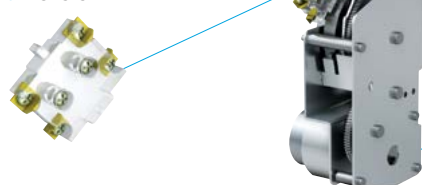
| Item              |                     | Contents                 |                  |
|-------------------|---------------------|--------------------------|------------------|
| Operating Power   |                     | Rated Voltage (Un)       | Load Current (A) |
|                   | DC                  | 24 V                     | 12 A             |
|                   |                     | 48 ~ 60 V                | 6 A              |
|                   |                     | AC/DC                    | 100 ~ 130 V      |
|                   | 200 ~ 250 V         |                          | 1.5 A            |
| Range of Motion   |                     | 80 ~ 110 % Un            |                  |
| 25 kA or Less     | Starting Power      | DC = 500 W, AC = 500 VA  |                  |
|                   | Power Consumption   | DC = 200 W, AC = 200 VA  |                  |
|                   | Starting Time       | approx. 0.2 sec          |                  |
|                   | Maintaining Power   | DC = 5 W, AC = 5 VA      |                  |
|                   | Charging Time       | 3 ~ 5 sec                |                  |
|                   | Dielectric Strength | 2,000 V 50/60 Hz (1 min) |                  |
| 31.5 kA or Higher | Starting Power      | DC = 900 W, AC = 900 VA  |                  |
|                   | Power Consumption   | DC = 350 W, AC = 350 VA  |                  |
|                   | Starting Time       | approx. 0.2 sec          |                  |
|                   | Maintaining Power   | DC = 5 W, AC = 5 VA      |                  |
|                   | Charging Time       | 3 ~ 5 sec                |                  |
|                   | Dielectric Strength | 2,000 V 50/60 Hz (1 min) |                  |

## Rated Current and Breaking Capacity within AC and DC Ranged

| Voltage  | T     | In    | Icu   |
|----------|-------|-------|-------|
| AC 220 V | 15 ms | 2.5 A | 25 A  |
| DC 24 V  | 15 ms | 10 A  | 12 A  |
| DC 60 V  | 15 ms | 6 A   | 8 A   |
| DC 110 V | 15 ms | 4 A   | 5 A   |
| DC 220 V | 15 ms | 1 A   | 1.5 A |

Spring Charged Limit Switch

\* HGVS-S1



Electric Motor

\* HGVS-M□ / 25 kV

\* HGVS-M□ / 40 kV

※ \* : Order Number for Separate Purchase

□ : Operating Power (1 : DC 24 V, 2 : AC/DC 48 ~ 60 V, 4 : AC/DC 100 ~ 130 V, 6 : AC/DC 200 ~ 250 V)

As motors vary depending on VCB capacity, check it prior to placing an order.

## Attachments (HGV)

### Basic Attachments

#### Auxiliary Contacts and Control Cables

- A, B : Provides counter controlling connector and pin to connect to breaker (Lead cable is not supplied).
- C, D : Standard length of lead cable of control circuit is 2.0 m and 0.8 SQ or higher is applied.
- Only either of two above is provided by default. Choose between 4NO + 4NC and 10NO + 10NC.



Control Circuit Connector

\* HGVS-JACK □



Control Circuit Cable

\* HGVS-LC □

#### Compact HGV Control Cable



Control Circuit Connector

\* HGVS-□□JACK COM



Control Circuit Cable

\* HGVS-LC □ COM

※ \* : Order Number for Separate Purchase

□ : Number of Auxiliary Contact (4 : 4NO + 4NC, 10 : 10NO + 10NC)

Cable installation direction is left by default at the time of product shipment. For Compact HGV, Control Circuit Lead Cable(1.5m, 0.8SQ or more) is provided.

## Optional Attachments

### Secondary Trip Coil

- Double control device that can trip breaker even in the event of problem to trip coil.
- It trips breaker by below external controlling voltage.
- It is placed next to trip coil and cannot be applied at the same time with C.T operated release.

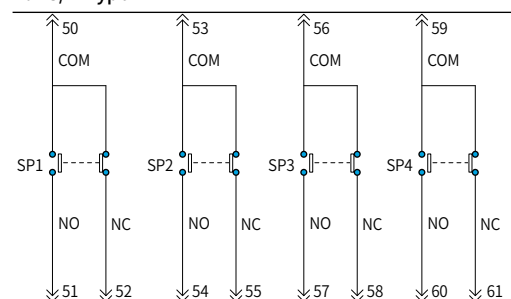
### Position Switch

- Contact switch that shows pushing/drawing position of test and service of breaker. It is inside of the breaker.
- For G and M types, default specification is 2NO + 2NC per position.
- For E and F types, default specification is 1NO + 1NC per position.

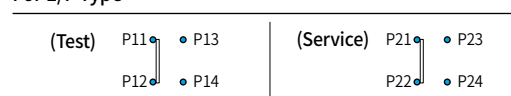
### Rating

| Item                | Contents |                          |
|---------------------|----------|--------------------------|
| Operating Power     | DC       | Rated Voltage (Un)       |
|                     |          | Load Current (A)         |
|                     | AC/DC    | 24 V                     |
|                     |          | 9.5 A                    |
| Range of Motion     | DC       | 48 ~ 60 V                |
|                     |          | 5 A                      |
|                     | AC/DC    | 100 ~ 130 V              |
|                     |          | 2.5 A                    |
| Starting Power      | DC       | 200 ~ 250 V              |
|                     |          | 1.5 A                    |
|                     | AC/DC    | 65 ~ 120 %               |
|                     |          | DC = 200 W, AC = 200 VA  |
| Starting Time       | DC       | approx. 120 ms           |
|                     |          | approx. 120 ms           |
|                     | AC/DC    | DC = 4 W, AC = 4 VA      |
|                     |          | DC = 4 W, AC = 4 VA      |
| Dielectric Strength | DC       | 2,000 V 50/60 Hz (1 min) |
|                     |          | 2,000 V 50/60 Hz (1 min) |
|                     | AC/DC    | 2,000 V 50/60 Hz (1 min) |
|                     |          | 2,000 V 50/60 Hz (1 min) |

### For G/M Type



### For E/F Type



Secondary Trip Coil  
\* HGVS-RSOL □



Position Switch  
\* HGVS-P4 (For G/M)



※ \* : Order Number for Separate Purchase

□ : Operating Power (1 : DC 24 V, 2 : AC/DC 48 ~ 60 V, 4 : AC/DC 100 ~ 130 V, 6 : AC/DC 200 ~ 250 V)



## Attachments (HGV)

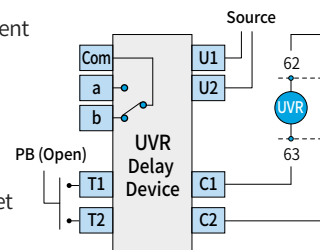
### Optional Attachments

#### UVR (Under Voltage Release)

- Controlling device that automatically trips breaker when external controlling voltage supplied to breaker drops below a certain value.
- By default, instantaneous type is supplied but in order to delay for certain time, integrate it with UVR delay device for use.
- When input control voltage does not reach the range in the below table, breaker cannot close electrically and mechanically.

#### UVR Time Delay Device

- It is used to delay trip time of breaker for a set time and attached to exterior of breaker to be mounted in panel or cradle.
- Controlling device used in connection with UVR to prevent breaker trip when power network is released due to voltage drop or breaking over a short time.
- Operating voltage must be set as same as UVR.



#### Rating

| Item                |       | Contents                 |                  |
|---------------------|-------|--------------------------|------------------|
| Operating Power     | DC    | Rated Voltage (Un)       | Load Current (A) |
|                     |       | 24 V                     | 10.5 A           |
|                     | AC/DC | 48 ~ 60 V                | 4.3 A            |
|                     |       | 100 ~ 130 V              | 2 A              |
|                     |       | 200 ~ 250 V              | 1 A              |
| Range of Motion     |       | Drop Out : 4.5 ~ 65 %    |                  |
|                     |       | Pick Up : 65 ~ 80 %      |                  |
| Starting Power      |       | DC = 200 W, AC = 200 VA  |                  |
| Starting Time       |       | approx. 120 ms           |                  |
| Maintaining Power   |       | DC = 4 W, AC = 4 VA      |                  |
| Dielectric Strength |       | 2,000 V 50/60 Hz (1 min) |                  |

#### Rating

| Item                |       | Contents                 |                  |                        |
|---------------------|-------|--------------------------|------------------|------------------------|
| Operating Power     |       | Rated Voltage (Un)       | Load Current (A) |                        |
|                     |       |                          | Inrush State     | Normal State           |
|                     | DC    | 24 V                     | 10.5 A (200 VA)  | 1.05 A (4 VA or lower) |
|                     |       | 48 ~ 60 V                | 4.3 A (200 VA)   | 0.43 A (4 VA or lower) |
|                     | AC/DC | 100 ~ 130 V              | 2 A (200 VA)     | 0.2 A (4 VA or lower)  |
|                     |       | 200 ~ 250 V              | 1 A (200 VA)     | 0.1 A (4 VA or lower)  |
| Range of Motion     |       | Drop Out : 4.5 ~ 65 %    |                  |                        |
|                     |       | Pick Up : 65 ~ 80 %      |                  |                        |
| Delay Time Setting  |       | 0.5, 1.0, 1.5, 3.0 sec   |                  |                        |
| Dielectric Strength |       | 2,000 V 50/60 Hz (1 min) |                  |                        |



UVR Delay Device

\* HGVS-UD□



UVR

\* HGVS-UV□



※ \* : Order Number for Separate Purchase

□ : Operating Power (1 : DC 24 V, 2 : AC/DC 48 ~ 60 V, 4 : AC/DC 100 ~ 130 V, 6 : AC/DC 200 ~ 250 V)

### Button Cover

- Device to prevent manual on/off of breaker due to erroneous operation of operator.
- When it is applied, manual on/off is unavailable and padlock function can be performed at the same time.
- Lock is not provided by default (Ø10 hole provided).

### Position Padlock

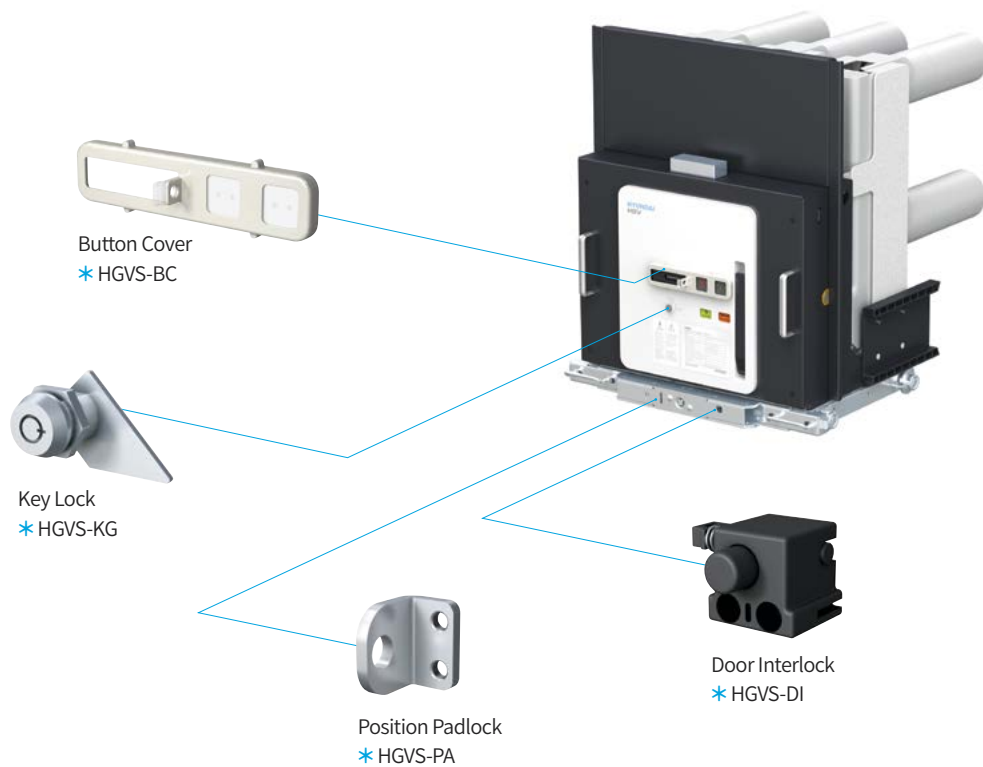
- Device to prevent pushing/drawing of breaker during maintenance and operation of operator.
- Lock is not provided by default (Ø8 hole provided).

### Key Lock

- Device to lock and release breaker status depending on purpose of operator.
- When locked, electrical and mechanical input is unavailable.
- It can only lock when breaker is tripped.

### Door Interlock

- Device that makes pushing/drawing unavailable when panel door is open
- Option only available for MS and ME type cradle.



## Attachments (HGV)

### Optional Attachments

#### C.T Operated Release

- Device that automatically trips breaker with current release that can operate by C. T. secondary current when overcurrent and short circuit occurs.
- It is placed next to trip coil and cannot be applied at the same time with second trip coil.

#### Rating

| Item              | Contents |
|-------------------|----------|
| Rated Current     | 1.0 A    |
| Operating Current | 0.85 A   |

#### Position Padlock Kirk Key

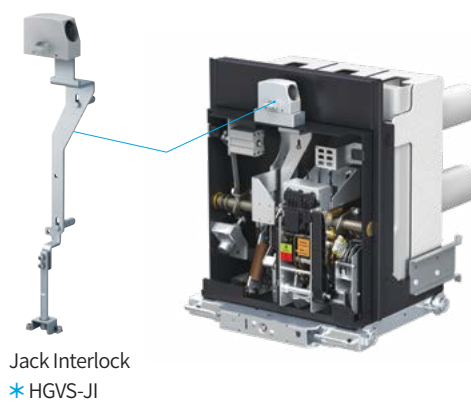
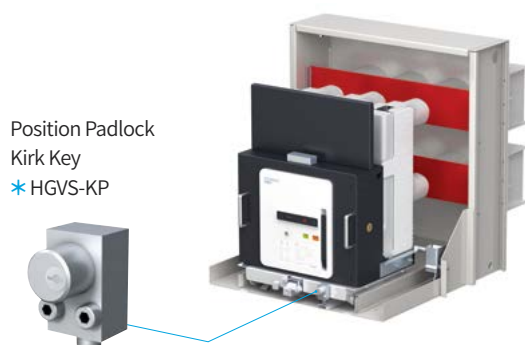
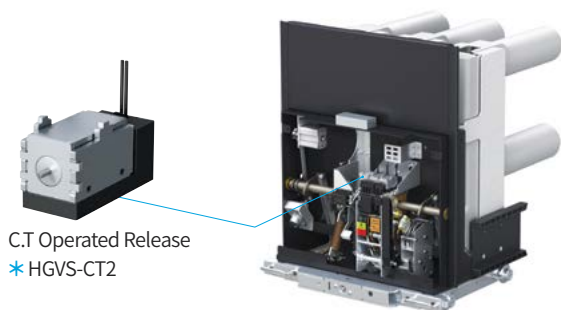
- Device that locks or releases breaker in the given position.
- It can be mounted when cradle is E or F type.

#### Manual Bar

- Device that can manually operate breaker with lock hanging on a button cover.
- Only operator should carry it and use it as required.
- This device length is set to be used for breaker only in test positions.

#### Jack Interlock

- Device that allows pushing/drawing only when control circuit connector on the input side mounted on cradle is normally connected to control circuit connector of breaker
- Control circuit connect cannot be separated when breaker is in service position or being pushed/drawn. Connection and separation is only available in test positions.
- It can be mounted when cradle is G or M type.



### Earthing Switch

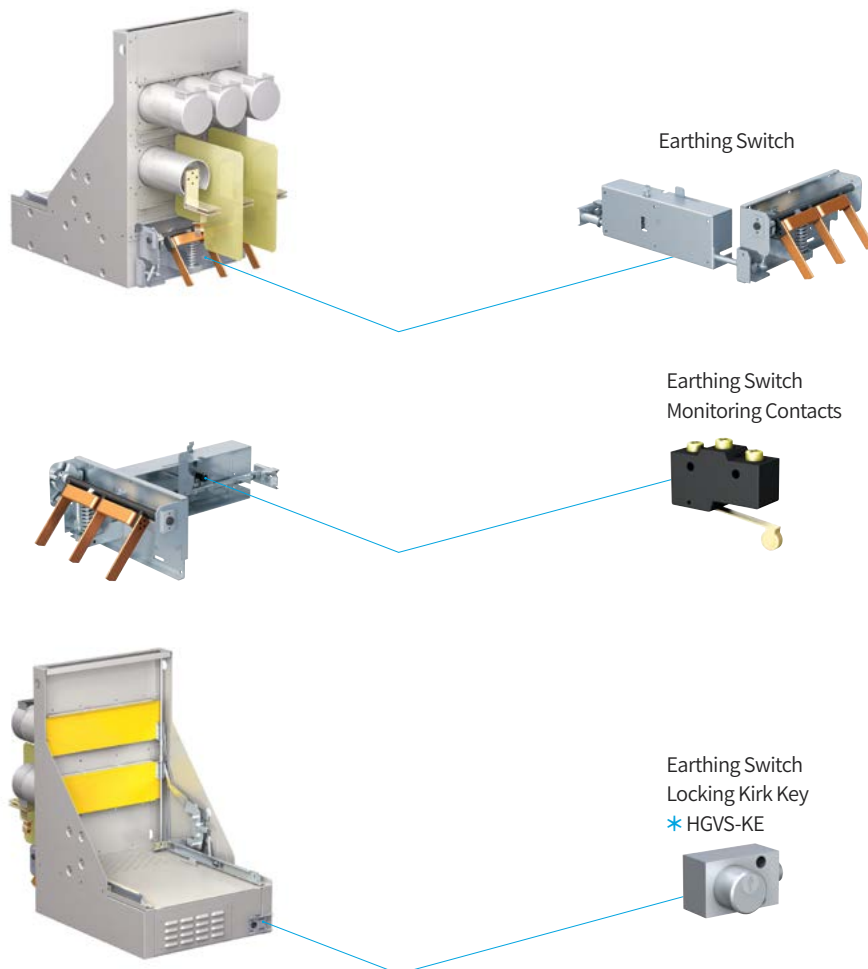
- Device that discharges charging current on the load side during panel maintenance or abnormality check in a test position or when breaker is fully drawn out.
- Operation is unavailable when breaker is drawing in. Applicable to G and M types.

### Earthing Switch Locking Kirk Key

- Device to prevent operation for safety after maintenance or abnormality check or for other purpose after earthing switch check.

### Earthing Switch Monitoring Contacts

- Contacts that display on/off status of grounding when applying earthing switch.
- It is installed to prevent potential accident by arbitrary operation.
- It should be installed with earthing switch and provides 1NO + 1NC contacts.
- It should be selected when mounting earthing switch.



# Attachments (HGV)

## Optional Attachments

### Vacuum Checker

Breaking in vacuum circuit breaker is carried out in a vacuum interrupters fully sealed to a very vacuum status. Vacuum interrupters are manufactured in a special process, thus can be used without inspection except for appearance check. However, for more stable operation, customer may use below mobile vacuum checker to inspect vacuum interrupters.

| Item           | Contents            |
|----------------|---------------------|
| Order No.      | HAFS-VC9            |
| Input Voltage  | AC 200 ~ 220 V      |
| Output Voltage | AC 11 kV / AC 22 kV |
| Weight         | 22 kg               |
| Shape          | Portable            |



## Condensor Trip Device

Attachment with a function to manually or automatically trip breaker using power charged to condenser when control power is not supplied due to a short circuit accidents, etc. when using alternating current power for controlling breaker trip. It has advantages as follows :

- Can automatically trip breaker using No. 3 and 4 contacts of built-in relay and switch operation for setting delay is as follows :
  - ON : Delay (Operation after less than 1.5 sec of delay)
  - OFF : By-Pass (Operation without delay)
- CTD function and rectifying function are combined and as the device is designed to use constant load current within 2 A, no separate rectifying is required.

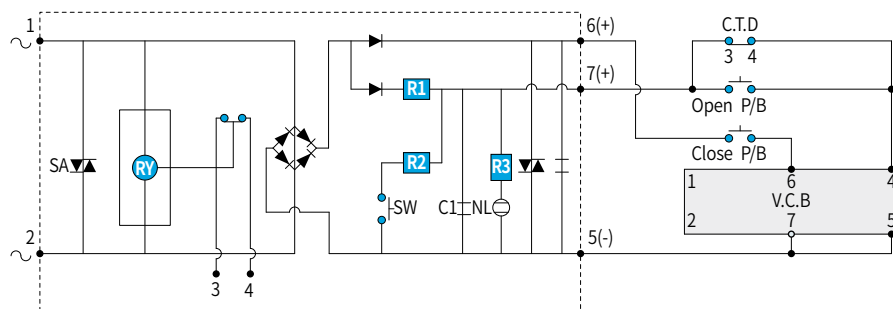


| Item                      | Contents                         |          |          |          |
|---------------------------|----------------------------------|----------|----------|----------|
| Order No.                 | HVFS-T7                          | HVFS-T9  | HVFS-T4  | HVFS-T6  |
| Rated Input Voltage       | AC 110 V                         | AC 220 V | DC 110 V | DC 220 V |
| Constant Charging Voltage | DC 145 V                         | DC 290 V | DC 110 V | DC 220 V |
| Constant Current Capacity | DC 2 A                           |          |          |          |
| Delayed Current Time      | 0, 1.5 sec or less <sup>1)</sup> |          |          |          |
| Rated Frequency           | 50/60 Hz                         |          |          |          |

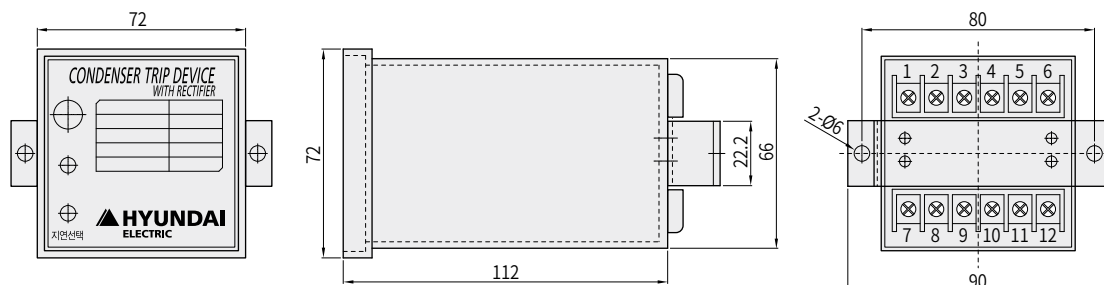
※ 1) For use in combination with VCB, controlling power of trip circuit should be DC.

## For AC

Unit : mm



Alternating Current Input Power  
NO. 1, 2  
Condenser Trip Power  
NO. 7 (+), 5 (-)  
Direct Current Constant Power  
NO. 6 (+), 5 (-)  
Delay Contact  
(For automatic trip as well)  
NO. 3, 4



## Attachments (HGV)

### Order Code for Spare HGV Attachments

| Code              | Name                                              | Spec                                                     |
|-------------------|---------------------------------------------------|----------------------------------------------------------|
| HVFS-MGHANDLE     | Pushing/Drawing Handle                            | G, M Types                                               |
| HVFS-EFHANDLE     |                                                   | E, F Types                                               |
| HGVS-GMTRUCK_P□S○ | Pushing/Drawing Device                            | G, M Types                                               |
| HVFS-EFHANDLE     |                                                   | E, F Types                                               |
| HGVS-COUNTER      | Opening/Closing Counter                           |                                                          |
| HGVS-CSOL□        | Closing Coil                                      |                                                          |
| HGVS-TSOL□        | Trip Coil                                         |                                                          |
| HGVS-RSOL□        | Secondary Trip Coil                               |                                                          |
| HGVS-UV□          | UVR                                               |                                                          |
| HGVS-UD□          | UVR Delay Device                                  |                                                          |
| HGVS-M□           | Electric Motor                                    |                                                          |
| HGVS-CT2          | C.T Operaterd Release                             | 1.0 A                                                    |
| HGVS-ASW4         | Aux Switch                                        | 4NO + 4NC                                                |
| HGVS-ASW10        |                                                   | 10NO + 10NC                                              |
| HGVS-S1           | Spring Charged Limit Switch                       | 1NO                                                      |
| HGVS-P2           | Position Switch                                   | 1NO + 1NC applied for E and F                            |
| HGVS-P4           |                                                   | 2NO + 2NC applied for G and M                            |
| HGVS-BC           | Button Cover                                      |                                                          |
| HGVS-OB           | Manual Bar                                        |                                                          |
| HGVS-KG           | Key Lock                                          |                                                          |
| HGVS-PA           | Position Padlock                                  |                                                          |
| HGVS-DI           | Door Interlock                                    |                                                          |
| HGVS-KE           | Earthing Switch Locking Kirk Key                  |                                                          |
| HGVS-KP           | Position Padlock Kirk key                         |                                                          |
| HGVS-JACK4        | Control Circuit Connector<br>(Single Supply)      | 4NO + 4NC                                                |
| HGVS-JACK10       |                                                   | 10NO + 10NC                                              |
| HGVS-LC4          | Control Circuit Cable                             | 4NO + 4NC                                                |
| HGVS-LC10         |                                                   | 10NO + 10NC                                              |
| HAFS-VC9          | Vacuum Checker                                    |                                                          |
| HVFS-T4           | Condenser Trip Device                             | Input DC 110 V                                           |
| HVFS-T6           |                                                   | Input DC 220 V                                           |
| HVFS-T7           |                                                   | Input AC 110 V                                           |
| HVFS-T9           |                                                   | Input AC 220 V                                           |
| HGVS-DHANDLE COM  | Draw-Out Handle(Only For Compact HGV)             | E,F,G Types                                              |
| HGVS-TSOL□ COM    | Trip Coil(Only For Compact HGV)                   | HGV1099A/1011A                                           |
| HGVS-RSOL□ COM    | Secondary Trip Coil(Only For Compact HGV)         | HGV1099A/1011A                                           |
| HGVS-ASW4 COM     | Auxiliary Switch(Only For Compact HGV)            | 4NO + 4NC, Fixed Type, Plug and Socket Only For A Type   |
| HGVS-ASW7 COM     |                                                   | 7NO + 7NC, Fixed Type, Plug and Socket Only For B Type   |
| HGVS-ASW10 COM    |                                                   | 10NO + 10NC, Fixed Type, Plug and Socket Only For D Type |
| HGV-P/S1 COM      | Position Switch (Only For Compact HGV)            | 1NO + 1NC applied for E and F                            |
| HGV-CAM1 COM      | Cam for Position Switch<br>(Only For Compact HGV) | HGV1099A/1011A                                           |
| HGV-CAM2 COM      |                                                   | HGV1141B/1142B                                           |
| HGVS-LC4 COM      | Control Circuit Cable<br>(Only For Compact HGV)   | 4NO + 4NC                                                |
| HGVS-LC7 COM      |                                                   | 7NO + 7NC                                                |
| HGVS-LC10 COM     |                                                   | 10NO + 10NC                                              |
| HVGS-22JACK       | Control Jack                                      | 4NO + 4NC Plug and Socket Only For A Type                |
| HVGS-36JACK       | Control Jack                                      | 7NO + 7NC Plug and Socket Only For B Type                |
| HVGS-PL1099       | Plug-in Contact<br>(Only For Compact HGV)         | 8kA 400A                                                 |
| HVGS-PL1141       |                                                   | 25kA 630A                                                |
| HVGS-PL1011       |                                                   | 12.5kA 630A                                              |
| HVGS-PL1142       |                                                   | 25kA 1250A                                               |

※ Product codes vary depending on control voltage and draw-out type, see contents herein.

## Attachments (HVF)

### Basic Attachments (HVF)

| Code                    | Name                       | Spec                    |
|-------------------------|----------------------------|-------------------------|
| HVFS-HANDLE             | Charging Handle            | HVF, HAF                |
| HVFS-MGHANDLE           | Pushing/Drawing Handle     | SF Type, M Type, G Type |
| HVFS-EFHANDLE           |                            | E Type, F Type          |
| HAFS-24JACK             | Control Circuit Connector  | HVF, HAF                |
| HVFS-LEADCABLE (A-Type) | Control Circuit Lead Cable | A-Type                  |
| HVFS-LEADCABLE (B-Type) |                            | B-Type                  |

※ Handle (HVF Type) : HVF pushing/drawing breaker is used for pushing and drawing of breaker body.

Pushing/Drawing Handle (Pushing/Drawing Breaker) : Used for pushing/drawing of pushing/drawing breaker.

Charging Handle (HVF/HAF/HVG Type) : Used for manual closing spring charging. Also HAF pushing/drawing VCB is used for pushing/drawing of breaker body.

Control Circuit Lead Cable : Standard length is 2.2 m and applies 1.5 SQ or higher. (Applied to A and B types)

Fixed Plate (Fixed Breaker) : Fixed plate for fixed breaker.

Control Circuit Connector : Applied to pushing/drawing jack. (Applied to C and D types)

( ) What is given in parentheses is spare order code.

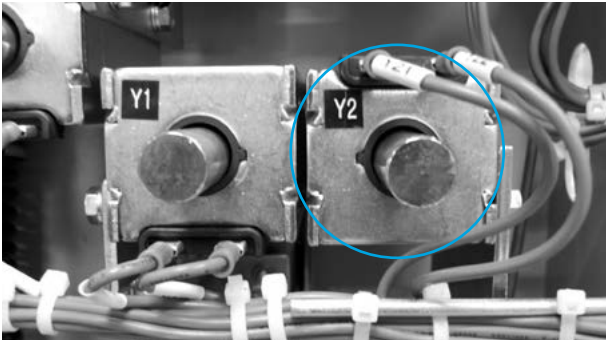


## Attachments (HVF)

### Optional Attachments

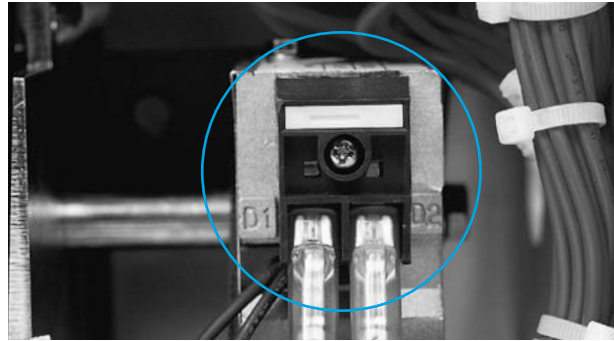
#### Secondary Trip Solenoid (Y2)

Additionally attaches and protects the second shunt release in addition to the first shunt release (Trip Solenoid) or can automatically trip breaker by electrical or mechanical operation.



#### Undervoltage Release (Y7)

Undervoltage release (UVR) can be used to automatically trip breaker when control voltage drops below a certain value. It can be connected to potential transformer but DC operation is available as well. UVR automatically trips breaker when control voltage is less than 35 % of rated value and can close breaker when control voltage is recovered to 85 % or higher. Also, when using UVR, attach electric lockout also to prevent closing of unnecessary breaker when control voltage gets under a certain value.



#### C.T Operated Release (Y4)

Provides automatic trip of breaker with current release that can operate by C.T secondary current when overcurrent and short-circuit occur. Its appearance is same as undervoltage release (Y7).

| Item              | Contents         |                 |
|-------------------|------------------|-----------------|
| Order No.         | HAFS-CT1         | HAFS-CT2        |
| Rated Current     | 0.5 A            | 1.0 A           |
| Operating Current | 0.45 A or higher | 0.8 A or higher |
| Coil Resistance   | 20 $\Omega$      | 11 $\Omega$     |

※ If multiple options are built-in, make sure to discuss with us.  
Second trip solenoid (Y2) and Undervoltage Release (Y7) do not apply at the same time.

#### Electrical Lockout (F1)

Device that makes closing of breaker unavailable when control voltage drops under a certain value and can close of breaker when control voltage recovers to above a certain value.

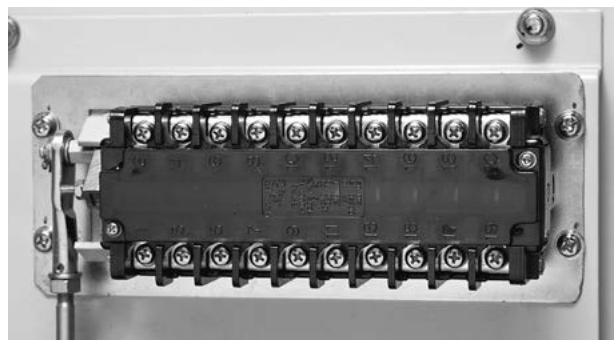
- Pick-Up :  
85 % or higher of rated voltage
- Drop-Out :  
60 % or less of rated voltage



#### MOC (M5) : Mechanism Operated Cell Switches

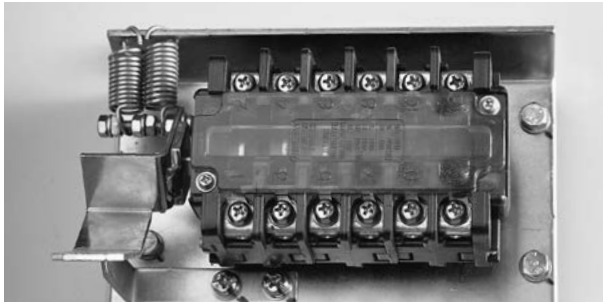
This switch is a mechanical operation switch which operates directly by mechanical structure of breaker when breaker is in operation mode. It can be individually operated and default contact is made up of 5NO + 5NC.

However, installed by default for ANSI draw-out type VCB.



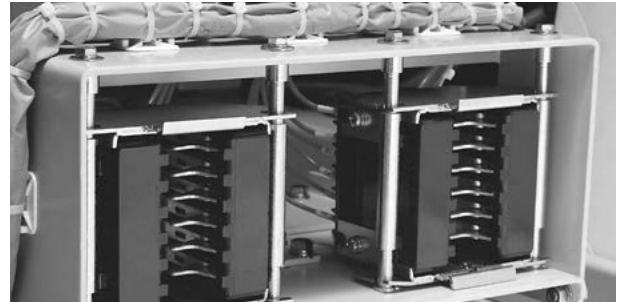
### TOC (T3) : Truck Operated Cell Switches

The truck operated cell switch operates when breaker is drawn in from driving position and should not transform if moving unit is not completely connected to driving position. Default contact is made up of 3NO + 3NC. However, it is installed by default for ANSI draw-out type VCB.



### Auto Secondary Jack

This Control Jack is a method that applies to Position 3 that does not breaker to connect on a disconnecting position and automatically connects on test and connection positions. It is mounted on ANSI VCB by default.



### Earthing Switch

Device installed for safety of operator by discharging charging current to the load side for maintenance of switchgear after drawing out breaker or moving it to disconnected position. It can only be mounted on G type cradle. For detailed mountable models, contact us.



### Contacts for Earthing Switch Operation (EE)

Contacts that show operating status (on/off) of earthing switch when using earthing switch. It is installed to prevent potential accidents caused by arbitrary operations and provides 1NO + 1NC contacts.



### Spring Charged Signal (S41) Draw-Out

It refers to the electrical function to externally check the status of VCB waiting for closing. It additionally attaches limit switch of charge unit within VCB for application. If without further discussion, draw-out standard is control jack No. 3 and 8.

### Button Padlock (Lock Button for Closing and Trip Buttons)

Locking device can be installed on button to prevent potential accident.

- BB : Button Padlock (Close & Open)
- BC : Button Padlock (Close)
- BO : Button Padlock (Open)



## Attachments (HVF)

### Optional Attachments

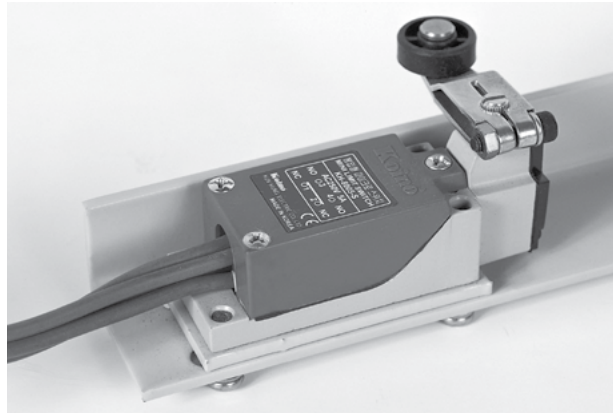
#### Varistor Module (V□)

In case the surge that is generated when opening/closing shunt release, soleid, motor of DC control circuit may affect solid-state control device of other control circuit, varistor module can be additionally attached to both sides of motor and solenoid.



#### Position Switch (P2)

It has functions to electrically display status of test and connection positions of breaker. Default contact draw-out provides 1NO + 1NC per position. However, at a customer request, extension up to 4NO + 4NC per position is available for HVF type VCB only with cable 1.5 SQ or higher and 2.5 MR draw-out as standard.



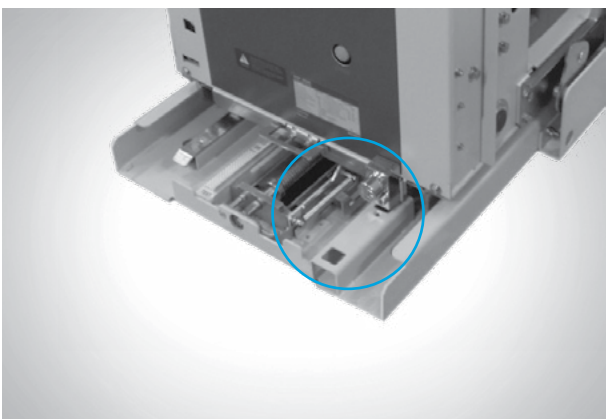
#### Flame-Retardant Cable (NA, NB)

Auxiliary and control circuit cable. It uses flame-retardant cable for cable distribution based on following methods :

- NA : Auxiliary Contact 4NO + 4NC Application (A and C Type Jack)
- NB : Auxiliary Contact 7NO + 7NC, 10NO + 10NC Application (B and D Type Jack)

#### Key Lock (KL)

Part that enables locking and releasing of breaker position in a given position.



#### Vacuum Checker

Breaking at vacuum circuit breaker is carried out in a completely vacuum tube in a highly vacuum state ; vacuum tube is manufactured in a special process and can be use without a separate inspection except for exterior check for 20 years. However, for more stable operation, customer may use below mobile vacuum checker to inspect vacuum tube.

| Item           | Contents            |
|----------------|---------------------|
| Order No.      | HAFS-VC9            |
| Input Voltage  | AC 200 ~ 220 V      |
| Output Voltage | AC 11 kV / AC 22 kV |
| Weight         | 22 kg               |
| Shape          | Portable            |



## Condensor Trip Device

Attachment with a function to manually or automatically trip breaker using power charged to condenser when control power is not supplied due to a short circuit accidents, etc. when using alternating current power for controlling breaker trip. It has advantages as follows :

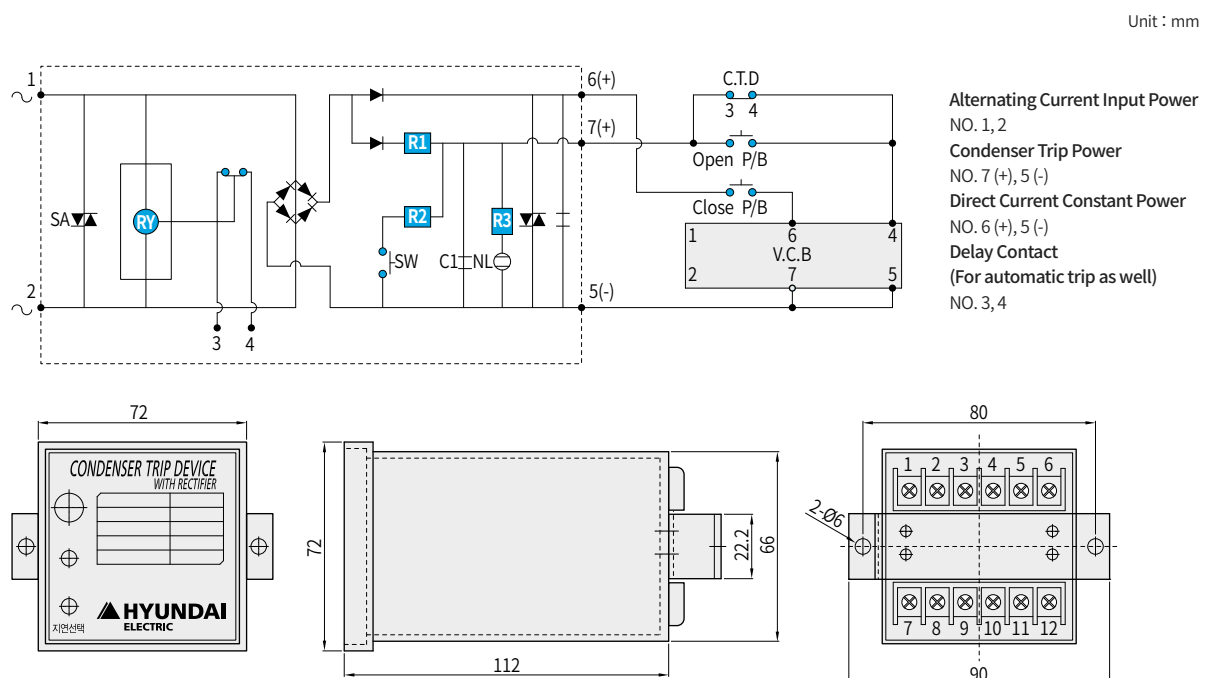
- Can automatically trip breaker using No. 3 and 4 contacts of built-in relay and switch operation for setting delay is as follows :
  - ON : Delay (Operation after less than 1.5 sec of delay)
  - OFF : By-Pass (Operation without delay)
- CTD function and rectifying function are combined and as the device is designed to use constant load current within 2 A, no separate rectifying is required.



| Item                      | Contents                         |          |          |          |
|---------------------------|----------------------------------|----------|----------|----------|
| Order No.                 | HVFS-T7                          | HVFS-T9  | HVFS-T4  | HVFS-T6  |
| Rated Input Voltage       | AC 110 V                         | AC 220 V | DC 110 V | DC 220 V |
| Constant Charging Voltage | DC 145 V                         | DC 290 V | DC 110 V | DC 220 V |
| Constant Current Capacity | DC 2 A                           |          |          |          |
| Delayed Current Time      | 0, 1.5 sec or less <sup>1)</sup> |          |          |          |
| Rated Frequency           | 50/60 Hz                         |          |          |          |

※ 1) For use in combination with VCB, controlling power of trip circuit should be DC.

## For AC

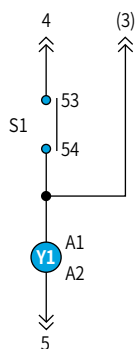


## Attachments (HVF)

### Optional Attachments

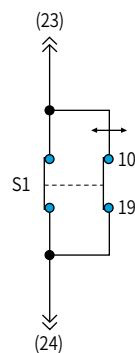
#### Trip Circuit Supervision Signal (Tc) Draw-Out

- It is applied to the relay with a function of monitoring abnormality of trip coil among electrical protective relay.
- Without further discussion, draw-out is made with (3).



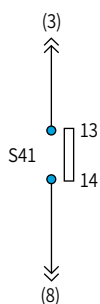
#### Wiping Contact (WC)

- Aux. Early "B" contact configuration is available when connected parallel with "B" contact in the switch.
- Without further discussion, draw-out is made with (23) and (24) of control Jack.



#### Spring Charged Signal (SI)

- Electrical function to externally check the status of VCB waiting for closing.
- Without further discussion, draw-out is made with (3) and (8) of control Jack.



#### Electro Locking Device (LC)

- Earthing switch operation can be automatically locked using electricity by linking with earthing switch. For operating power, DC is used and DC 100, 125, 220, are 240 V applied.



## Order Code for Spare HVF Attachments

HAFS-48Jack / Control Jack / (10NO + 10 NC Cable Type D Type )

HVFS-Controller (DC 48\_N) / UVR Controller / DC 48 V

HVFS-Controller (AC/DC 110\_N) / UVR Controller / AC/DC 110 V, DC 125 V

HVFS-Controller (AC/DC 220\_N) / UVR Controller / AC/DC 220 V

To purchase spare products for vacuum circuit breakers, orders as follows can be placed :

| Code                    | Name                  | Spec                                                                                 |
|-------------------------|-----------------------|--------------------------------------------------------------------------------------|
| HAFS-K1□                | Anti-Pumping Relay    | 2 : DC 48 V, 4 : DC 110 V, 5 : DC 125 V,<br>6 : DC 220 V, 7 : AC 110 V, 9 : AC 220 V |
| HAFS-M □                | Charging Motor        |                                                                                      |
| HAFS-L04 (NEW)          | Lockout Relay         | AC/DC 110 V, DC 125 V                                                                |
| HAFS-L06 (NEW)          | Lockout Relay         | AC/DC 220 V                                                                          |
| HAFS-SOL□ <sup>1)</sup> | Closing Solenoid      | 2 : DC 48 V, 4 : DC 110 V, 5 : DC 125 V,<br>6 : DC 220 V, 7 : AC 110 V, 9 : AC 220 V |
| HVFS-SOL□ <sup>2)</sup> | Tripping Solenoid     |                                                                                      |
| HAFS-UV4 (NEW)          | Under Voltage Release | AC/DC 110 V, DC 125 V, AC/DC 220 V                                                   |
| HVFS-T4                 | Condensor Trip Device | DC 110 V                                                                             |
| HVFS-T6                 | Condensor Trip Device | DC 220 V                                                                             |
| HVFS-T7                 | Condensor Trip Device | AC 110 V                                                                             |
| HVFS-T9                 | Condensor Trip Device | AC 220 V                                                                             |
| HVFS-T/Jumper           | Test Jumper           | -                                                                                    |
| HAFS-ASW4               | Auxiliary Switch      | 4NO + 4NC                                                                            |
| HAFS-ASW7               | Auxiliary Switch      | 7NO + 7NC                                                                            |
| HAFS-ASW10              | Auxiliary Switch      | 10NO + 10NC                                                                          |
| HAFS-L/S                | Limit Switch (S1)     | 1NO + 1NC                                                                            |
| HVFS-P/S (NEW)          | Position Switch       | 1NO + 1NC                                                                            |
| HAFS-C/ME               | Closing Mechanism     | -                                                                                    |
| HAFS-T/ME               | Tripping Mechanism    | -                                                                                    |
| HAFS-CT1                | CT Operated Release   | 0.5 A                                                                                |
| HAFS-CT2                | CT Operated Release   | 1 A                                                                                  |
| HAFS-22JACK             | Control Jack          | 4NO + 4NC, Plug and Socket Only (A Type)                                             |
| HAFS-24JACK             | Control Jack          | 4NO + 4NC, Plug and Socket Only (C Type) <sup>3)</sup>                               |
| HAFS-44JACK             | Control Jack          | 7NO + 7NC, Plug and Socket Only (B Type)                                             |
| HAFS-HANDLE             | Charging Handle       | -                                                                                    |
| HVFS-EFHANDLE           | Draw-Out Handle       | ES, FS Cradle                                                                        |
| HVFS-MGHANDLE           | Draw-Out Handle       | GS, CS, MS, SF Cradle                                                                |
| HAFS-VC9 (22 kV)        | Vacuum Checker        | AC 220 / AC 22 kV                                                                    |
| HAFS-VC9 (28 kV)        | Vacuum Checker        | AC 220 / AC 28 kV                                                                    |
| HVFS-LEADCABLE (A-Type) | Lead Cable            | 4NO + 4NC, Fixed Type                                                                |
| HVFS-LEADCABLE (B-Type) | Lead Cable            | 7NO + 7NC, Fixed Type                                                                |

※ <sup>1)</sup> For HAF type, use <sup>1)</sup> code for both closing and trip.

<sup>2)</sup> For HVF type, use <sup>1)</sup> code for closing, <sup>2)</sup> code for trip.

<sup>3)</sup> For D type, order 2 sets of C type.

For additional UVR option installation, contact us.

For replacement of UVR Controller prior to Oct 2016, UVR requires replacement simultaneously as well. (Not compatible with older UVR)



## Attachments (UVC)

### Basic Attachments

#### Control Circuit Lead Cable

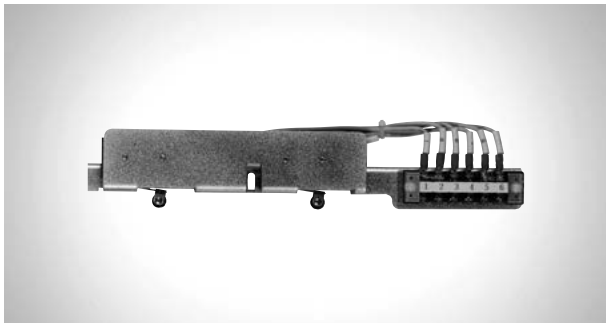
Standard length is 1.5 m and cable is 17AWG (Gray Color).



### Optional Devices

#### Position Switch

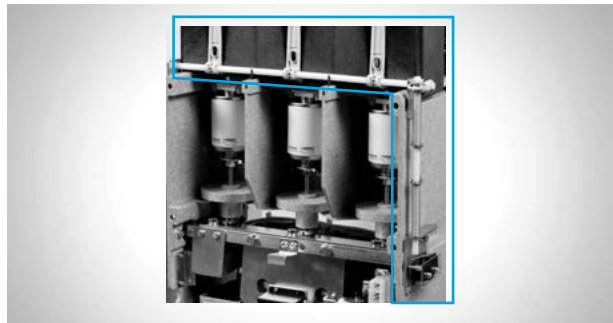
Device to electrically display the status of test and contact positions of high-pressure vacuum contactor. It provides one c contact in each position.



※ Order Code : CP / For P4, offer 2 Com at each position.

#### Fuse Melting Indicator

Device that informs melting statue of fuse and it is made up with one c contact.



#### Potential Transformer (P.T)

It lowers the voltage of main busbar on the primary side to 110 V or 220 V to be used as a power of high-pressure vacuum contactor or distribution line devices.



#### Manual Inspection Handle

It is used for manual inspection of the product with front cover removed.



#### Electrical Position Interlock

Device that allows supply of high-pressure vacuum contactor power at a correct (Test and connect) positions only. Mechanical interlock that is mechanically provided allows power supply at an incorrect position as well but it makes closing unavailable mechanically.

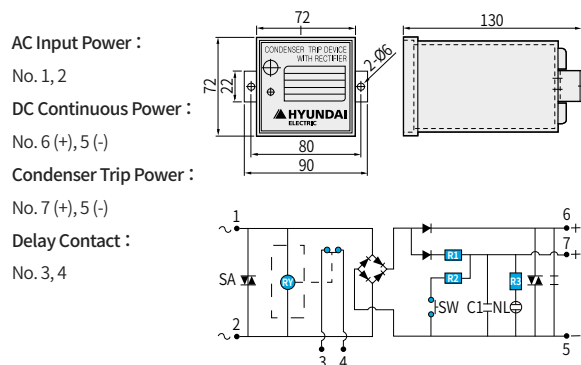
## Optional Attachments

### Condenser Tripping Device (CTD)

Device that can manually or automatically trip breaker using power charged to condenser when control power is not supplied due to a short circuit accidents, etc. when using alternating current power for controlling trip. CTD can be purchased as a spare part only.

| Item                             | Contents             |          |
|----------------------------------|----------------------|----------|
| Order No.                        | UVCS0013             | UVCS0014 |
| Rated Input Voltage              | AC 110 V             | AC 220 V |
| Constant Voltage Charging        | DC 145 V             | DC 290 V |
| Constant Current Capacity        | DC 2 A               |          |
| Rated Frequency                  | 50 / 60 Hz           |          |
| Time Delay Circuit <sup>1)</sup> | Less than 1.5 sec    |          |
| Applied Standards                | IEC 60694 / KSC 4611 |          |

※ 1) Customer can choose one without delay as a option.



### Vacuum Checker

Breaking in vacuum contactor is carried out in a vacuum interrupter fully sealed to a highly vacuum status. Vacuum interrupters are manufactured in a special process, thus can be used without inspection except for appearance check. However, in order to inspect vacuum interrupters for more stable operation, customer can use below mobile vacuum checker.

| Item           | Contents            |
|----------------|---------------------|
| Order No.      | HAFS-VC9            |
| Input Voltage  | AC 200 / 220 V      |
| Output Voltage | AC 11 kV / AC 22 kV |
| Weight         | 22 kg               |
| Shape          | Portable            |



### Controllers

Electronic controller that provides closing coil current. It has latch and instantaneous type selection switches and for control power AC/DC.



### Latch Device

It consists of a trip coil and a latch mechanism unit.

Trip coil can be purchased separately (UVCS0023, UVCS0024) and applies to instantaneous type only.





## Attachments (UVC)

### Order Code for Spare UVC Attachments

| Code     | Spec                                                                  | Code     | Spec                                   |
|----------|-----------------------------------------------------------------------|----------|----------------------------------------|
| UVCS0001 | Open/Close Collector                                                  | UVCS6250 | Fuse-7.2 kV/250 A/50 kA, 192 mm (SIBA) |
| UVCS0002 | Manual Inspection Handle                                              | UVCS6315 | Fuse-7.2 kV/315 A/50 kA, 292 mm (SIBA) |
| UVCS0003 | Latch Device (DC 110 V)                                               | UVCS6355 | Fuse-7.2 kV/355 A/50 kA, 292 mm (SIBA) |
| UVCS0004 | Latch Device (DC 220 V)                                               | UVCS7006 | Fuse-12 kV/6.3 A/63 kA, 292 mm (SIBA)  |
| UVCS0006 | Position Switch                                                       | UVCS7010 | Fuse-12 kV/10 A/63 kA, 292 mm (SIBA)   |
| UVCS0007 | Closing Coil (Continuous-Type) <sup>1)</sup>                          | UVCS7016 | Fuse-12 kV/16 A/63 kA, 292 mm (SIBA)   |
| UVCS0008 | Closing Coil (Latch-Type) <sup>1)</sup>                               | UVCS7020 | Fuse-12 kV/20 A/63 kA, 292 mm (SIBA)   |
| UVCS0009 | Potential Transformer (3.3 kV/110 V, 200 VA)                          | UVCS7025 | Fuse-12 kV/25 A/63 kA, 292 mm (SIBA)   |
| UVCS0010 | Potential Transformer (3.3 kV/220 V, 200 VA)                          | UVCS7032 | Fuse-12 kV/32 A/63 kA, 292 mm (SIBA)   |
| UVCS0011 | Potential Transformer (6.6 kV/110 V, 200 VA)                          | UVCS7040 | Fuse-12 kV/40 A/63 kA, 292 mm (SIBA)   |
| UVCS0012 | Potential Transformer (6.6 kV/220 V, 200 VA)                          | UVCS7050 | Fuse-12 kV/50 A/63 kA, 292 mm (SIBA)   |
| UVCS0013 | CTD (AC 110 V)                                                        | UVCS7063 | Fuse-12 kV/63 A/63 kA, 292 mm (SIBA)   |
| UVCS0014 | CTD (AC 220 V)                                                        | UVCS7080 | Fuse-12 kV/80 A/63 kA, 292 mm (SIBA)   |
| UVCS0015 | Shutter Set (E Class→F Class)                                         | UVCS7100 | Fuse-12 kV/100 A/63 kA, 292 mm (SIBA)  |
| UVCS0016 | Control Circuit Lead Cable (1.5 m)                                    | UVCS7125 | Fuse-12 kV/125 A/63 kA, 292 mm (SIBA)  |
| UVCS0017 | Fuse Holder (For DIN Fuse, Plate Spring Included) <sup>2)</sup>       | UVCS7160 | Fuse-12 kV/160 A/63 kA, 292 mm (SIBA)  |
| UVCS0018 | Isolating Contact (Main Circuit Connecting Terminal) <sup>2)</sup>    | UVCS7200 | Fuse-12 kV/200 A/50 kA, 292 mm (SIBA)  |
| UVCS0019 | Controller (AC/DC 100 ~ 125 V, AC/DC 200 ~ 230 V)                     | UVCS2005 | Fuse-3.6 kV/5 A/40 kA/G Type (LS)      |
| UVCS0021 | E Class Cradle (200/400 A)                                            | UVCS2010 | Fuse-3.6 kV/10 A/40 kA/G Type (LS)     |
| UVCS0022 | F Class Cradle (200/400 A)                                            | UVCS2020 | Fuse-3.6 kV/20 A/40 kA/G Type (LS)     |
| UVCS0023 | Trip Coil (DC 110 V)                                                  | UVCS2030 | Fuse-3.6 kV/30 A/40 kA/G Type (LS)     |
| UVCS0024 | Trip Coil (DC 220 V)                                                  | UVCS2040 | Fuse-3.6 kV/40 A/40 kA/G Type (LS)     |
| HVC00703 | Vacuum Interrupters for Vacuum Contactor (7.2 kV 400 A) <sup>3)</sup> | UVCS2050 | Fuse-3.6 kV/50 A/40 kA/G Type (LS)     |
| UVCS6006 | Fuse-7.2 kV/6.3 A/63 kA, 192 mm (SIBA)                                | UVCS2060 | Fuse-3.6 kV/60 A/40 kA/G Type (LS)     |
| UVCS6010 | Fuse-7.2 kV/10 A/63 kA, 192 mm (SIBA)                                 | UVCS2075 | Fuse-3.6 kV/75 A/40 kA/G Type (LS)     |
| UVCS6020 | Fuse-7.2 kV/20 A/63 kA, 192 mm (SIBA)                                 | UVCS2100 | Fuse-3.6 kV/100 A/40 kA/G Type (LS)    |
| UVCS6025 | Fuse-7.2 kV/25 A/63 kA, 192 mm (SIBA)                                 | UVCS2150 | Fuse-3.6 kV/150 A/40 kA/G Type (LS)    |
| UVCS6032 | Fuse-7.2 kV/31.5 A/63 kA, 192 mm (SIBA)                               | UVCS2200 | Fuse-3.6 kV/200 A/40 kA/G Type (LS)    |
| UVCS6040 | Fuse-7.2 kV/40 A/63 kA, 192 mm (SIBA)                                 | UVCS2300 | Fuse-3.6 kV/300 A/40 kA/G Type (LS)    |
| UVCS6050 | Fuse-7.2 kV/50 A/63 kA, 192 mm (SIBA)                                 | UVCS2400 | Fuse-3.6 kV/400 A/40 kA/G Type (LS)    |
| UVCS6063 | Fuse-7.2 kV/63 A/63 kA, 192 mm (SIBA)                                 | UVCS3020 | Fuse-3.6 kV/20 A/40 kA/M Type (LS)     |
| UVCS6080 | Fuse-7.2 kV/80 A/63 kA, 192 mm (SIBA)                                 | UVCS3050 | Fuse-3.6 kV/50 A/40 kA/M Type (LS)     |
| UVCS6100 | Fuse-7.2 kV/100 A/63 kA, 192 mm (SIBA)                                | UVCS3100 | Fuse-3.6 kV/100 A/40 kA/M Type (LS)    |
| UVCS6125 | Fuse-7.2 kV/125 A/63 kA, 192 mm (SIBA)                                | UVCS3150 | Fuse-3.6 kV/150 A/40 kA/M Type (LS)    |
| UVCS6160 | Fuse-7.2 kV/160 A/63 kA, 192 mm (SIBA)                                | UVCS3200 | Fuse-3.6 kV/200 A/40 kA/M Type (LS)    |
| UVCS6200 | Fuse-7.2 kV/200 A/50 kA, 192 mm (SIBA)                                | UVCS3300 | Fuse-3.6 kV/300 A/40 kA/M Type (LS)    |

※ 1) Order 2 units for one set.

2) Order 6 units for one set.

3) Order 3 units for one set.

Order 3 fuses for one set.

## Order Code for Spare UVC Attachments

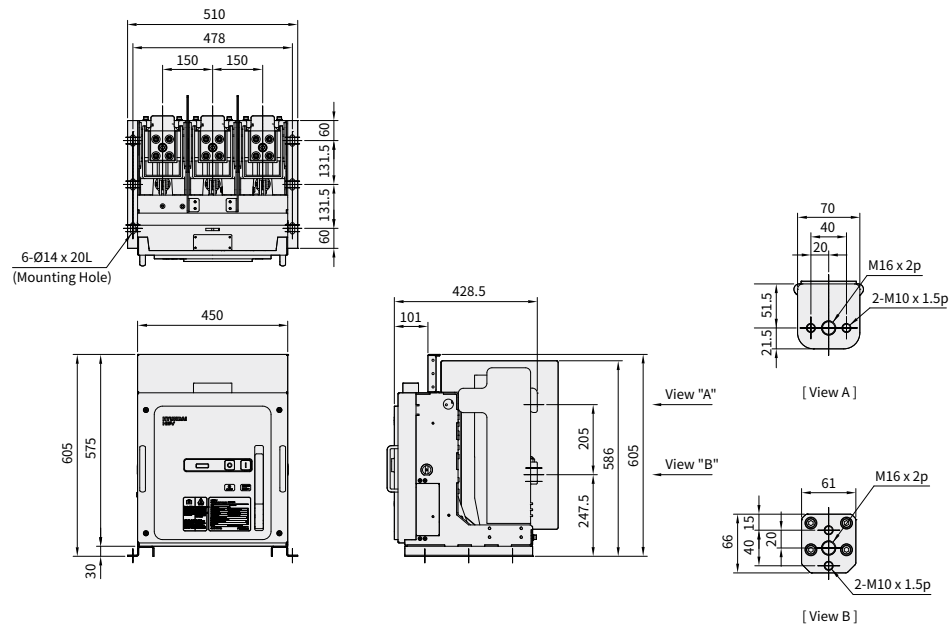
| Code     | Spec                                 | Code     | Spec                                  |
|----------|--------------------------------------|----------|---------------------------------------|
| UVCS3400 | Fuse-3.6 kV/400 A/40 kA/M Type (LS)  | UVCS8030 | Fuse-3.6 kV/30 A/40 kA/DIN Type (LS)  |
| UVCS4005 | Fuse-7.2 kV/5 A/40 kA/G Type (LS)    | UVCS8040 | Fuse-3.6 kV/40 A/40 kA/DIN Type (LS)  |
| UVCS4010 | Fuse-7.2 kV/10 A/40 kA/G Type (LS)   | UVCS8050 | Fuse-3.6 kV/50 A/40 kA/DIN Type (LS)  |
| UVCS4020 | Fuse-7.2 kV/20 A/40 kA/G Type (LS)   | UVCS8063 | Fuse-3.6 kV/63 A/40 kA/DIN Type (LS)  |
| UVCS4030 | Fuse-7.2 kV/30 A/40 kA/G Type (LS)   | UVCS8075 | Fuse-3.6 kV/75 A/40 kA/DIN Type (LS)  |
| UVCS4040 | Fuse-7.2 kV/40 A/40 kA/G Type (LS)   | UVCS8100 | Fuse-3.6 kV/100 A/40 kA/DIN Type (LS) |
| UVCS4050 | Fuse-7.2 kV/50 A/40 kA/G Type (LS)   | UVCS8125 | Fuse-3.6 kV/125 A/40 kA/DIN Type (LS) |
| UVCS4060 | Fuse-7.2 kV/60 A/40 kA/G Type (LS)   | UVCS8160 | Fuse-3.6 kV/160 A/40 kA/DIN Type (LS) |
| UVCS4075 | Fuse-7.2 kV/75 A/40 kA/G Type (LS)   | UVCS8200 | Fuse-3.6 kV/200 A/40 kA/DIN Type (LS) |
| UVCS4100 | Fuse-7.2 kV/100 A/40 kA/G Type (LS)  | UVCS9005 | Fuse-7.2 kV/5 A/40 kA/DIN Type (LS)   |
| UVCS4150 | Fuse-7.2 kV/150 A/40 kA/G Type (LS)  | UVCS9010 | Fuse-7.2 kV/10 A/40 kA/DIN Type (LS)  |
| UVCS4200 | Fuse-7.2 kV/200 A/40 kA/G Type (LS)  | UVCS9020 | Fuse-7.2 kV/20 A/40 kA/DIN Type (LS)  |
| UVCS5020 | Fuse-7.2 kV/20 A/40 kA/M Type (LS)   | UVCS9030 | Fuse-7.2 kV/30 A/40 kA/DIN Type (LS)  |
| UVCS5050 | Fuse-7.2 kV/50 A/40 kA/M Type (LS)   | UVCS9040 | Fuse-7.2 kV/40 A/40 kA/DIN Type (LS)  |
| UVCS5100 | Fuse-7.2 kV/100 A/40 kA/M Type (LS)  | UVCS9050 | Fuse-7.2 kV/50 A/40 kA/DIN Type (LS)  |
| UVCS5150 | Fuse-7.2 kV/150 A/40 kA/M Type (LS)  | UVCS9063 | Fuse-7.2 kV/63 A/40 kA/DIN Type (LS)  |
| UVCS5200 | Fuse-7.2 kV/200 A/40 kA/M Type (LS)  | UVCS9075 | Fuse-7.2 kV/75 A/40 kA/DIN Type (LS)  |
| UVCS5300 | Fuse-7.2 kV/300 A/40 kA/M Type (LS)  | UVCS9100 | Fuse-7.2 kV/100 A/40 kA/DIN Type (LS) |
| UVCS5400 | Fuse-7.2 kV/400 A/40 kA/M Type (LS)  | UVCS9125 | Fuse-7.2 kV/125 A/40 kA/DIN Type (LS) |
| UVCS8005 | Fuse-3.6 kV/5 A/40 kA/DIN Type (LS)  | UVCS9160 | Fuse-7.2 kV/160 A/40 kA/DIN Type (LS) |
| UVCS8010 | Fuse-3.6 kV/10 A/40 kA/DIN Type (LS) | UVCS9200 | Fuse-7.2 kV/200 A/40 kA/DIN Type (LS) |
| UVCS8020 | Fuse-3.6 kV/20 A/40 kA/DIN Type (LS) | -        | -                                     |

## Dimensions

## XA-Type Vacuum Circuit Breakers (7.2/12 kV) Fixed-Type, Phase-to-Phase Distance 150 mm

Unit : mm

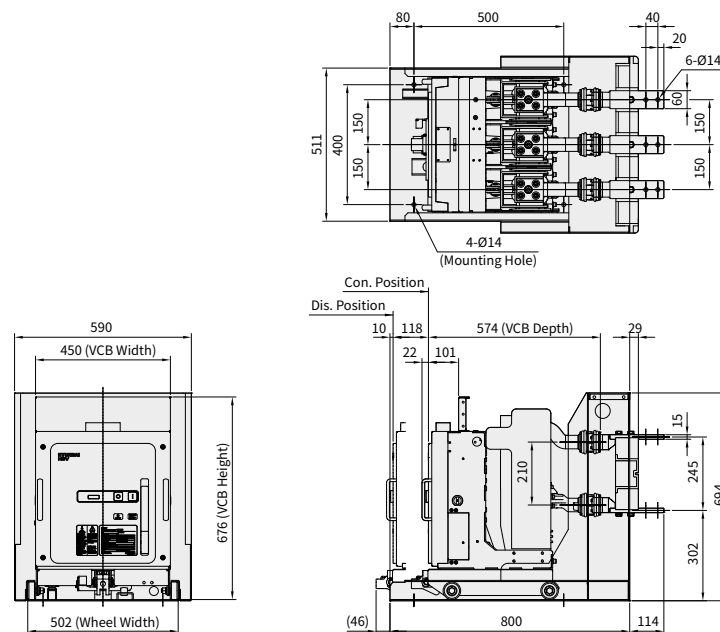
HGV 1141C  
HGV 1142C  
HGV 2141C  
HGV 2142C



## ES-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 150 mm

Unit : mm

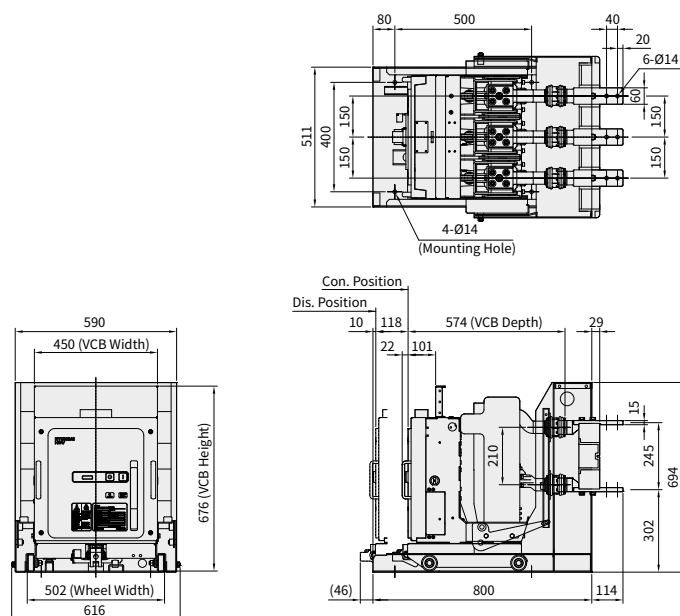
HGV 1141C  
HGV 1142



## FS-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 150 mm

Unit : mm

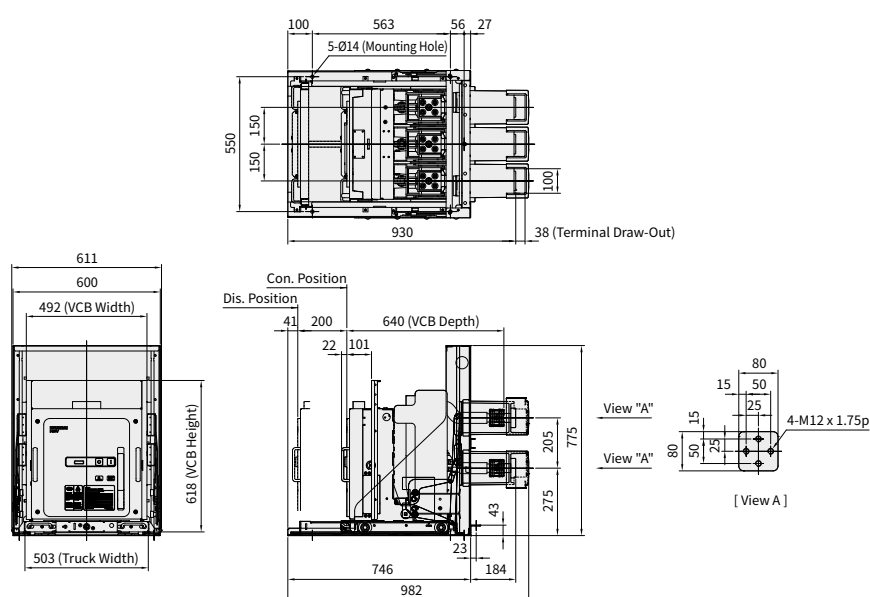
HGV 1141C  
HGV 1142



## GS-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 150 mm

Unit : mm

HGV 1141C  
HGV 1142



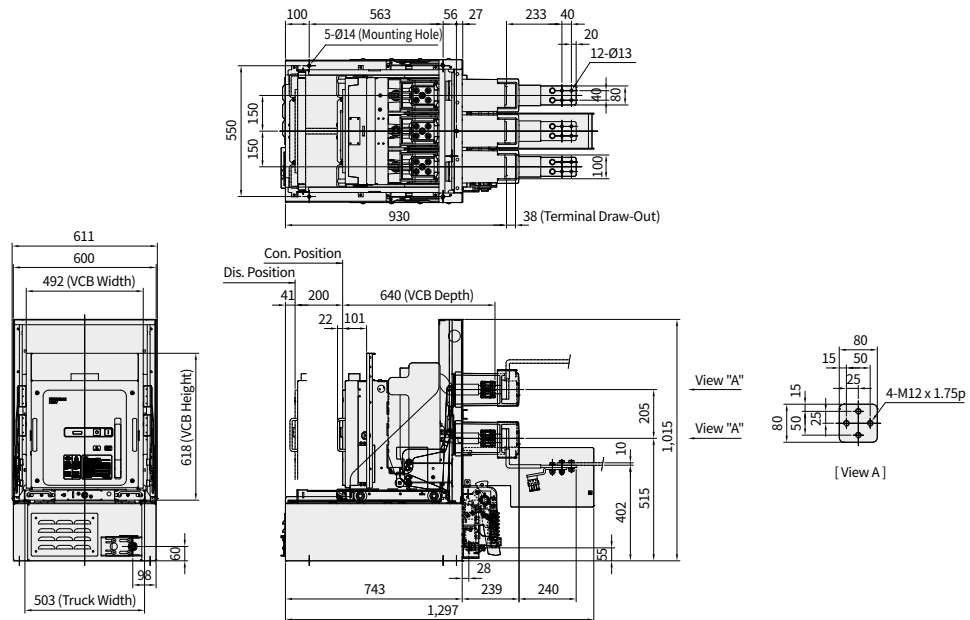
※ Dimension on this page are subject to change without notice.

## Dimensions

### GE-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 150 mm

Unit : mm

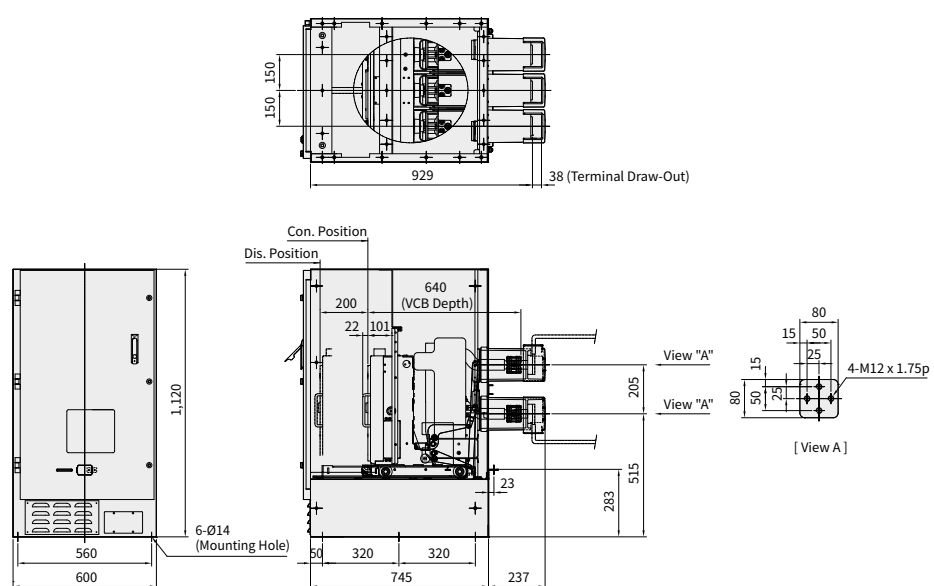
HGV 1141C  
HGV 1142



### MS-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 150 mm

Unit : mm

HGV 1141C  
HGV 1142

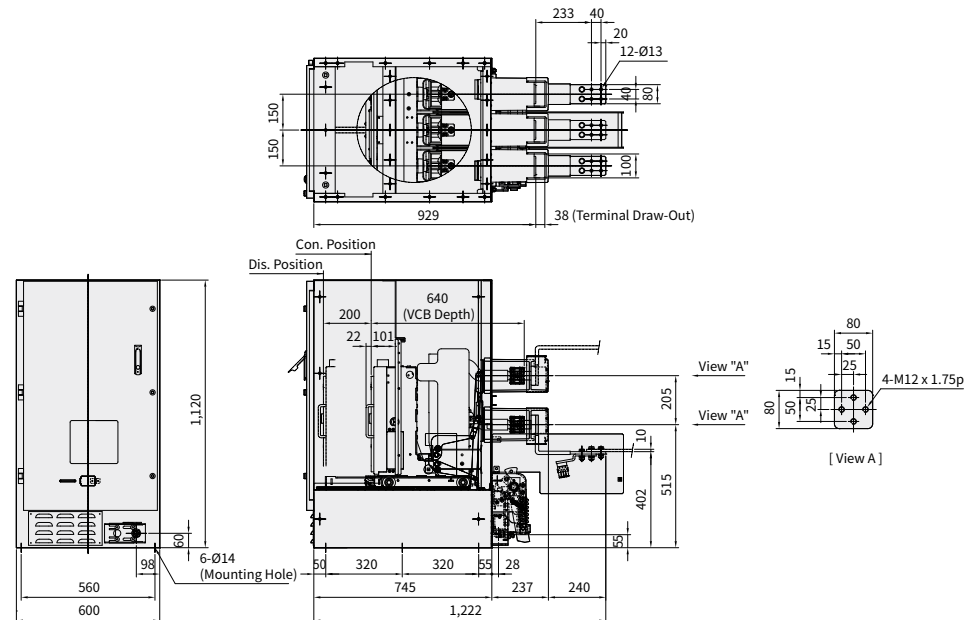


※ Dimension on this page are subject to change without notice.

## ME-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 150 mm

Unit : mm

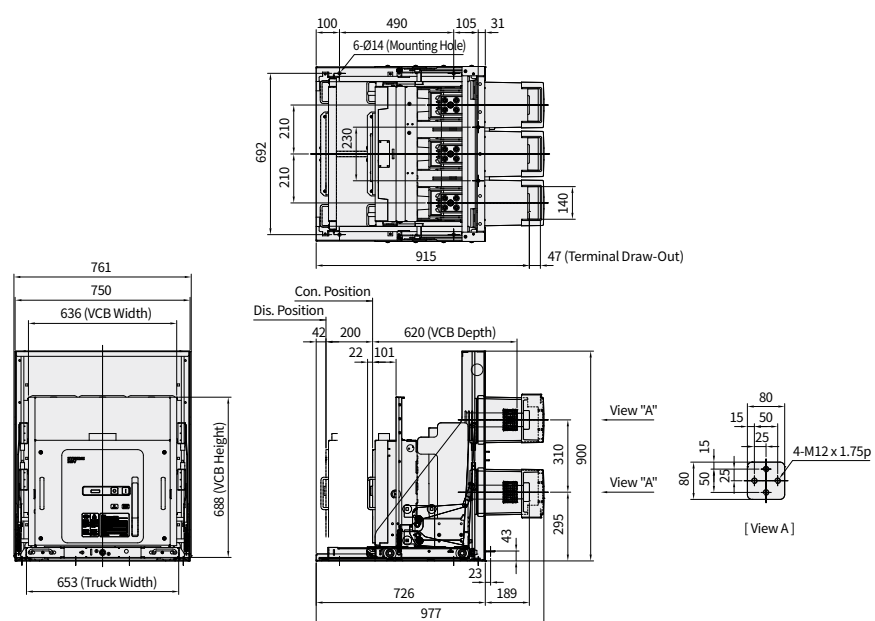
HGV 1141C  
HGV 1142



## GS-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 1141F  
HGV 1142  
HGV 1144



※ Dimension on this page are subject to change without notice.

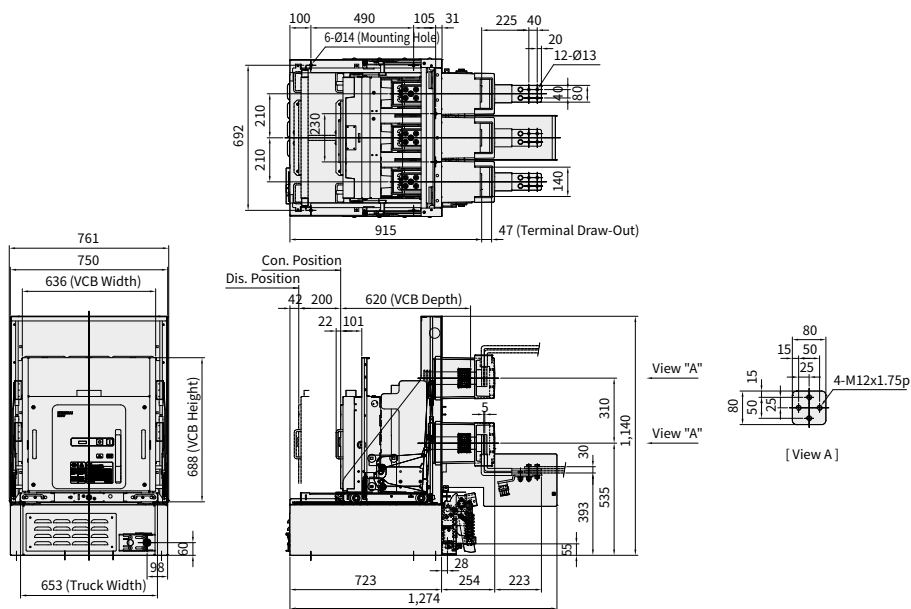
## Dimensions

## GE-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 1141F  
HGV 1142  
HGV 1144

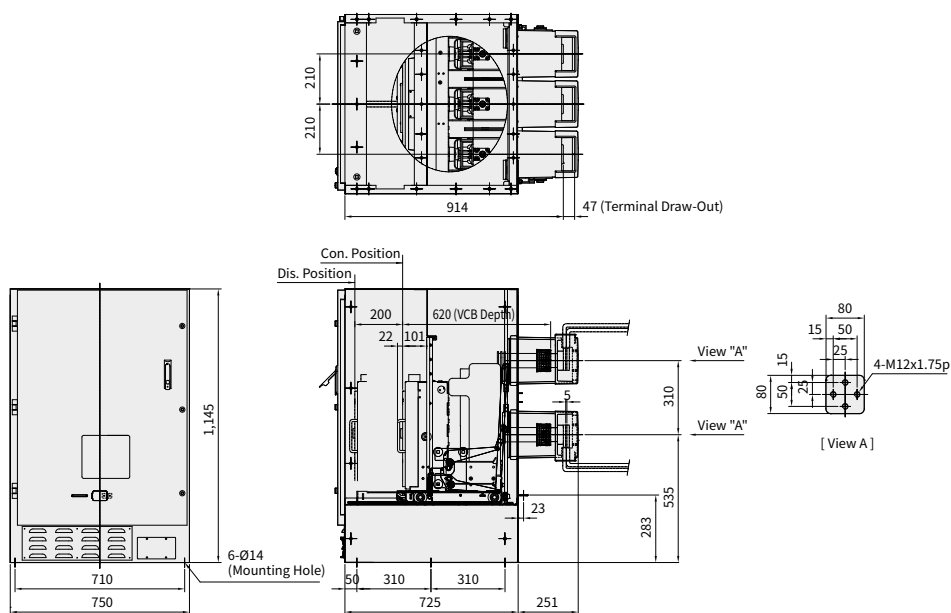
- 630/1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



## MS-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 1141F  
HGV 1142  
HGV 1144

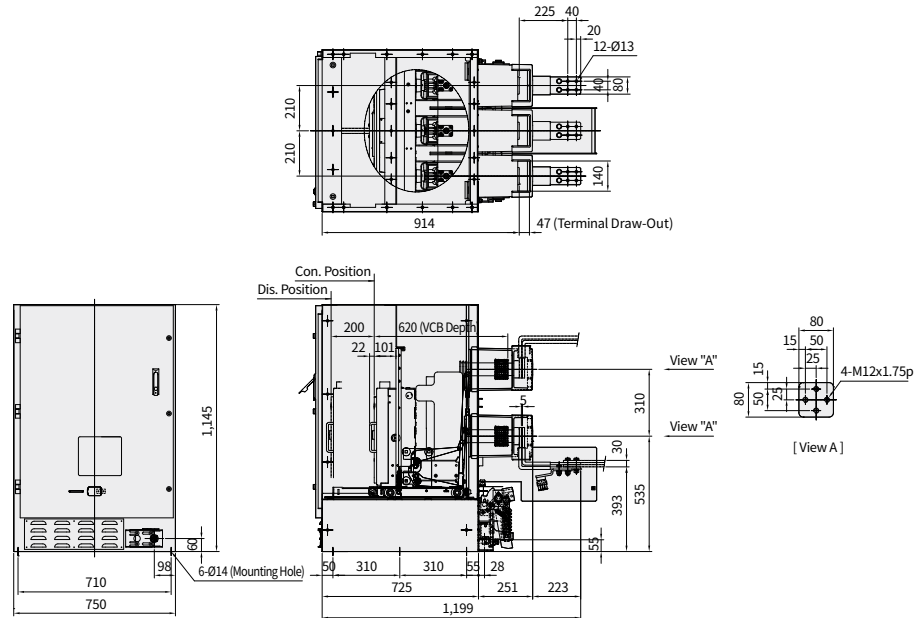


## ME-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

HGV 1141F  
HGV 1142  
HGV 1144

- 630/1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea

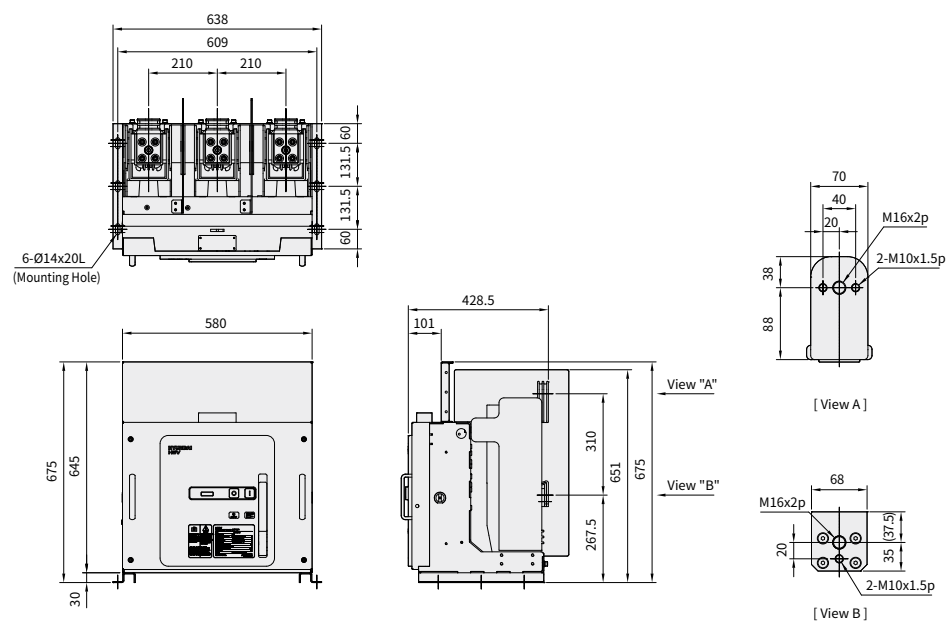
Unit : mm



## XA-Type Vacuum Circuit Breakers (7.2/12 kV) Fixed-Type, Phase-to-Phase Distance 210 mm

HGV 1144F  
HGV 2144

Unit : mm



※ Dimension on this page are subject to change without notice.

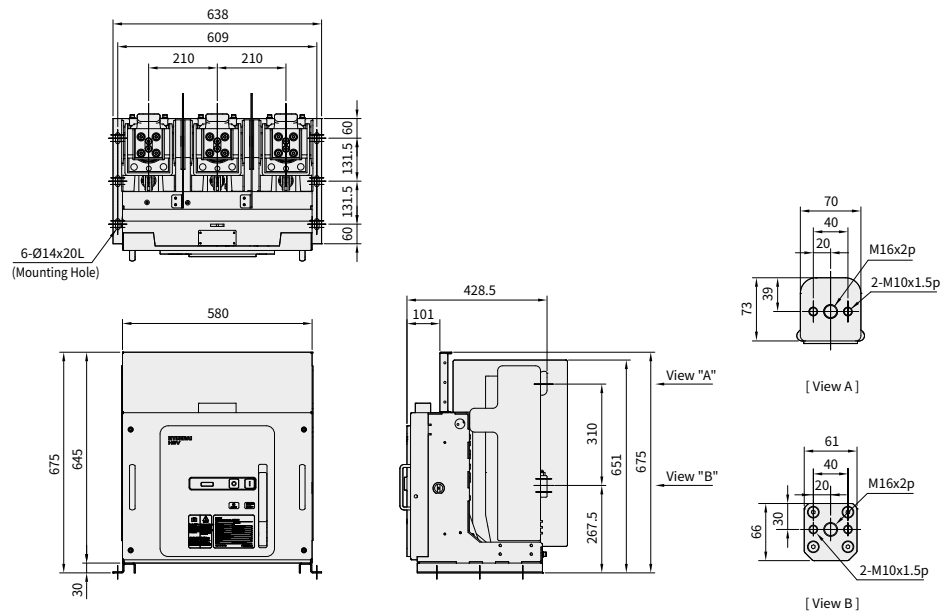


## Dimensions

### XA-Type Vacuum Circuit Breakers (7.2/12 kV) Fixed-Type, Phase-to-Phase Distance 210 mm

Unit : mm

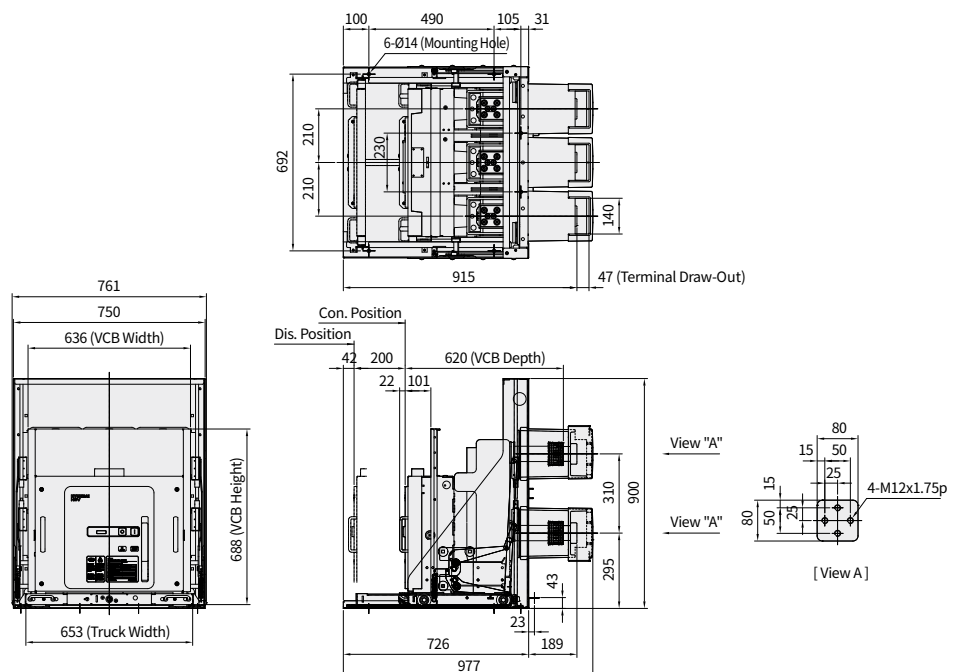
HGV 1152F  
HGV 1162  
HGV 2152  
HGV 2162



### GS-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 1152F  
HGV 1154  
HGV 1162  
HGV 1164  
HGV 1172  
HGV 1174



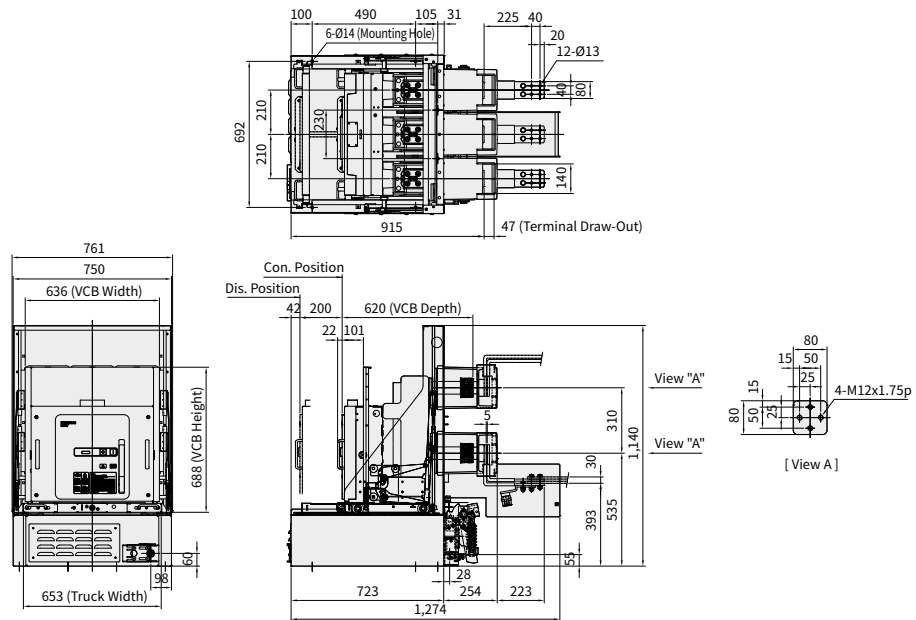
※ Dimension on this page are subject to change without notice.

## GE-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 1152F  
HGV 1154  
HGV 1162  
HGV 1164  
HGV 1172  
HGV 1174

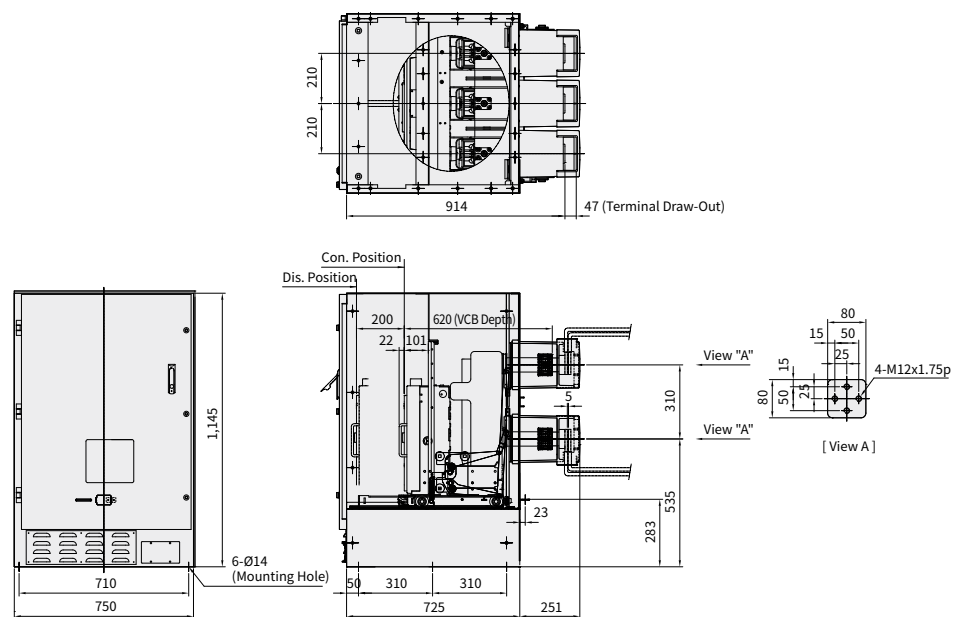
- 1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



## MS-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 1152F  
HGV 1154  
HGV 1162  
HGV 1164  
HGV 1172  
HGV 1174



※ Dimension on this page are subject to change without notice.

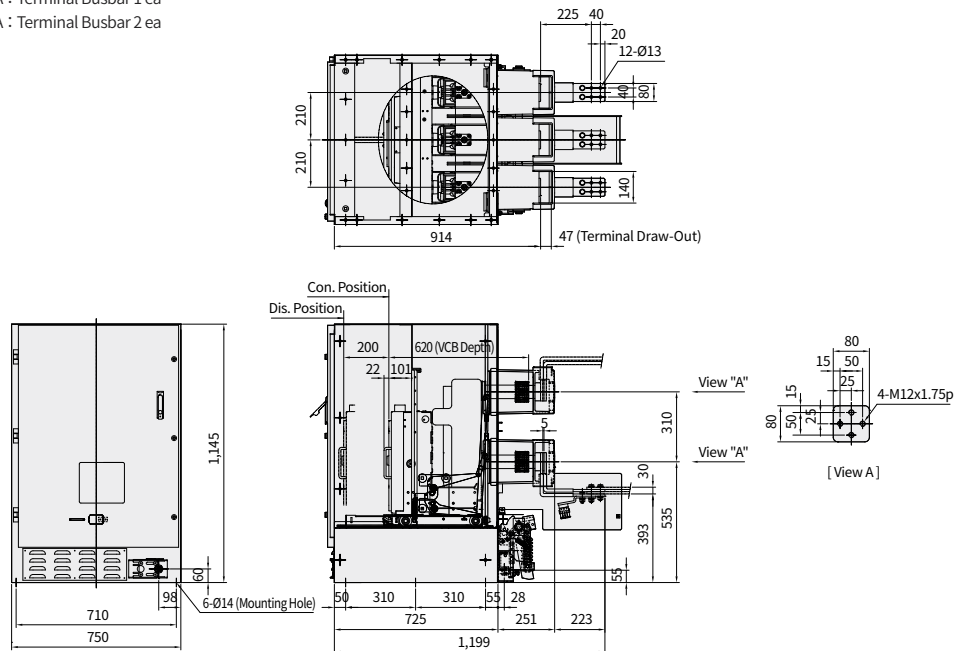
## Dimensions

### ME-Type Vacuum Circuit Breakers (7.2 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 1152F  
HGV 1154  
HGV 1162  
HGV 1164  
HGV 1172  
HGV 1174

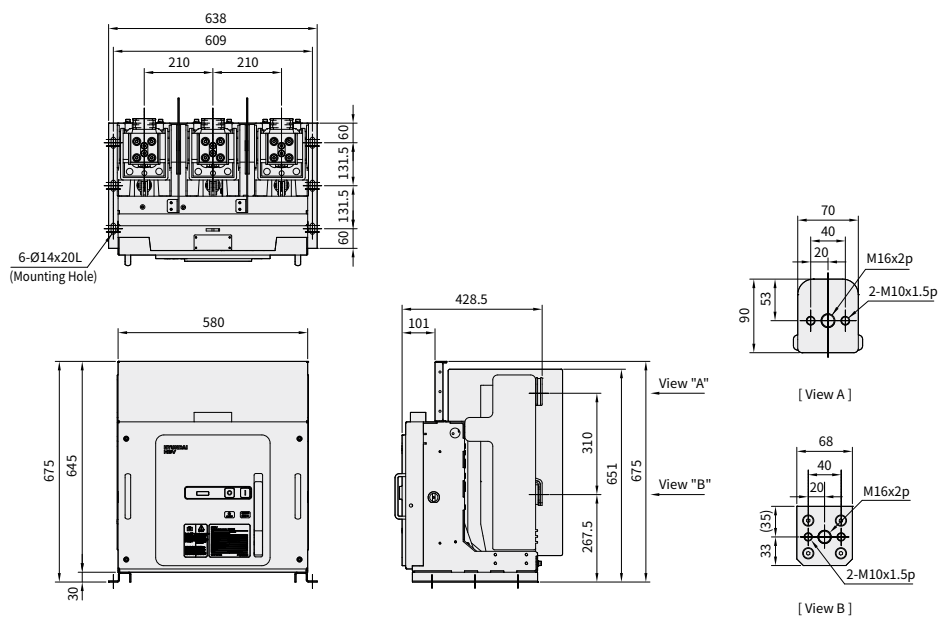
- 1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



### XA-Type Vacuum Circuit Breakers (7.2/12 kV) Fixed-Type, Phase-to-Phase Distance 210 mm

Unit : mm

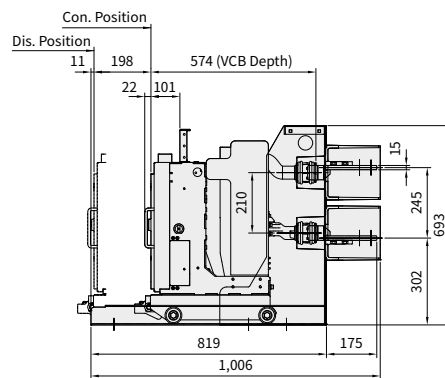
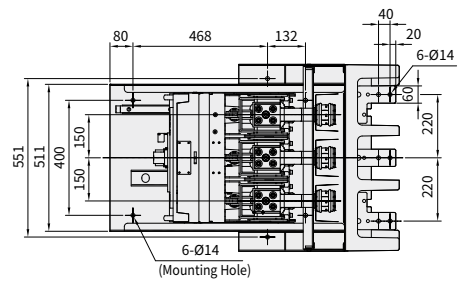
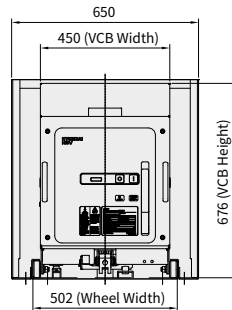
HGV 1154F  
HGV 1164  
HGV 1172  
HGV 1174  
HGV 2154  
HGV 2164  
HGV 2172  
HGV 2174



## ES-Type Vacuum Circuit Breakers (12 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 150 mm

Unit : mm

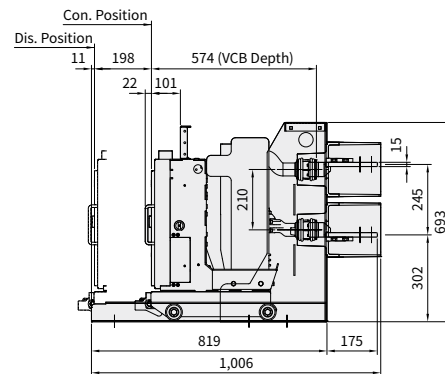
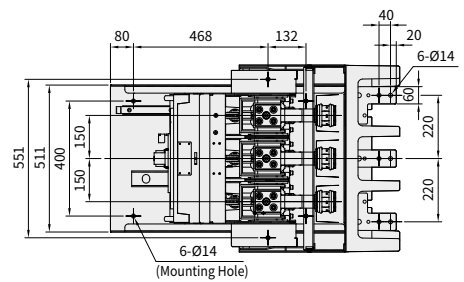
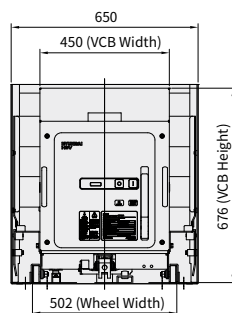
HGV 2141C  
HGV 2142



## FS-Type Vacuum Circuit Breakers (12 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 150 mm

Unit : mm

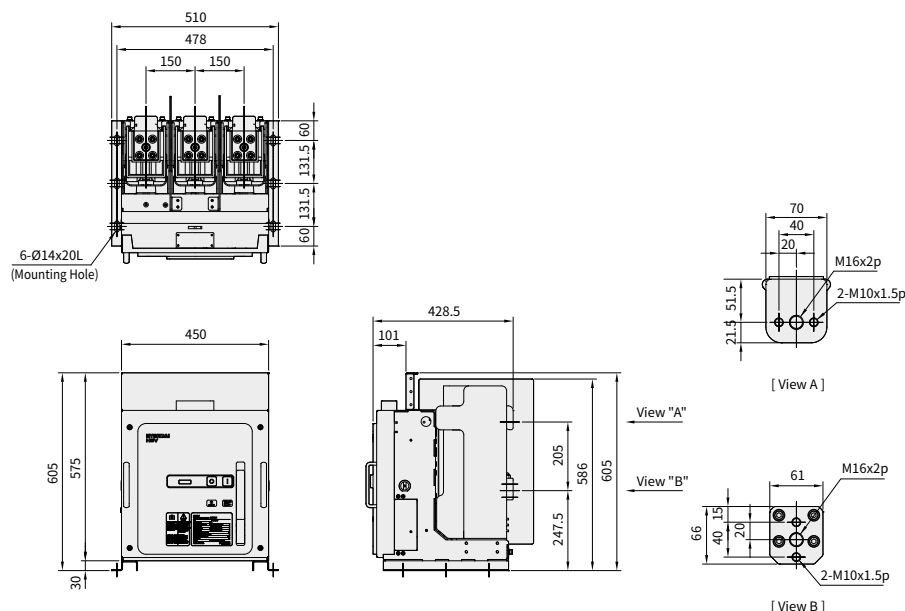
HGV 2141C  
HGV 2142



## Dimensions

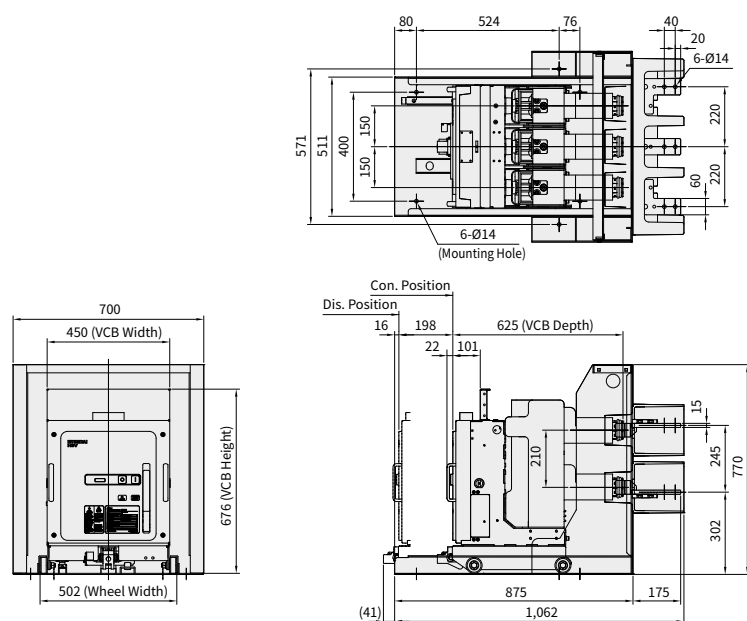
### XA-Type Vacuum Circuit Breakers (17.5 kV) Fixed-Type, Phase-to-Phase Distance 150 mm

Unit : mm

HGV 3141C  
HGV 3142


### ES-Type Vacuum Circuit Breakers (17.5 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 150 mm

Unit : mm

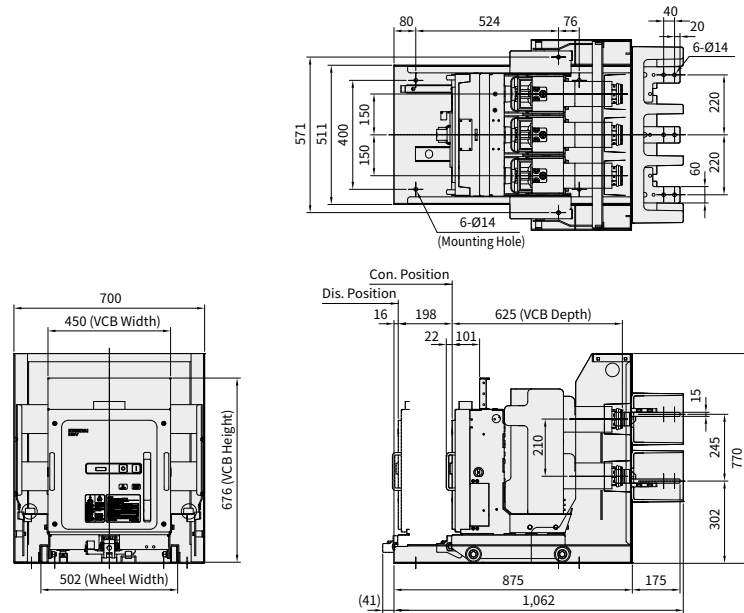
HGV 3141C  
HGV 3142


※ Dimension on this page are subject to change without notice.

## FS-Type Vacuum Circuit Breakers (17.5 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 150 mm

Unit : mm

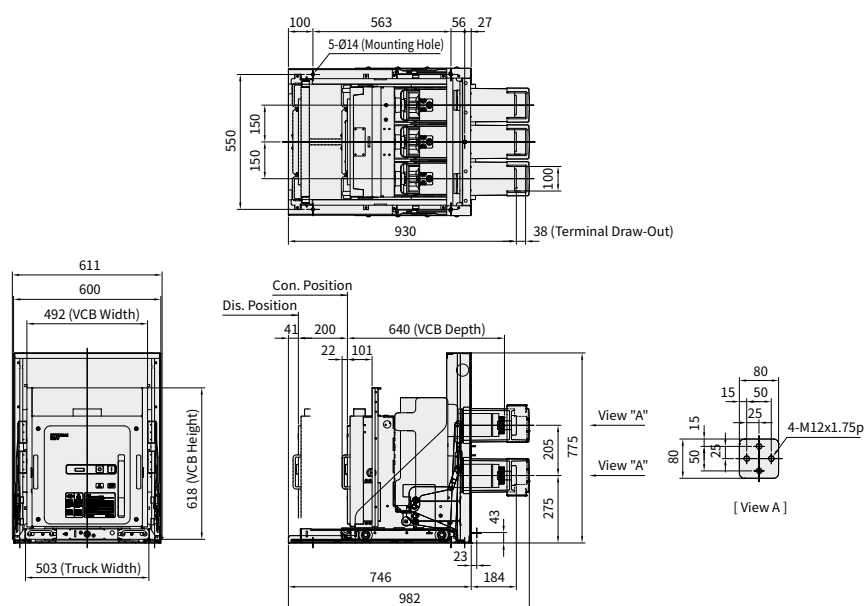
HGV 3141C  
HGV 3142



## GS-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 150 mm

Unit : mm

HGV 2141C  
HGV 2142  
HGV 3141  
HGV 3142



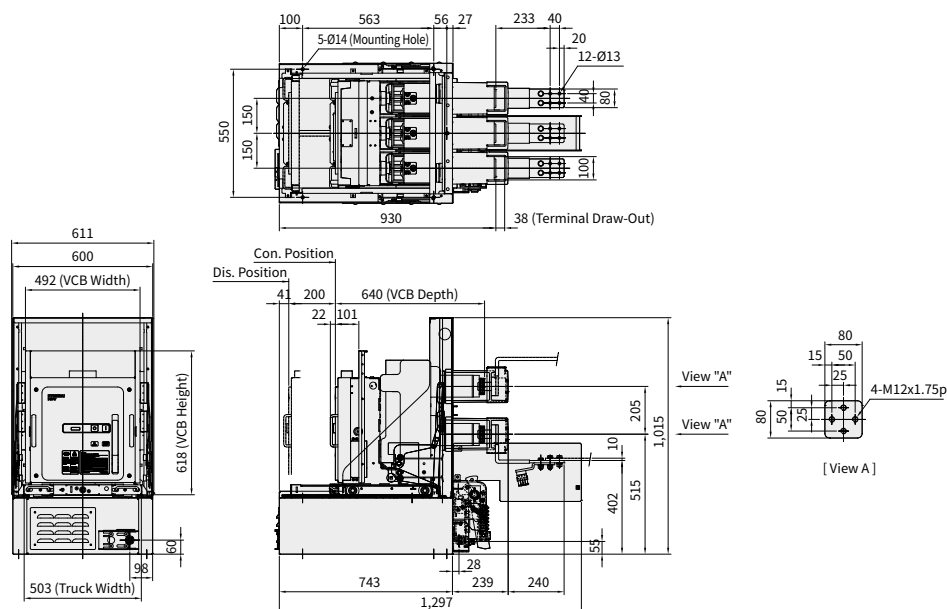
※ Dimension on this page are subject to change without notice.

## Dimensions

### GE-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 150 mm

Unit : mm

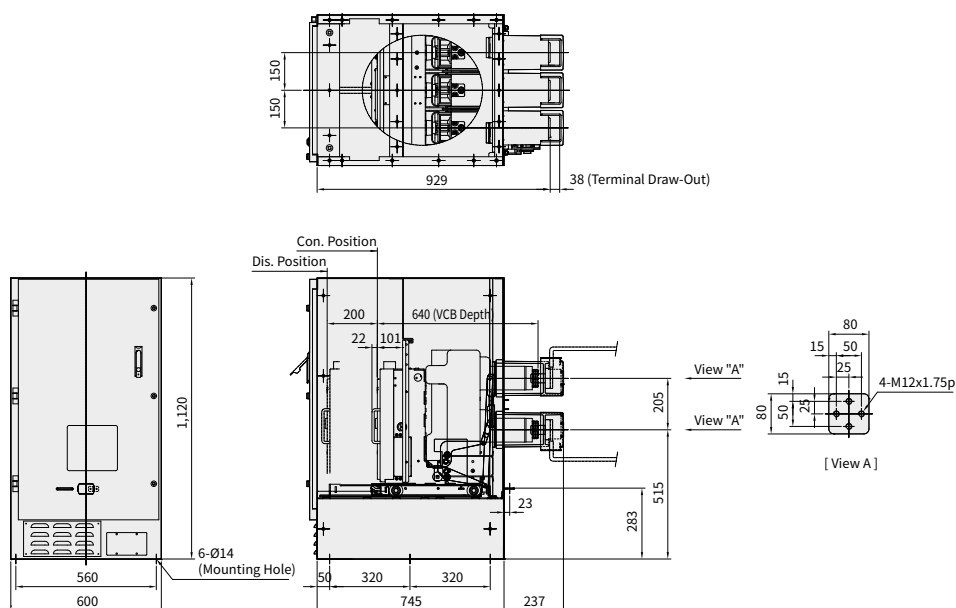
HGV 2141C  
HGV 2142  
HGV 3141  
HGV 3142



### MS-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 150 mm

Unit : mm

HGV 2141C  
HGV 2142  
HGV 3141  
HGV 3142

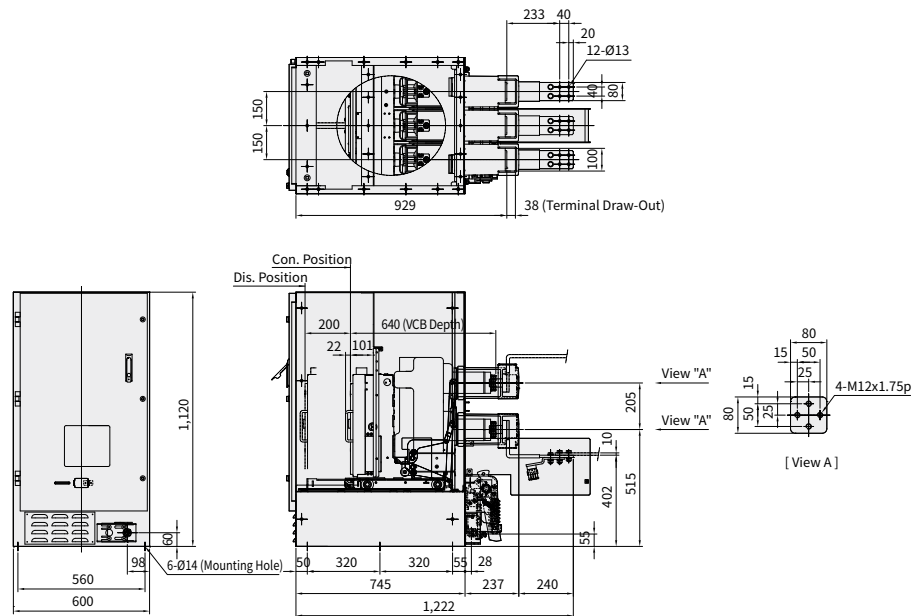


※ Dimension on this page are subject to change without notice.

## ME-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 150 mm

Unit : mm

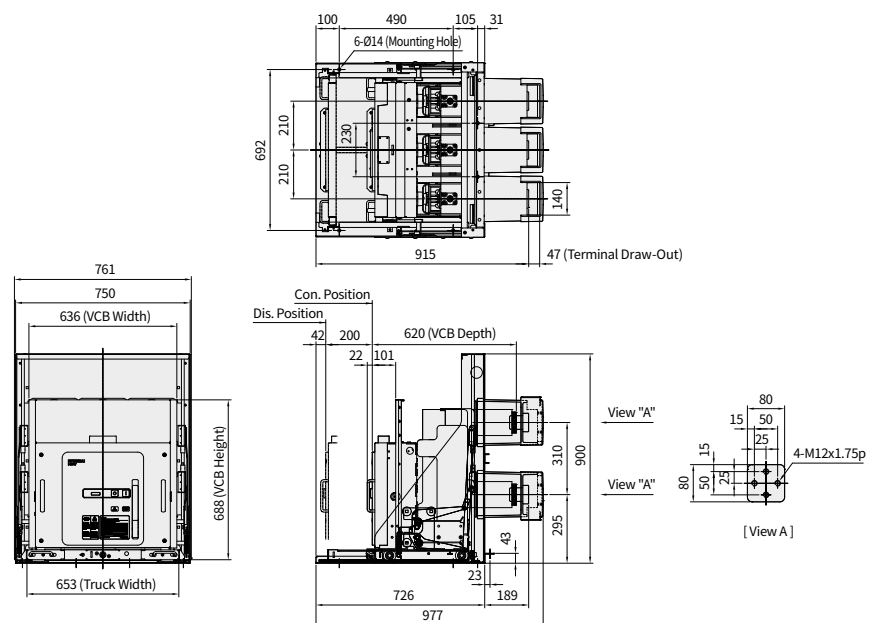
HGV 2141C  
HGV 2142  
HGV 3141  
HGV 3142



## GS-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 2141F  
HGV 2142  
HGV 2144  
HGV 3141  
HGV 3142  
HGV 3144



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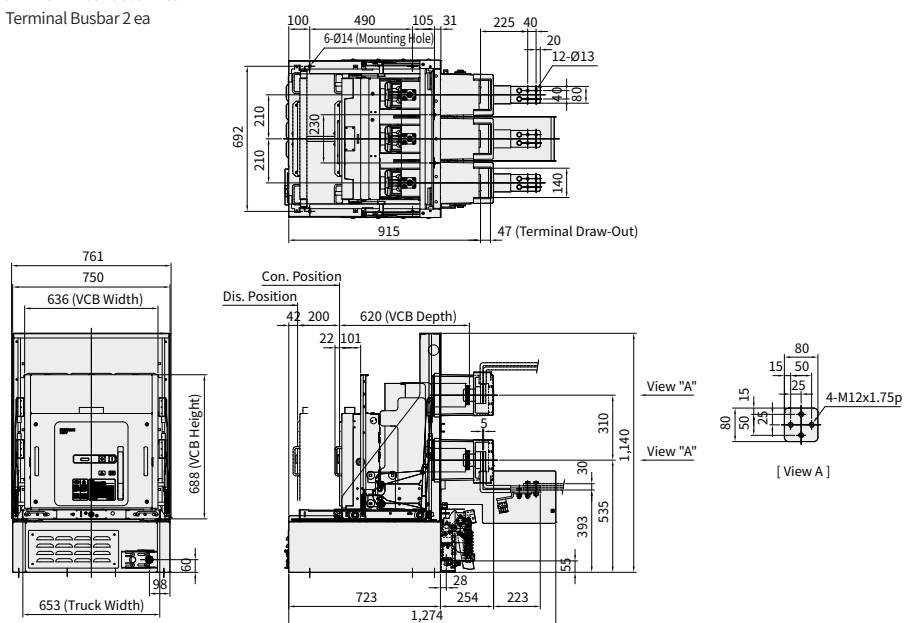
## Dimensions

### GE-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 2141F  
HGV 2142  
HGV 2144  
HGV 3141  
HGV 3142  
HGV 3144

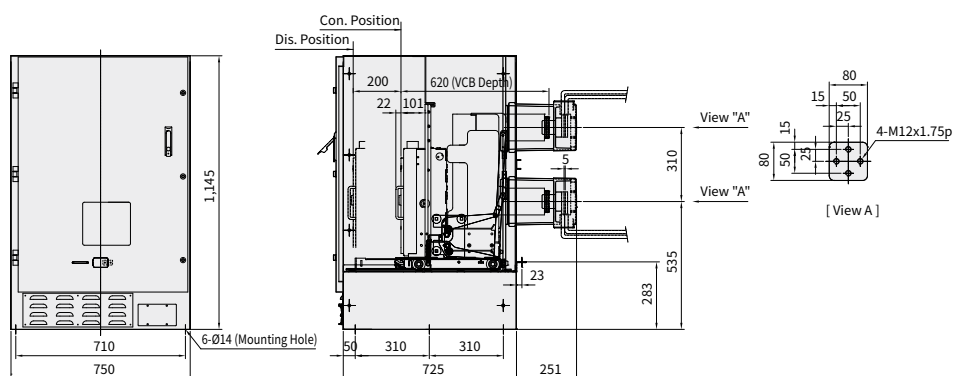
- 630/1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



### MS-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 2141F  
HGV 2142  
HGV 2144  
HGV 3141  
HGV 3142  
HGV 3144



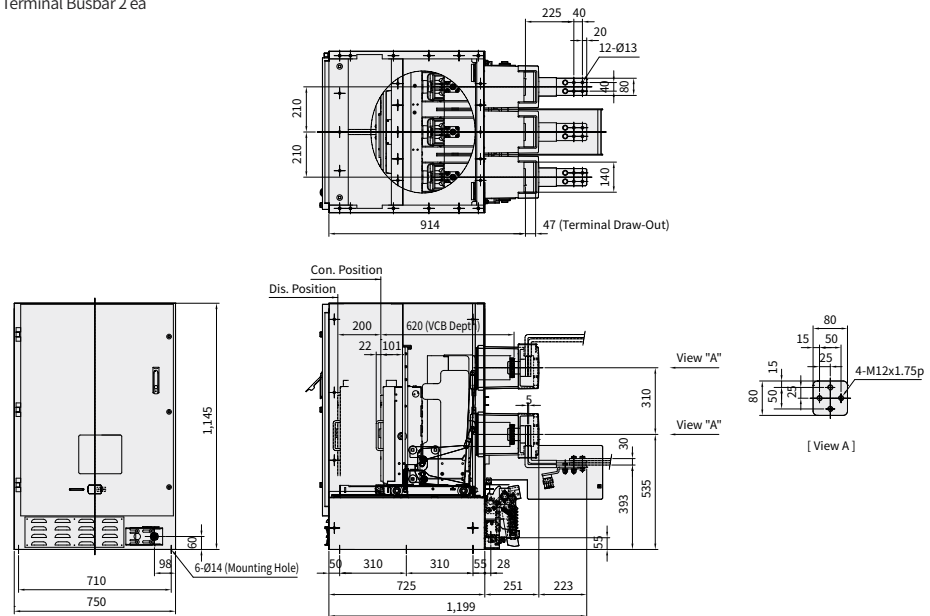
※ Dimension on this page are subject to change without notice.

## ME-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 2141F  
HGV 2142  
HGV 2144  
HGV 3141  
HGV 3142  
HGV 3144

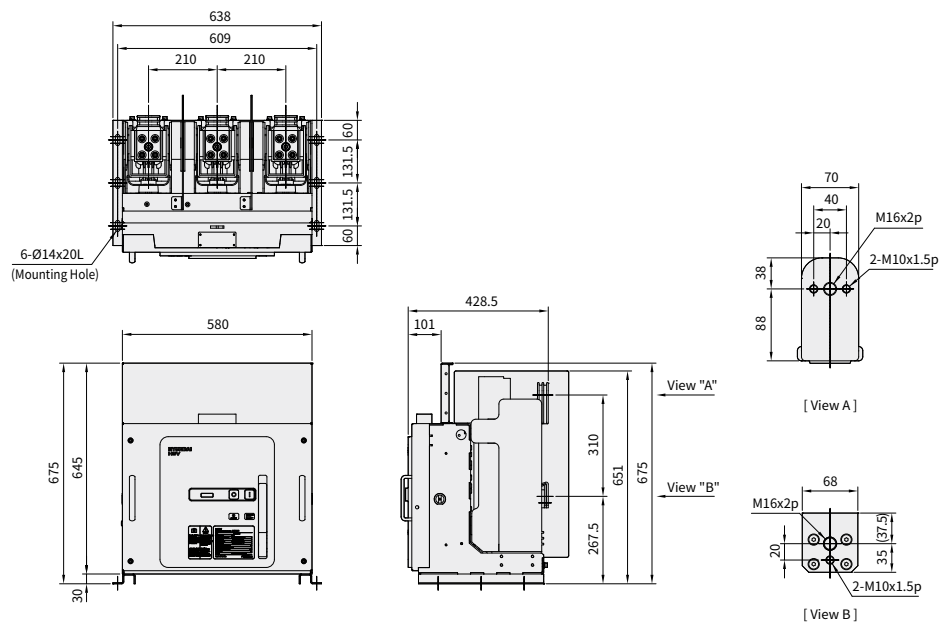
- 630/1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



## XA-Type Vacuum Circuit Breakers (17.5 kV) Fixed-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 3144F

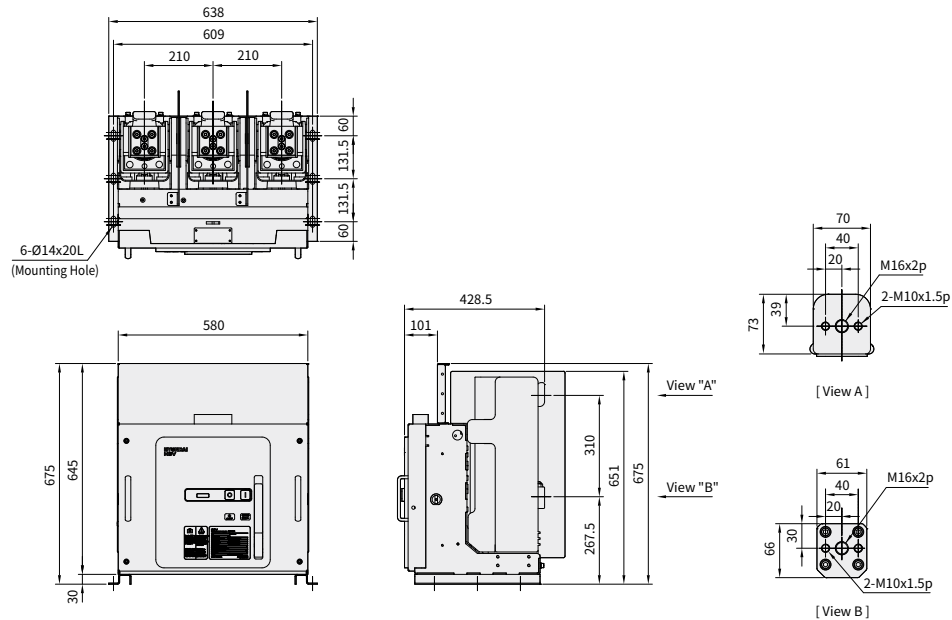


※ Dimension on this page are subject to change without notice.

## Dimensions

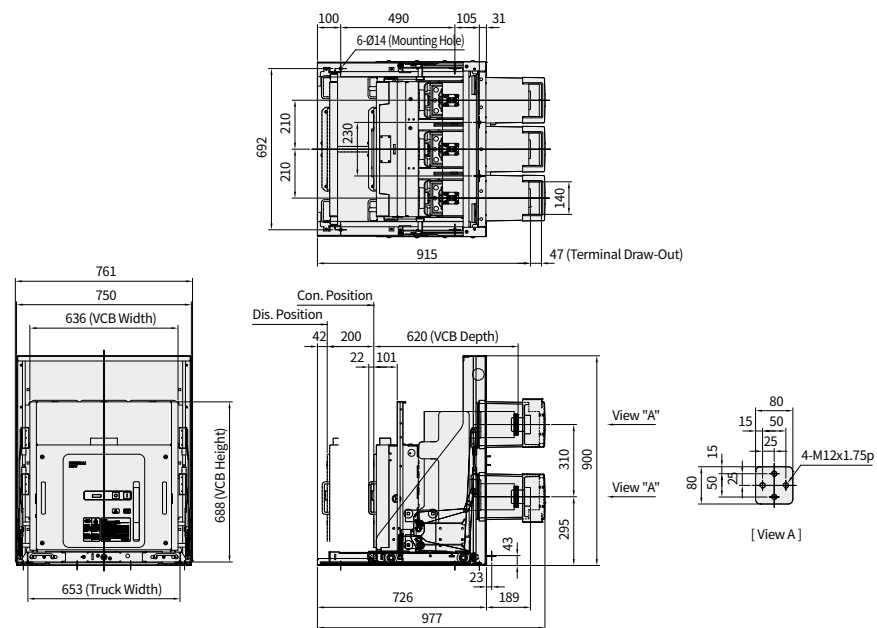
### XA-Type Vacuum Circuit Breakers (17.5 kV) Fixed-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 3152F  
HGV 3162


### GS-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 2152F  
HGV 2154  
HGV 2162  
HGV 2164  
HGV 2172  
HGV 2174  
HGV 3152  
HGV 3154  
HGV 3162  
HGV 3164  
HGV 3172  
HGV 3174


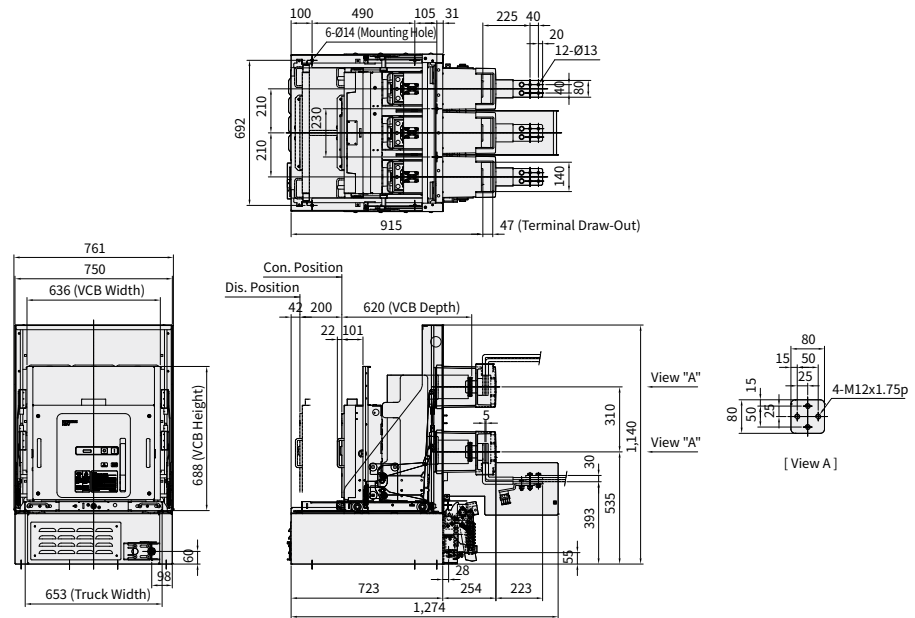
※ Dimension on this page are subject to change without notice.

## GE-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 2152F  
HGV 2154  
HGV 2162  
HGV 2164  
HGV 2172  
HGV 2174  
HGV 3152  
HGV 3154  
HGV 3162  
HGV 3164  
HGV 3172  
HGV 3174

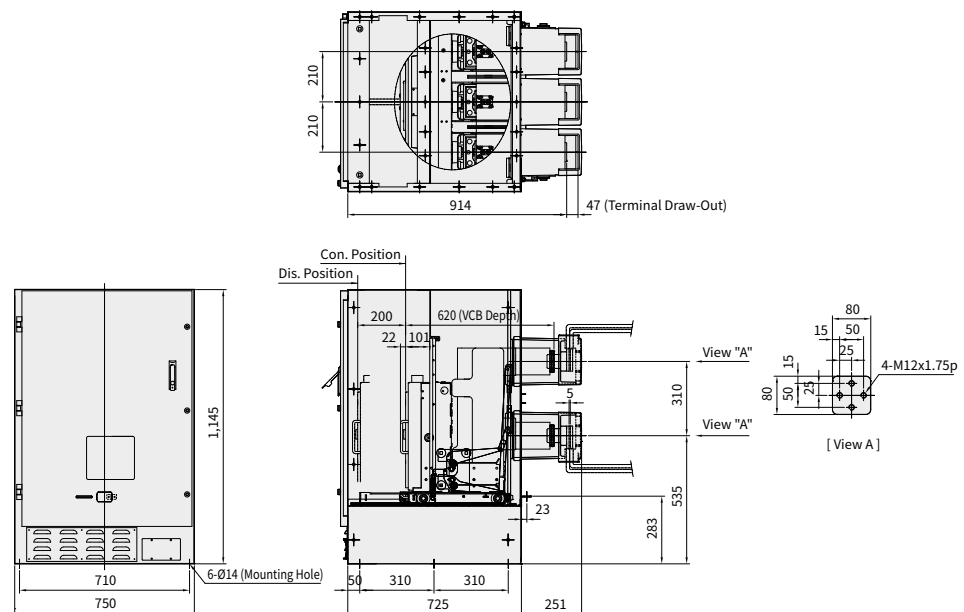
- 1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



## MS-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 2152F  
HGV 2154  
HGV 2162  
HGV 2164  
HGV 2172  
HGV 2174  
HGV 3152  
HGV 3154  
HGV 3162  
HGV 3164  
HGV 3172  
HGV 3174



※ Dimension on this page are subject to change without notice.

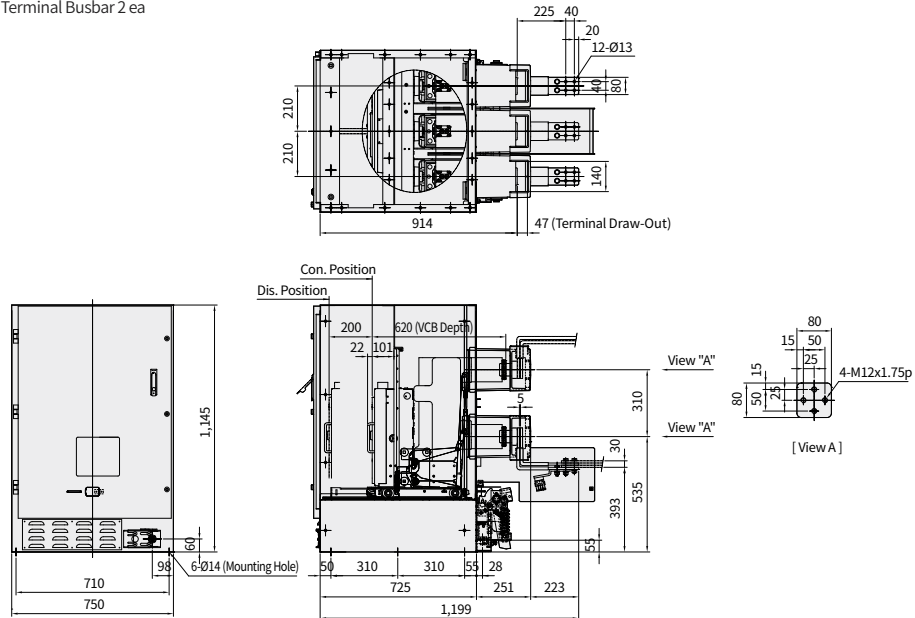
## Dimensions

### ME-Type Vacuum Circuit Breakers (12/17.5 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 2152F  
HGV 2154  
HGV 2162  
HGV 2164  
HGV 2172  
HGV 2174  
HGV 3152  
HGV 3154  
HGV 3162  
HGV 3164  
HGV 3172  
HGV 3174

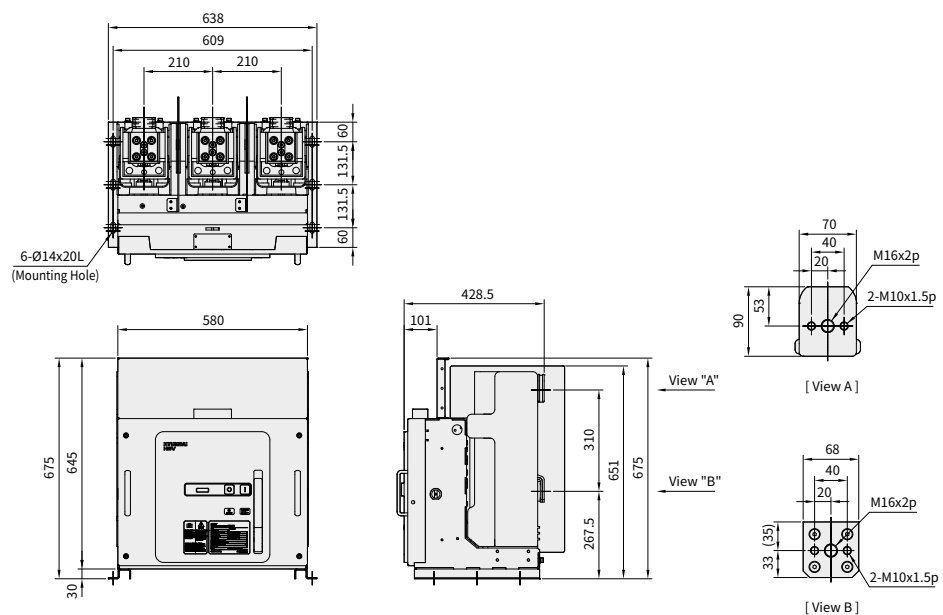
- 1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



### XA-Type Vacuum Circuit Breakers (17.5 kV) Fixed-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 3154F  
HGV 3164  
HGV 3172  
HGV 3174

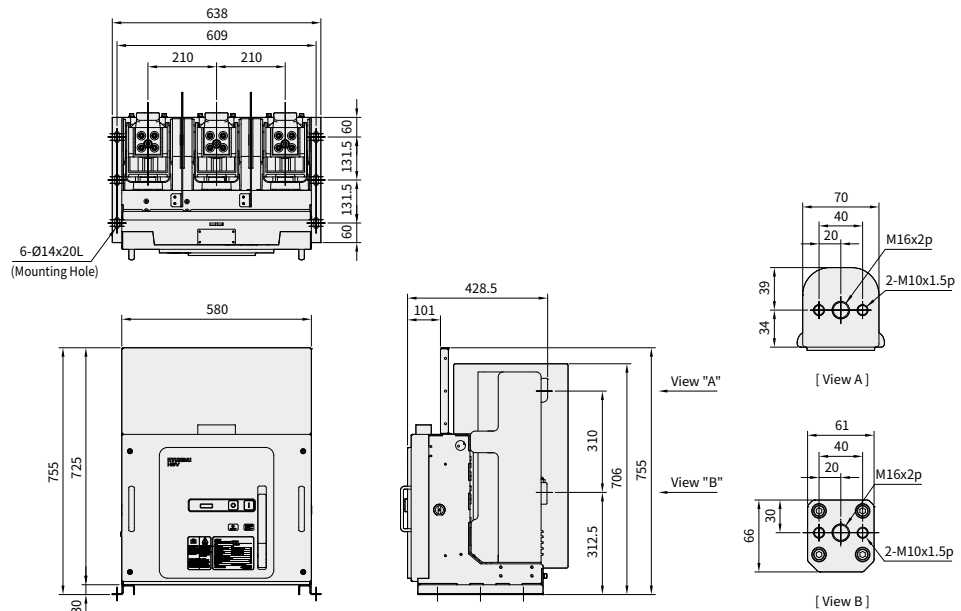


※ Dimension on this page are subject to change without notice.

# XA-Type Vacuum Circuit Breakers (24/25.8 kV) Fixed-Type, Phase-to-Phase Distance 210 mm

Unit : mm

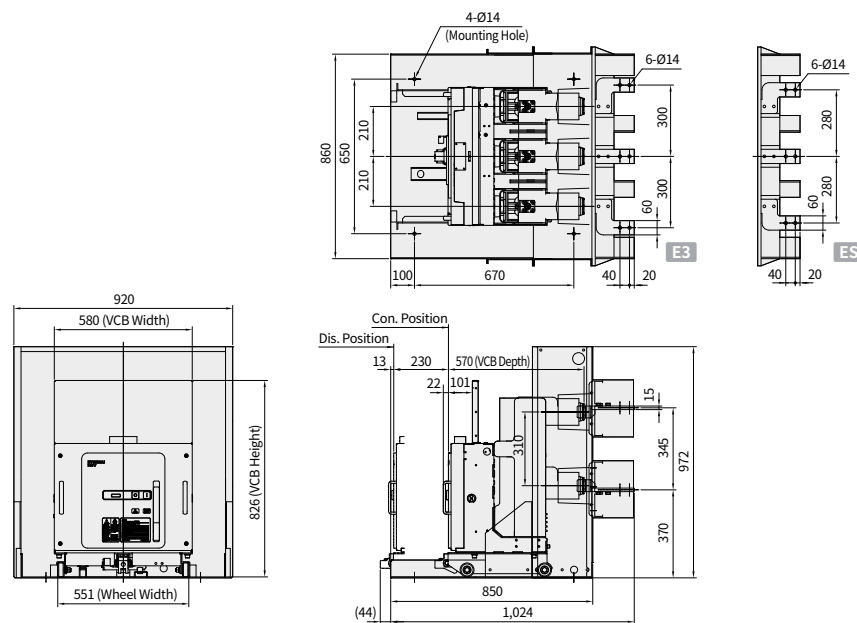
HGV6111F  
HGV6112  
HGV6141  
HGV6142



# ES/E3-Type Vacuum Circuit Breakers (24/25.8 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV6111F  
HGV6112  
HGV6141  
HGV6142



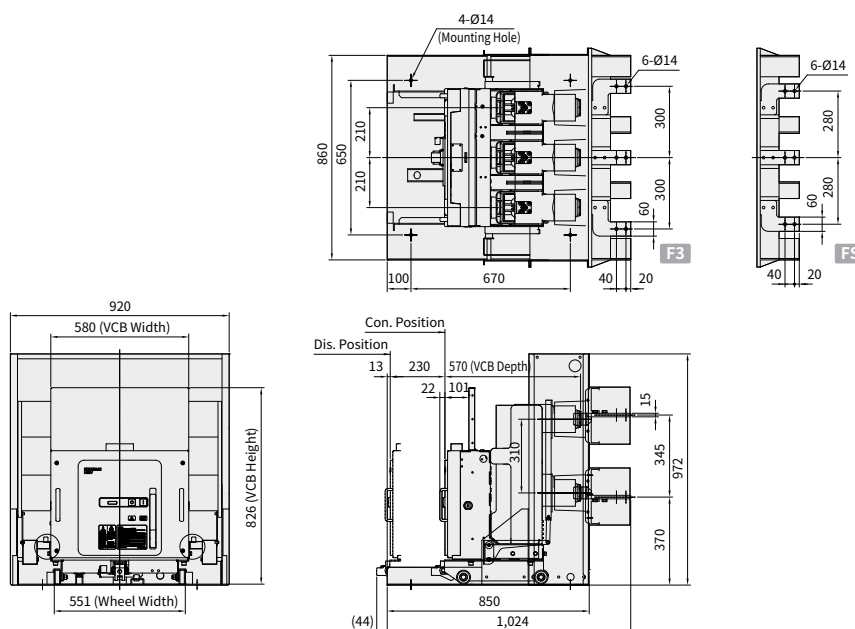
※ Dimension on this page are subject to change without notice.

## Dimensions

### FS/F3-Type Vacuum Circuit Breakers (24/25.8 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 210 mm

Unit : mm

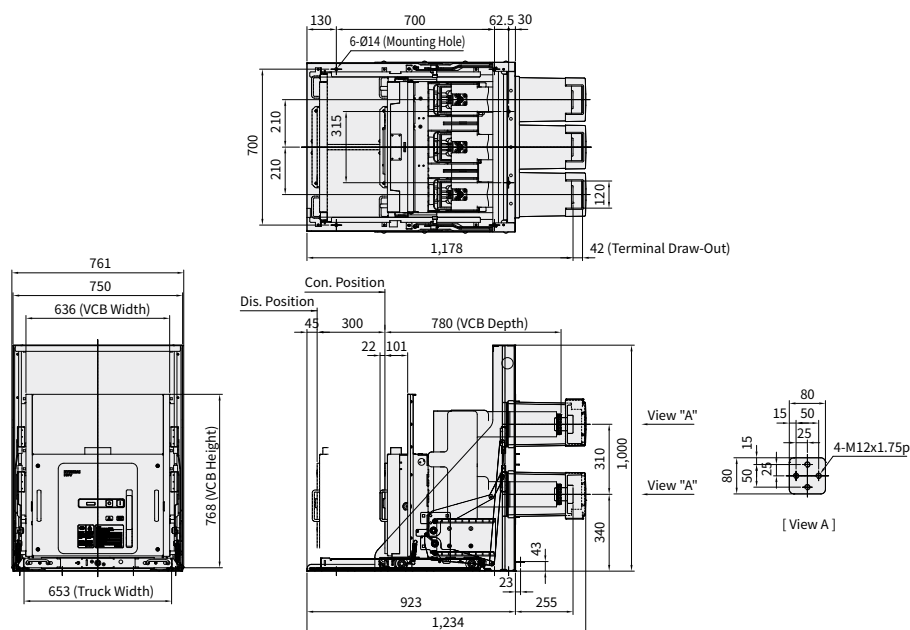
HGV 6111F  
HGV 6112  
HGV 6141  
HGV 6142



### GS-Type Vacuum Circuit Breakers (24/25.8 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 6111F  
HGV 6112  
HGV 6114  
HGV 6141  
HGV 6142  
HGV 6144



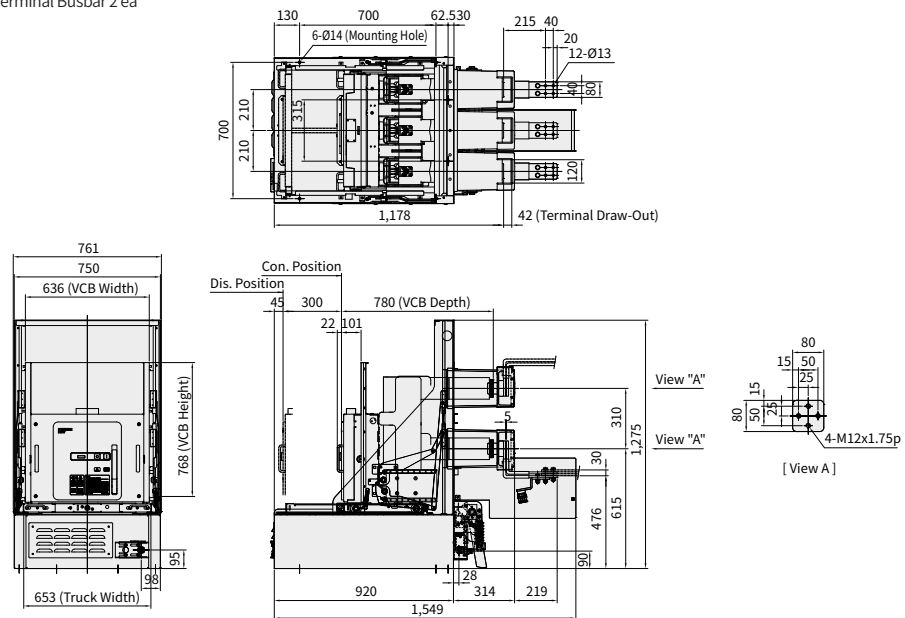
※ Dimension on this page are subject to change without notice.

## GE-Type Vacuum Circuit Breakers (24/25.8 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 6111F  
HGV 6112  
HGV 6114  
HGV 6141  
HGV 6142  
HGV 6144

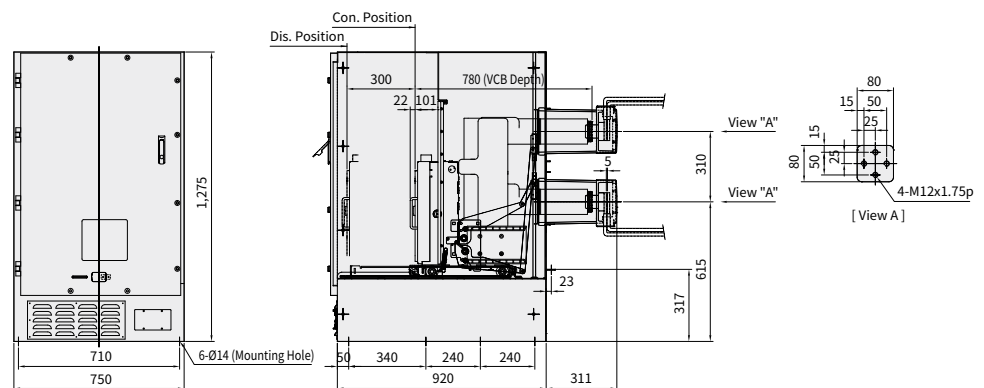
- 630/1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



## MS-Type Vacuum Circuit Breakers (24/25.8 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 6111F  
HGV 6112  
HGV 6114  
HGV 6141  
HGV 6142  
HGV 6144



※ Dimension on this page are subject to change without notice.



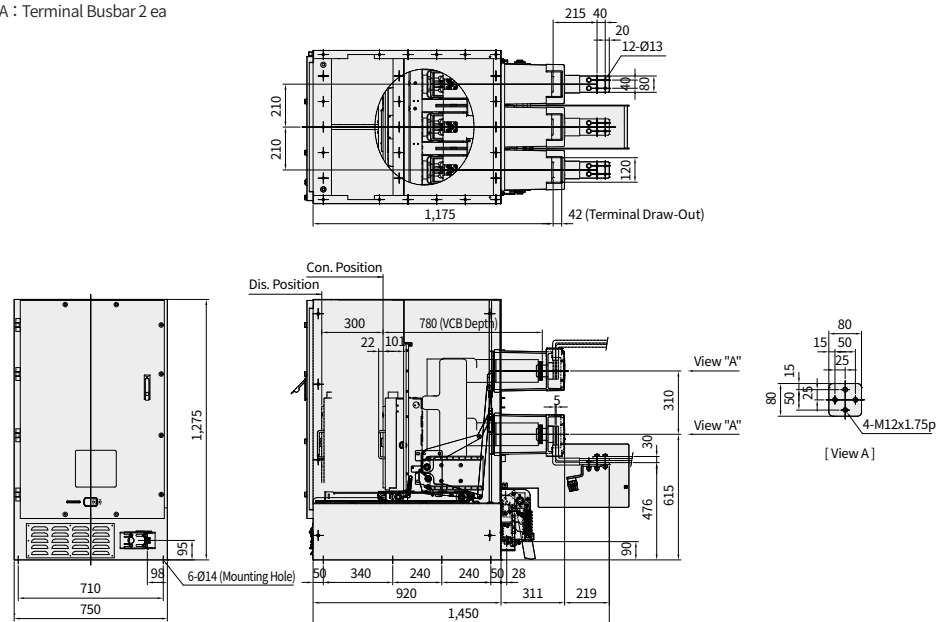
## Dimensions

### ME-Type Vacuum Circuit Breakers (24/25.8 kV) Draw-Out Type, Screw-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 6111F  
HGV 6112  
HGV 6114  
HGV 6141  
HGV 6142  
HGV 6144

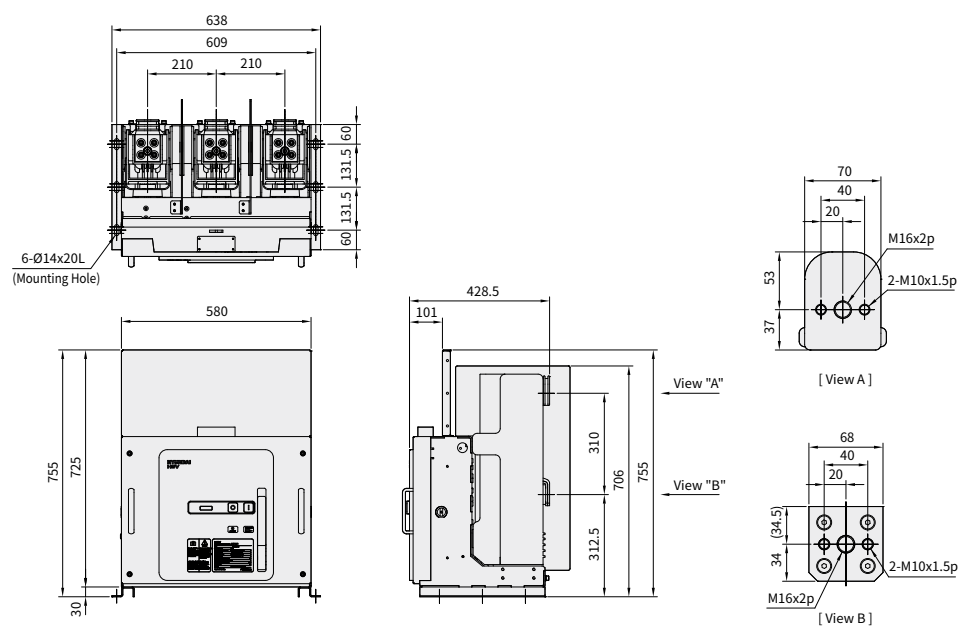
- 630/1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



### XA-Type Vacuum Circuit Breakers (24/25.8 kV) Fixed-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 6144F

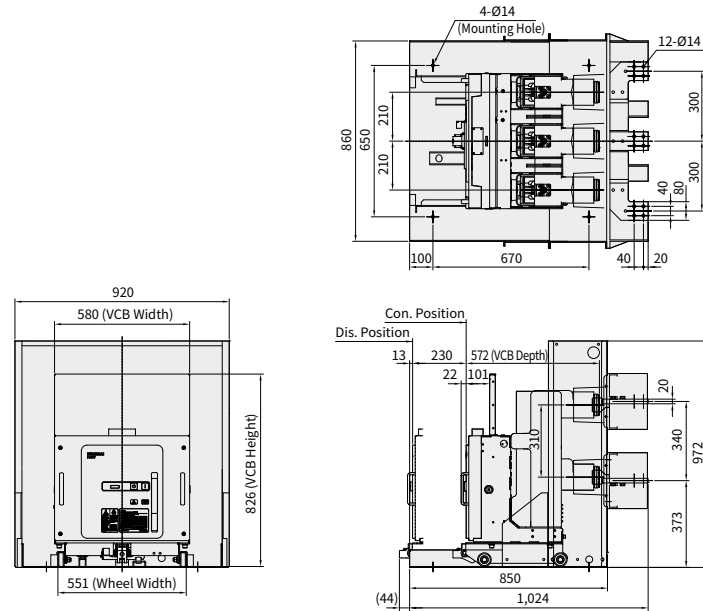


※ Dimension on this page are subject to change without notice.

# ES-Type Vacuum Circuit Breakers (24/25.8 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 210 mm

Unit : mm

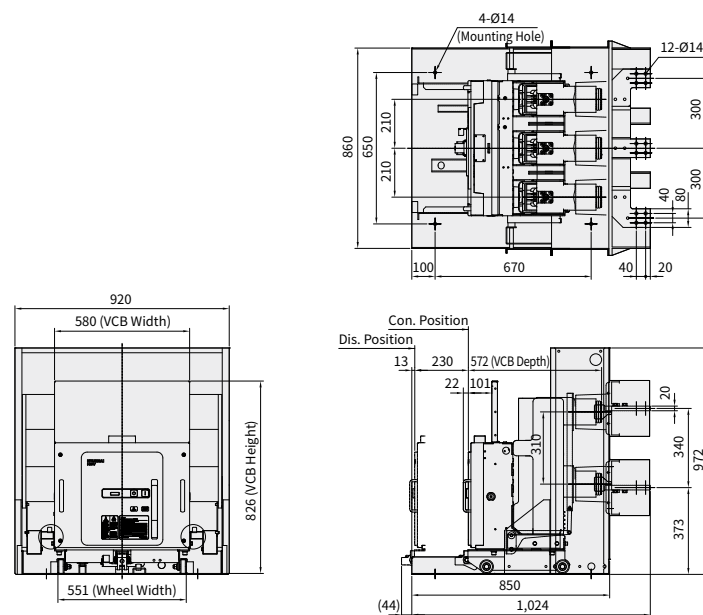
HGV 6144F



# FS-Type Vacuum Circuit Breakers (24/25.8 kV) Draw-Out Type, Lever-Type, Phase-to-Phase Distance 210 mm

Unit : mm

HGV 6144F



※ Dimension on this page are subject to change without notice.

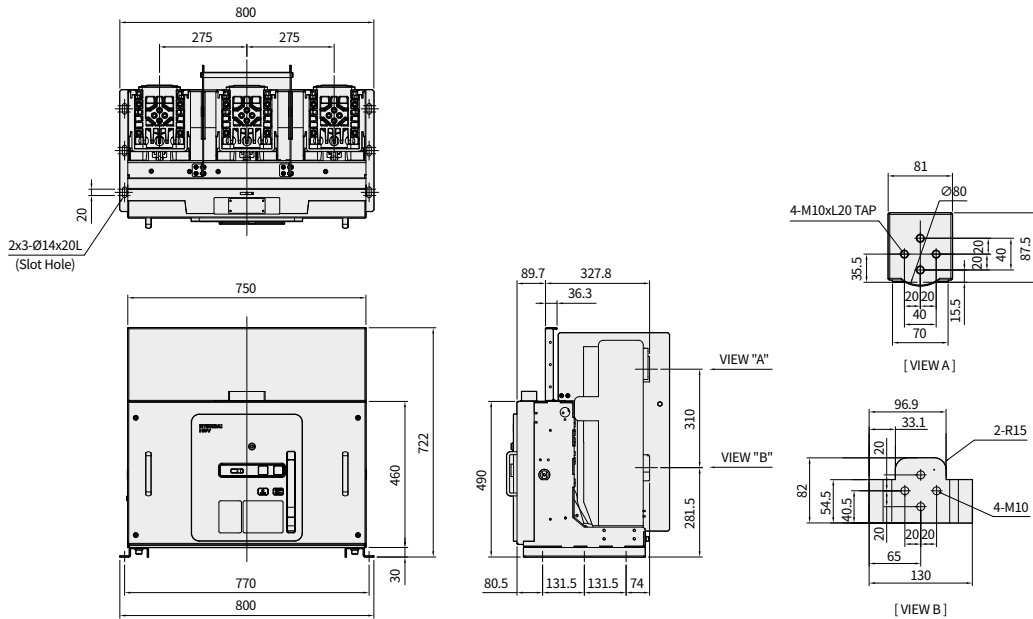
# Dimensions

## IXA-Type Vacuum Circuit Breakers (7.2/12 kV) Fixed-Type, Phase-to-Phase Distance 275 mm

Unit : mm

HGV 1156I  
HGV 1157  
HGV 1158  
HGV 1166  
HGV 1167  
HGV 1168  
HGV 1176  
HGV 1177  
HGV 1178  
HGV 2156  
HGV 2157  
HGV 2158  
HGV 2166  
HGV 2167  
HGV 2168  
HGV 2176  
HGV 2177  
HGV 2178  
HGV 3156  
HGV 3157  
HGV 3158  
HGV 3166  
HGV 3167  
HGV 3168  
HGV 3176  
HGV 3177  
HGV 3178

- 2,500 A/3,150 A does not have fan
- 4,000 A requires fan (For fan capacity and ventilation path, contact us)

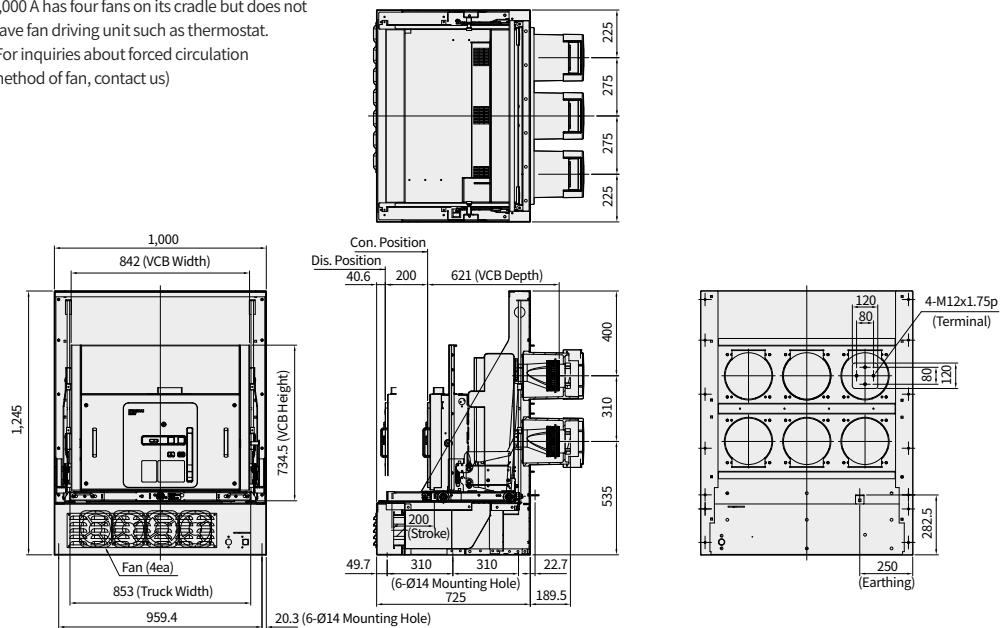


## IGS-Type Vacuum Circuit Breakers (7.2/12/17.5 kV) Draw-Out Type, Phase-to-Phase Distance 275 mm

Unit : mm

HGV 1156I  
HGV 1157  
HGV 1158  
HGV 1166  
HGV 1167  
HGV 1168  
HGV 1176  
HGV 1177  
HGV 1178  
HGV 2156  
HGV 2157  
HGV 2158  
HGV 2166  
HGV 2167  
HGV 2168  
HGV 2176  
HGV 2177  
HGV 2178  
HGV 3156  
HGV 3157  
HGV 3158  
HGV 3166  
HGV 3167  
HGV 3168  
HGV 3176  
HGV 3177  
HGV 3178

- Pushing-Drawing Distance : 200 mm
- 2,500 A/3,150 A does not have fan
- 4,000 A has four fans on its cradle but does not have fan driving unit such as thermostat. (For inquiries about forced circulation method of fan, contact us)



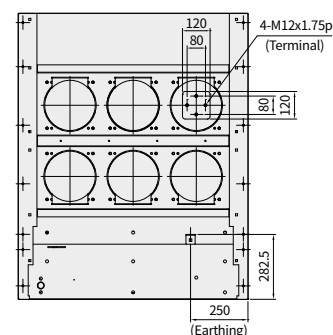
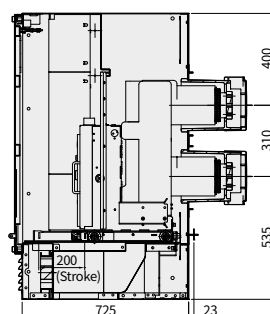
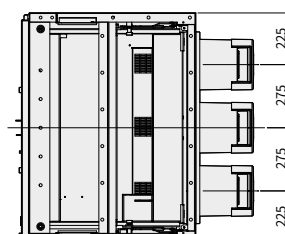
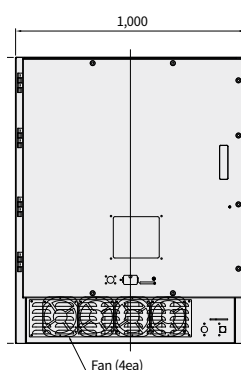
※ Dimension on this page are subject to change without notice.

### IMS-Type Vacuum Circuit Breakers (7.2/12/17.5 kV) Draw-Out Type, Phase-to-Phase Distance 275 mm

Unit : mm

HGV 11561  
HGV 1157  
HGV 1158  
HGV 1166  
HGV 1167  
HGV 1168  
HGV 1176  
HGV 1177  
HGV 1178  
HGV 2156  
HGV 2157  
HGV 2158  
HGV 2166  
HGV 2167  
HGV 2168  
HGV 2176  
HGV 2177  
HGV 2178  
HGV 3156  
HGV 3157  
HGV 3158  
HGV 3166  
HGV 3167  
HGV 3168  
HGV 3176  
HGV 3177  
HGV 3178

- Pushing-Drawing Distance : 200 mm
  - 2,500 A/3,150 A does not have fan
  - 4,000 A has four fans on its cradle but does not have fan driving unit such as thermostat.
- (For inquiries about forced circulation method of fan, contact us)

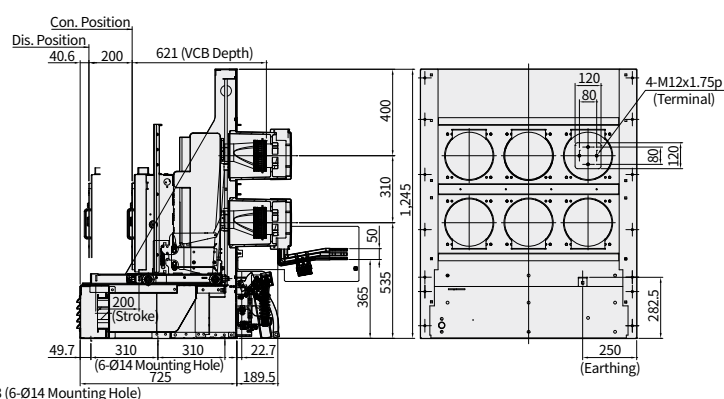
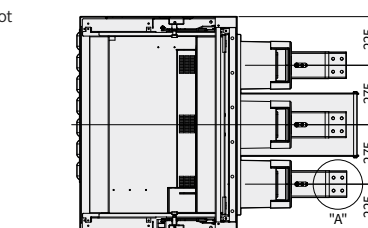
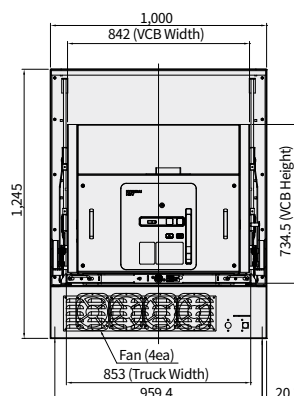


## IGE-Type Vacuum Circuit Breakers (7.2/12/17.5 kV) Draw-Out Type, Phase-to-Phase Distance 275 mm

Unit : mm

HGV 11561  
HGV 1157  
HGV 1158  
HGV 1166  
HGV 1167  
HGV 1168  
HGV 2156  
HGV 2157  
HGV 2158  
HGV 2166  
HGV 2167  
HGV 2168  
HGV 2176  
HGV 2177  
HGV 2178  
HGV 3156  
HGV 3157  
HGV 3158  
HGV 3166  
HGV 3167  
HGV 3168  
HGV 3176  
HGV 3177  
HGV 3178

- Pushing-Drawing Distance : 200 mm
- 2,500 A/3,150 A does not have fan
- 4,000 A has four fans on its cradle but does not have fan driving unit such as thermostat.  
(For inquiries about forced circulation method of fan, contact us)
- 2,500/3,150/4,000 A : Terminal Busbar 3 ea



※ Dimension on this page are subject to change without notice.

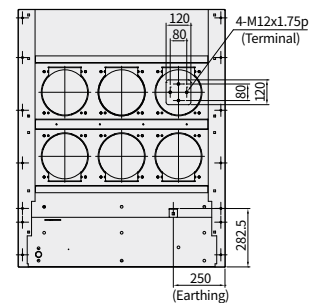
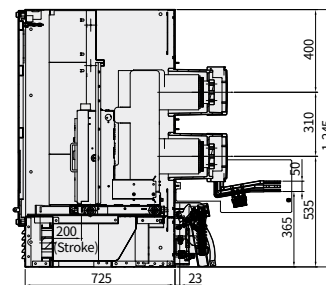
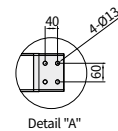
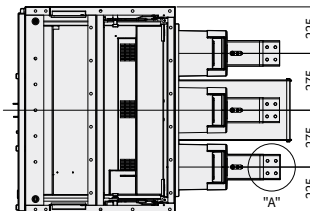
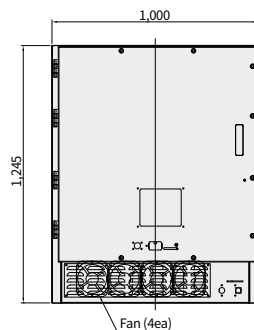
# Dimensions

## IME-Type Vacuum Circuit Breakers (7.2/12/17.5 kV) Draw-Out Type, Phase-to-Phase Distance 275 mm

Unit : mm

HGV 1156I  
HGV 1157  
HGV 1158  
HGV 1166  
HGV 1167  
HGV 1168  
HGV 2156  
HGV 2157  
HGV 2158  
HGV 2166  
HGV 2167  
HGV 2168  
HGV 2176  
HGV 2177  
HGV 2178  
HGV 3156  
HGV 3157  
HGV 3158  
HGV 3166  
HGV 3167  
HGV 3168  
HGV 3176  
HGV 3177  
HGV 3178

- Pushing-Drawing Distance : 200 mm
- 2,500 A/3,150 A does not have fan
- 4,000 A has four fans on its cradle but does not have fan driving unit such as thermostat.  
(For inquiries about forced circulation method of fan, contact us)
- 2,500/3,150/4,000 A : Terminal Busbar 3 ea

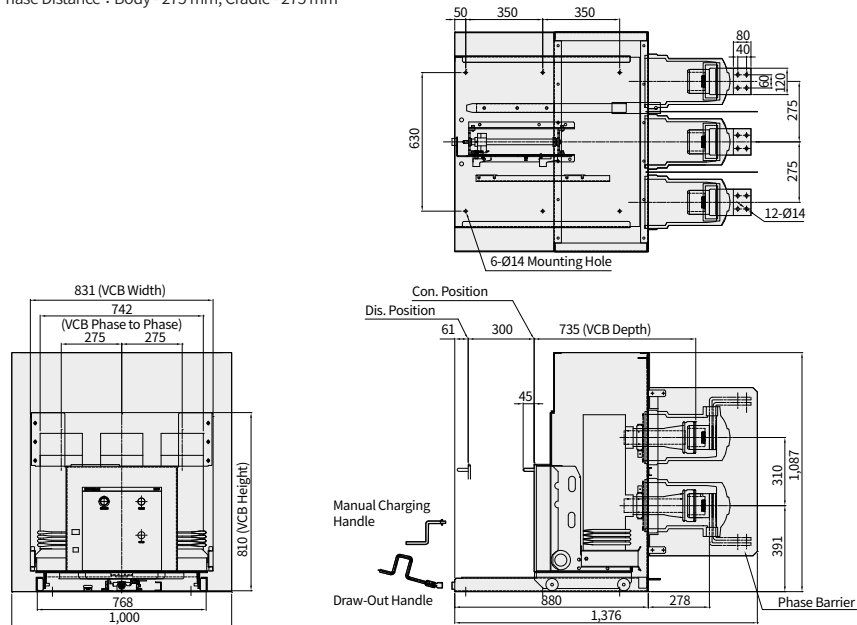


## GS-Type Vacuum Circuit Breakers (24 kV) Draw-Out Type, Screw-Type

HVF 6146  
HVF 6147

- Metal Shutter Type.
- Phase-to-Phase Distance : Body - 275 mm, Cradle - 275 mm

Unit : mm

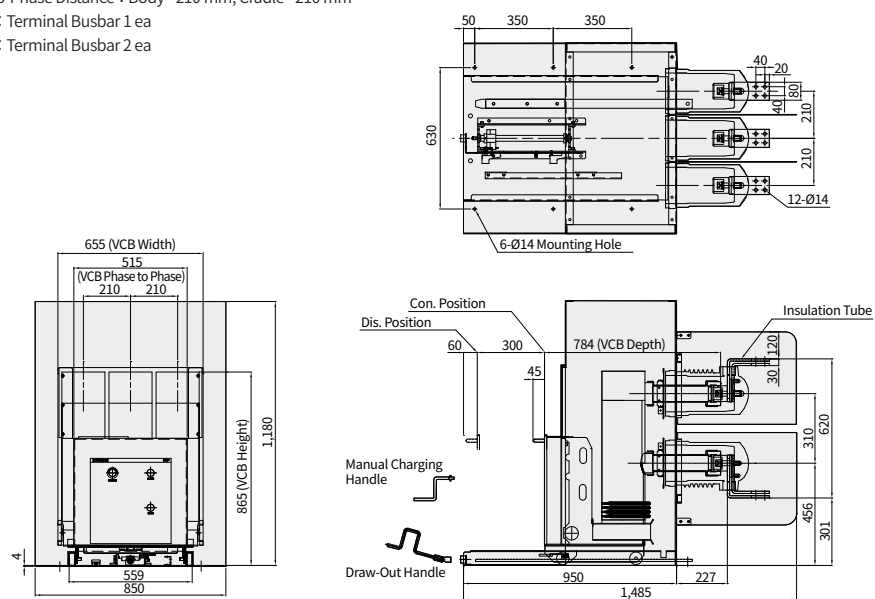


## GS-Type Vacuum Circuit Breakers (24 kV) Draw-Out Type, Screw-Type

HVF 6162  
HVF 6164

- Metal Shutter Type.
- Phase-to-Phase Distance : Body - 210 mm, Cradle - 210 mm
- 1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea

Unit : mm



※ Dimension on this page are subject to change without notice.

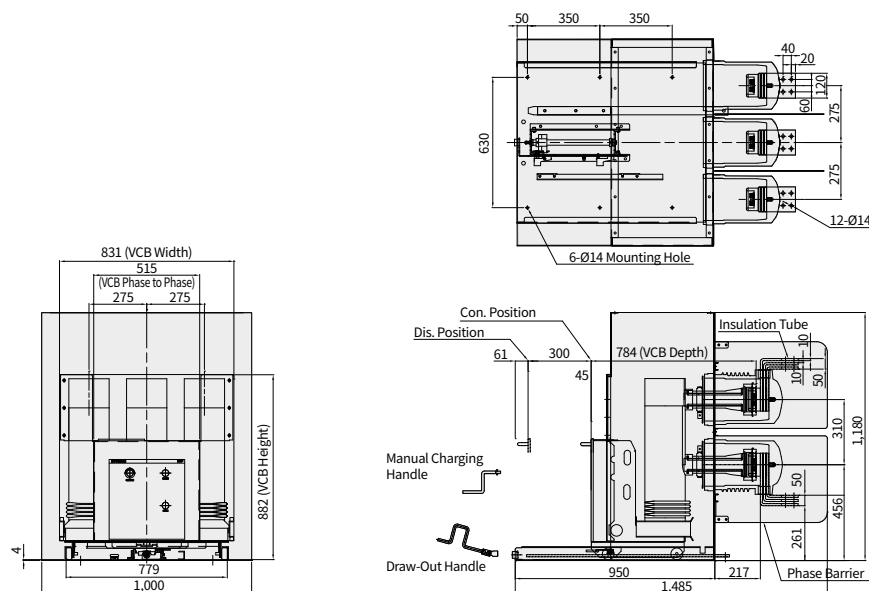
# Dimensions

## GS-Type Vacuum Circuit Breakers (24 kV) Draw-Out Type, Screw-Type

HVF 6166  
HVF 6167

- Metal Shutter Type.
- Phase-to-Phase Distance : Body - 275 mm, Cradle - 275 mm

Unit : mm

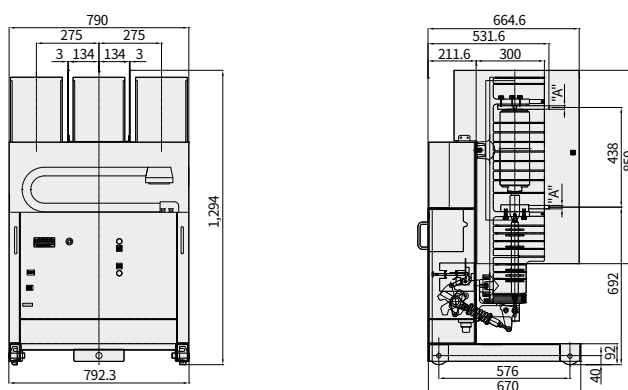


## XA-Type Vacuum Circuit Breakers (36/38 kV) Fixed Type

HVF 7052  
HVF 7054  
HVF 7056  
HVF 7057  
HVF 7062  
HVF 7064  
HVF 7067

- Phase-to-Phase Distance : Body - 275 mm

Unit : mm



| Model             | Rated Current     | Size | Terminal Type | Main Terminal |        |
|-------------------|-------------------|------|---------------|---------------|--------|
|                   |                   | "A"  |               | A Type        | B Type |
| HVF7052/7062      | 1,250 A (1,200 A) | 15   | A             |               |        |
| HVF7054/7064      | 2,500 A (2,000 A) | 20   | A             |               |        |
| HVF7056/7057/7067 | 3,150 A (3,000 A) | 30   | B             |               |        |

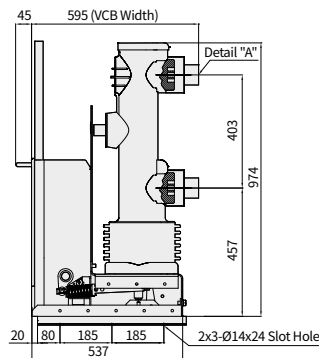
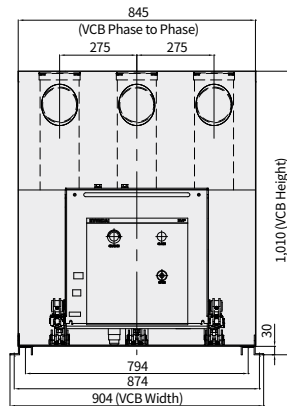
※ Dimension on this page are subject to change without notice.

# XA-Type Vacuum Circuit Breakers (36 kV) Fixed Type

HVF 7142  
HVF 7144

- Phase-to-Phase Distance : Body - 275 mm

Unit : mm



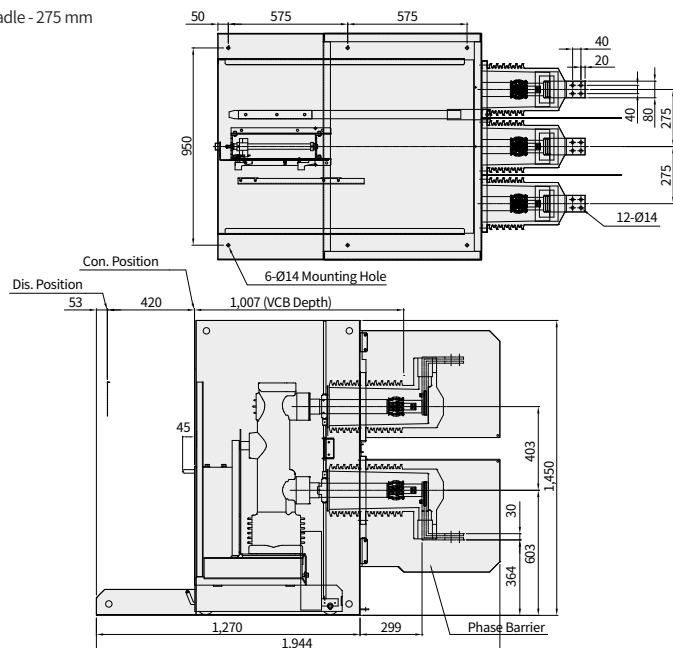
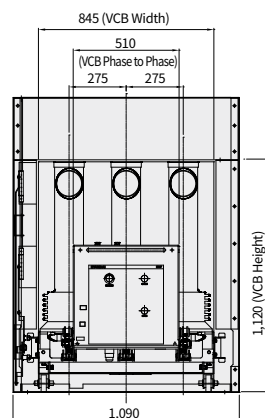
| Item       | 1,250/2,000 A |
|------------|---------------|
| Detail "A" |               |

# GS-Type Vacuum Circuit Breakers (36 kV) Draw-Out Type

HVF 7142  
HVF 7144

- Metal Shutter Type.
- Phase-to-Phase Distance : Body - 275 mm, Cradle - 275 mm
- 1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea

Unit : mm



※ Dimension on this page are subject to change without notice.



# Dimensions

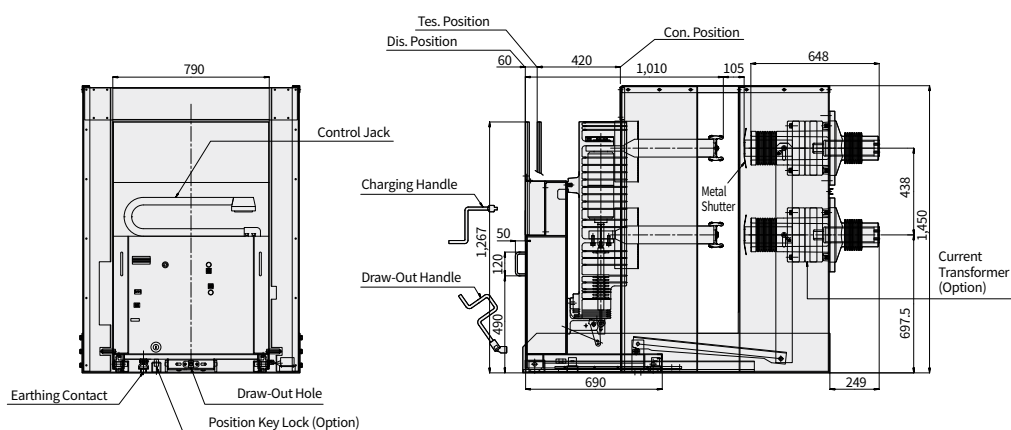
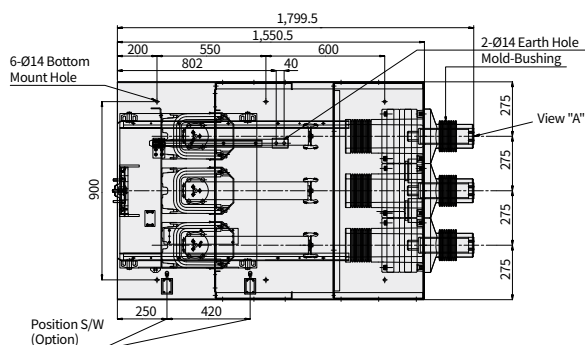
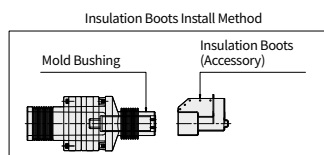
## GS-Type Vacuum Circuit Breakers (36/38 kV) Draw-Out Type, Screw-Type

Standard : IEC

Unit : mm

HVF 7052  
HVF 7054  
HVF 7056  
HVF 7062  
HVF 7064  
HVF 7066

• Phase-to-Phase Distance : Body - 275 mm, Cradle - 275 mm



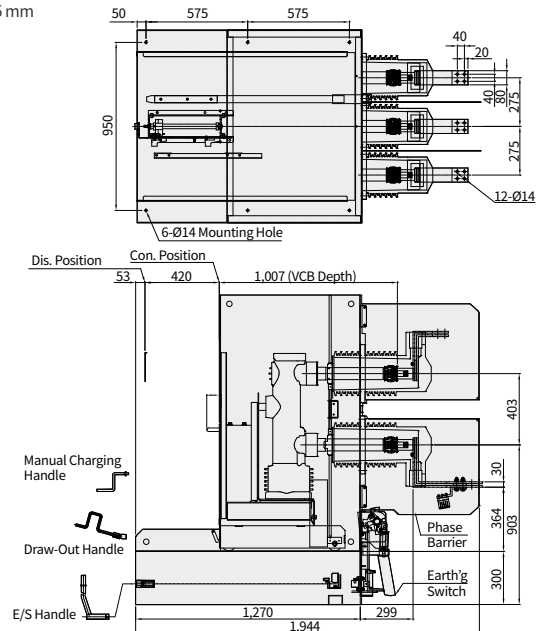
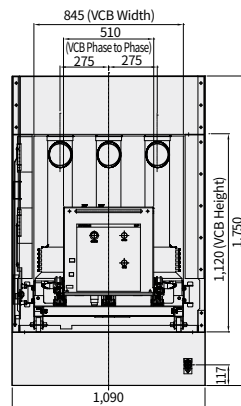
| Model           | Rated Current | Main Circuit Terminal View (View "A") |
|-----------------|---------------|---------------------------------------|
| HVF7052/HVF7062 | 1,250 A       |                                       |
| HVF7054/HVF7064 | 2,000 A       |                                       |
| HVF7056/HVF7066 | 2,500 A       |                                       |

## GE-Type Vacuum Circuit Breakers (36 kV) Draw-Out Type, Screw-Type

Unit : mm

HVF 7142  
HVF 7144

- Metal Shutter Type.
- Phase-to-Phase Distance : Body - 275 mm, Cradle - 275 mm
- 1,250 A : Terminal Busbar 1 ea
- 2,000 A : Terminal Busbar 2 ea



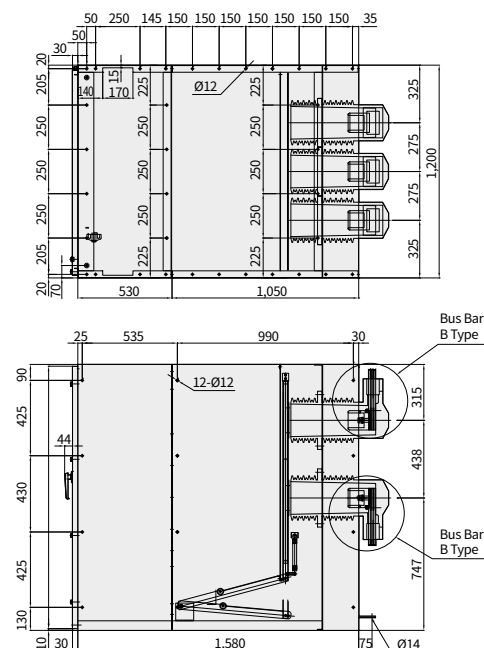
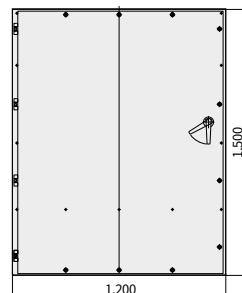
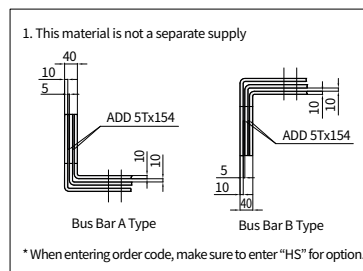
## GS-Type Vacuum Circuit Breakers (36 kV) Draw-Out Type (Door), MCSG Type

Standard: IEC

Unit : mm

HVF 7057

- Insulation Shutter Type.
- GS-Class.
- VCB Phase-to-Phase Distance : 275 mm



※ Dimension on this page are subject to change without notice.

# Dimensions

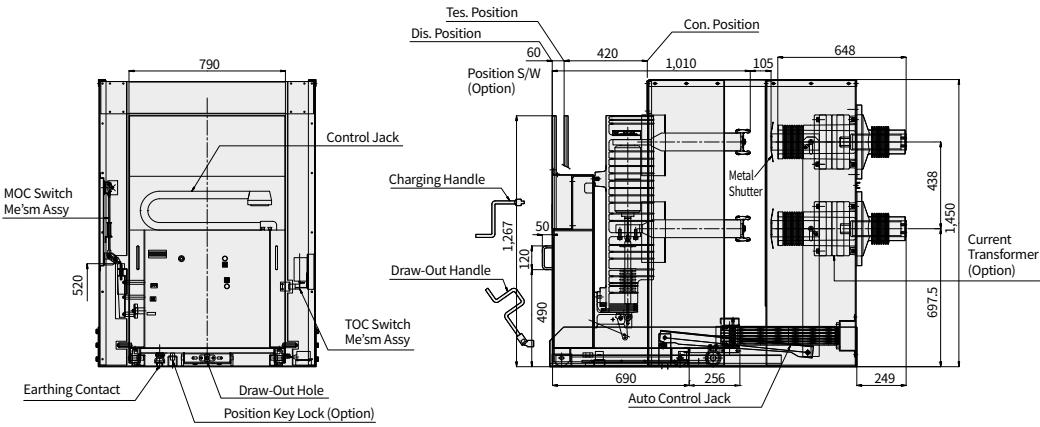
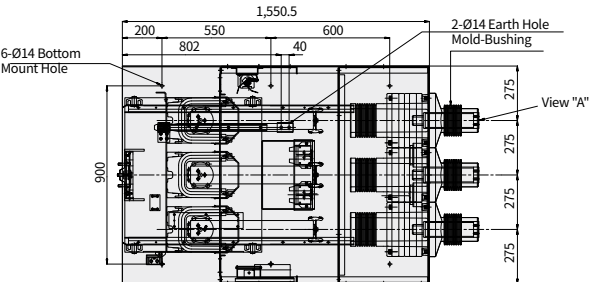
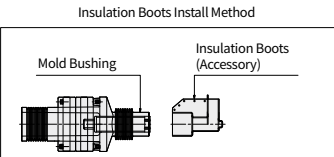
## GS-Type Vacuum Circuit Breakers (36/38 kV) GS Draw-Out Type, Screw-Type

Standard : ANSI

Unit : mm

HVF 7052  
HVF 7054  
HVF 7056  
HVF 7057  
HVF 7062  
HVF 7064  
HVF 7067

• Phase-to-Phase Distance : Body - 275 mm, Cradle - 275 mm



| Model             | Rated Current     | Main Circuit Terminal View (View "A") |
|-------------------|-------------------|---------------------------------------|
| HVF7052/7062      | 1,250 A (1,200 A) |                                       |
| HVF7054/7064      | 2,000 A           |                                       |
| HVF7056/7057/7067 | 2,500/3,000 A     |                                       |

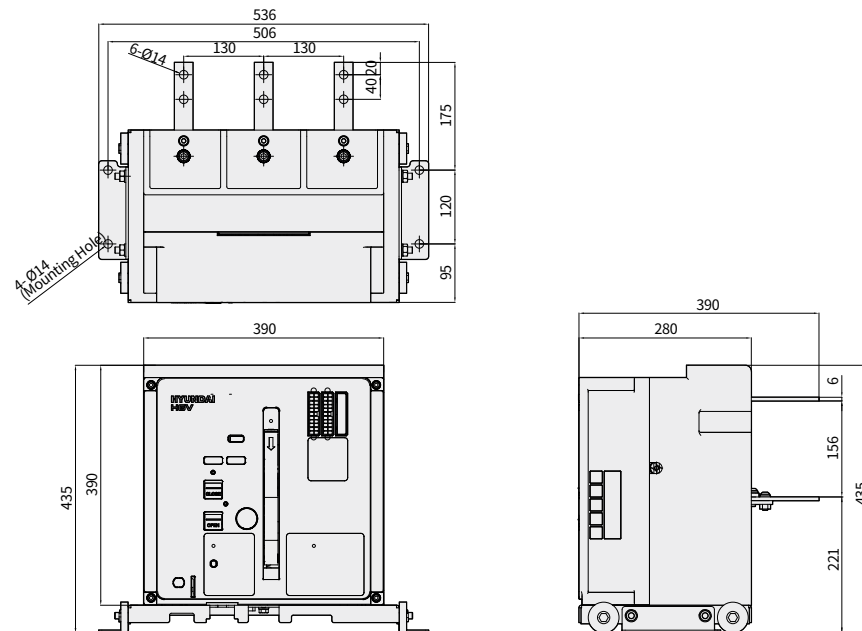
※ Dimension on this page are subject to change without notice.

## Dimensions(Compact HGV)

### X-Type Vacuum Circuit Breakers (7.2 kV, 8/12.5kA) Fixed Type

IEC 62271-100

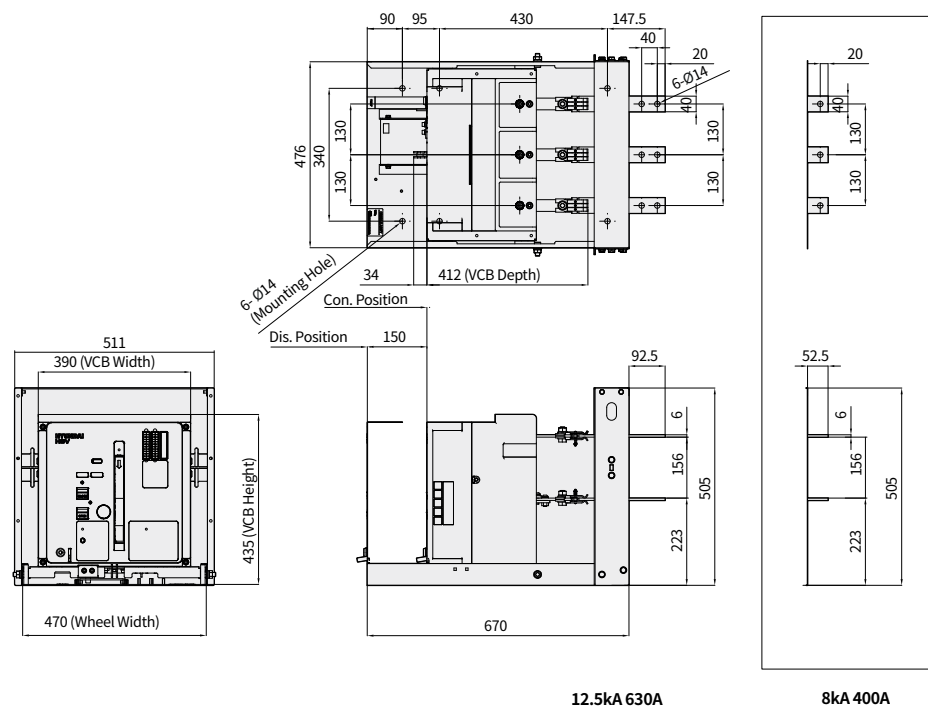
Unit : mm

HGV1199A  
HGV1111A


### E-Type Vacuum Circuit Breakers (7.2 kV, 8/12.5kA) Draw-Out Type

IEC 62271-100

Unit : mm

HGV1199A  
HGV1111A


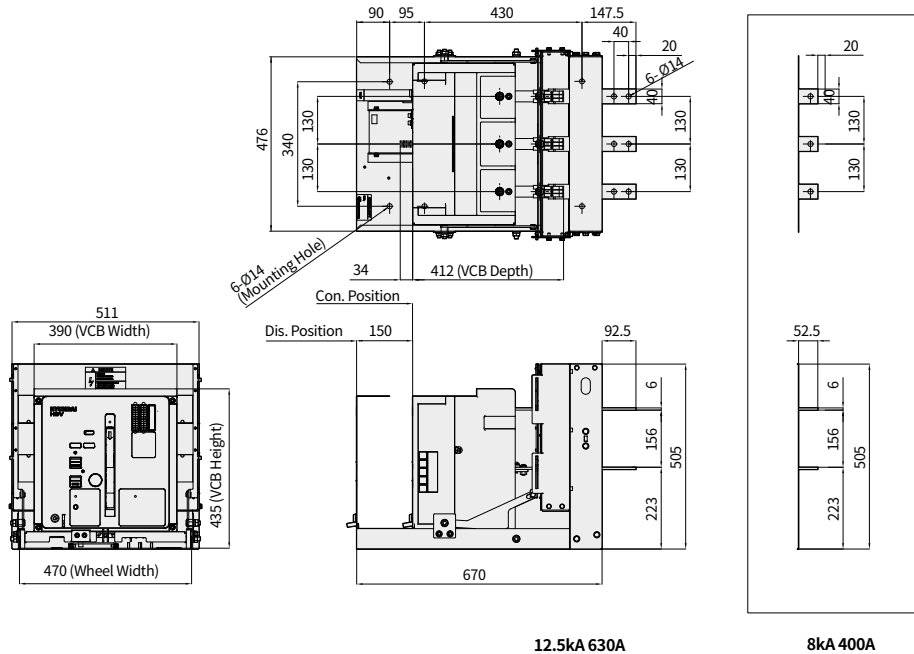
※ Dimension on this page are subject to change without notice.

## Dimensions(Compact HGV)

## F-Type Vacuum Circuit Breakers (7.2 kV, 8/12.5kA) Draw-Out Type

Unit : mm

HGV1199A  
HGV1111A



12.5kA 630A

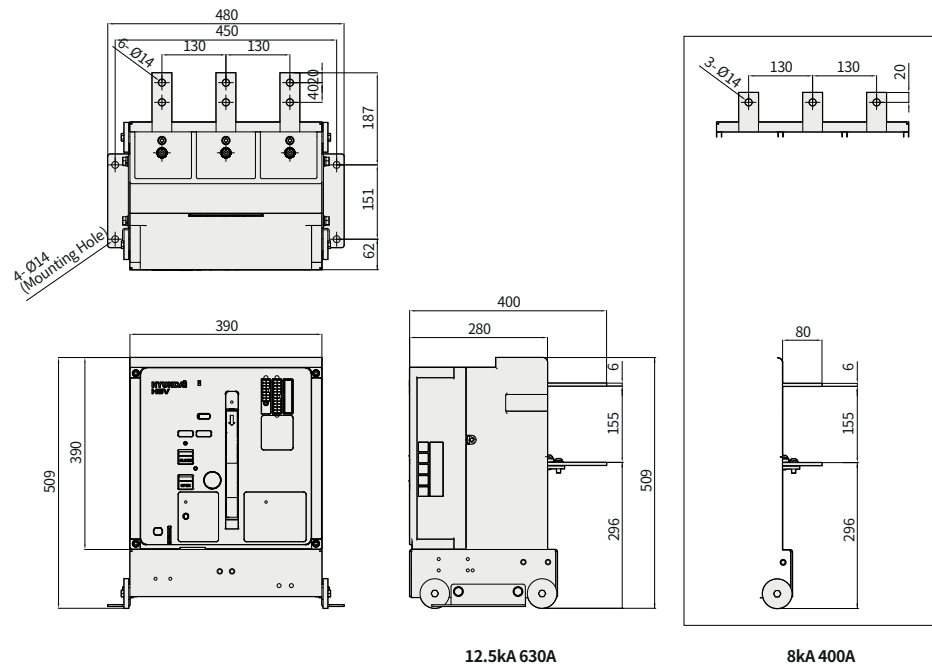
8kA 400A

# Dimensions(Compact HGV Retrofit)

## X-Type Vacuum Circuit Breakers (7.2 kV, 8/12.5kA) Fixed Type

HGV 1199A RV  
HGV 1111A RV

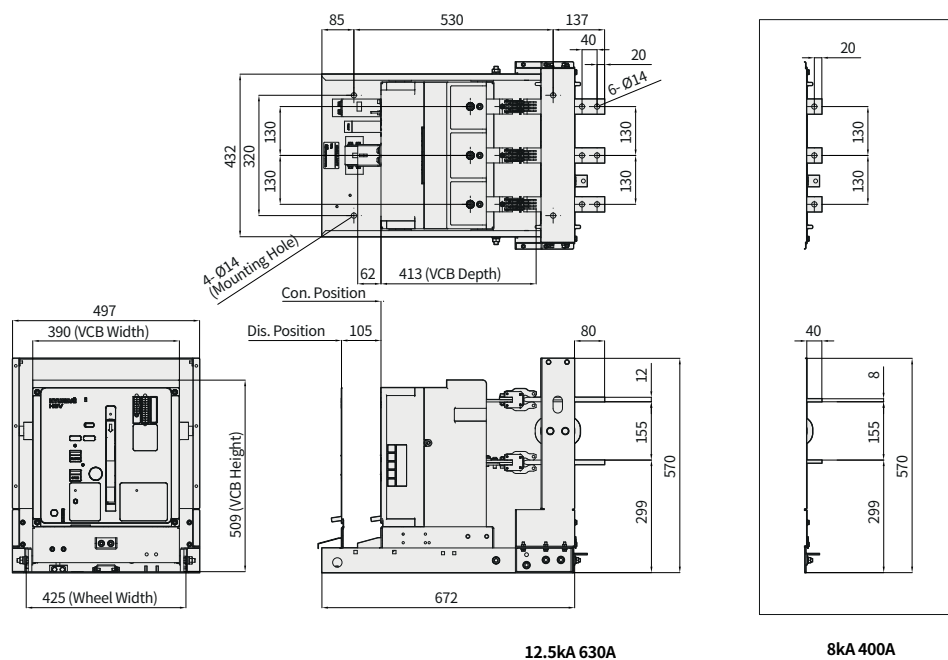
Unit : mm



## E-Type Vacuum Circuit Breakers (7.2 kV, 8/12.5kA) Draw-Out Type

HGV 1199A RV  
HGV 1111A RV

Unit : mm



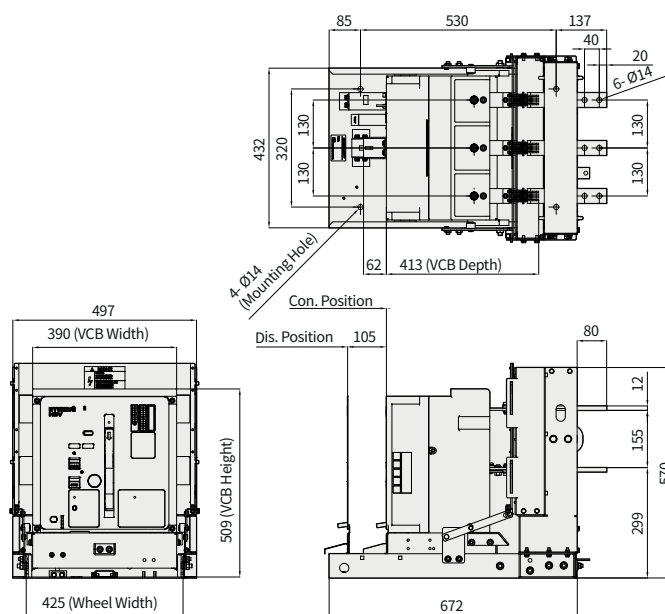
※ Dimension on this page are subject to change without notice.

# Dimensions

## F-Type Vacuum Circuit Breakers (7.2 kV, 8/12.5kA) Draw-Out Type

Unit : mm

HGV 1199A RV  
HGV 1111A RV



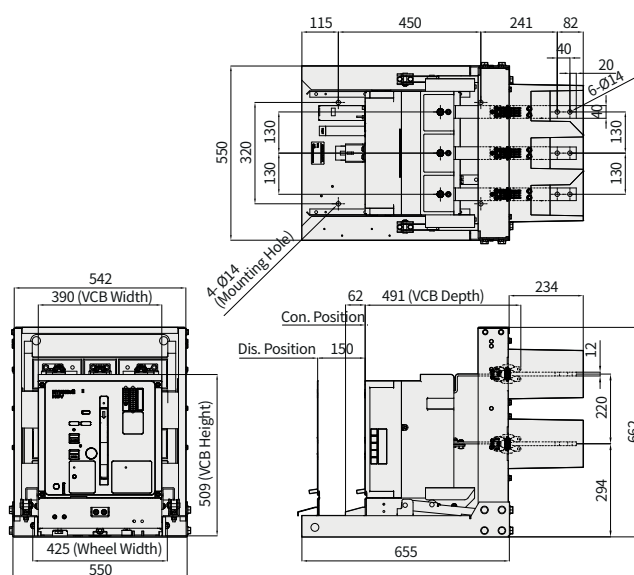
12.5kA 630A

8kA 400A

## G-Type Vacuum Circuit Breakers (7.2 kV, 8/12.5kA) Draw-Out Type

Unit : mm

HGV 1199A RV  
HGV 1111A RV



12.5kA 630A

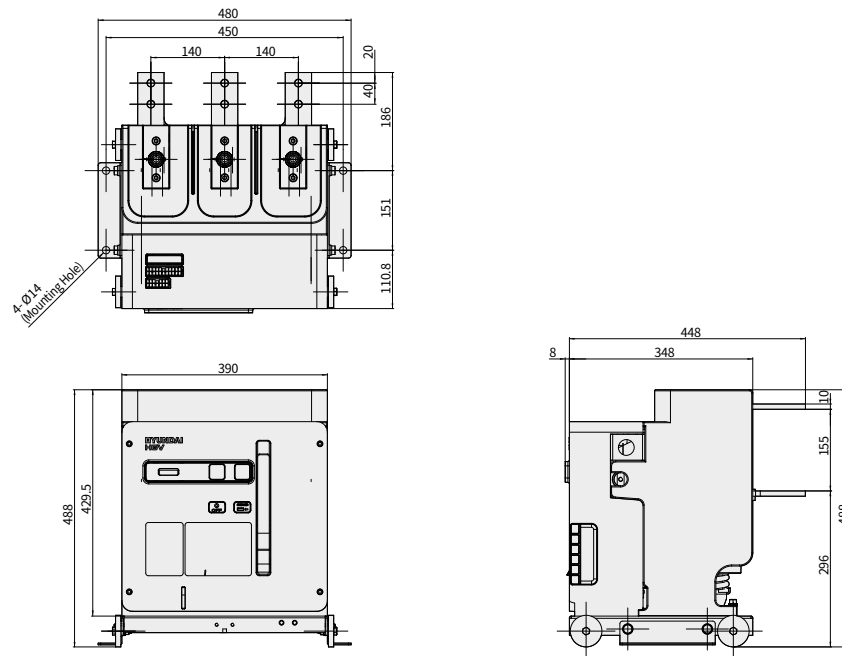
8kA 400A

※ Dimension on this page are subject to change without notice.

# X-Type Vacuum Circuit Breakers (7.2 kV, 25kA) Fixed Type

Unit : mm

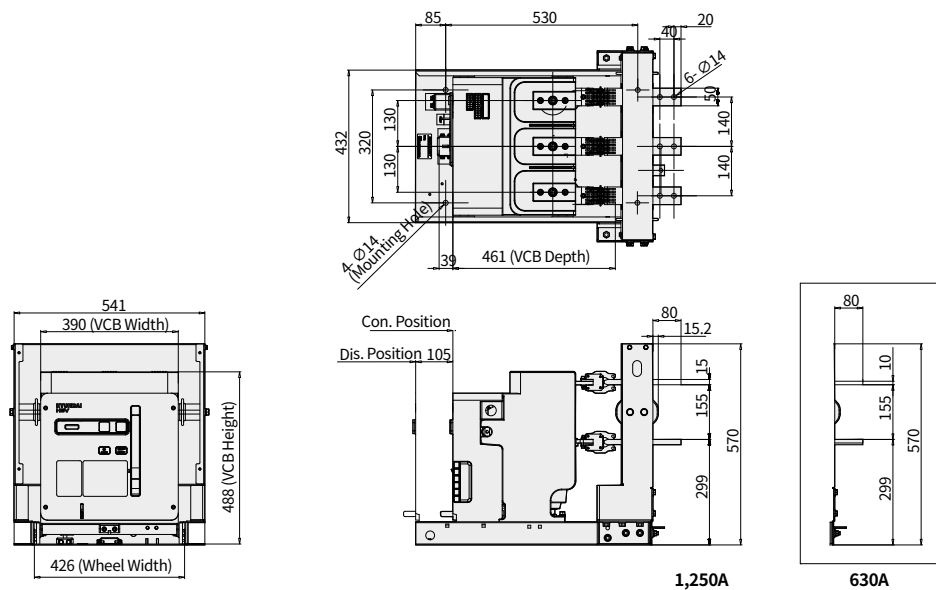
HGV 1141B  
HGV 1142B



# E-Type Vacuum Circuit Breakers (7.2 kV, 25kA) Draw-Out Type

Unit : mm

HGV 1141B  
HGV 1142B



※ Dimension on this page are subject to change without notice.

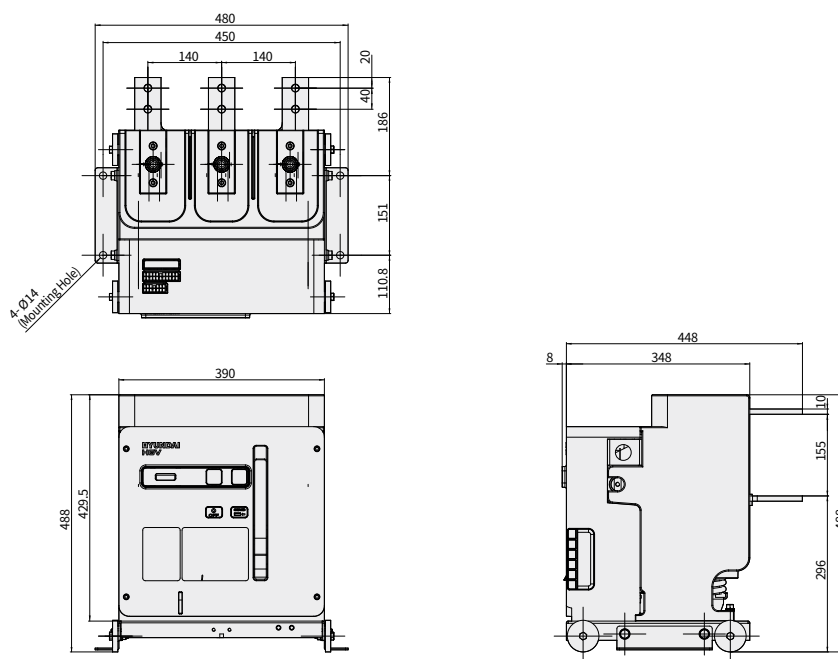


# Dimensions

## X-Type Vacuum Circuit Breakers (7.2 kV, 25kA) Fixed Type

Unit : mm

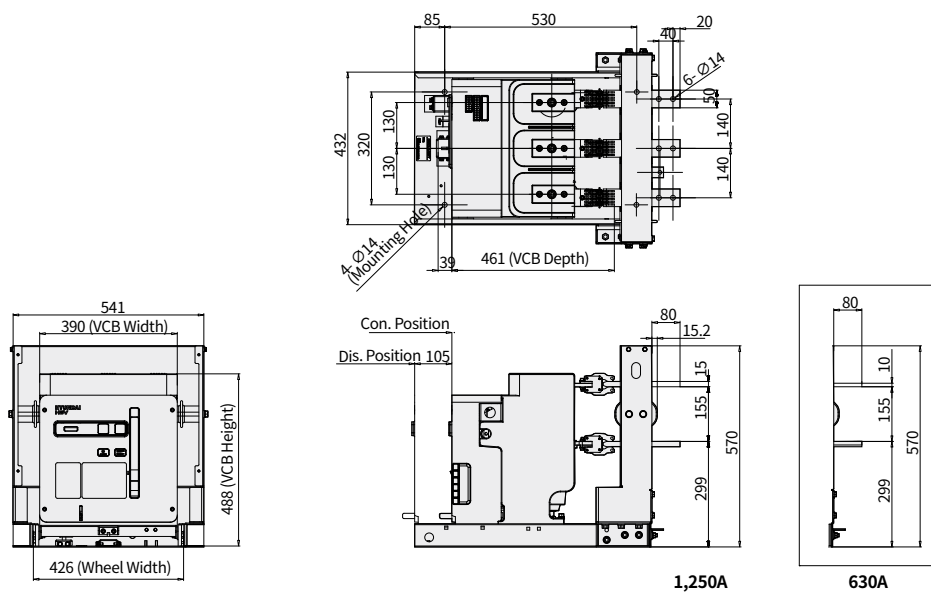
HGV 1141B  
HGV 1142B



## E-Type Vacuum Circuit Breakers (7.2 kV, 25kA) Draw-Out Type

Unit : mm

HGV 1141B  
HGV 1142B



※ Dimension on this page are subject to change without notice.

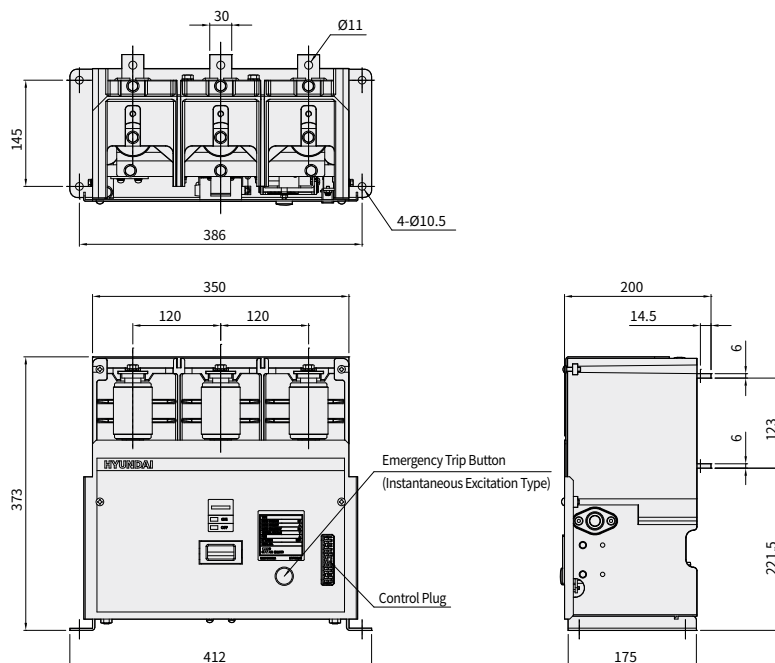


## Dimensions

### Vacuum Contactor (3.6/7.2 kV) Fixed Type

X1 and fuse not attached ; 21 pin front draw-out control plug

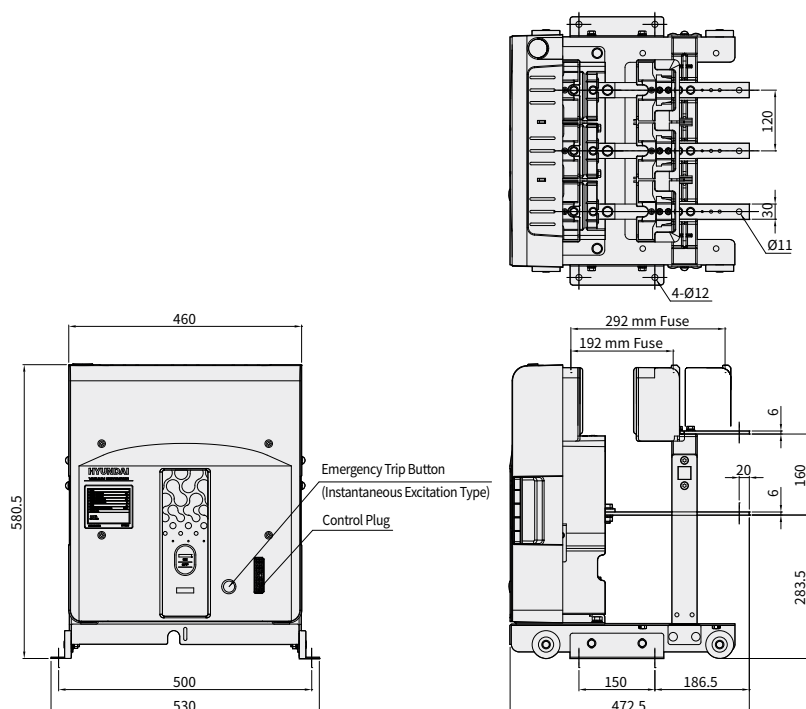
Unit : mm



### Vacuum Contactor (3.6/7.2 kV) Fixed Type

A1 and DIN fuse attached ; 21 pin front draw-out control plug

Unit : mm

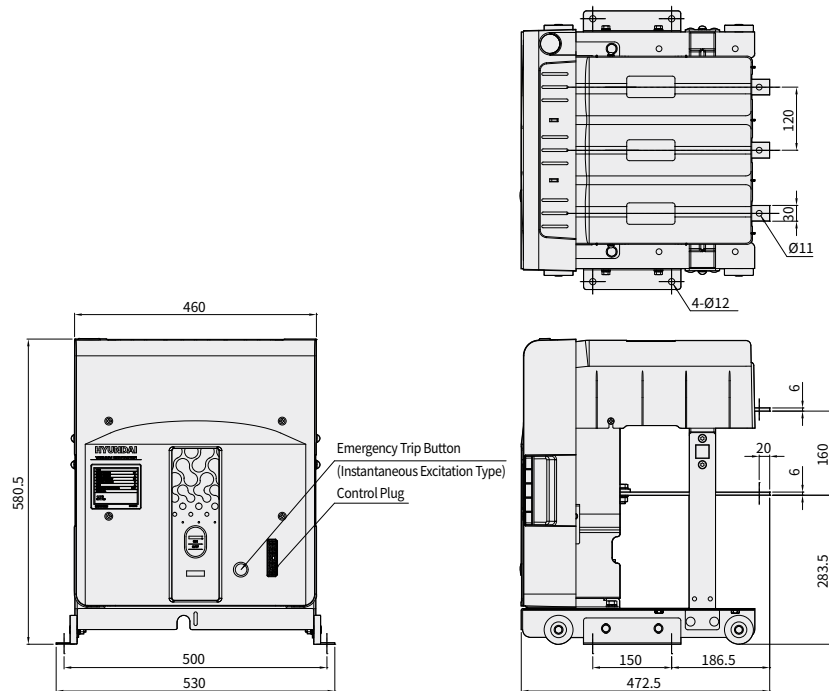


※ Dimension on this page are subject to change without notice.

## Vacuum Contactor (3.6/7.2 kV) Fixed Type

A2 and KS fuse not attached ; 21 pin front draw-out control plug

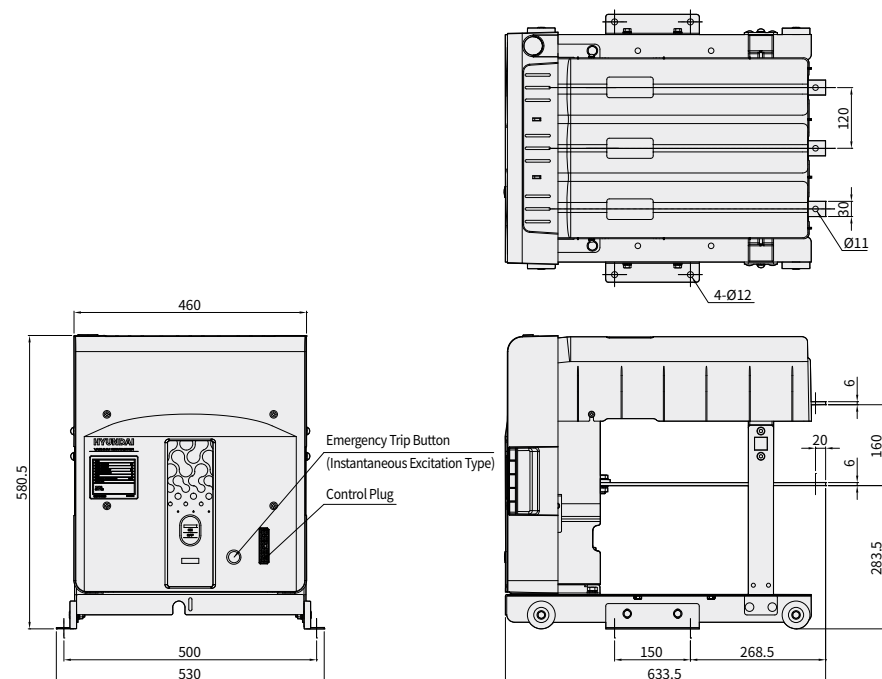
Unit : mm



## Vacuum Contactor (7.2 kV) Fixed Type

A3 and KS fuse not attached (300, 400 A for 7.2 kV motor) ; 21 pin front draw-out control plug

Unit : mm



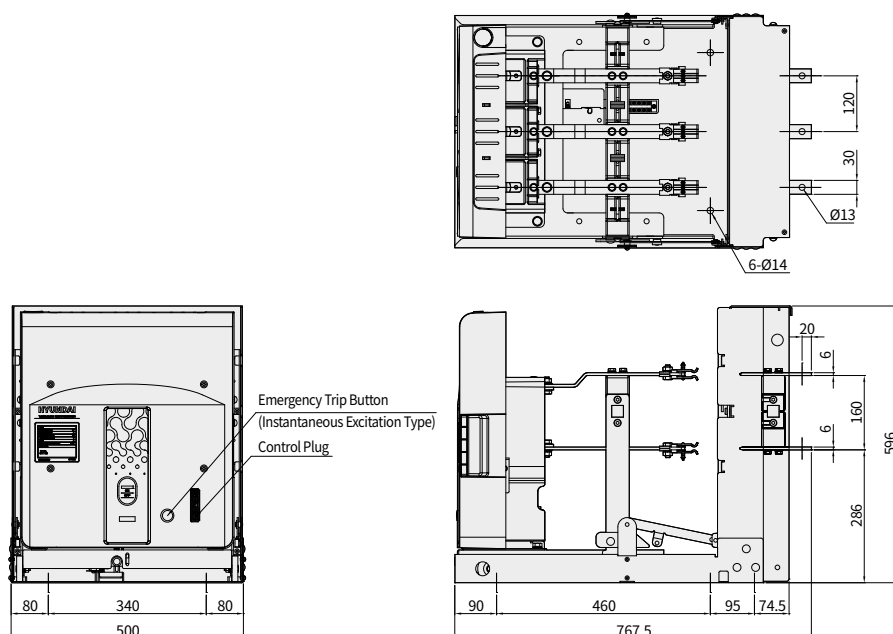
※ Dimension on this page are subject to change without notice.

## Dimensions

### E/F-Class Vacuum Contactor (3.6/7.2 kV) Draw-Out Type

B1 and fuse not attached ; 21 pin front draw-out control plug

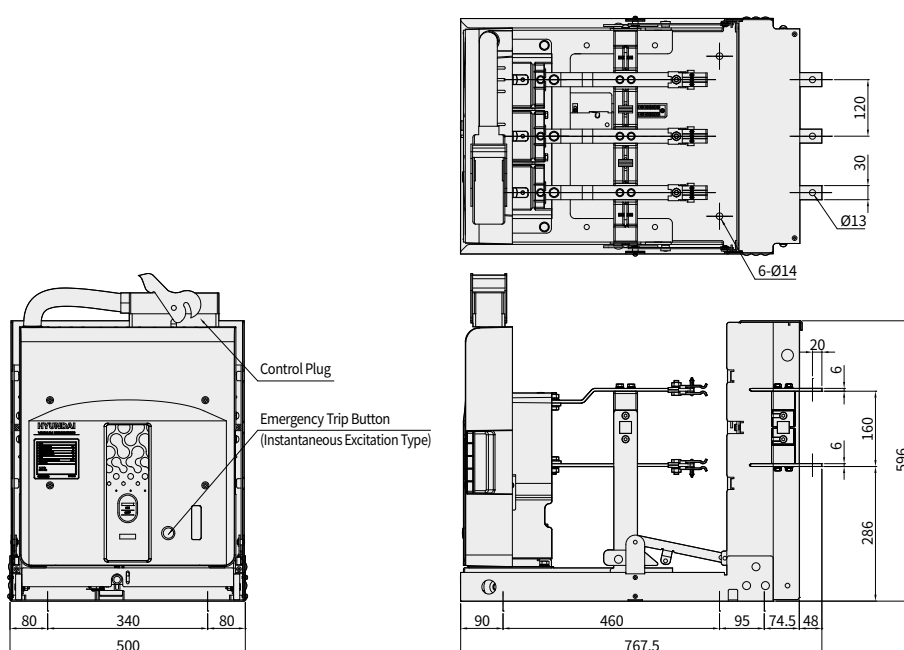
Unit : mm



### E/F-Class Vacuum Contactor (3.6/7.2 kV) Draw-Out Type

B2 and fuse not attached ; 52 pin upper part draw-out control plug

Unit : mm

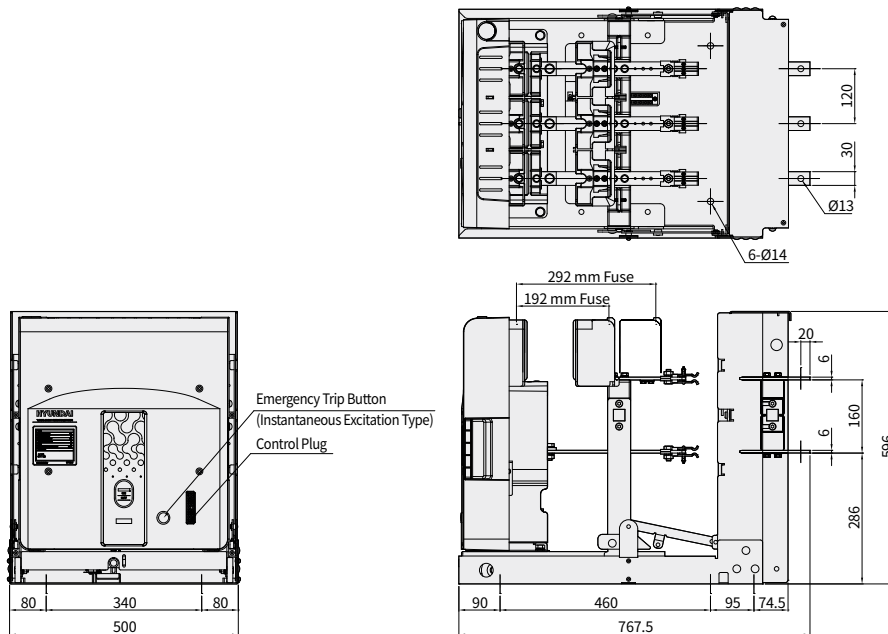


※ Dimension on this page are subject to change without notice.

## E/F-Class Vacuum Contactor (3.6/7.2 kV) Draw-Out Type

D1 and DIN fuse attached ; 21 pin front draw-out control plug

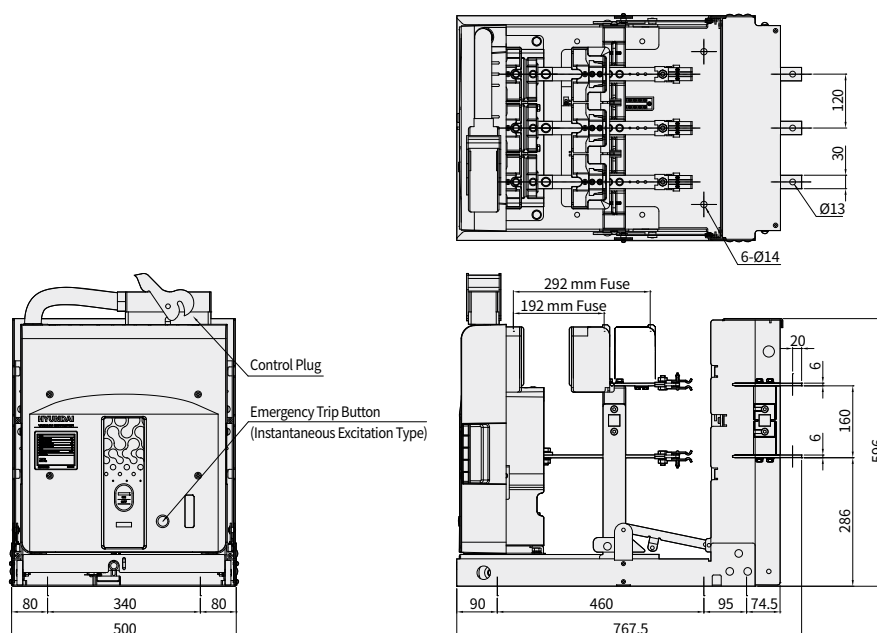
Unit : mm



## E/F-Class Vacuum Contactor (3.6/7.2 kV) Draw-Out Type

D2 and DIN fuse attached ; 52 pin upper part draw-out control plug

Unit : mm



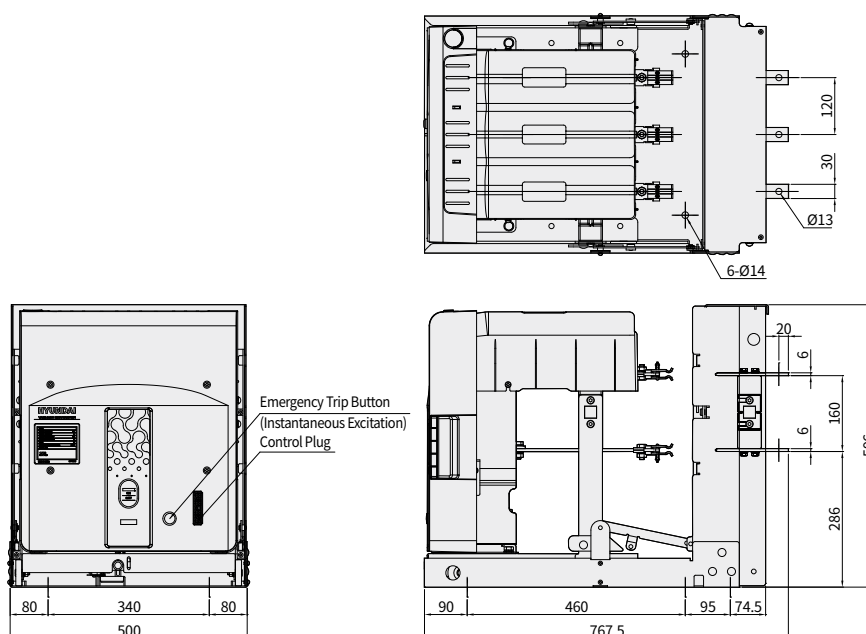
※ Dimension on this page are subject to change without notice.

## Dimensions

### E/F-Class Vacuum Contactor (3.6/7.2 kV) Draw-Out Type

D3 and KS fuse not attached ; 21 pin front draw-out control plug

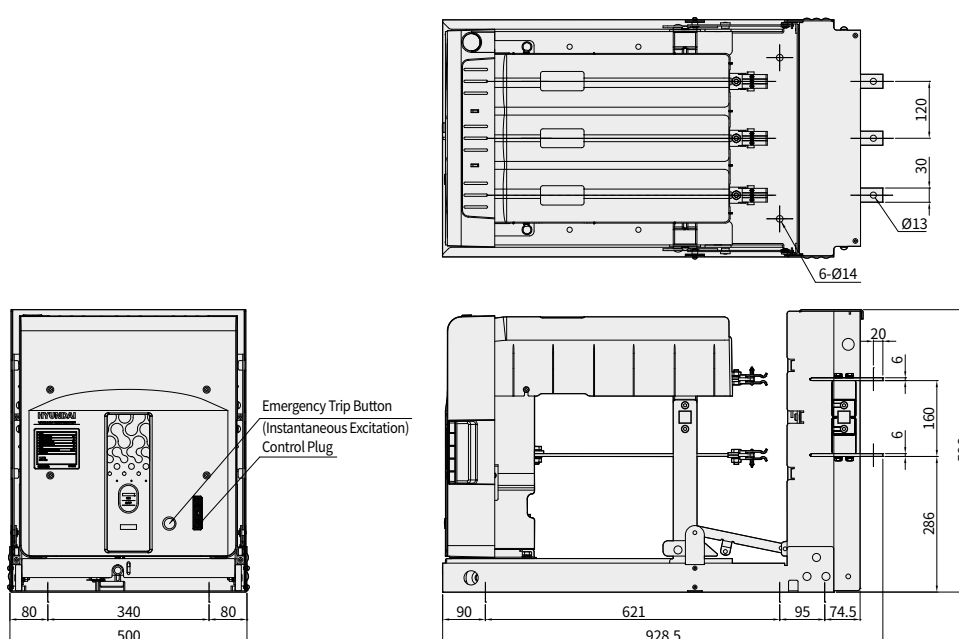
Unit : mm



### E/F-Class Vacuum Contactor (7.2 kV) Draw-Out Type

D4 and KS fuse not attached (300, 400 A for 7.2 kV motor) ;  
21 pin front draw-out control plug

Unit : mm

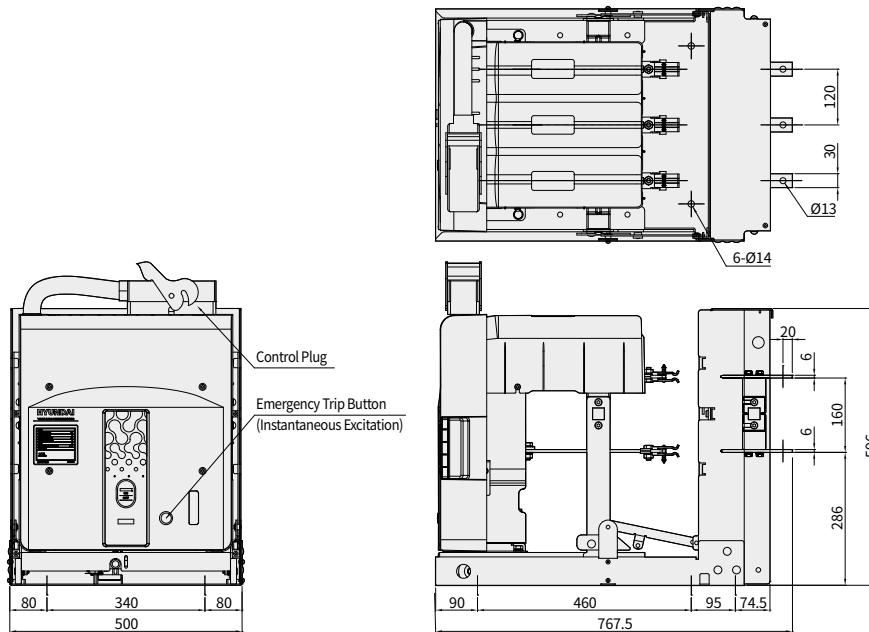


※ Dimension on this page are subject to change without notice.

## E/F-Class Vacuum Contactor (3.6/7.2 kV) Draw-Out Type

D5 and KS fuse attached ; 52 pin upper part draw-out control plug

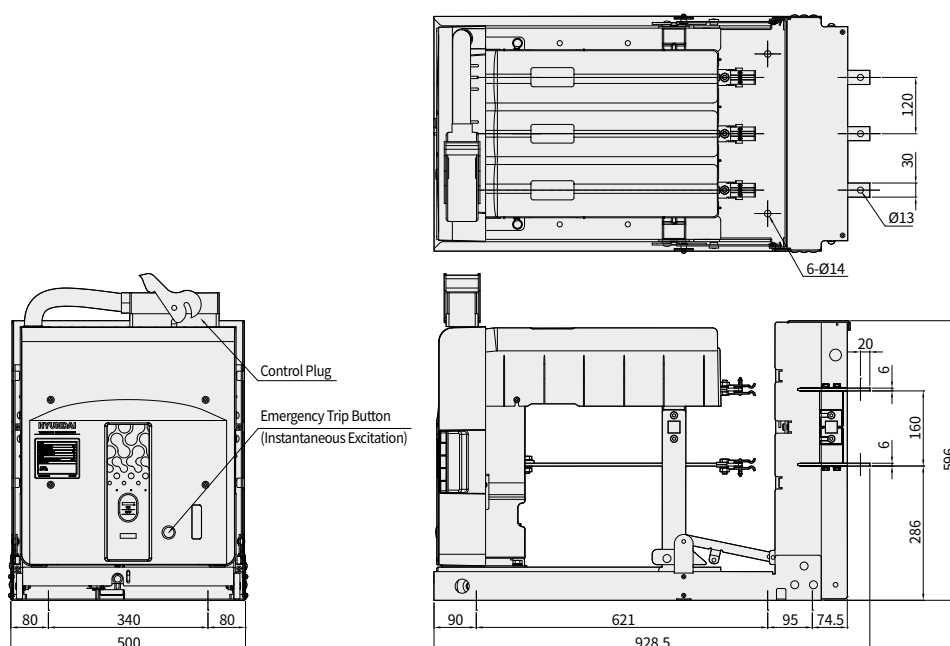
Unit : mm



## E/F-Class Vacuum Contactor (7.2 kV) Draw-Out Type

D6 and KS fuse not attached (300, 400 A for 7.2 kV motor) ; 52 pin upper part draw-out control plug

Unit : mm



※ Dimension on this page are subject to change without notice.

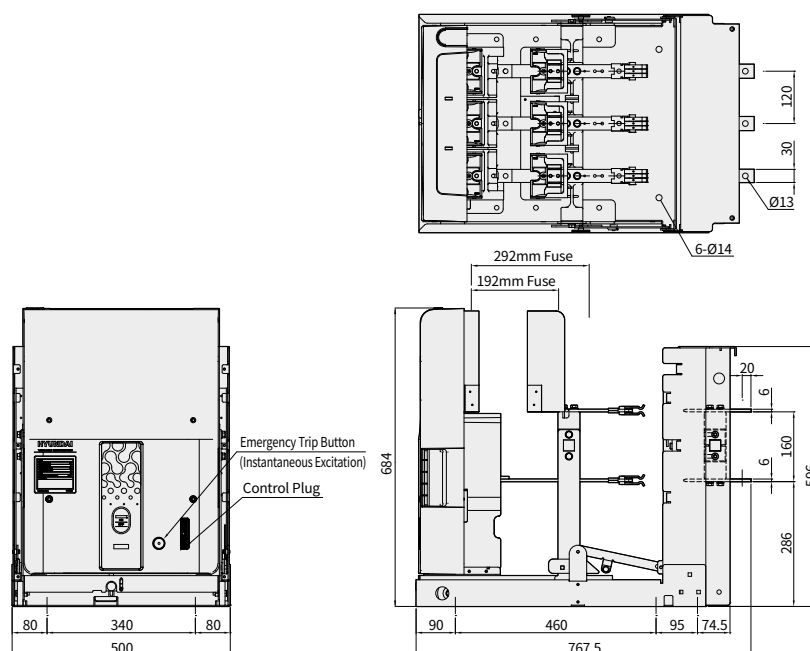


# Dimensions

## E/F-Class UVC (3.6/7.2kV) Draw-Out Type

H1, DIN fuse double attached ; 21pin front draw-out control plug

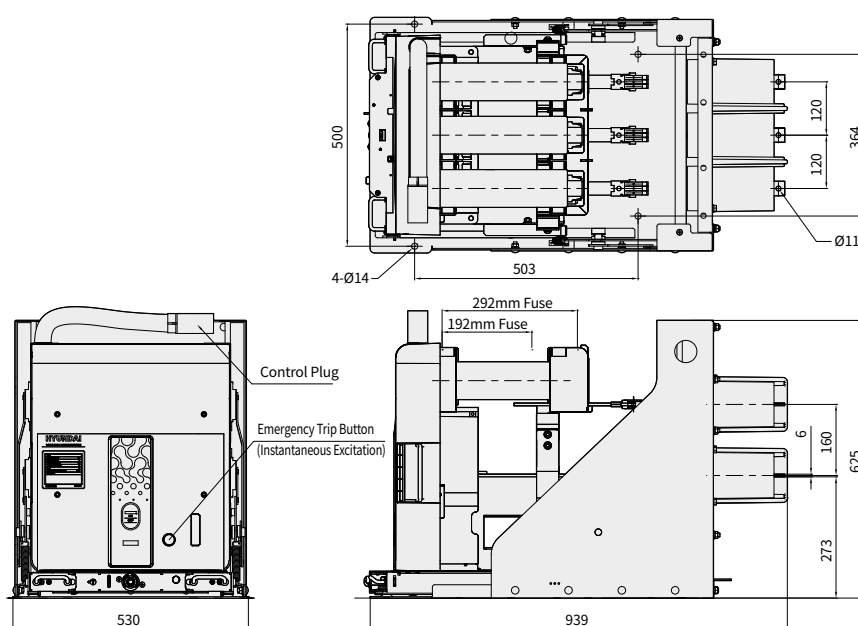
Unit : mm



## M-Class UVC (3.6/7.2kV) Screw Draw-Out Type

S1, DIN fuse attached ; 72pin upper part draw-out control plug

Unit : mm

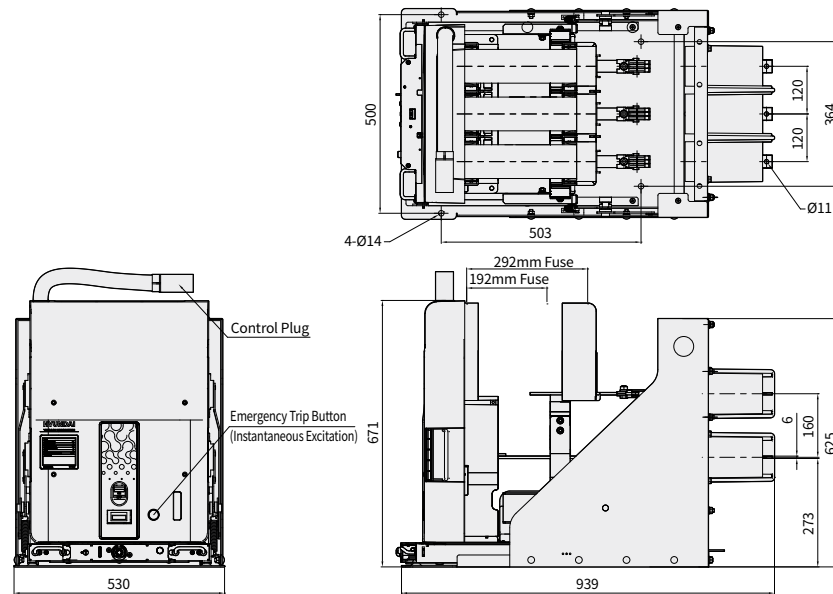


※ Dimension on this page are subject to change without notice.

**M-Class UVC (3.6/7.2kV) Screw Draw-Out Type** S4, DIN fuse double attached ; 72pin upper part draw-out control plug

S4, DIN fuse double attached ; 72pin upper part draw-out control plug

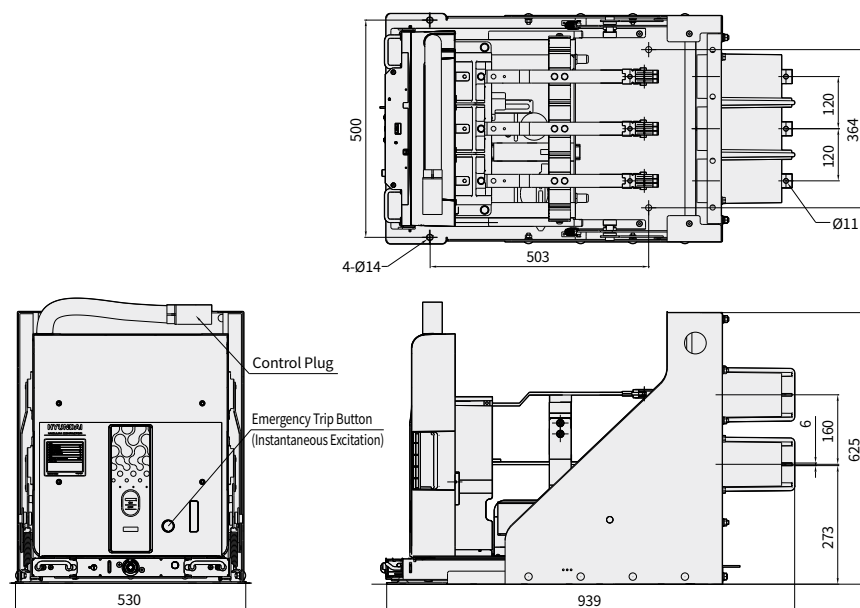
Unit : mm



**M-Class UVC (3.6/7.2kV) Screw Draw-Out Type** S5, fuse not attached ; 72pin upper part draw-outcontrol plug

S5, fuse not attached ; 72pin upper part draw-out control plug

Unit : mm



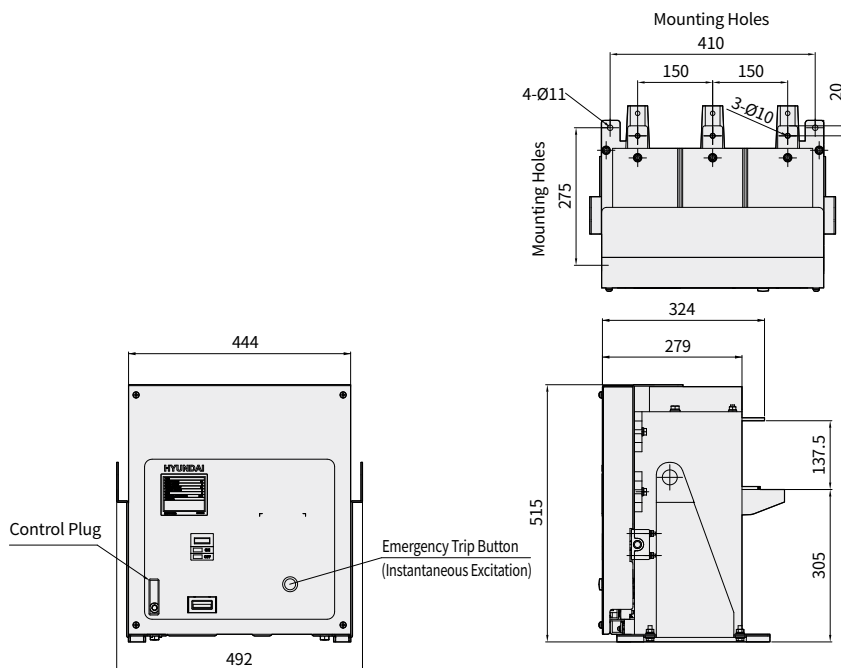
※ Dimension on this page are subject to change without notice.

## Dimensions

### UVC (12kV) Fixed Type

X1, fuse not attached ; 21pin front draw-out control plug

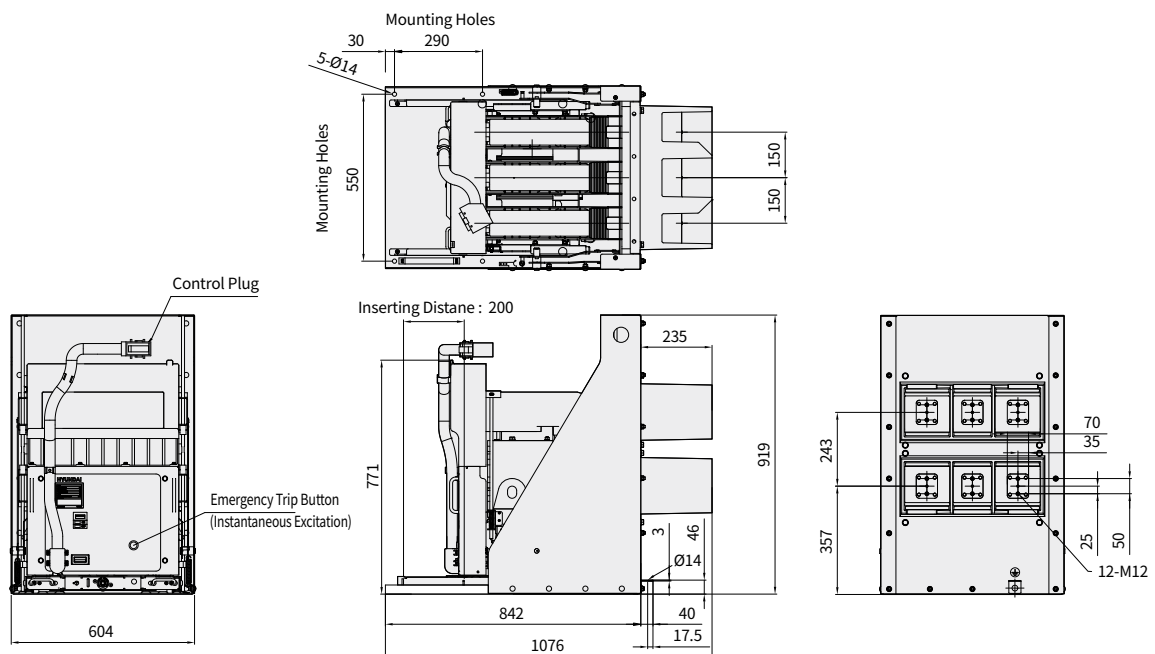
Unit : mm



### M-Class UVC(12kV) Screw Draw-Out Type

S1, DIN fuse attached/S5, fuse not attached ; 72pin upper part draw-out control plug

Unit : mm

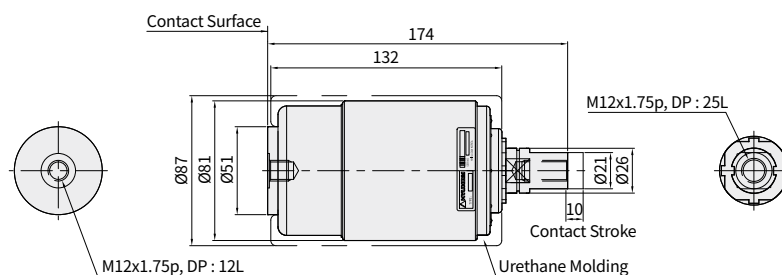




# Dimensions (Vacuum Interrupters)

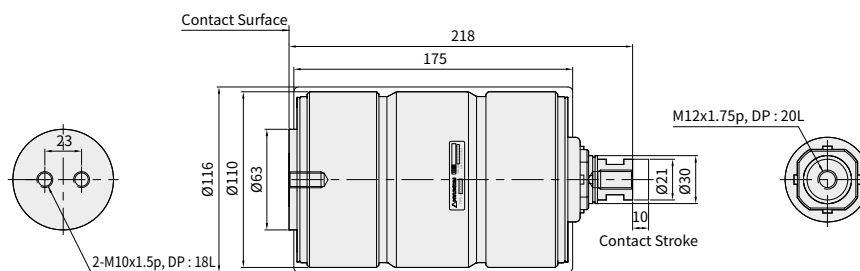
## HCV-3B

Unit : mm



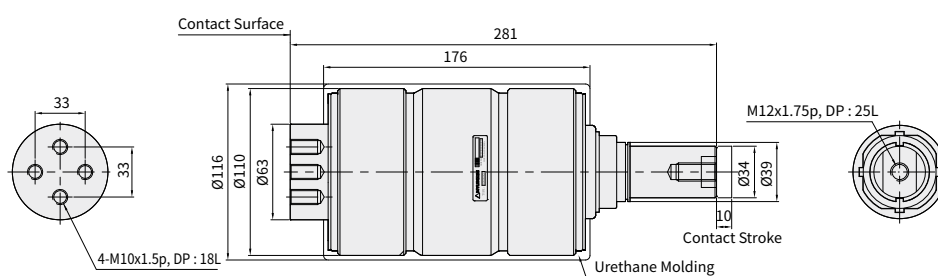
## HCV-3D

Unit : mm



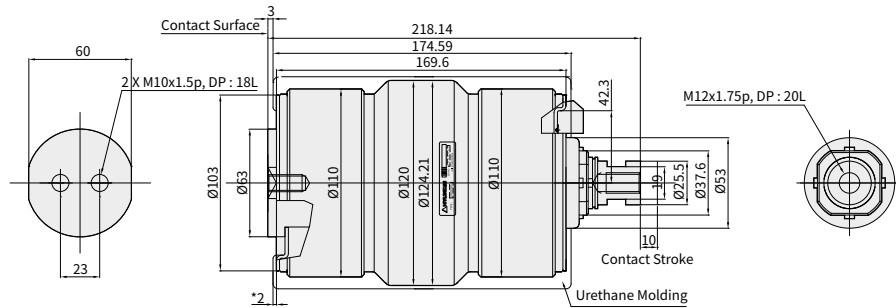
## HCV-3E

Unit : mm



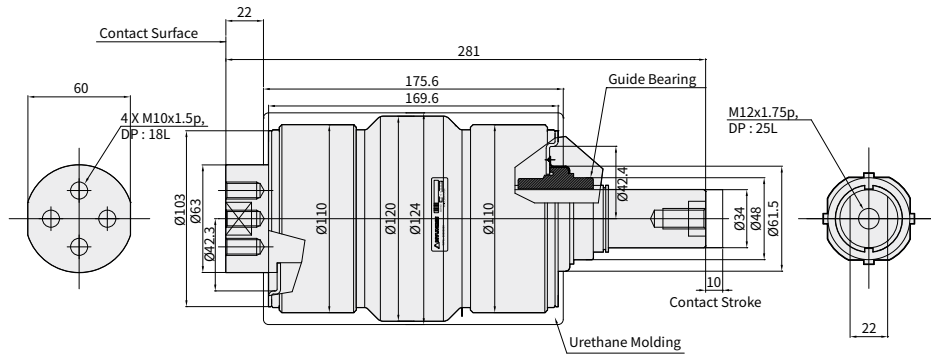
## HCV-3F

Unit : mm



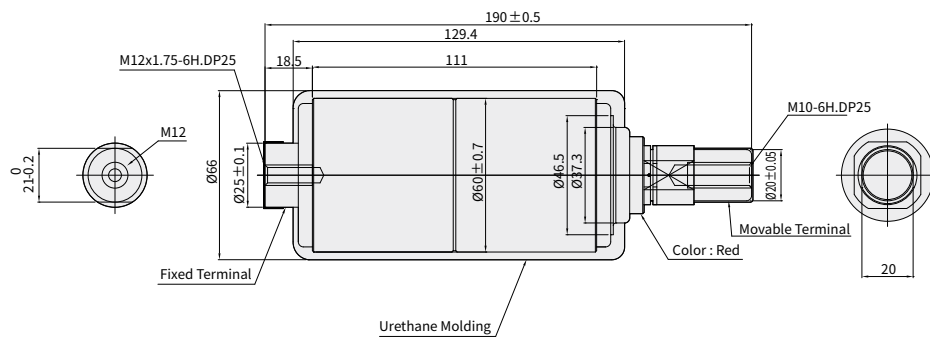
## HCV-3G

Unit : mm



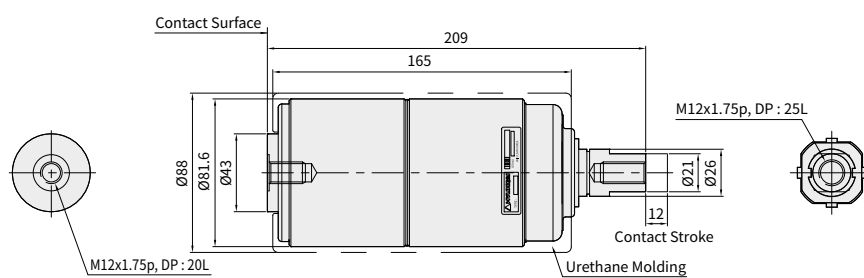
## HCV-6A

Unit : mm



## HCV-6B

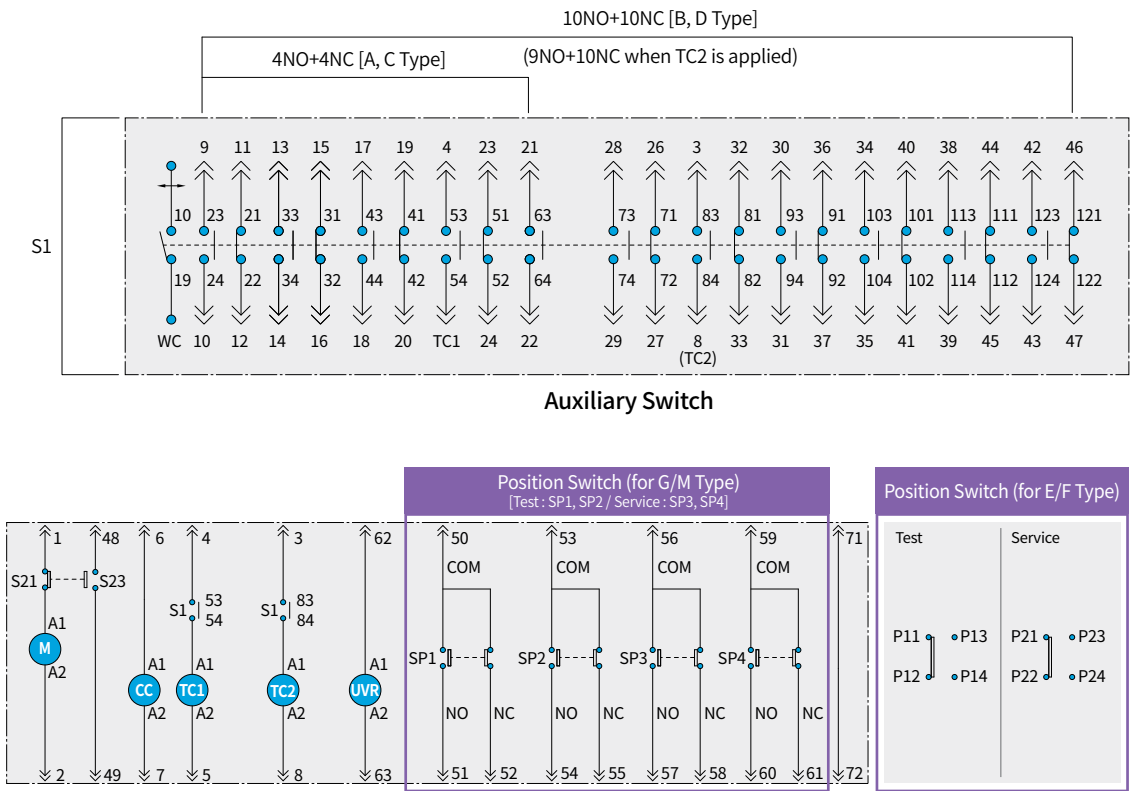
Unit : mm



※ Dimension on this page are subject to change without notice.

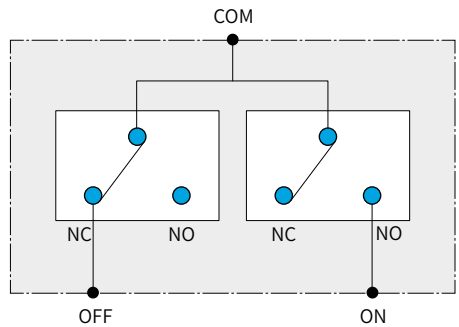
# Circuit Diagram

HGV

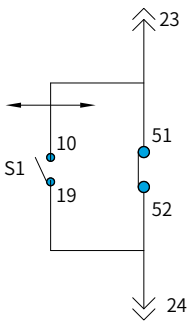


| Legend |                       |         |                                           |
|--------|-----------------------|---------|-------------------------------------------|
| M      | Motor                 | S21     | Motor Control Switch                      |
| CC     | Closing Coil (Close)  | S23     | Spring Charged Limit Switch               |
| TC1    | Trip Coil (Open)      | S1      | Auxiliary Switch                          |
| TC2    | Secondary Trip Coil   | SP1 ~ 4 | Position Switch (Test : 2C, Service : 2C) |
| UVR    | Under Voltage Release |         |                                           |

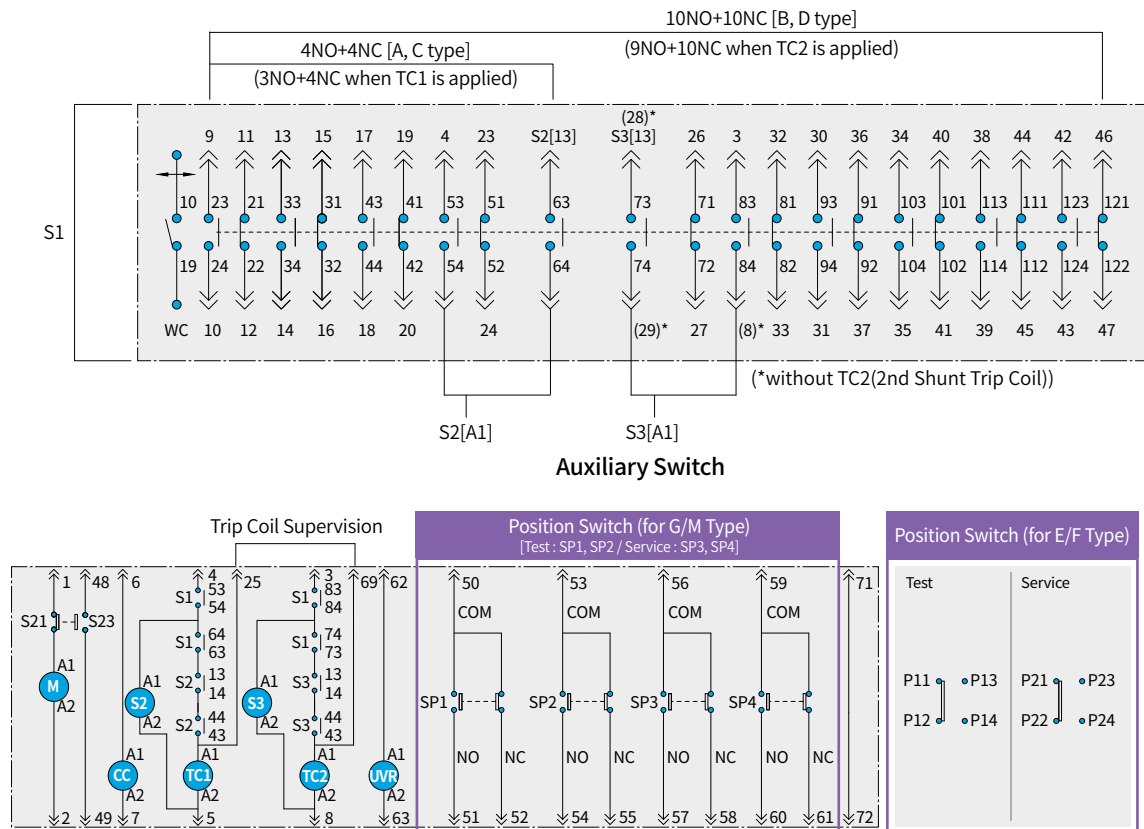
## Earthing Switch Behavior Monitoring Contact Circuit Diagram



## Early B Contact(WC) Circuit Diagram



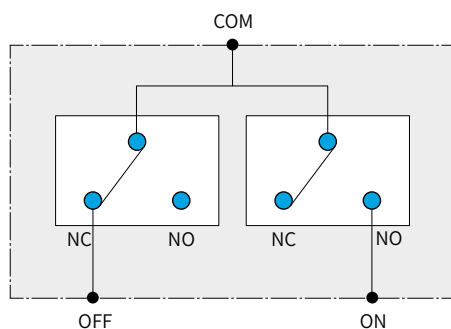
## HGV (with Trip Supervision)



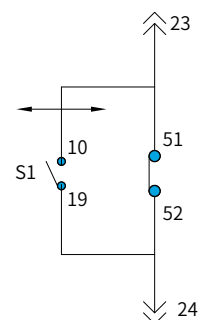
### Legend

|     |                       |         |                                           |
|-----|-----------------------|---------|-------------------------------------------|
| M   | Motor                 | S21     | Motor Control Switch                      |
| CC  | Closing Coil (Close)  | S23     | Spring Charged Limit Switch               |
| TC1 | Trip Coil (Open)      | S1      | Auxiliary Switch                          |
| TC2 | Secondary Trip Coil   | S2, S3  | HGR Relay                                 |
| UVR | Under Voltage Release | SP1 ~ 4 | Position Switch (Test : 2C, Service : 2C) |

## Earthing Switch Behavior Monitoring Contact Circuit Diagram



## Early B Contact(WC) Circuit Diagram

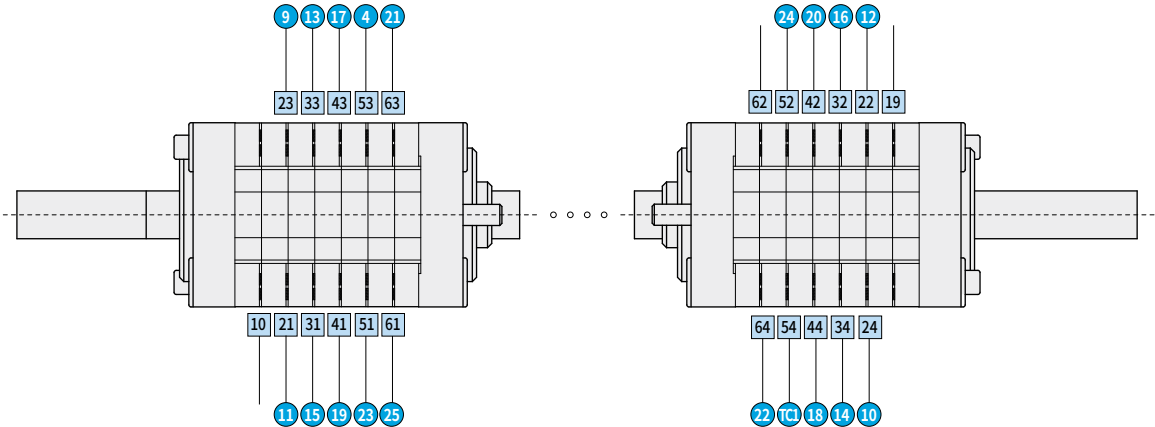




# Circuit Diagram

HGV

Auxiliary Switch

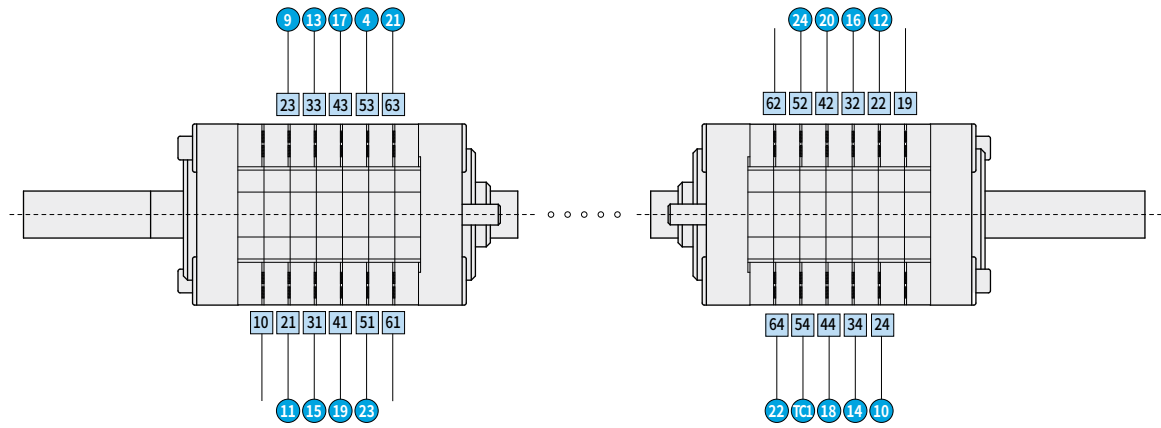


Terminal No.

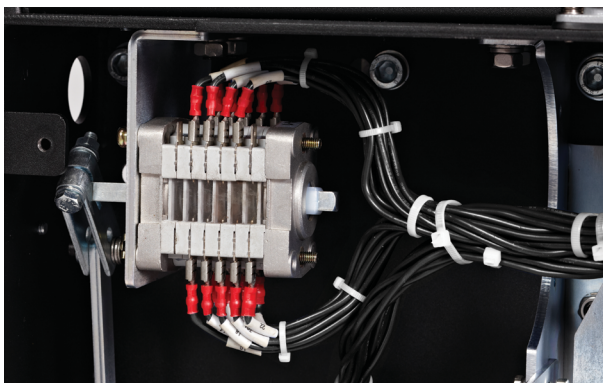
|    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |

Control Jack Panel Side

### Auxiliary Switch



### Control Jack Terminal No.



Auxiliary Switch

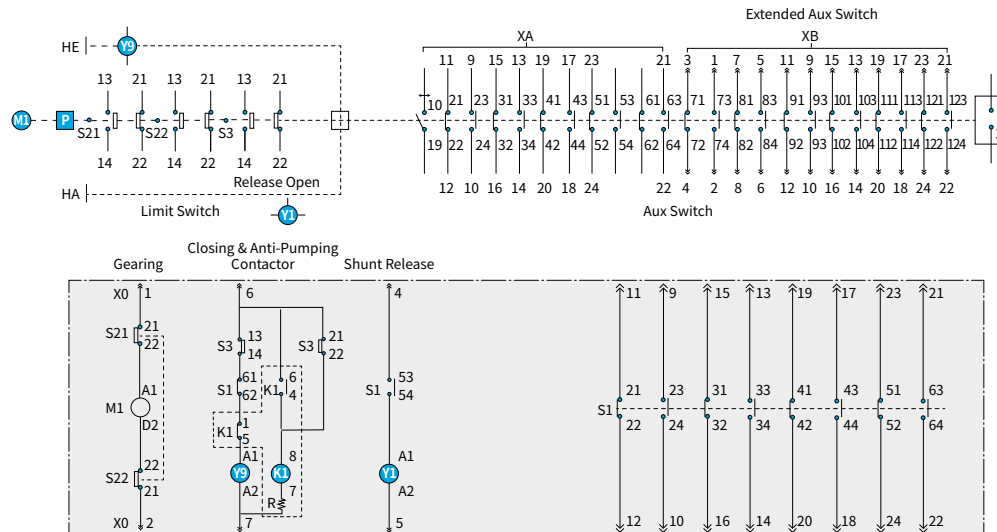


Control Jack Terminal

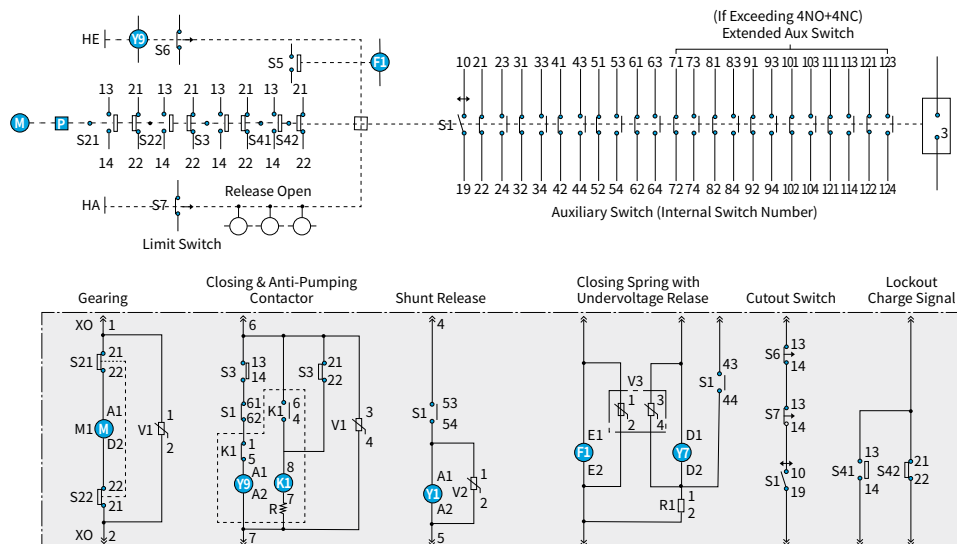
# Circuit Diagram

## HVF

### Standard Circuit Diagram



### Varist and Attached Release Detached Circuit



- |                             |                            |                                                         |
|-----------------------------|----------------------------|---------------------------------------------------------|
| F1 : Lockout                | Y1 : Tripping Solenoid     | S3 : Limit Switch (K1 Control)                          |
| HA : Manual Tripping        | Y7 : Under Voltage Release | S41, S42 : Limit Switch (Spring charging status signal) |
| HE : Manual Closing         | Y9 : Closing Solenoid      | S6, S7 : Cutout Switch                                  |
| K1 : Anti-Pumping Relay     | R1 : Resistance            | V1, V2, V3 : Varistor Module                            |
| M1 : Motor                  | S1 : Aux Switch            | X0 : Plug/Socket                                        |
| P : Stored Energy Mechanism | S21, S22 : Limit Switch    |                                                         |
- (Charge spring and then interrupt motor circuit)

※ For request for B type jack, circuit diagram has the same draw-out number of additional aux contact circuit diagram of HVG VCB on page 115.

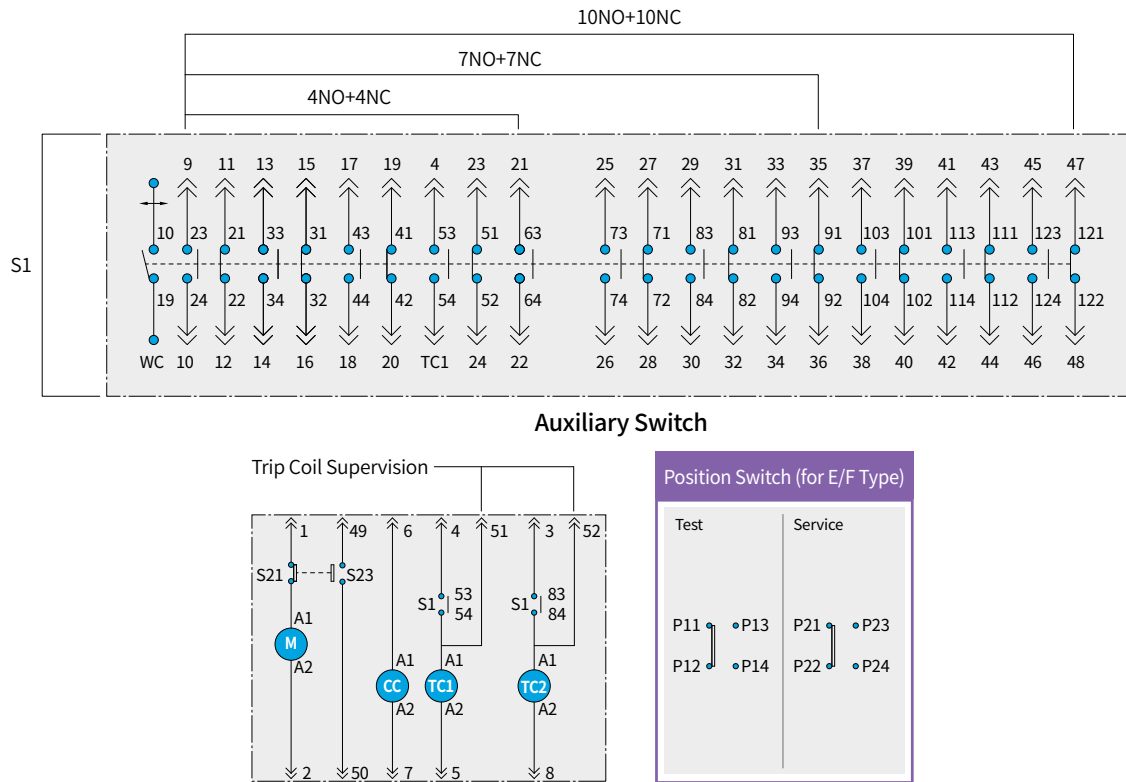
For request for draw-out type option, No. 3 and 8 are drawn-out by default. For request for fixed type option, No. 21 and 22 are drawn out by default.

For request for two or more options, refer to Vacuum Circuit Breakers (Technical Data) on our website.

No 10 and 19 of S1 is a wiping contact; connecting it in parallel with 'b' contact enables early 'b' contact configuration. (Option : WC)

M1 (Charging Motor) can be used both for AC and DC.

## Compact HGV



## Legend

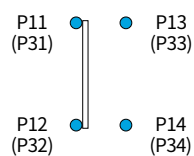
|     |                      |     |                             |
|-----|----------------------|-----|-----------------------------|
| M   | Motor                | S21 | Motor Control Switch        |
| CC  | Closing Coil (Close) | S23 | Spring Charged Limit Switch |
| TC1 | Trip Coil (Open)     | S1  | Auxiliary Switch            |
| TC2 | Secondary Trip Coil  |     |                             |

※ For request for 2nd Trip Coil(R□) / Spring Charged Signal(S1) / Trip Supervision(TS), 4NO+3NC, 7NO+6NC, 10NO+9NC is applied.  
(S1,TS,R□ simultaneous application not allowed)

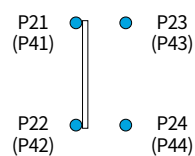
※ For request for R□, 23→3, 24→8 / S1, 23→49, 24→50 / TS, 23→51, 24→52 (Applied to 2nd Trip Coil)

## Position Switch Diagram

## Test Position



## Service Position

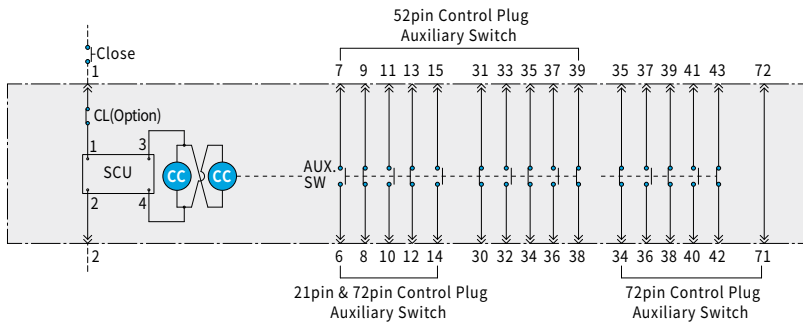


※ When VCB is in the Test Position, P13,P14 are connected.  
When VCB is in the Service Position, P23,P24 are connected.

## Circuit Diagram

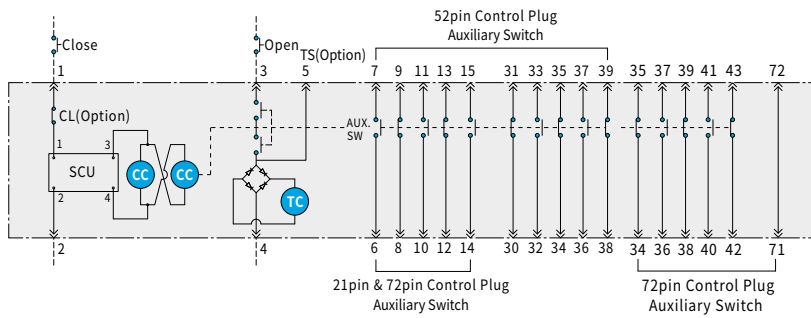
### UVC

#### Continuous Excitation Type (3.6/7.2 kV)

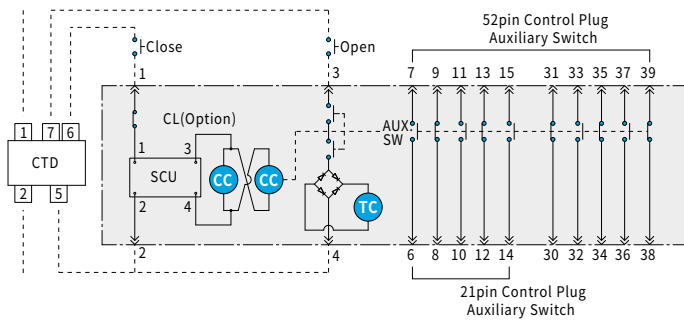


CL : Electrical Position Interlock (Attachment)  
 CC : Closing Coil  
 AUX. Switch : Aux Contact  
 TC : Trip Coil  
 CTD : Condenser Trip Device  
 SCU : Controller  
 TS : Trip Coil Supervision Contact

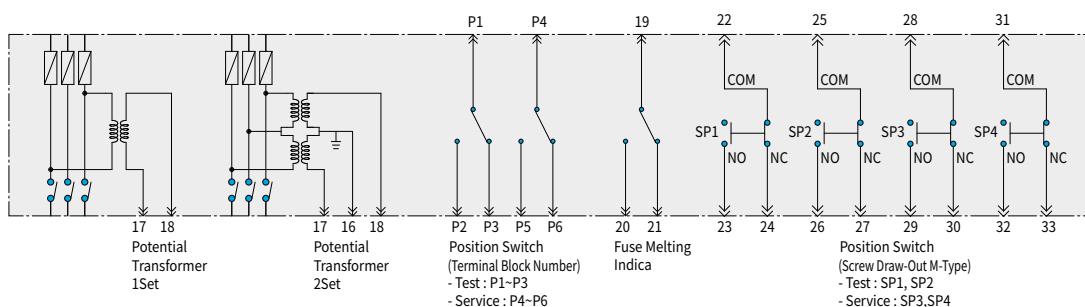
#### Instantaneous Excitation Type (3.6/7.2 kV)



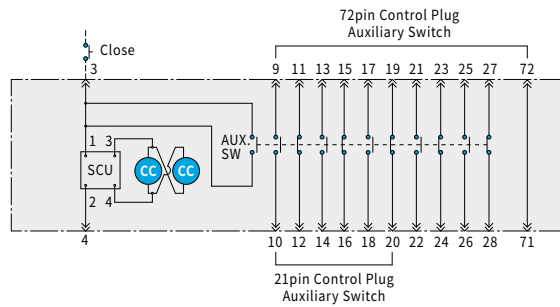
#### Instantaneous Excitation Type (CTD Attached) (3.6/7.2 kV)



#### Attachment (3.6/7.2 kV)

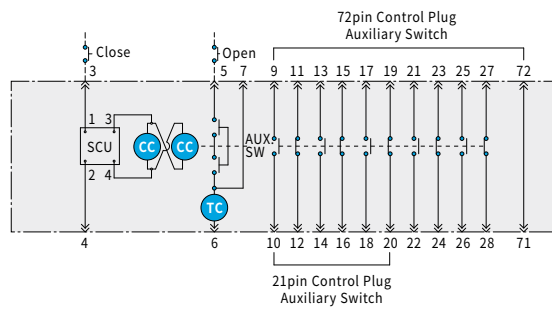


### Continuous Excitation Type (12 kV)

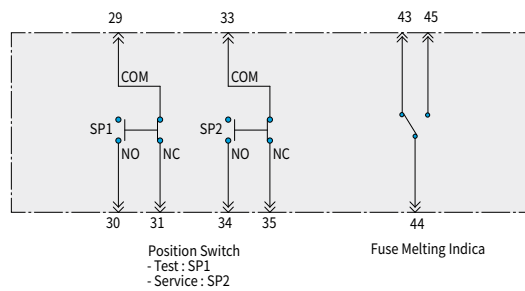


CL : Electrical Position Interlock (Attachment)  
CC : Closing Coil  
AUX, Switch : Aux Contact  
TC : Trip Coil  
CTD : Condenser Trip Device  
SCU : Controller

### Instantaneous Excitation Type (12 kV)



### Instantaneous Excitation Type (CTD Attached) (12 kV)



## Order Code

### HGV Type (For Body + Cradle Order)

| HGV   |                            | 61            |                       | 4              |         | 4             |         | F                    |                    | GS                  |                                                           |
|-------|----------------------------|---------------|-----------------------|----------------|---------|---------------|---------|----------------------|--------------------|---------------------|-----------------------------------------------------------|
| Model |                            | Rated Voltage |                       | Rated Breaking |         | Rated Current |         | Inter-Phase Distance |                    | Installation Method |                                                           |
| HGV   | HG Vacuum Circuit Breakers | 10            | 7.2 kV <sup>13)</sup> | 1              | 12.5 kA | 1             | 630 A   | A                    | 130 <sup>14)</sup> | XA                  | Fixed-Type                                                |
|       |                            | 11            | 7.2kV                 | 4              | 25 kA   | 2             | 1,250 A | B                    | 140 <sup>14)</sup> | EA                  | Draw-Out (E-Type Body)                                    |
|       |                            | 21            | 12 kV                 | 5              | 31.5 kA | 4             | 2,000 A | C                    | 150                | ES                  | Draw-Out (Shutter Unattached Cradle)                      |
|       |                            | 31            | 17.5 kV               | 6              | 40 kA   | 6             | 2,500 A | D                    | 165                | E3                  | Draw-Out (ES-Type 24 kV, Inter-Phase 300 mm, 630/1,250 A) |
|       |                            | 61            | 24/25.8 kV            | 7              | 50 kA   | 7             | 3,150 A | F                    | 210                | FA                  | Draw-Out (F-Type Body)                                    |
|       |                            |               |                       | 9              | 8 kA    | 8             | 4,000 A | I                    | 275                | FS                  | Draw-Out (Insulating Shutter Attached Cradle)             |
|       |                            |               |                       |                |         | 9             | 400 A   |                      |                    | F3                  | Draw-Out (FS-Type 24 kV, Inter-Phase 300 mm, 630/1,250 A) |
|       |                            |               |                       |                |         |               |         |                      |                    | GA                  | Draw-Out (GS-Type Body)                                   |
|       |                            |               |                       |                |         |               |         |                      |                    | GS <sup>15)</sup>   | Draw-Out (Bushing and Metal Shutter Attached Cradle)      |
|       |                            |               |                       |                |         |               |         |                      |                    | GE <sup>1)</sup>    | Draw-Out (GS-Type + Earthing Switch)                      |
|       |                            |               |                       |                |         |               |         |                      |                    | MS                  | Draw-Out (Cell Type Cradle)                               |
|       |                            |               |                       |                |         |               |         |                      |                    | ME <sup>1)</sup>    | Draw-Out (MS-Type + Earthing Switch)                      |

### HGV Type (For Separate Order for Cradle)

| GVL   |                                   | 61            |                       | 4              |         | 4             |         | F                    |                    | ME                  |          |
|-------|-----------------------------------|---------------|-----------------------|----------------|---------|---------------|---------|----------------------|--------------------|---------------------|----------|
| Model |                                   | Rated Voltage |                       | Rated Breaking |         | Rated Current |         | Inter-Phase Distance |                    | Installation Method |          |
| GVL   | HG Vacuum Circuit Breakers Cradle | 10            | 7.2 kV <sup>13)</sup> | 1              | 12.5 kA | 1             | 630 A   | A                    | 130 <sup>14)</sup> | ES, E3              | Draw-Out |
|       |                                   | 11            | 7.2kV                 | 4              | 25 kA   | 2             | 1,250 A | B                    | 140 <sup>14)</sup> | FS, F3              | Draw-Out |
|       |                                   | 21            | 12 kV                 | 5              | 31.5 kA | 4             | 2,000 A | C                    | 150                | GS                  | Draw-Out |
|       |                                   | 31            | 17.5 kV               | 6              | 40 kA   | 6             | 2,500 A | D                    | 165                | GE <sup>1)</sup>    | Draw-Out |
|       |                                   | 61            | 24/25.8 kV            | 7              | 50 kA   | 7             | 3,150 A | F                    | 210                | MS                  | Draw-Out |
|       |                                   |               |                       | 9              | 8 kA    | 8             | 4,000 A | I                    | 275                | ME <sup>1)</sup>    | Draw-Out |
|       |                                   |               |                       | 9              |         | 400 A         |         |                      |                    |                     |          |

※ 1) Earthing switch attaching type should contain attachment "EE" in its order code.

2) R□ and C2 cannot be applied simultaneously.

3) Only available with UVR.

4) Apply both close button and trip button.

5) Only MS and ME types can be applied.

6) Applicable only to GA, GS, GE, MS, and ME types.

7) □ : A (4NO + 4NC applied), B (10NO + 10NC applied)

8) □ : 2 (1NO + 1NC applied per position), 4 (2NO + 2NC applied per position)

9) Applicable only to GE and ME.

10) Lead cable is not provided. (See 56 page)

11) Order for breaker only should contain "EI".

12) Applicable to 12 kV products. (See 36 page rating and specifications)

□ : 1 (Inter-phase 150 mm), 2 (Inter-phase 210 mm, 25 kA),  
3 (Inter-phase 275 mm), 4 (Inter-phase 210 mm, 31.5/40/50 kA)

13) Only Compact HGV 7.2kV 8/12.5kA can be applied.

14) Only Compact HGV can be applied.

15) In case of Compact HGV, Insulation Shutter applied.

| 4                                 | 4                       | 4                    | C                                                | P2                   |
|-----------------------------------|-------------------------|----------------------|--------------------------------------------------|----------------------|
| Closing Operation (Motor) Voltage | Closing Control Voltage | Trip Control Voltage | Auxiliary Contacts and Control Circuit Connector | Attachments          |
| 1                                 | DC 24 V                 |                      | A <sup>10)</sup>                                 | EE <sup>1)</sup>     |
| 2                                 | AC/DC 48 ~ 60 V         |                      | B <sup>10)</sup>                                 | U□ <sup>2)</sup>     |
| 4                                 | AC/DC 100 ~ 130 V       |                      | C                                                | R□ <sup>2)</sup>     |
| 6                                 | AC/DC 200 ~ 250 V       |                      | D                                                | KG                   |
|                                   |                         |                      | A <sup>14)</sup>                                 | BC <sup>4)</sup>     |
|                                   |                         |                      | B <sup>14)</sup>                                 | PA                   |
|                                   |                         |                      | D <sup>14)</sup>                                 | DI <sup>5)</sup>     |
|                                   |                         |                      | X <sup>14)</sup>                                 | JL <sup>6)</sup>     |
|                                   |                         |                      |                                                  | N□ <sup>7)</sup>     |
|                                   |                         |                      |                                                  | P□ <sup>8)</sup>     |
|                                   |                         |                      |                                                  | TS                   |
|                                   |                         |                      |                                                  | KP                   |
|                                   |                         |                      |                                                  | KE <sup>9)</sup>     |
|                                   |                         |                      |                                                  | EI <sup>6) 11)</sup> |
|                                   |                         |                      |                                                  | B□ <sup>12)</sup>    |
|                                   |                         |                      |                                                  | ZZ                   |

| 0                                 | 0                       | 0                    | 0                           | KL               |
|-----------------------------------|-------------------------|----------------------|-----------------------------|------------------|
| Closing Operation (Motor) Voltage | Closing Control Voltage | Trip Control Voltage | Auxiliary Contacts and Line | Attachments      |
| 0                                 | None                    |                      | 0                           | KE               |
|                                   |                         |                      |                             | EE <sup>1)</sup> |
|                                   |                         |                      |                             | DM <sup>5)</sup> |
|                                   |                         |                      |                             | ZZ               |



## Order Code

### HVF Type (For Body + Cradle Order)

| HVF   |                         | 11            |            | 4              |         | 1             |         | C                                  |     | ES                  |                                                                                        |
|-------|-------------------------|---------------|------------|----------------|---------|---------------|---------|------------------------------------|-----|---------------------|----------------------------------------------------------------------------------------|
| Model |                         | Rated Voltage |            | Rated Breaking |         | Rated Current |         | Inter-Phase Distance <sup>1)</sup> |     | Installation Method |                                                                                        |
| HVF   | Vacuum Circuit Breakers | 11            | 7.2 kV     | 1              | 12.5 kA | 1             | 630 A   | A                                  | 130 | XA                  | Fixed-Type                                                                             |
|       |                         | 21            | 12 kV      | 4              | 25 kA   | 2             | 1,250 A | B                                  | 140 | EA                  | Draw-Out (E-Type Body)                                                                 |
|       |                         | 31            | 17.5 kV    | 5              | 31.5 kA | 4             | 2,000 A | C                                  | 150 | ES                  | Draw-Out (Shutter Unattached Cradle)                                                   |
|       |                         | 61            | 24/25.8 kV | 6              | 40 kA   | 6             | 2,500 A | D                                  | 165 | FA                  | Draw-Out (F-Type Body)                                                                 |
|       |                         | 70            | 36/38 kV   | 7              | 50 kA   | 7             | 3,150 A | E                                  | 178 | FS                  | Draw-Out (Shutter Attached Cradle)                                                     |
|       |                         | 71            | 36 kV      |                |         | 8             | 4,000 A | F                                  | 210 | IA                  | Draw-Out (IG-Type Body)                                                                |
|       |                         |               |            |                |         |               |         | G                                  | 250 | IG                  | Draw-Out (Bushing and Insulation Shutter Attached Cradle)                              |
|       |                         |               |            |                |         |               |         | H                                  | 254 | IE <sup>2)</sup>    | Draw-Out (IG-Type + Earthing Switch)                                                   |
|       |                         |               |            |                |         |               |         | I                                  | 275 | GA                  | Draw-Out (GS-Type Body)                                                                |
|       |                         |               |            |                |         |               |         | J                                  | 300 | GS                  | Draw-Out (Bushing and Metal Shutter Attached Cradle)                                   |
|       |                         |               |            |                |         |               |         | K                                  | 350 | GE <sup>2)</sup>    | Draw-Out (GS-Type + Earthing Switch)                                                   |
|       |                         |               |            |                |         |               |         |                                    |     | CS                  | Draw-Out (G-Level VCB for HVF 7.2/12 kV Vessel)                                        |
|       |                         |               |            |                |         |               |         |                                    |     | E3                  | Draw-Out (24 kV Shutter Unattached, Phase-to-Phase Distance 300 mm Cradle 630/1,250 A) |
|       |                         |               |            |                |         |               |         |                                    |     | F3                  | Draw-Out (24 kV Shutter Attached, Phase-to-Phase Distance 300 mm Cradle 630/1,250 A)   |
|       |                         |               |            |                |         |               |         |                                    |     | SA                  | Draw-Out (Screw Operation Type Body)                                                   |
|       |                         |               |            |                |         |               |         |                                    |     | SF                  | Draw-Out (Screw Operation Type, FS-Type VCB)                                           |
|       |                         |               |            |                |         |               |         |                                    |     | KD                  | Draw-Out (630/1,250 A for E-Type 24 kV for Cradle Depth 850 mm)                        |
|       |                         |               |            |                |         |               |         |                                    |     | MS                  | Draw-Out (ANSI 38 kV Draw-Out Type VCB and G-Type Cradle)                              |
|       |                         |               |            |                |         |               |         |                                    |     | WA                  | Draw-Out (ANSI 4.76 kV Draw-Out Type VCB)                                              |
|       |                         |               |            |                |         |               |         |                                    |     | MA                  | Draw-Out (HEES Standard Switchgear Models)                                             |
|       |                         |               |            |                |         |               |         |                                    |     | GK                  | Draw-Out (KEPCO Hydro and Thermal Models)                                              |

### HVF Type (With Separate Cradle Order)

| DVF   |                                | 11            |            | 4              |         | 1             |         | C                                  |     | ES                  |          |
|-------|--------------------------------|---------------|------------|----------------|---------|---------------|---------|------------------------------------|-----|---------------------|----------|
| Model |                                | Rated Voltage |            | Rated Breaking |         | Rated Current |         | Inter-Phase Distance <sup>1)</sup> |     | Installation Method |          |
| DVF   | Vacuum Circuit Breakers Cradle | 11            | 7.2 kV     | 1              | 12.5 kA | 1             | 630 A   | A                                  | 130 | ES                  | Draw-Out |
|       |                                | 21            | 12 kV      | 4              | 25 kA   | 2             | 1,250 A | B                                  | 140 | FS                  | Draw-Out |
|       |                                | 31            | 17.5 kV    | 5              | 31.5 kA | 4             | 2,000 A | C                                  | 150 | GS                  | Draw-Out |
|       |                                | 61            | 24/25.8 kV | 6              | 40 kA   | 6             | 2,500 A | D                                  | 165 | MS                  | Draw-Out |
|       |                                | 70            | 38 kV      | 7              | 50 kA   | 7             | 3,150 A | E                                  | 178 | GK                  | Draw-Out |
|       |                                | 71            | 36 kV      |                |         | 8             | 4,000 A | F                                  | 210 | IG                  | Draw-Out |
|       |                                |               |            |                |         |               |         | G                                  | 250 | GE                  | Draw-Out |
|       |                                |               |            |                |         |               |         | H                                  | 254 | SF                  | Draw-Out |
|       |                                |               |            |                |         |               |         | I                                  | 275 | IG                  | Draw-Out |
|       |                                |               |            |                |         |               |         | J                                  | 300 | E3                  | Draw-Out |
|       |                                |               |            |                |         |               |         | K                                  | 350 | F3                  | Draw-Out |

※ 1) Body phase-to-phase distance.  
Refer to 34 ~ 38 pages for selecting phase-to-phase distance.

2) Earthing Switch attaching type must have attachment EE  
(Earthing Switch operation marking point) in its order code.

| 4                                 | 4                       | 4                    | A                           | P2          |
|-----------------------------------|-------------------------|----------------------|-----------------------------|-------------|
| Closing Operation (Motor) Voltage | Closing Control Voltage | Trip Control Voltage | Auxiliary Contacts and Line | Attachments |
| 2                                 | DC 48 V                 |                      | A                           | P2          |
| 4                                 | DC 110 V                |                      | B                           | U□          |
| 5                                 | DC 125 V                |                      | C                           | R□          |
| 6                                 | DC 220 V                |                      | D                           | L□          |
| 7                                 | AC 110 V                |                      | X                           | V□          |
| 9                                 | AC 220 V                |                      | W                           | PO          |
| L                                 | DC 250 V                |                      |                             | KL          |
| A                                 | DC 24 V (Special)       |                      |                             | EL          |
| B                                 | DC 48 V (Special)       |                      |                             | CO          |
| D                                 | DC 110 V (Special)      |                      |                             | S1          |
| E                                 | DC 125 V (Special)      |                      |                             | C1          |
| F                                 | DC 220 V (Special)      |                      |                             | C2          |
| G                                 | AC 110 V (Special)      |                      |                             | EE          |
| I                                 | AC 220 V (Special)      |                      |                             | NA          |
|                                   |                         |                      |                             | NB          |
|                                   |                         |                      |                             | TC          |
|                                   |                         |                      |                             | S2          |
|                                   |                         |                      |                             | WC          |
|                                   |                         |                      |                             | ZZ          |
|                                   |                         |                      |                             | BB          |
|                                   |                         |                      |                             | BC          |
|                                   |                         |                      |                             | BO          |
|                                   |                         |                      |                             | LC          |

| 0                                 | 0                       | 0                    | 0                           | P2          |
|-----------------------------------|-------------------------|----------------------|-----------------------------|-------------|
| Closing Operation (Motor) Voltage | Closing Control Voltage | Trip Control Voltage | Auxiliary Contacts and Line | Attachments |
| 0                                 | None                    |                      | 0                           | P2          |
|                                   |                         |                      |                             | KL          |
|                                   |                         |                      |                             | ZZ          |
|                                   |                         |                      |                             | EE          |
|                                   |                         |                      |                             | LC          |

## Order Code

### UVC Type (For Body + Cradle Order)

| UVC   |                  | 6             |        | 4             |       | C                |                 | D1                |                |                                                                                           | F1       |                                            |                      |
|-------|------------------|---------------|--------|---------------|-------|------------------|-----------------|-------------------|----------------|-------------------------------------------------------------------------------------------|----------|--------------------------------------------|----------------------|
| Model |                  | Rated Voltage |        | Rated Current |       | Operation Method |                 | Connection Method |                | Fuse                                                                                      | Division |                                            | Cradle               |
| UVC   | Vacuum Contactor | 3             | 3.6 kV | 2             | 200 A | C                | Continuous-Type | X1                | Fixed-Type     | Fuse Unattached<br>21 Pin Control Plug (Front Draw-Out)                                   | 00       | Fixed-Type                                 | -                    |
|       |                  | 6             | 7.2 kV | 4             | 400 A |                  | Latch-Type      |                   |                |                                                                                           | E0       | E-Class (Shutter Unattached)               | Not Used (Body Only) |
|       |                  |               |        |               |       |                  |                 | A1                | Fixed-Type     | DIN Fuse Attached<br>21 Pin Control Plug (Front Draw-Out)                                 | E1       |                                            | Used                 |
|       |                  |               |        |               |       |                  |                 | A2                | Fixed-Type     | KS Fuse Attached<br>21 Pin Control Plug (Front Draw-Out)                                  | F0       | F-Class (Shutter Attached)                 | Not Used (Body Only) |
|       |                  |               |        |               |       |                  |                 | A3                | Fixed-Type     | KS Fuse Attached<br>300 A, 400 A for 7.2 kV Motor<br>21 Pin Control Plug (Front Draw-Out) | F1       |                                            | Used                 |
|       |                  |               |        |               |       |                  |                 | B1                | Draw-Out       | Fuse Unattached<br>21 Pin Control Plug (Front Draw-Out)                                   | M0       | M-Class (Metal Shutter attached & Bushing) | Not Used (Body Only) |
|       |                  |               |        |               |       |                  |                 | B2                | Draw-Out       | Fuse Unattached<br>52 Pin Control Plug (Top Draw-Out)                                     | M1       |                                            | Used                 |
|       |                  |               |        |               |       |                  |                 | D1                | Draw-Out       | DIN Fuse Attached<br>21 Pin Control Plug (Front Draw-Out)                                 |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | D2                | Draw-Out       | DIN Fuse Attached<br>52 Pin Control Plug (Top Draw-Out)                                   |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | D3                | Draw-Out       | KS Fuse Attached<br>21 Pin Control Plug (Front Draw-Out)                                  |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | D4                | Draw-Out       | KS Fuse Attached<br>300 A, 400 A for 7.2 kV Motor<br>21 Pin Control Plug (Front Draw-Out) |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | D5                | Draw-Out       | KS Fuse Attached<br>52 Pin Control Plug (Top Draw-Out)                                    |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | D6                | Draw-Out       | KS Fuse Attached<br>300 A, 400 A for 7.2 kV Motor<br>52 Pin Control Plug (Top Draw-Out)   |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | H1                | Draw-Out       | DIN Double Fuse Attached<br>21 Pin Control Plug (Front Draw-Out)                          |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | S1                | Screw Draw-Out | DIN Fuse Attached<br>72 Pin Control Plug (Top Draw-Out)                                   |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | S4                | Screw Draw-Out | DIN Double Fuse Attached<br>72 Pin Control Plug (Top Draw-Out)                            |          |                                            |                      |
|       |                  |               |        |               |       |                  |                 | S5                | Screw Draw-Out | DIN Fuse Unattached<br>72 Pin Control Plug (Top Draw-Out)                                 |          |                                            |                      |

| 6000                                                                           |                           |                               |                                           | L                 |                   | CM          |                               |                       |
|--------------------------------------------------------------------------------|---------------------------|-------------------------------|-------------------------------------------|-------------------|-------------------|-------------|-------------------------------|-----------------------|
| Fuse Specifications                                                            |                           |                               |                                           | Operating Voltage |                   | Attachments |                               |                       |
| 0000                                                                           | Fuse Holder Unattached    |                               |                                           | L                 | AC/DC 100 ~ 125 V | CL          | Electrical Position Interlock |                       |
| 200A                                                                           | Fuse Holder Only Attached | For LS Company KS/G-Type Fuse | 3.6 kV 50 A or below                      | H                 | AC/DC 200 ~ 230 V | CM          | Fuse Melting Indicator        | DIN Standard          |
| 200B                                                                           |                           |                               | 3.6 kV 75 ~ 200 A                         |                   |                   | CD          | Fuse Melting Indicator        | KS Standard           |
| 200C                                                                           |                           |                               | 3.6 kV 300 A, 400 A                       |                   |                   | CP          | Position Detecting Switch     |                       |
| 300B                                                                           |                           | For LS Company KS/M-Type Fuse | 3.6 kV 100 A or below                     |                   |                   | P4          | Position Detecting Indicator  | Screw Draw-Out M Type |
| 300C                                                                           |                           |                               | 3.6 kV 150 ~ 200 A                        |                   |                   | T1          | 1 Potential Transformer       | 3.3 kV/110 V          |
| 300D                                                                           |                           |                               | 3.6 kV 300 A, 400 A                       |                   |                   | T2          | 1 Potential Transformer       | 3.3 kV/220 V          |
| 400A                                                                           |                           | For LS company KS/G-Type Fuse | 7.2 kV 60 A or below                      |                   |                   | T3          | 1 Potential Transformer       | 6.6 kV/110 V          |
| 400B                                                                           |                           |                               | 7.2 kV 75 ~ 100 A                         |                   |                   | T5          | 1 Potential Transformer       | 6.6 kV/220 V          |
| 400C                                                                           |                           |                               | 7.2 kV 150 ~ 200 A                        |                   |                   | T4          | 2 Potential Transformer       | 3.3 kV/110 V          |
| 500B                                                                           |                           | For LS company KS/M-Type Fuse | 7.2 kV 50 A or below                      |                   |                   | T7          | 2 Potential Transformer       | 3.3 kV/220 V          |
| 500C                                                                           |                           |                               | 7.2 kV 100 ~ 200 A                        |                   |                   | T6          | 2 Potential Transformer       | 6.6 kV/110 V          |
| 500D                                                                           |                           |                               | 7.2 kV 300 A, 400 A                       |                   |                   | T8          | 2 Potential Transformer       | 6.6 kV/220 V          |
| 6000                                                                           |                           | DIN-Type                      | Length 192 mm, SIBA Company or LS Company |                   |                   | T5          | Trip Coil Supervision Contact | Screw Draw-Out M Type |
| 600A                                                                           |                           |                               | Length 292 mm, SIBA Company 315 A, 355 A  |                   |                   |             |                               |                       |
| 600B                                                                           |                           | DIN-Type Double               | Length 192mm                              |                   |                   |             |                               |                       |
| □□□□<br>4 Digits<br>Excluding<br>UVCS from<br>Spare Part<br>Fuse Order<br>Code | Fuse Attached             | 6□□□                          | SIBA Company Fuse (7.2 kV)                |                   |                   |             |                               |                       |
|                                                                                |                           | 7□□□                          | SIBA Company Fuse (12 kV)                 |                   |                   |             |                               |                       |
|                                                                                |                           | 2□□□                          | LS Company KS/G-Type Fuse                 |                   |                   |             |                               |                       |
|                                                                                |                           | 3□□□                          | LS Company KS/M-Type Fuse                 |                   |                   |             |                               |                       |
|                                                                                |                           | 4□□□                          | LS Company KS/G-Type Fuse                 |                   |                   |             |                               |                       |
|                                                                                |                           | 5□□□                          | LS Company KS/M-Type Fuse                 |                   |                   |             |                               |                       |
|                                                                                |                           | 8□□□                          | LS Company DIN-Type Fuse                  |                   |                   |             |                               |                       |
|                                                                                |                           | 9□□□                          | LS Company DIN-Type Fuse                  |                   |                   |             |                               |                       |

Order Code

UVC Type 12kV (For Body + Cradle Order)

| UVC   |                  | 8             |      | 4             |      | C                |                 | S1                |                |                                                             | M1       |                                               |                         |  |  |
|-------|------------------|---------------|------|---------------|------|------------------|-----------------|-------------------|----------------|-------------------------------------------------------------|----------|-----------------------------------------------|-------------------------|--|--|
| Model |                  | Rated Voltage |      | Rated Current |      | Operation Method |                 | Connection Method |                | FUSE                                                        | Division |                                               | Cradle                  |  |  |
| UVC   | Vacuum contactor | 8             | 12kV | 2             | 200A | C                | Continuous-Type | X1                | Fixed-Type     | Fuse Unattached<br>21pin Control Plug<br>(Front Draw-Out)   | 00       | Fixed-Type                                    | -                       |  |  |
|       |                  |               |      | 4             | 400A |                  |                 |                   |                | DIN Fuse Attached<br>72pin Control Plug<br>(Top Draw-Out)   |          |                                               | Not Used<br>(Body Only) |  |  |
|       |                  |               |      |               |      | L                | Latch-Type      | S1                | Screw Draw-Out | DIN Fuse Unattached<br>72pin Control Plug<br>(Top Draw-Out) | M0       | M-Class<br>(Metal Shutter attached & Bushing) | Used                    |  |  |
|       |                  |               |      |               |      |                  |                 |                   |                |                                                             |          |                                               |                         |  |  |
|       |                  |               |      |               |      |                  |                 | S5                | Screw Draw-Out |                                                             | M1       |                                               |                         |  |  |
|       |                  |               |      |               |      |                  |                 |                   |                |                                                             |          |                                               |                         |  |  |

| 7000                |                           |          |                           |
|---------------------|---------------------------|----------|---------------------------|
| FUSE Specifications |                           |          |                           |
| 0000                | Fuse Holder Unattached    |          |                           |
| 6000                | Fuse Holder Only Attached | DIN-Type | Length 192mm              |
| 7000                |                           |          | Length 292mm              |
| 700A                |                           |          | Length 442mm              |
| 6□□□                | Fuse Attached             | DIN-Type | SIBA Company Fuse (7.2kV) |
| 7□□□                |                           |          | SIBA Company Fuse (12kV)  |

| L                 |                  |
|-------------------|------------------|
| Operating Voltage |                  |
| L                 | AC/DC 100 ~ 125V |
| H                 | AC/DC 200 ~ 230V |

| DM          |                              |
|-------------|------------------------------|
| Accessories |                              |
| DM          | Fuse Melting Indicator       |
| DP          | Position Detecting Indicator |

# Order Code

## VI Order Code

| HCV   |                     | 6B     |                                               |
|-------|---------------------|--------|-----------------------------------------------|
| Model |                     | Rating |                                               |
| VI    | Vacuum Interrupters | 3B     | 7.2/12/17.5 kV 25 kA 630/1,250/2,000 A        |
|       |                     | 3D     | 7.2/12/17.5 kV 31.5/40 kA 1,250/2,000 A       |
|       |                     | 3E     | 7.2/12/17.5 kV 31.5/40 kA 2,500/3,150/4,000 A |
|       |                     | 3F     | 7.2/12/17.5 kV 50 kA 1,250/2,000 A            |
|       |                     | 3G     | 7.2/12/17.5 kV 50 kA 2,500/3,150/4,000 A      |
|       |                     | 6A     | 24/25.8 kV 12.5 kA 630 A                      |
|       |                     | 6B     | 24/25.8 kV 12.5/25 kA 630/1,250/2,000 A       |
|       |                     |        |                                               |

## Operating Environment

### Standard Operating Environment

Defining values below have been set in accordance with IEC 62271-100 (IEC 62271-1).

| Ambient Temperature | - 5 ~ + 40 °C

(Average day temperature below 35 °C)

| Operating Altitude | Less than 1,000 m above sea level

| Relative Humidity | Less than 95 % (Daily average less than 95 %)

The environment may affect insulation performance and the durability of the vacuum circuit breaker thus, make sure to check the operation environmental conditions before application.



For operation in a high temperature exceeding 40 °C, follow the derating in accordance with the ambient temperature in the catalog.



Operation in a humid place with frequent heavy rain may deteriorate dielectric strength and electrical performance.



For saving and using in a dusty and humid place, it is recommended to use anti-dust cover and moisture preventer. Excessive shock and vibration can cause damage to the operating mechanism.



For a long-term ON or OFF, it is recommended to regularly open/close load current to maintain the interrupting performance.



When there is much corrosive gas, it should be kept in a closed protective structure to minimize damage due to corrosion.



In high altitude mountains, the dielectric strength is degraded, thus check the insulation performance correction factor and apply higher rated products.

### Special Operation Environments

HG-Series vacuum circuit breakers are designed/manufactured to operate at a standard operating environment specified in the IEC standard. In order to operate the breaker in a special environment as follows, contact us.

- In case altitude and ambient temperature does not fall in the standard operating environment
- Places with much sea breeze or salt
- Places with heavy snow
- Places with frequent shock and vibration
- In case relative humidity does not fall in the standard operating environment
- In case humidity is high and rainfall is frequent
- Places with much dust, vapor, corrosive and flammable gases and wet steam
- Other special environment that does not fall in the standard environment category



## Operating Environment

### Compensation of Insulation Performance where Altitude above Sea Level Exceeds 1,000 m

Since the higher the elevation the more insulation performance degradation, refer to below correction factor to select the product to operate.

※ **Product Selection** ≥ Commercial Frequency Withstand Voltage and Brain Shock Withstand Voltage × Correction Factor

For example, to select a product to operate in a place where rated voltage is 7.2 kV and sea level altitude is 2,000 m,

- Correction factor for 2,000 m is 1.13

- Withstand voltage required for rated voltage :

Commercial frequency withstand voltage = 20 kV/min, Brain shock withstand voltage = 60 kV

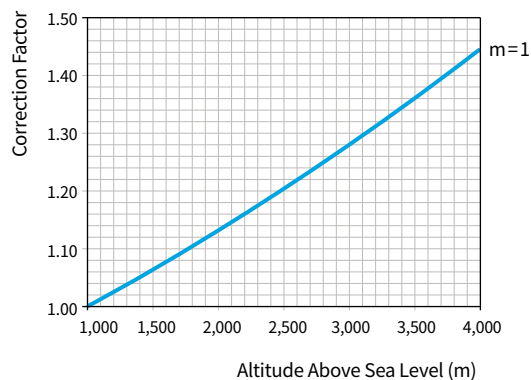
- Standard of required withstand voltage :

Commercial frequency withstand voltage =  $20 \times 1.13 = 22.6$  kV/min,

Brain shock withstand voltage =  $60 \times 1.13 = 67.8$  kV.

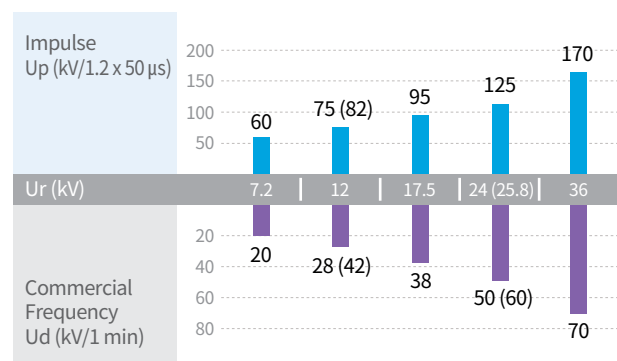
Thus make sure to select product with rated voltage of 12 kV that meets the required insulation performance.

**1,000 m**  
When Altitude  
Above Sea Level



| Item              | Description |         |         |         |         |
|-------------------|-------------|---------|---------|---------|---------|
| Applied Altitude  | 1,000 m     | 1,500 m | 2,000 m | 2,500 m | 3,000 m |
| Correction Factor | 1.0         | 1.06    | 1.13    | 1.2     | 1.28    |

Standard of Withstand Voltage per Rated Voltage Specified in IEC 62271-1



### Correcting Rated Current According to Ambient Temperature

If ambient temperature exceeds the temperature of the standard operating environment, use below formula to correct operating current value and apply to operation.

$$I_s = I_r \sqrt{\frac{\theta_{\max} - \theta_a}{\theta_\gamma}}$$

$I_s$  : Corrected rated continuous conducting current (A)

$I_r$  : Rated continuous conducting current in a normal state (-5 ~ +40 °C) (A)

$\theta_{\max}$  : All temperature in the highest permissible temperature area (°C)

$\theta_a$  : Actual ambient temperature (if less than -5 °C or higher than +40 °C)

$\theta_\gamma$  : Highest permissible temp in the highest temperature area during rated current (°C)

E.g.) If ambient temperature is 50 °C, corrected continued conducting current of

$$\text{breaker of 2,000 A rated current : } 2,000 \times \sqrt{\frac{105 - 50}{65}} = 1,840 \text{ A}$$

**40 °C**

When Ambient  
Temperature

Table for Rated Current based on Ambient Temperature

| Rated Current (A) | Ambient Temp (°C) |       |       |       |       |
|-------------------|-------------------|-------|-------|-------|-------|
|                   | -5 ~ 40           | 45    | 50    | 55    | 60    |
| 4,000             | 4,000             | 3,843 | 3,679 | 3,508 | 3,328 |
| 3,150             | 3,150             | 3,026 | 2,898 | 2,763 | 2,621 |
| 2,500             | 2,500             | 2,402 | 2,300 | 2,193 | 2,080 |
| 2,000             | 2,000             | 1,922 | 1,840 | 1,754 | 1,664 |
| 1,250             | 1,250             | 1,201 | 1,150 | 1,096 | 1,040 |
| 630               | 630               | 605   | 580   | 553   | 524   |

## Maintenance Inspection List

### Breaker Anomaly and Action Plan

| Symptom                                | Cause                                                                                                                                                                                                                                                                                                           | Action Plan                                                                                                                                                                                                                                                                                                                |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Closing Spring is not Charged          | Electrical spring is not charged <ul style="list-style-type: none"> <li>Control cable is missing or short</li> <li>Motor/limit switch is faulty</li> </ul>                                                                                                                                                      | <ul style="list-style-type: none"> <li>Check if control cable is missing</li> <li>Replace motor/limit switch</li> </ul>                                                                                                                                                                                                    |
|                                        | Manual spring is not charged                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Check operating mechanism unit status</li> </ul>                                                                                                                                                                                                                                    |
| Breaker is not Closing                 | Electrical closing or manual closing is not available <ul style="list-style-type: none"> <li>Control cable is missing or short</li> <li>Motor charging failure</li> <li>Interlock operation failure</li> <li>Voltage application status failure</li> <li>During UVR or secondary trip coil operation</li> </ul> | <ul style="list-style-type: none"> <li>Check if control cable is missing</li> <li>Check motor connection status</li> <li>Check interlock operation status</li> <li>Check voltage status<br/>(Minimum Voltage : Rated <math>\times</math> 85 %)</li> <li>Check UVR or secondary trip coil control voltage status</li> </ul> |
|                                        | Tripped after half-closing status or right after closing                                                                                                                                                                                                                                                        | Check operating status of operating                                                                                                                                                                                                                                                                                        |
| Breaker is not Tripped                 | Electrical trip and manual trip is not available <ul style="list-style-type: none"> <li>Control cable is missing or short</li> <li>Bad auxiliary switch</li> <li>Voltage application status failure</li> </ul>                                                                                                  | <ul style="list-style-type: none"> <li>Check if control cable is missing</li> <li>Replace auxiliary switch</li> <li>Check voltage status<br/>(Minimum Voltage : Rated <math>\times</math> 70 %)</li> </ul>                                                                                                                 |
|                                        | Pushing/drawing handle insertion failure                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Check pushing/drawing handle insertion status</li> </ul>                                                                                                                                                                                                                            |
| Breaker does not Push/ Draw            | Interference occurs to shutter and interruption period                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Check assembly status of shutter mechanism and shutter mechanism unit</li> </ul>                                                                                                                                                                                                    |
|                                        | Interlock malfunction                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Check interlock operation status</li> </ul>                                                                                                                                                                                                                                         |
| Breaker Position Switch is not Working | Pushing/drawing device interlock failure                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                            |
|                                        | Control cable is missing or short                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Check if control cable is missing</li> </ul>                                                                                                                                                                                                                                        |
|                                        | Position switch failure                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Replace position switch</li> </ul>                                                                                                                                                                                                                                                  |

### Periodic Inspection List

| Inspection Item          | Items to Check                                                                                                                                             | Inspection Intervals                                               |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Basics                   | 1. Wipe off dirt or moisture on the insulator/insulator surface with a dry cloth                                                                           | Twice a year                                                       |
|                          | 2. Check external damage                                                                                                                                   |                                                                    |
|                          | 3. Check the status of bolt and nut tightness in and out of operation mechanism unit                                                                       |                                                                    |
|                          | 4. Check any damage to snap-retainer and C-ring                                                                                                            |                                                                    |
|                          | 5. Check connection status between the terminal and the conductor<br>(Modified by corrosion and temperature)                                               |                                                                    |
| Operation Test           | 1. Check electrical/mechanical operation of operation mechanism unit<br>(At least 10 continued operation)                                                  | Every 2,000 operation, or interrupting each short-circuit 10 times |
|                          | 2. Check if ON/OFF indicator or behavior count indicator is working properly                                                                               |                                                                    |
| Insulation Resistance    | Measure insulation resistance between phases and between counter grounds at 1,000 V Megger (For measurement 500 M $\Omega$ or below, analysis is required) | Twice a year                                                       |
| Withstand Voltage Test   | Conduct commercial frequency withstand voltage in compliance with regulated application value                                                              | Twice a year                                                       |
| Apply Grease             | 1. Apply grease to each rotating and rubbing areas<br>(Grease Specification : CHEMAX HHI 5000 # 1)                                                         | Every two years or every 2,000 operation                           |
|                          | 2. Wipe the terminal conductor with a dry cloth and apply very small amount of conductive grease (Grease Specifications : FLOIL G-5002)                    |                                                                    |
| Vacuum Interrupters (VI) | 1. Check status of contacts wear with naked eyes (Replacement is required when white mark of VI stem is confirmed to be 1/2 or less with breaker closing)  | Every two years or every 2,000 operation                           |
|                          | 2. Check vacuum degree using vacuum checker with breaker tripped                                                                                           |                                                                    |

## Current Status of Acquired Standards

### Approvals & Certificates

#### Hi-Series VCB (Vacuum Circuit Breaker)

| Type of Certification | Approvals                                                                         |                                                                                   | Certificate                                                                         |                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Type of Standard      | KS                                                                                | KAS Certified V Checkmark                                                         | IEC                                                                                 | GB                                                                                  |
| Mark                  |  |  |  |  |
| Testing Institute     | KS                                                                                | Korea Electrical Safety Corporation KAS-P-008                                     | KERI                                                                                | GB 1984                                                                             |
| Certification Country | Korea                                                                             | Korea                                                                             | Korea                                                                               | China                                                                               |
| HAF1072-3             |                                                                                   |                                                                                   |                                                                                     | ●                                                                                   |
| HAF1074-3             |                                                                                   |                                                                                   |                                                                                     | ●                                                                                   |
| HAF1077-3             |                                                                                   |                                                                                   |                                                                                     | ●                                                                                   |
| HVG1011               | ●                                                                                 | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVG1031               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVG1041               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVG1099               | ●                                                                                 | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVG1131               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVG1132               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVG1141               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVG1142               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1141               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1142               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1151               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1152               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1154               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1162               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1164               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1166               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1167               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1168               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1172               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1174               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1176               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1177               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1178               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF1378               |                                                                                   |                                                                                   |                                                                                     | ●                                                                                   |
| HVF1442               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVF1444               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVF1462               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVF1464               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVF1542               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVF1544               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVF2141               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF2142               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF2151               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF2152               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF2154               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF2161               |                                                                                   |                                                                                   | ●                                                                                   |                                                                                     |
| HVF2162               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF2164               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF2166               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |
| HVF2167               |                                                                                   | ●                                                                                 | ●                                                                                   |                                                                                     |

| Type of Certification | Approvals                                                                         | Certificate                                                                                                                                                         |                                                                                     |                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Type of Standard      | KS                                                                                | KAS Certified V Checkmark                                                                                                                                           | IEC                                                                                 | GB                                                                                  |
| Mark                  |  |   |  |  |
| Testing Institute     | KS                                                                                | Korea Electrical Safety Corporation KAS-P-008                                                                                                                       | KERI                                                                                | GB 1984                                                                             |
| Certification Country | Korea                                                                             | Korea                                                                                                                                                               | Korea                                                                               | China                                                                               |
| HVF2168               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF2172               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF2174               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF2176               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF2177               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF2178               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3141               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3142               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3151               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3152               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3154               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3161               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF3162               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3164               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3166               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3167               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF3362               |                                                                                   |                                                                                                                                                                     |                                                                                     | ●                                                                                   |
| HVF3364               |                                                                                   |                                                                                                                                                                     | ●                                                                                   | ●                                                                                   |
| HVF3442               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF3444               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF3462               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF3464               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF3467               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF3542               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF3544               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF6111               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF6112               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF6114               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF6141               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF6142               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF6144               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF6146               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF6147               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF6162               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF6164               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF6166               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF6167               |                                                                                   |                                                                                                                                                                     | ●                                                                                   |                                                                                     |
| HVF7052               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   | ●                                                                                   |
| HVF7056               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF7057               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF7062               |                                                                                   |                                                                                                                                                                     |                                                                                     | ●                                                                                   |
| HVF7142               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |
| HVF7144               |                                                                                   | ●                                                                                                                                                                   | ●                                                                                   |                                                                                     |

## Current Status of Acquired Standards

### Approvals & Certificates

#### Hi-Series VCS (High-Pressure Vacuum Contactor)

| Type of Certification | Approvals                                                                         |  | Certificate                                                                       |                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Type of Standard      | UL                                                                                |  | IEC                                                                               | ANSI                                                                                |
| Mark                  |  |  |  |  |
| Testing Institute     | UL                                                                                |  | KERI                                                                              | KERI                                                                                |
| Certification Country | USA                                                                               |  | Korea                                                                             | Korea                                                                               |
| HCA34CD               | ●                                                                                 |  |                                                                                   |                                                                                     |
| HCA62CD               |                                                                                   |  | ●                                                                                 |                                                                                     |
| HCA62LD               |                                                                                   |  | ●                                                                                 |                                                                                     |
| HCA64CD               | ●                                                                                 |  | ●                                                                                 | ●                                                                                   |
| HCA64LD               |                                                                                   |  | ●                                                                                 | ●                                                                                   |

#### U-Series VCS (High-Pressure Vacuum Contactor)

| Type of Certification | Approvals                                                                           |  | Certificate                                                                                                                                                              |                                                                                       |
|-----------------------|-------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Type of Standard      | UL                                                                                  |  | KAS Certified V Checkmark                                                                                                                                                | IEC                                                                                   |
| Mark                  |  |  |   |  |
| Testing Institute     | UL                                                                                  |  | Korea Electrical Safety Corporation<br>KAS-P-008                                                                                                                         | KERI                                                                                  |
| Certification Country | USA                                                                                 |  | Korea                                                                                                                                                                    | Korea                                                                                 |
| UVC32C                | ●                                                                                   |  | ●                                                                                                                                                                        |                                                                                       |
| UVC32L                | ●                                                                                   |  | ●                                                                                                                                                                        |                                                                                       |
| UVC34C                | ●                                                                                   |  |                                                                                                                                                                          |                                                                                       |
| UVC34L                | ●                                                                                   |  |                                                                                                                                                                          |                                                                                       |
| UVC62C                | ●                                                                                   |  | ●                                                                                                                                                                        | ●                                                                                     |
| UVC62L                | ●                                                                                   |  | ●                                                                                                                                                                        | ●                                                                                     |
| UVC64C                | ●                                                                                   |  |                                                                                                                                                                          | ●                                                                                     |
| UVC64L                | ●                                                                                   |  |                                                                                                                                                                          | ●                                                                                     |

## Approvals & Marine Certificates

### Hi-Series VCB (Vacuum Circuit Breaker)

| Type of Certification | Vessel                                                                            |                                                                                   |                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Type of Standard      | Korean Register                                                                   | Bureau Veritas                                                                    | Germanischer Lloyd                                                                  |
| Mark                  |  |  |  |
| Testing Institute     | KR                                                                                | BV                                                                                | GL                                                                                  |
| Certification Country | Korea                                                                             | France                                                                            | Germany                                                                             |
| HVF1164               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF1166               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF1167               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF1168               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF1172               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF1174               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF1176               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF1177               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF1178               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2041               | ●                                                                                 |                                                                                   | ●                                                                                   |
| HVF2042               | ●                                                                                 | ●                                                                                 | ●                                                                                   |
| HVF2164               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2166               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2167               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2168               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2172               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2174               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2176               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2177               |                                                                                   | ●                                                                                 |                                                                                     |
| HVF2178               |                                                                                   | ●                                                                                 |                                                                                     |
| HGV1142C              | ●                                                                                 | ●                                                                                 | ●                                                                                   |
| HGV2142C              | ●                                                                                 | ●                                                                                 | ●                                                                                   |

### Hi-Series VCS (High-Pressure Vacuum Contactor)

| Type of Certification | Vessel                                                                              |                                                                                     |                                                                                       |
|-----------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Type of Standard      | Korean Register                                                                     | Bureau Veritas                                                                      | Germanischer Lloyd                                                                    |
| Mark                  |  |  |  |
| Testing Institute     | KR                                                                                  | BV                                                                                  | GL                                                                                    |
| Certification Country | Korea                                                                               | France                                                                              | Germany                                                                               |
| HCA32C                | ●                                                                                   | ●                                                                                   |                                                                                       |
| HCA34C                | ●                                                                                   | ●                                                                                   |                                                                                       |
| HCA62C                | ●                                                                                   | ●                                                                                   |                                                                                       |
| HCA64CD               | ●                                                                                   | ●                                                                                   | ●                                                                                     |
| HCA64LD               |                                                                                     | ●                                                                                   | ●                                                                                     |
| UVC64                 |                                                                                     |                                                                                     | ●                                                                                     |







## Korea

|                    |                                                                                         |                     |                       |
|--------------------|-----------------------------------------------------------------------------------------|---------------------|-----------------------|
| <b>Head Office</b> | 477, Bundangsuseo-ro, Bundang-gu, Seongnam-si,<br>Gyeonggi-do, Republic of Korea        | Tel: +82-2-479-9180 | Fax : +82-2-500-4958  |
| <b>Factory</b>     | 53, Je3gongdan 3-gil, Seoun-myeon, Anseong-si,<br>Gyeonggi-do, 17605, Republic of Korea | Tel : +52-202-8179  | Fax : +82-52-202-8100 |

## Branch Offices

|                    |                                                                                                                       |                           |                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------|
| <b>London</b>      | 50-68 High Street, Weybridge, KT13 8BL, United Kingdom                                                                | Tel : +44-7979-125051     |                       |
| <b>Frankfurt</b>   | Eschborner Landstrasse 55, 60489 Frankfurt am Main, Germany                                                           | Tel : +49-69-7490-3934    |                       |
| <b>Moscow</b>      | World Trade Center, Ent.6, #412, Krasnopresnenskaya Nab.12,<br>Moscow, 123610, Russia                                 | Tel : +7-495-258-1381     |                       |
| <b>Riyadh</b>      | Office 404, 4th Floor Akaria-2 Bldg., Olaya St., PO Box<br>9187, Riyadh 11413, KSA                                    | Tel : +966-(0)11-210-1107 |                       |
| <b>Dubai</b>       | Unit 205, Emaar Square Building NO.4 Sheikh Zayed Road,<br>Dubai 252458, U.A.E                                        | Tel : +971-4-425-7995     | Fax : +971-4-425-7996 |
| <b>Bangkok</b>     | 19th Floor, Unit 1908, Sathorn Square Office Tower, 98 North<br>Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand | Tel : +66-02-115-7920     | Fax : +66-2-115-7898  |
| <b>Ho Chi Minh</b> | Centec Tower #1405, 72 Nguyễn Thị Minh Khai, Phường 6, Quận 3,<br>Thành phố Hồ Chí Minh, Vietnam                      | Tel : +84-28-3535-0465    |                       |
| <b>Osaka</b>       | 1-Room 5th Floor Nagahori Plaza Bldg. 2-4-8 Minami Senba,<br>chuo-ku, Osaka 542-0081, Japan                           | Tel : +81-6-6261-5766~7   | Fax : +81-6-6261-5818 |