Building a better future
Global Leader

Vacuum Circuit Breaker

HVF & HVG Type

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

We build a better
future!

HVF & HVG Type

Vacuum Circuit Breaker

Ensuring excellent switching capability and high quality with various advantages

- Retaining the high dielectric strength with the interrupter of the high vacuum degree of 10^{-7}mbar.
- Providing reliable mechanical performance and long-life expectancy with rigid structure of motor-spring energy stored mechanism.
- Having excellent breaking capability with the special contact material designed by the advanced vacuum technology.
- Having rapid breaking time of 3 cycle.
- Certified by New IEC publication 62271-100 and other related standards by HYUNDAI in ISO9001/14001 and OHSAS18001 certified facilities.

HVF

Rigid structure to prove high reliability and long-life expectancy

– Wide 600 / 800mm switchgear available with small size & light weight
– Mechanical endurance of 30,000 operations

– (IEC)	7.2-17.5kV	25-50kA	630-4,000A
	24/25.8kV	12.5-31.5kA	630-3,150A
	36/40.5kV	25-31.5kA	1,250-3,150A
(ANSI)	4.76kV	50kA	1,200-4,000A
	15kV	40kA	1,200-2,000A
	38kV	31.5-40kA	1,200-3,000A

HVG

Compact structure to minimize the switchgear dimension

– Wide 600mm switchgear available with small size & light weight
– Mechanical endurance of 20,000 operations
– 7.2kV, 8-25kA, 400-1,250A

CONTENTS

Features

HVF

HVF type

- With rigid structure and minimized moving parts, HVF breaker operation mechanism features reduced maintenance requirements providing high reliability and long-life expectancy.
- The breakers are more compactly designed in size with high performance vacuum interrupters, which are made with the special contact material and advanced vacuum technology.
- This series are certified by New IEC publication 62271-100, ANSI C37.09 and other domestic standards.

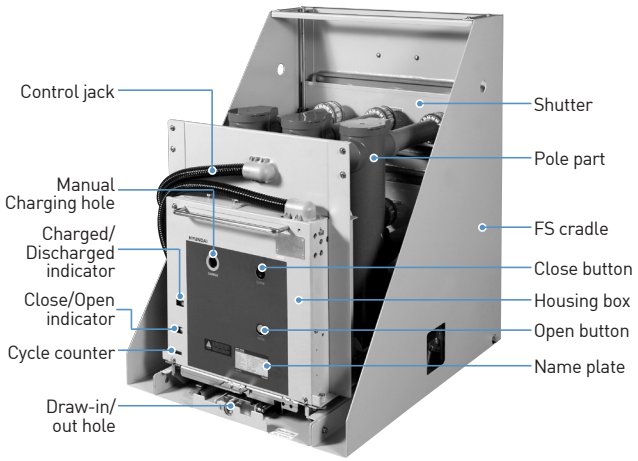
Operating mechanism

HVF circuit breakers have motor-spring energy stored mechanisms of a rigid structure. It consists of the charging mechanism, the closing spring, the trip spring, the motor, solenoids, auxiliary switches, spring charged and on/off indicators as shown in Fig.1.

Depending on the intended protection functions, the operating mechanism can be supplemented by 2nd shunt release, under voltage release, lockout relay, cut-out switch, limit switch, electrical local closing and so on.

The released closing spring is automatically recharged by the charging motor, and capable of the operating sequences "open-close-open" which is required when unsuccessful auto-reclosing operation is attempted.

<Fig.1> Front view of HVF type



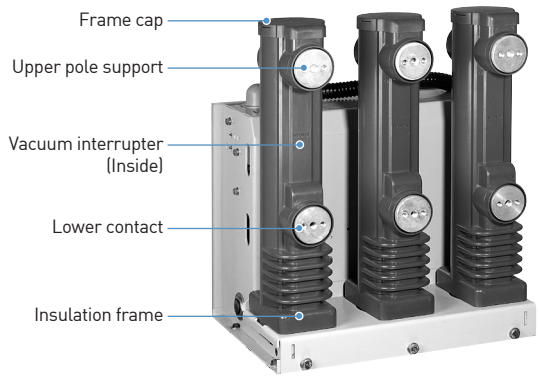
Pole part

The pole parts are placed on the rear side of the operating mechanism. The internal parts of the pole are well enclosed by the tubular type insulation frame as shown in Fig.2.
This prevents dust on the internal insulation material which is highly resistant to tracking.

The vacuum interrupters are mounted rigidly in the insulation frame, so they can withstand forces arising from switching operation and contact pressure.

In the closed state, the necessary contact pressure is established by the contact pressure spring and the atmospheric pressure. The contact pressure spring automatically compensates the arc erosion which is very small.

<Fig.2>Rear view of HVF type



HVG

HVG type

- HVG Vacuum circuit-breakers are very compact, so it is possible to reduce the switchgear size and to minimize its insulation space.
- This type of circuit breaker has a compact structure, which can be easily maintained, so it requires minimal maintenance.

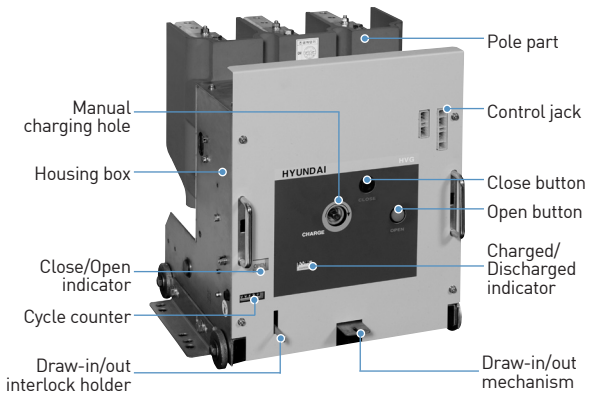
Operating mechanism

HVG vacuum circuit breakers have the simplified motor spring energy stored mechanism which consists of the closing spring, the motor, link mechanisms solenoids, auxiliary switches and indicators as shown in Fig.3.

The closing spring can be charged manually or electrically, and released mechanically with the manual closing push button or electrically through the remote electrical control.

The released closing spring is automatically recharged by the charging motor, and capable of the operating sequences “open-close-open” which is required when unsuccessful auto-reclosing operation is attempted.

<Fig.3> Front view of HVG type



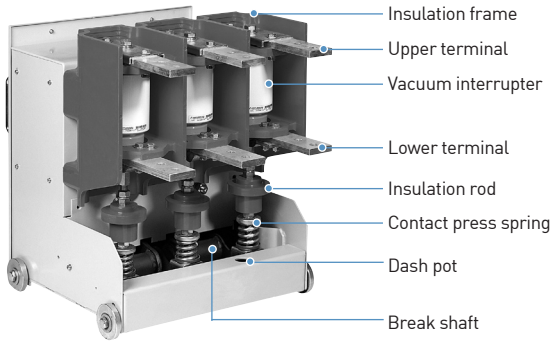
Pole part

The pole parts are mounted on the rear side of the operating mechanism in the insulation frame.

The vacuum interrupter is mounted rigidly in the insulation frame, so that it withstands forces arising from switching operation and contact pressure.

The current conducting path consists of the plug-in contacts, terminals, the vacuum interrupter and the flexible terminal.

<Fig.4> Rear view of HVG type



Ratings

HVF

Model [1]	HVF114□	HVF115□	HVF116□	HVF117□	HVF214□	HVF215□	HVF216□	HVF217□
Standard	IEC 62271-100							
Rated voltage (kV)	7.2				12			
Frequency (Hz)	50 / 60							
Rated current (A)	1 630 2 1,250	1 630 2 1,250 4 2,000	1 630 2 1,250 4 2,000 6 2,500 7 3,150 8 4,000	2 1,250 4 2,000 6 2,500 7 3,150 8 4,000	1 630 2 1,250	1 630 2 1,250 4 2,000 6 2,500	1 630 2 1,250 4 2,000 6 2,500 7 3,150 8 4,000	2 1,250 4 2,000 6 2,500 7 3,150 8 4,000
Rated short-circuit breaking current (kA)	25	31.5	40	50	25	31.5	40	50
Rated short-circuit making current (kA)	65	82	104	130	65	82	104	130
Short-time withstand current for 3sec (kA)	25	31.5	40	50	25	31.5	40	50
Power-frequency withstand voltage (kV, 1mim)	20				28 / 42 [2]			
Impulse withstand voltage (kV, 1.2×50㎲)	60				75			
Operating duty	O - 0.3sec - CO - 3min - CO / CO - 15sec - CO							
Closing time (ms, at DC110V)	55			54	55			54
Opening time (ms, at DC110V)	32			36	32			36
Breaking time (cycles)	3							
Closing operation – System	Motor spring stored energy							
Closing operation – Supply voltage (V)	DC48, 110, 125, 220 / AC110, 125, 220							
Closing operation – Current (A)	Refer to Table 3 (see page 15)							
Closing & tripping control – Tripping system	Shunt trip							
Closing & tripping control – Supply voltage (V)	DC48, 110, 125, 220 / AC110, 125, 220							
Closing & tripping control – Current (A)	Refer to Table 3 (see page 15)							
Operating life (times) – Mechanical operation [3]	30,000							
Operating life (times) – Electrical operation	Refer to table 2 (see page 14)			20,000	Refer to table 2 (see page 14)			20,000
Auxiliary contacts	4NO+4NC, 7NO+7NC (Max. 10NO+10NC+1W)							
Weight (kg) (Main-body)	1 110 2 110	1 110 2 110 4 130	1 115 2 115 4 130 6 200 7 200 8 250	2 200 4 6 250 7 250 8 250	1 110 2 110	1 110 2 110 4 130 6	1 115 2 115 4 130 6 200 7 200 8 250	2 200 4 6 250 7 250 8 250

※ 1) Type number in the square "□". Shall be listed as shown in the line for the rated current.
2) Power-frequency withstand voltage 42kV is available on request.
3) The value is with maintenance, 10,000 times without maintenance.

HVF

Model [1]		HVF314□	HVF315□	HVF316□	HVF611□	HVF614□	HVF714□	HVF705□
Standard		IEC 62271-100						
Rated voltage (kV)		17.5			24 / 25.8		36	36
Frequency (Hz)		50 / 60						
Rated current (A)		1 630 2 1,250	1 630 2 1,250 4 2,000 6 2,500	1 630 2 1,250 4 2,000 6 2,500 7 3,150	1 630 2 1,250 4 2,000	1 630 2 1,250 4 2,000 6 2,500	2 1,250 4 2,000 6 2,500	2 1,250 6 2,500 7 3,150
Rated short-circuit breaking current (kA)		25	31.5	40	12.5	25	25	31.5
Rated short-circuit making current (kA)		65	82	104	32.5	65	65	82
Short-time withstand current for 3sec (kA)		25	31.5	40	12.5	25	25	31.5
Power-frequency withstand voltage (kV, 1mim)		38			50 / 65 [2]		70	70
Impulse withstand voltage (kV, 1.2×50㎲)		95			125		170	170
Operating duty		O - 0.3sec - CO - 3min - CO / CO - 15sec - CO						
Closing time (ms, at DC110V)		52			68		75	62
Opening time (ms, at DC110V)		32					45	42
Breaking time (cycles)		3					5	5
Closing operation	System	Motor spring stored energy						
	Supply voltage (V)	DC48, 110, 125 / AC110, 125, 220						
	Current (A)	Refer to Table 3 (see page 15)						
Closing & tripping control	Tripping system	Shunt trip						
	Supply voltage (V)	DC48, 110, 125, 220 / AC110, 125, 220						
	Current (A)	Refer to Table 3 (see page 15)						
Operating life (times)	Mechanical operation [3]	30,000						20,000
	Electrical operation	Refer to Table 2 (see page 14)						
Auxiliary contacts		4NO+4NC, 7NO+7NC (Max. 10NO+10NC+1W)						
Weight (kg) (Main-body)		1 110 2 110	1 110 2 110 4 130 6	1 115 2 115 4 130 6 200 7 200	1 110 2 110 4	1 110 2 130 4 145 6	2 130 4 145 6 180	2 340 6 400 7 400

※ 1) Type number in the square "□". Shall be listed as shown in the line for the rated current.
2) Power-frequency withstand voltage 65kV is available on request.
3) The value is with maintenance, 10,000 times without maintenance.

Ratings

HVF

Model [1]		HVF137□	HVF336□	HVF705□ [2]	HVF706□	HVF105□	HVF204□	HVF606□
Standard		ANSI C37.09				IEC 60056 (KR, GL)	IEC 60056 (KR, GL)	IEC 60056
Rated voltage (kV)		4.76	15	38		7.2	12	24
Frequency (Hz)		50 / 60						
Rated current (A)		2 1,200 8 4,000	2 1,200 4 2,000	2 1,200 4 2,000 7 3,000	2 1,200 4 2,000 7 3,000	1 630 2 1,250 4 2,000	1 630 2 1,250 4 2,000	2 1,250 4 2,000 6 2,500 7 3,150
Rated short-circuit breaking current (kA)		50	40	31.5	40/44 [4]	31.5	25	40
Rated short-circuit making current (kA)		130	104	82	104	82	65	104
Short-time withstand current (kA)		50 (2sec)	40 (2sec)	31.5 (3sec)	40 (3sec)	31.5 (3sec)	25 (3sec)	40 (3sec)
Power-frequency withstand voltage (kV, 1mim)		19	36	80	80	20	28	50
Impulse withstand voltage (kV, 1.2×50㎲)		60	95	150	150	60	75	150
Operating duty		O - 15sec - CO - 3min - CO	O - 0.3sec - CO - 3min - CO					
Closing time (ms, at DC110V)		75	75	75	75	75	75	75
Opening time (ms, at DC110V)		60	60	50	50	60	60	60
Breaking time (cycles)		5						
Closing operation	System	Motor spring stored energy						
	Supply voltage (V)	DC48, 110, 125 / AC110, 125, 220						
	Current (A)	Refer to Table 3 (see page 15)						
Closing & tripping control	Tripping system	Shunt trip						
	Supply voltage (V)	DC48, 110, 125, 220 / AC110, 125, 220						
	Current (A)	Refer to Table 3 (see page 15)						
Operating life (times)	Mechanical operation [3]	10,000	20,000	20,000		30,000		20,000
	Electrical operation	10,000	20,000	Refer to Table 2 (see page 14)				
Auxiliary contacts		4NO+4NC, 7NO+7NC (Max. 10NO+10NC+1W)						
Weight (kg) (Main-body)		2 200 8 300	2 160 4 160	2 340 4 365 7 400	2 340 4 365 7 400	1 150 2 160 4 160	1 150 2 160 4 160	2 340 4 360 6 400 7 400

※ 1) Type number in the square "□". Shall be listed as shown in the line for the rated current.
2) HVF705□ type can be applicable to IEC 62271-100 standard.
3) The value is with maintenance, 10,000 times without maintenance.
4) Rated short-circuit breaking current 44kA is available on request.

HVF

Model [1]	HVF224□	HVF225□	HVF226□	HVF611□	HVF614□	HVF625□	HVF725□
Standard	GOST-R 52565-06 / IEC 62271-100						
Rated voltage (kV)	12			24		24	40.5
Frequency (Hz)	50						
Rated current (A)	[1] 630 [2] 1,250	[2] 1,250 [4] 2,000	[2] 1,250 [4] 2,000 [6] 2,500 [7] 3,150	[1] 630 [2] 1,250	[1] 630 [2] 1,250 [4] 2,000	[1] 630 [2] 1,250 [4] 2,000 [6] 2,500 [7] 3,150	[2] 1,250 [4] 2,000 [6] 2,500 [7] 3,150
Rated short-circuit breaking current (kA)	25	31.5	40	12.5	25	31.5	31.5
Rated short-circuit making current (kA)	65	82	104	32.5	65	80	81.9
Short-time withstand current for 3sec (kA)	25	31.5	40	12.5	25	31.5	31.5
Power-frequency withstand voltage (kV, 1mim)	42			65		65	95
Impulse withstand voltage (kV, 1.2×50㎲)	75			125		125	190
Operating duty	O - 0.3sec - CO - 3min - CO / CO - 15sec - CO					O - 0.3sec - CO - 3min - CO	O - 0.3 sec - CO - 3min - CO / CO - 15sec - CO
Closing time (ms, at DC110V)	55			68		45-60	70
Opening time (ms, at DC110V)	32			32		35-45	40
Breaking time (cycles)	3			3		3	5
Closing operation – System	Motor spring stored energy						
Closing operation – Supply voltage (V)	DC48, 110, 125, 220 / AC110, 125, 220						
Closing operation – Current (A)	Refer to Table 3 (see page 15)						
Closing & tripping control – Tripping system	Shunt trip						
Closing & tripping control – Supply voltage (V)	DC48, 110, 125, 220 / AC110, 125, 220						
Closing & tripping control – Current (A)	Refer to Table 3 (see page 15)						
Operating life (times) – Mechanical operation [2]	30,000					20,000	
Operating life (times) – Electrical operation	Refer to Table 2 (see page 14)						
Auxiliary contacts	4NO+4NC, 7NO+7NC (Max. 10NO+10NC+1W)					6NO+6NC	4NO+4NC, 7NO+7NC (Max. 10NO+10NC+1W)
Weight (kg) (Main-body)	[1] 110 [2] 110	[2] 110 [4] 130	[2] 115 [4] 130 [6] 200 [7] 200	[1] 110 [2] 110	[1] 110 [2] 130 [4] 145	[1] 145 [2] 150 [4] 170 [6] 175 [7] 175	[2] 280 [4] 300 [6] 340 [7] 360

※ 1) Type number in the square "□". Shall be listed as shown in the line for the rated current.
2) The value is with maintenance, 10,000 times without maintenance.

Ratings

HVG

Model		HVG1099	HVG1011	HVG1131	HVG1132	HVG1141	HVG1142
Standard		IEC 62271-100					
Rated voltage (kV)		7.2					
Frequency (Hz)		50 / 60					
Rated current (A)		400	630	630	1,250	630	1,250
Rated short-circuit breaking current (kA)		8	12.5	20		25	
Rated short-circuit making current (kA)		20	32.5	52		65	
Short-time withstand current for 1sec (kA)		8	12.5	20		25	
Power-frequency withstand voltage (kV, 1mim)		20					
Impulse withstand voltage (kV, 1.2×50㎲)		60					
Operating duty		O - 0.3sec - CO - 3min - CO		O - 0.3sec - CO - 3min - CO / CO - 15sec - CO			
Closing time (ms, at DC110V)		32					
Opening time (ms, at DC110V)		22					
Breaking time (cycles)		3					
Closing operation	System	Motor spring stored energy					
	Supply voltage (V)	DC48, 110, 125, 220 / AC110, 125, 220					
	Current (A)	Refer to Table 3 (see page 15)					
Closing & tripping control	Tripping system	Shunt trip					
	Supply voltage (V)	DC48, 110, 125, 220 / AC110, 125, 220					
	Current (A)	Refer to Table 3 (see page 15)					
Operating life (times)	Mechanical operation[1)]	20,000					
	Electrical operation	Refer to Table 2 (see page 14)					
Auxiliary contacts		4NO+4NC, 7NO+7NC (Max. 10NO+10NC+1W)					
Weight (kg)	Fixed type	52	63	65	65	65	65
	Draw-out type	52	67	70	70	70	70

※ 1) The value is with maintenance, 10,000 times without maintenance.

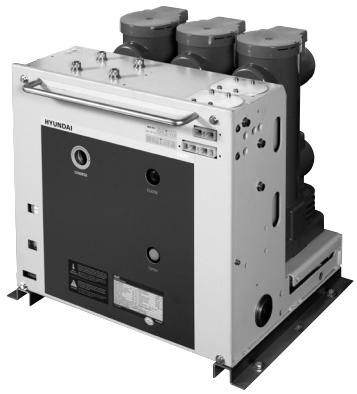
Type of Mounting

Hyundai vacuum circuit breakers offer various solutions for mounting with fixed and draw-out types. The draw-out type breakers consist of truck, mechanical interlock, control terminal, and various accessaries.

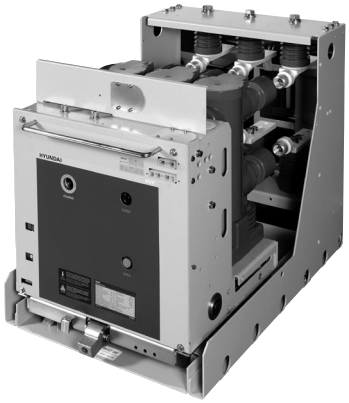
XA type	Fixed type VCB without cradle
ES type	Draw-out type VCB with ES cradle (Without shutter)
FS type	Draw-out type VCB with FS cradle (Nonmetallic partition with shutter)
SF type	Draw-out type VCB with FS cradle with screw type draw-in/out mechanism
GS type	Draw-out type VCB with GS cradle (Metallic partition with shutter and bushing)
GE type	Draw-out type VCB with GS cradle with earthing switch

※ Besides the standard version of draw-out circuit breakers, specially designed breakers like those for are available on request, such as ANSI standards or retrofit.

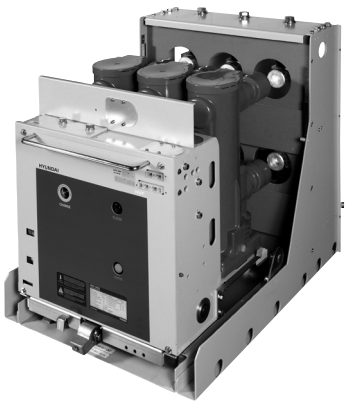
<Fig.5> XA type (HVF)



<Fig.6> ES type (HVF)



<Fig.7> FS type (HVF)



<Fig.8> GS type (HVF)

Technical Data [Application]

Applicable standards

HYUNDAI vacuum circuit breakers meet IEC 62271-100, IEC 60056, and ANSI C37.09 standards.

Rapid load transfer & Operating duty

With its consistent short closing and operating times, Hyundai vacuum circuit breakers are especially beneficial in load transfer from one circuit to another without interruption of service.
This high speed operation performs synchronizing of the systems to be paralleled at the instant of contact closure as well.
According to the relevant standards and breaker types, tests were carried out for the following operating duties.

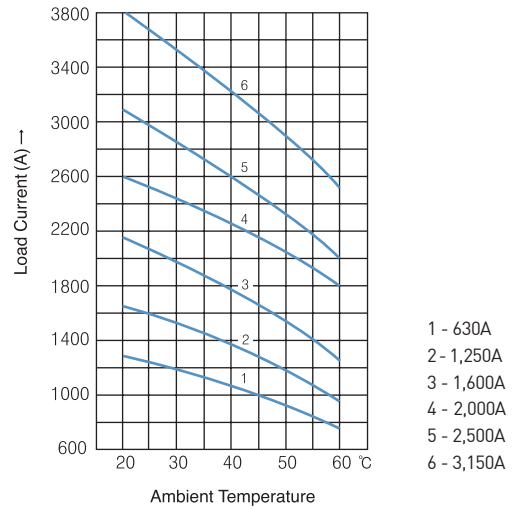
- CO - 15sec - CO
- O - 0.3sec - CO - 3min - CO
- O - 15sec - CO - 3min - CO

(O: Open, C: Close)

Current carring capacity

HYUNDAI vacuum circuit breakers may be operated at ambient temperatures between -25℃ and +40℃. The rated normal currents are determined according to IEC standards at an ambient temperature of 40℃.
When the breakers are operated at different termperatures, the correction on the operating current must be considered. Fig.9 shows appropriate operating currents at different ambient temperatures.
However, the diagram applies only to open type switchgear, so metal enclosed switchgear load currents should be reduced accordingly.

<Fig.9> Load characteristic curve



Switching of overload transmission lines and cables

The relatively small capacitive currents of overload transmission lines and cables under no load condition can be safely interrupted without restrike and overvoltage development.

Switching of capacitors

HYUNDAI vacuum circuit breakers are the solution for capacitive applications by switching the circuit without restrike and over voltage. VCB above 7.2kV 20kA can switch ON/OFF up to 400A capacitive load. For the higher than 400A circuit, it shall be informed in advance.

Switching unloaded transformer

By the special contact materials, the chopping current of the vacuum circuit breakers is only 4A to 5A, so overvoltage is limited when transformers are disconnected at no load condition.

Switching of motors

Long electrical lifetime at rated current lets HYUNDAI vacuum circuit breakers be the excellent solution for high voltage motors.
A surge absorber is recommended on these motors, which have less insulation level or less than 600A starting current. Even though low surge occurrence is the feature of HYUNDAI vacuum circuit breakers, the motor and the circuit itself can be further protected by the surge absorber.

Interruption of transient recovery voltage

HYUNDAI vacuum circuit breakers can break the accident current properly at down steam of transformers, generators, and current limit chokes, whose rising rates of transient recovery voltage are higher than IEC Standard, even up to 10kV/μs.

Arc Quenching System

A metal-vapor arc discharge in the vacuum is initiated by the current to be interrupted as the contacts open. The current flows through this metal-vapor plasma until the next zero transition.

The arc extinguishes in the vicinity of the current zero, and the conductive metal-vapor condenses within a few microseconds on the metal surfaces.
As a result, the dielectric strength in the contact gap is rapidly rebuilt.

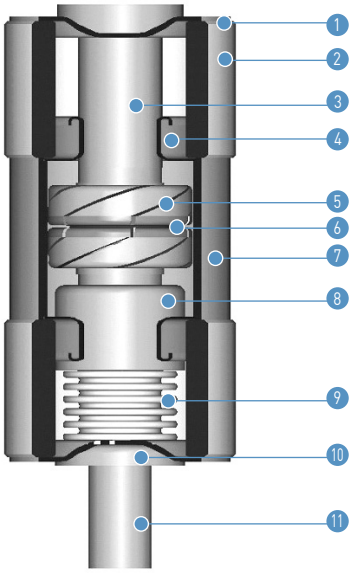
The rapid build-up of the dielectric strength at the contact gap enables the arc to be safely extinguished even if contact separation takes place shortly before a current zero transition. The maximum arcing time for the last pole to clear is therefore only up to 15ms.

If the metal vapor arc discharge can be maintained within a certain level, the current is supposed to be chopped prior to current zero.

This chopping current must be controlled in order to prevent build-up of unduly high overvoltages when inductive circuits are switched. The sintered CrCu contact limits the chopping current up to 4A to 5A.

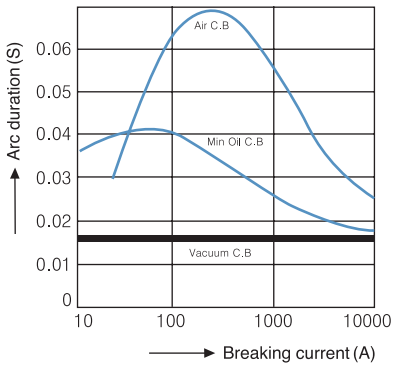
The geometry and size of the contact are designed differently according to breaking current and interrupter type.

<Fig.10> Section view of VI



1 End flange
2 Ceramic insulator
3 Fixed stem
4 Middle flange
5 Contact base
6 Contact trip
7 Act chamber
8 Bellows shield
9 Bellows
10 Bearing cap
11 Movable stem

<Fig.11> Arcing time-breaking current curve



<Table 1> Arc quenching medium

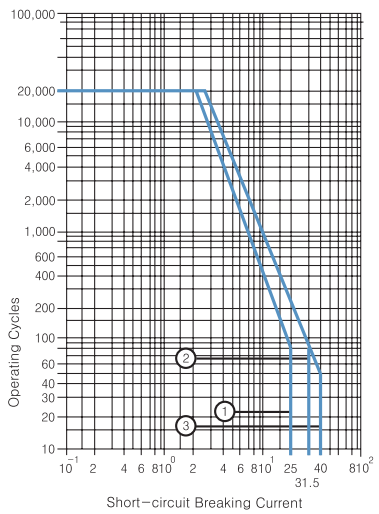
Breaker type	Arc voltage (V)
Vacuum circuit breaker	20-200
SF_6 gas circuit breaker	500-1,000
Oil circuit breaker	1,500-3,000
Magnetic blaster circuit breaker	1,500-3,000

Service Life

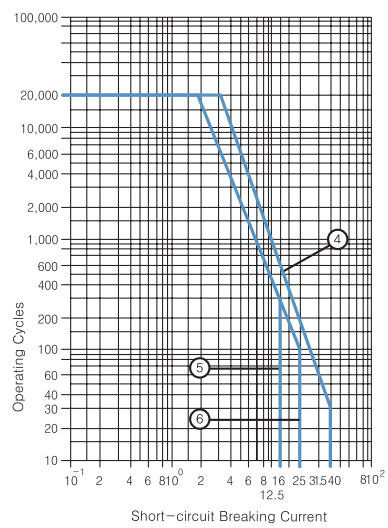
HVF / HVG type

HYUNDAI vacuum circuit breaker needs minimum maintenance due to the simple operating mechanism and robust construction.
Vacuum circuit breaker shall be maintained periodically to ensure the perfect performance during mechanical and/or electrical lifetime.
Please refer to the instruction manual for the detailed information.

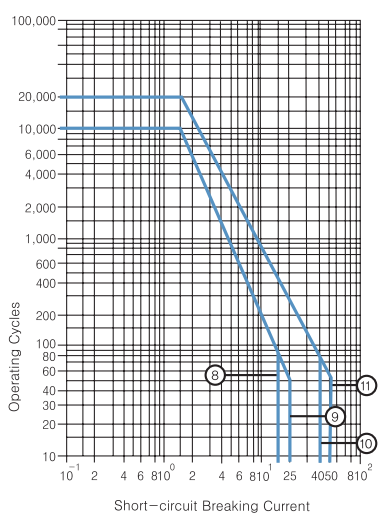
<Fig.12>



<Fig.13>



<Fig.14>



<Table 2> Electrical endurance curve number depending on VCB type

Model		HVF																	HVG			
Rated voltage	kV	4.76	7.2			12			15	17.5			24/25.8		36/40.5		38		7.2			
Rated breaking current	kA	50	25	31.5	40	25	31.5	40	40	25	31.5	40	12.5	25	25	31.5	31.5	40	8	12.5	20	25
Curve number	400A																		8			
	630A		1	2	3	1	2	4		1	2		5	6						8	9	9
	1,250A	11	1	2	3	1	2	4	10	1	2	4	5	6	6	2	2	4			9	9
	2,000A			2	3		2	4	10		2	4		6	6	2	2	4				
	2,500A				3			4				4				2	2	4				
	3,150A				3			4				4				2	2	4				
	4,000A	11										4										

Power Consumption & Rated Current

Charging motor

HYUNDAI VCB adopts short-time duty charging motor, and the specification is stipulated on Table 3.
Since the motor operating time is short, the maximum value and inrush current are disregarded.

Solenoids

Closing solenoid and tripping solenoid operate latching mechanism for VCB springs, so the VCB can be controlled remotely.
The specification is mentioned on Table 3.
The solenoids unlatch the closing spring and opening spring to close and open the VCB, respectively.

Auxiliary contacts

The following versions are available:

- X: Without control jack
- A: Double control jack mounted on the breaker body, 4NO+4NC
- B: Double control jack mounted on the breaker body, 7NO+7NC
- C: Single control jack leaded out from the breaker body with a 0.8m cable, 4NO+4NC
- D: Double control jack leaded out from the breaker body with two 0.8m cables, 10NO+10NC

Rating of auxiliary contacts

- Operating voltage: Max. 250V AC, DC
- Continuous thermal current: 10A
- Making current: 30A
- Switching capacity: 2A at DC220V, T=20ms

Power consumption & control voltage

<Table 3>

Control voltage	Control current (A)						Voltage range
	Motor		Closing solenoid		Tripping solenoid		
	HVF	HVG	HVF	HVG	HVF	HVG	
DC24V	21	-	4.0	-	12.4	-	Motor: 85-110% Close: 85-110% Open: 85-110%
DC48V	10.5	4.8	2.7	10.3	6.2	10.3	
DC60V	8	3.8	1.7	8.4	5.0	8.4	
DC110V	4.5	2.4	1.3	3.3	2.7	3.3	
DC125V	4.5	2.8	1.5	3.5	2.4	3.5	
DC220V	2.3	1.2	0.7	2.4	1.4	2.4	
AC110V	6.4	3.6	1.3	3.3	2.7	3.3	
AC220V	3.2	2.5	0.7	2.4	1.4	2.4	

Standard Accessories

HVF type

<Fig.16>

GS cradle

ES / FS cradle

< Draw-out handle >

Charging handle

Control jack lead cable (2.5m, 1.5SQ)
for A, B type control jack

Control jack connector for C, D type
control jack

HVG type

<Fig.17>

Charging handle

Draw-out handle

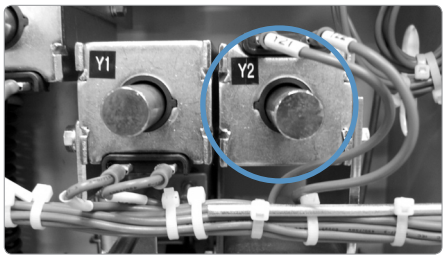
Fixing plate (Fixed type)

Control jack lead cable (2.5m, 1.5SQ)

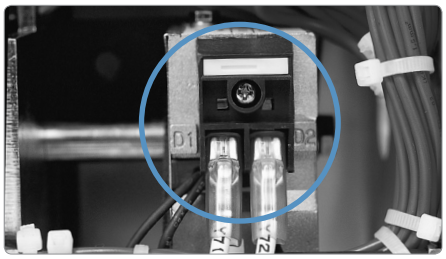
Additional Options

HVF type

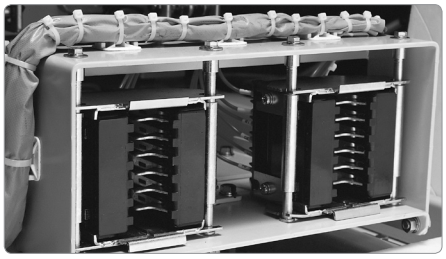
2nd shunt release



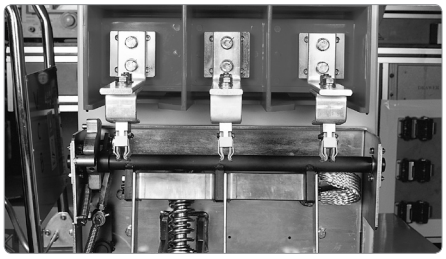
Under voltage release



Auto secondary jack

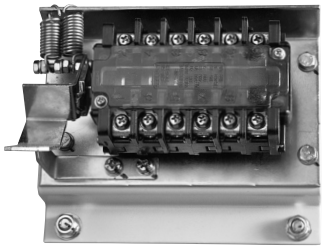


Earthing switch

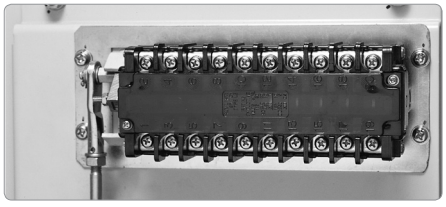


Lockout relay

Truck operated cell switches (TOC)



Mechanism operated cell switches (MOC)



Earthing switch operation indicator contact

CT operated release

Order code	HAFS-CT1	HAFS-CT2
Rated current	0.5A	1.0A
Operation current	above 0.45A	above 0.8A
Coil registance	20Ω	11Ω

Spring charged signal

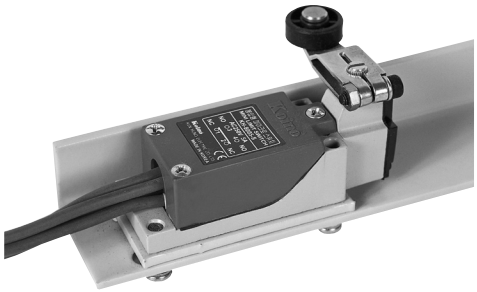
Using the auxiliary switches operated by the closing spring, the spring charged status can be displayed for visual checking.

Additional Options

HVF / HVG type

Varistor module

Position switch



Vacuum checker

Order code	HAFS-VC9
Rated input voltage	AC220V
Rated output voltage	AC11kV / 22kV
Dimension	W200×L350×H176

Condenser trip device

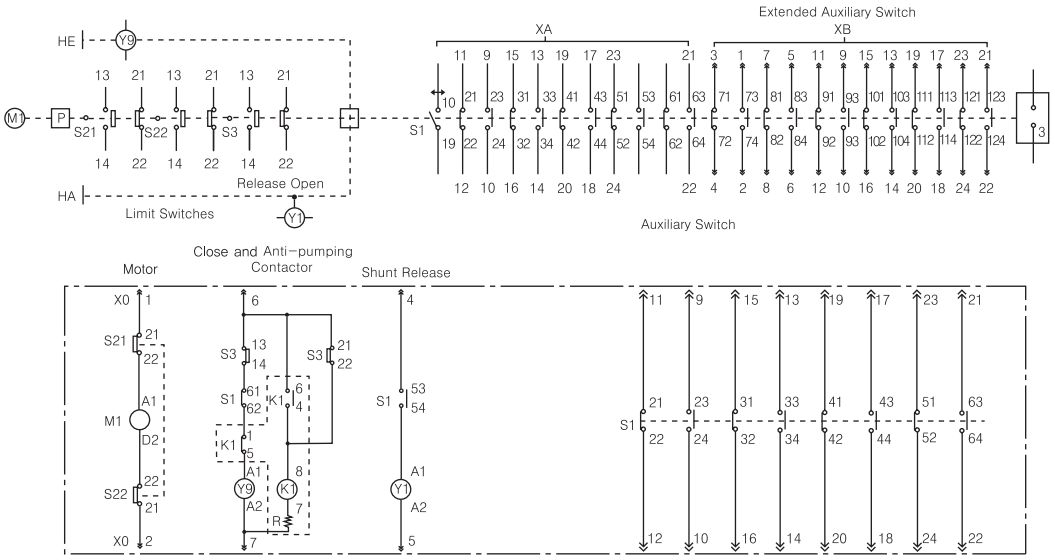
Order code	HVFS-T7	HVFS-T9	HVFS-T4	HVFS-T6
Rated input voltage	AC110V	AC220V	DC110V	DC220V
Charging voltage	DC145V	DC290V	DC110V	DC220V
Ordinary current	DC2A			
Time delay	within 1.5sec			
Frequency	50 / 60Hz		-	

Control Circuits

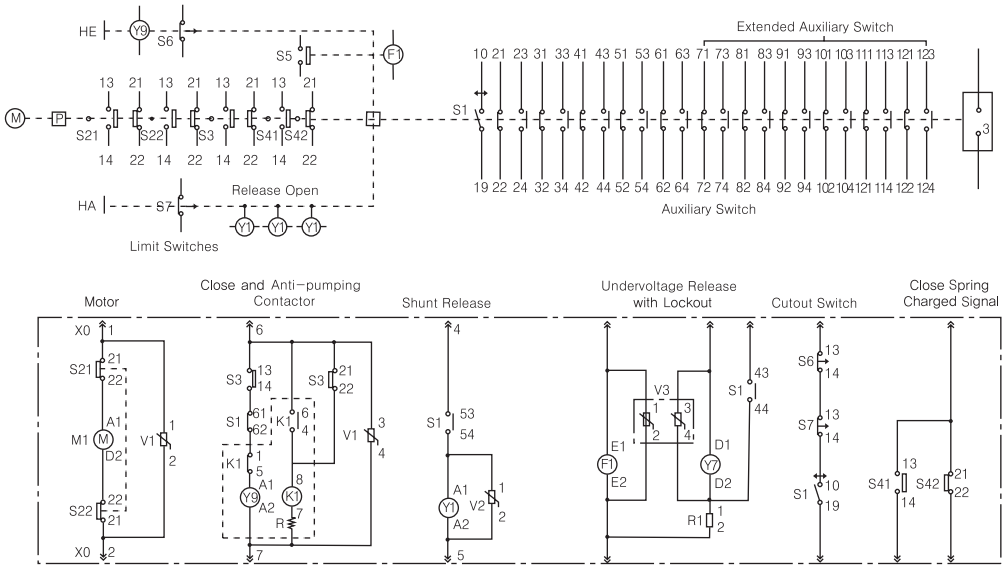
HVF

HVF type ◆ IEC 62271-100

Standard circuit



Optional circuit



F1: Lockout relay
HA: Manual tripping
HE: Manual closing
K1: Anti-pumping relay
M1: Motor
P: Stored energy mechanism
Y1: Tripping solenoid
Y7: Under voltage release
Y9: Closing solenoid
R1: Resistor
S1: Aux. switch
S21, S22: Limit switch
S3: Limit switch
S41, S42: Limit switch (spring charged signal)
S6, S7: Cutout switch
V1, V2, V3: Varistor module
X0: Plug / Socket

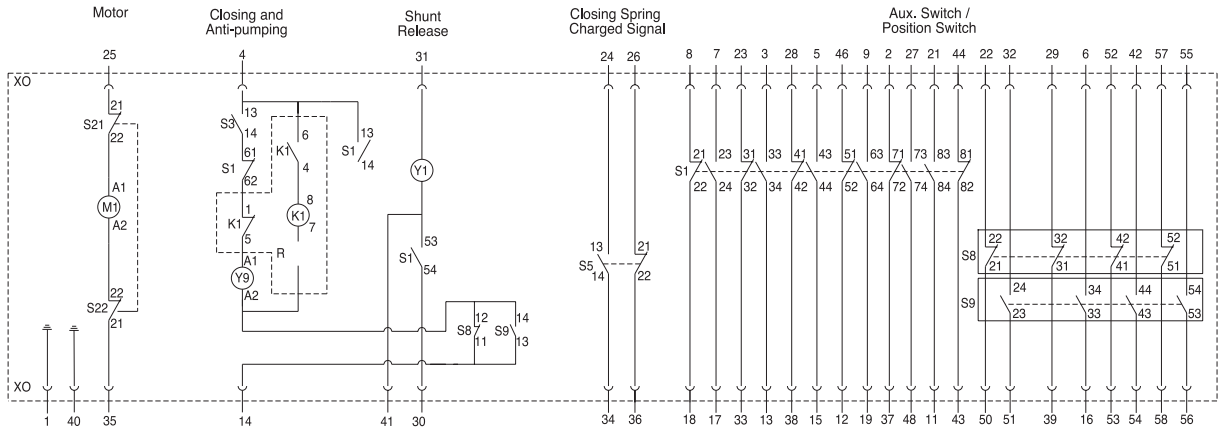
※ Diagram may be revised without notice.

Control Circuits

HVF

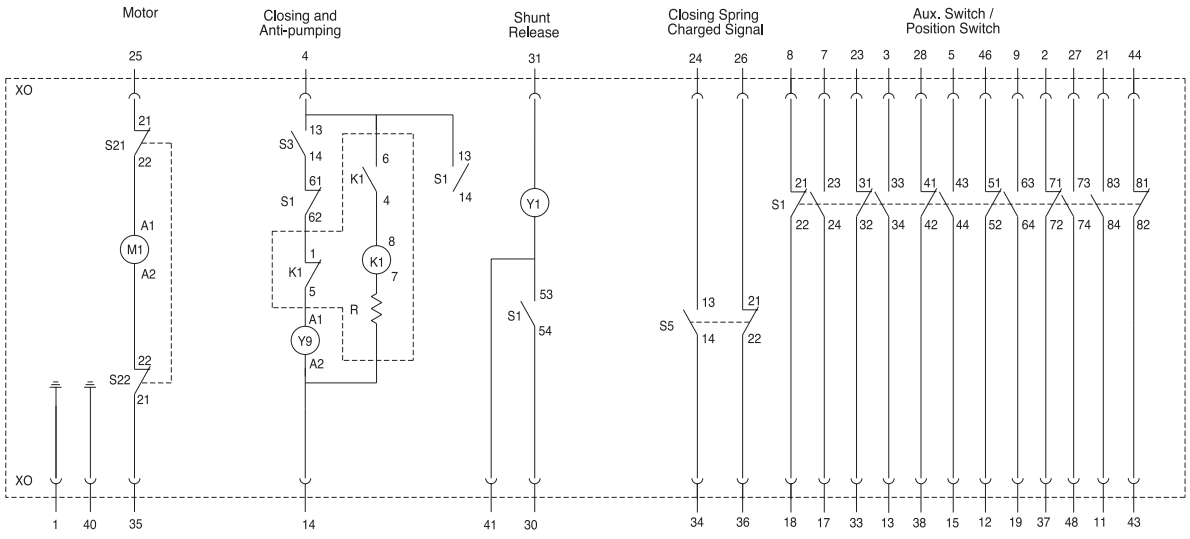
HVF type ◆ GOST-R 52565-06 / IEC 62271-100

HVF 224□ , 225□ , 226□ , 625□



※ The state of the breaker: spring released; open; the truck is in the test position

HVF 725□



※ The state of the breaker: spring released; open; the truck is in the test position

M1: Motor
Y1: Tripping solenoid
R: Resistor
X0: Plug connector

S9: Aux. switch (working position)
K1: Anti-pumping relay
S3, S5, S21, S22: Charging limit switch
Y9: Closing solenoid

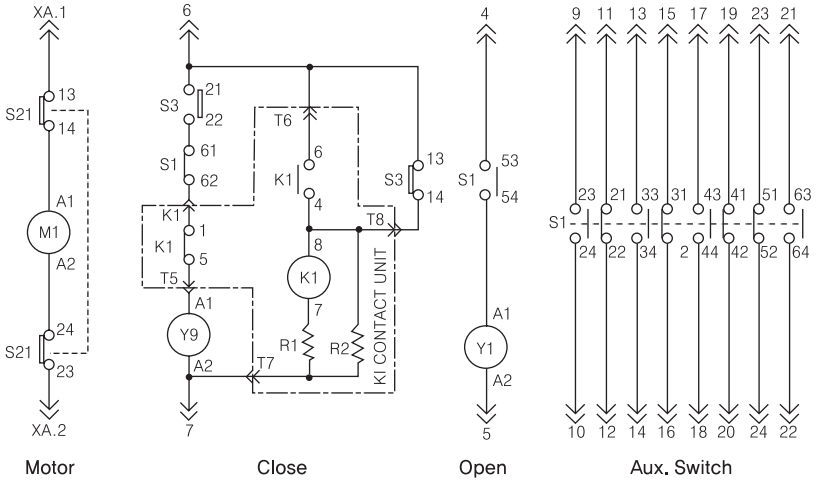
S1: Aux. switch
S8: Aux. switch (testing position)

※ Diagram may be revised without notice.

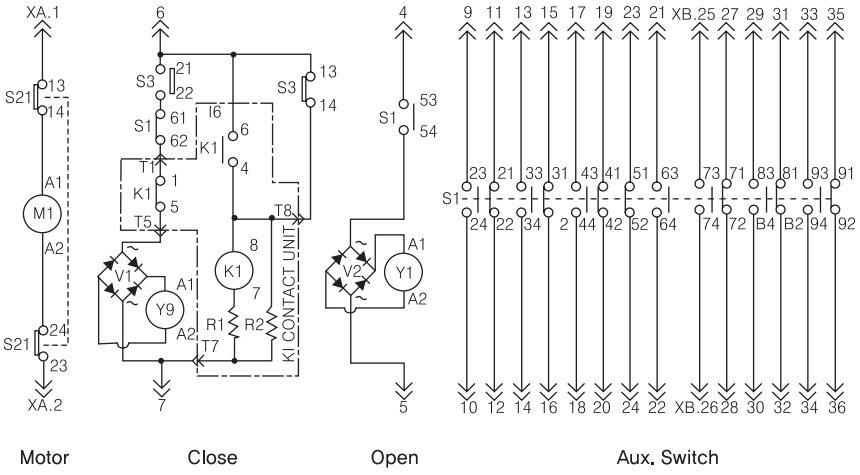
HVG

HVG type ◆ IEC 62271-100

DC circuit



AC circuit



K1: Anti-pumping relay
M1: Motor
S3: Limit switch
S21: Limit switch
S1: Aux. switch
V1: Rectifier
V2: Rectifier
R1, R2: Resistor
Y1: Tripping solenoid
Y9: Closing solenoid
XA: Plug/Socket
XB: Plug/Socket

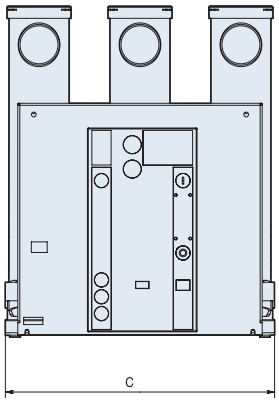
※ Diagram may be revised without notice.

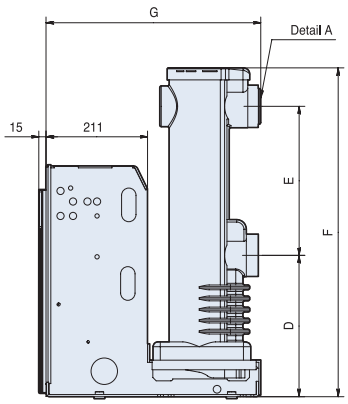
Dimensions [HVF fixed type & draw-out type body only]

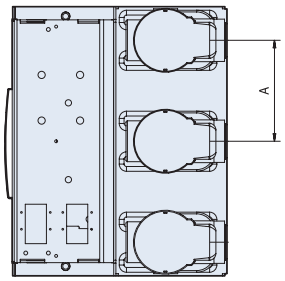
HVF

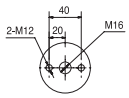
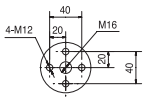
HVF fixed type (XA)

(Unit: mm)



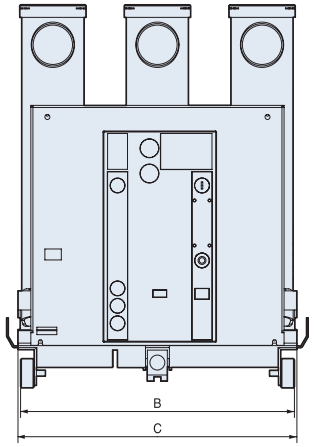


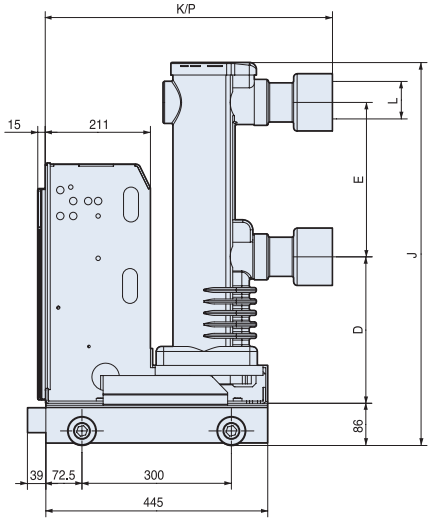


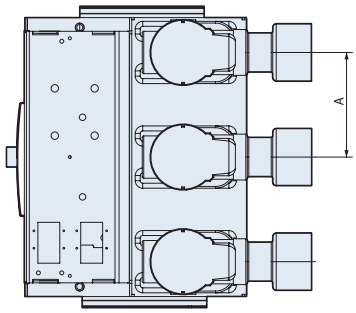
Rated Current	630A / 1,250A / 2,000A	2,500A / 3,150A
Detail A		

HVF draw-out type body only (EA, FA, SA, GA)

(Unit: mm)







※ Dimensions may be revised without notice.

HVF

(Unit: mm)

Dimensions / Model	XA/EA/FA/GA						EA/FA/GA	EA/FA			GA		
	A	C	D	E	F	G	J	B	L	K	B	L	P
HVF1141	150	515	230	210	525	447	622	499	40	587	501	50	633
HVF1142	150	515	230	210	525	447	622	499	50	587	501	50	633
HVF1151	165	515	234	275	592	447	675	499	50	587	501	50	633
HVF1152	165	515	234	275	592	447	675	499	50	587	501	50	633
HVF1154	165	515	234	275	592	447	675	499	60	587	501	60	633
HVF1161	165	515	234	275	592	447	675	499	50	587	501	50	633
HVF1162	165	515	234	275	592	447	675	499	50	587	501	50	633
HVF1164	165	515	234	275	592	447	675	499	60	587	501	60	633
HVF1166/7	210	612	245	310	630	450	738	550	90	587	549	90	633
HVF2172	210	667	245	310	734	450	738	-	-	-	549	50	610
HVF2176	275	831	245	310	788	450	738	-	-	-	768	109	613
HVF2177	275	831	245	310	788	450	738	-	-	-	768	109	613
HVF2178	275	831	245	310	788	450	780	-	-	-	768	109	613
HVF1372	165	535	234	254	645	447	-	-	-	-	-	-	-
HVF2141	150	515	230	210	525	447	622	499	40	587	501	50	633
HVF2141/2	150	515	230	210	525	447	622	499	50	587	501	50	633
HVF2151/2	165	515	234	275	592	447	675	499	50	587	501	50	633
HVF2154	165	515	234	275	592	447	675	499	60	587	501	60	633
HVF2161/2	165	515	234	275	592	447	675	499	50	587	501	50	633
HVF2164	165	515	234	275	592	447	675	499	60	587	501	60	633
HVF2166/7	210	612	245	310	630	450	738	550	90	587	549	90	633
HVF3141	150	510	230	210	525	447	610	499	40	587	501	50	673
HVF3142	150	510	230	210	525	447	610	499	50	587	501	50	673
HVF3151/2	165	515	234	275	592	447	675	499	50	587	501	50	673
HVF3154	165	515	234	275	592	447	675	499	60	587	501	60	673
HVF3161/2	165	515	234	275	592	447	675	499	50	587	501	50	673
HVF3164	165	515	234	275	592	447	675	499	60	587	501	60	673
HVF3166/7	210	610	249	310	630	450	738	550	90	587	549	90	673
HVF3362	254	813	234	275	592	447	-	-	-	-	-	-	-
HVF3364	254	813	235	275	592	447	-	-	-	-	-	-	-
HVF6111	210	560	298	310	688	450	774	550	40	587	549	50	784
HVF6112	210	560	298	310	688	450	774	550	50	587	549	50	784
HVF6141	210	560	298	310	688	450	774	550	40	587	549	50	784
HVF6142	210	560	298	310	688	450	774	550	50	587	549	50	784
HVF6144	210	560	298	310	688	450	774	550	60	587	549	60	784
HVF7142	275	845	457	403	984	595	-	-	-	-	845	50	1007
HVF7144	275	845	457	403	984	595	-	-	-	-	845	60	1007
HVF7146	275	845	457	403	984	595	-	-	-	-	845	90	1007
HVF2241/2	210	588	234	275	582	447	-	-	-	-	-	-	-
HVF2252	210	588	234	275	582	447	-	-	-	-	-	-	-
HVF2254	275	786	249	310	630	447	-	-	-	-	-	-	-
HVF2262	210	588	234	275	582	447	-	-	-	-	-	-	-
HVF2264/6/7	275	786	249	310	630	447	-	-	-	-	-	-	-
HVF7252/4/6/7	300	908	583	533	1102	659	-	-	-	-	-	-	-

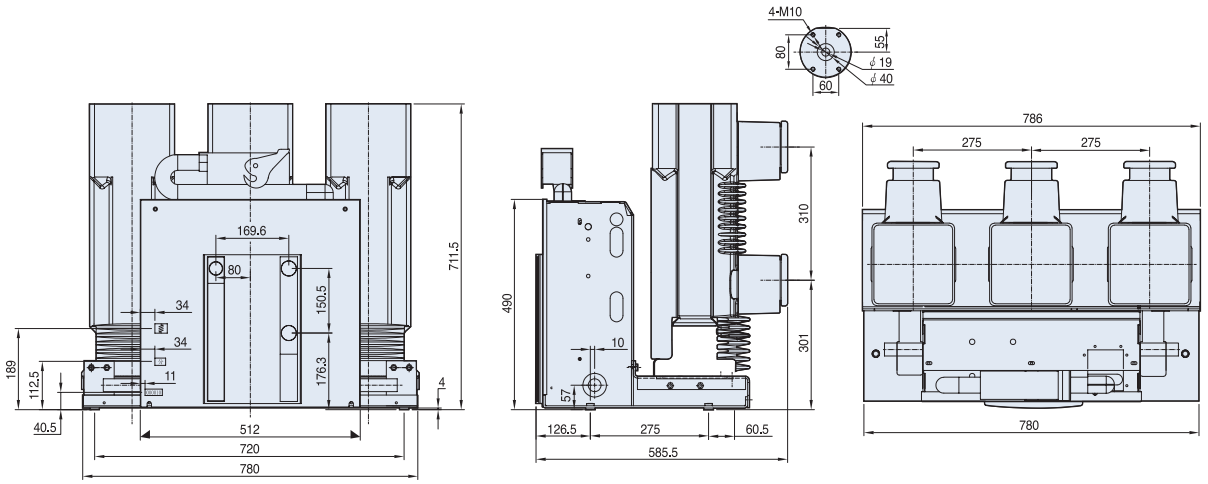
※ Dimensions may be revised without notice.

Dimensions

HVF

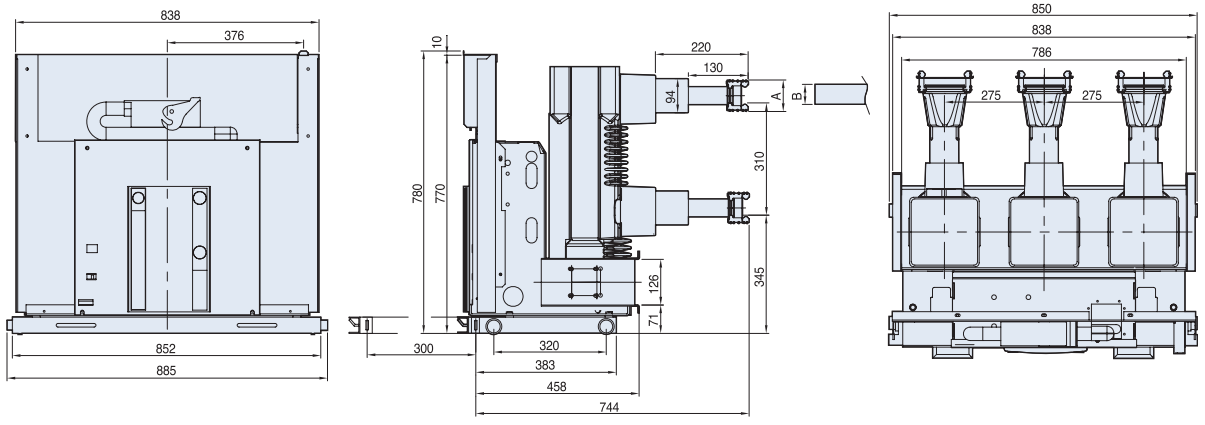
HVF6251, 6252, 6254, 6256, 6257 fixed type

(Unit: mm)



HVF6251, 6252 draw-out type body only

(Unit: mm)



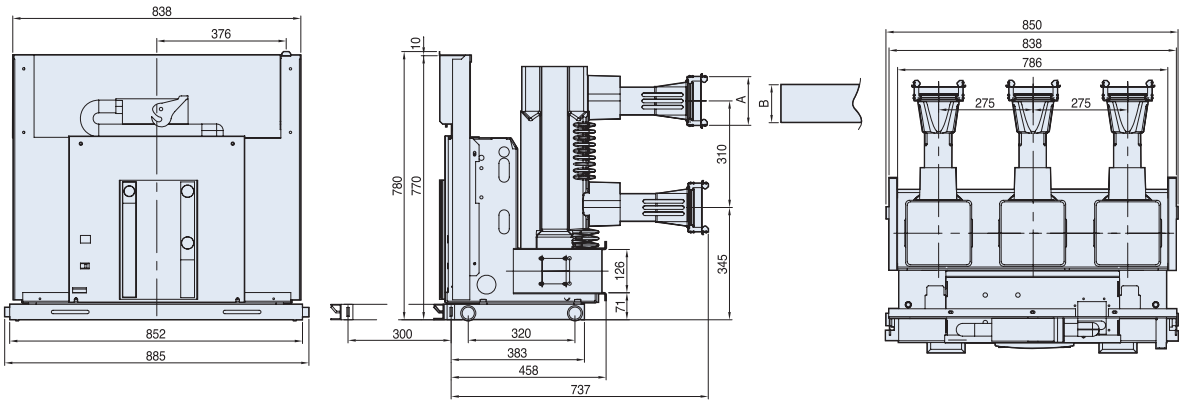
Type	630A	1,250A
A	74	87
B	35	49

※ Dimensions may be revised without notice.

HVF

HVF6254, 6256, 6257 draw-out type body only

(Unit: mm)



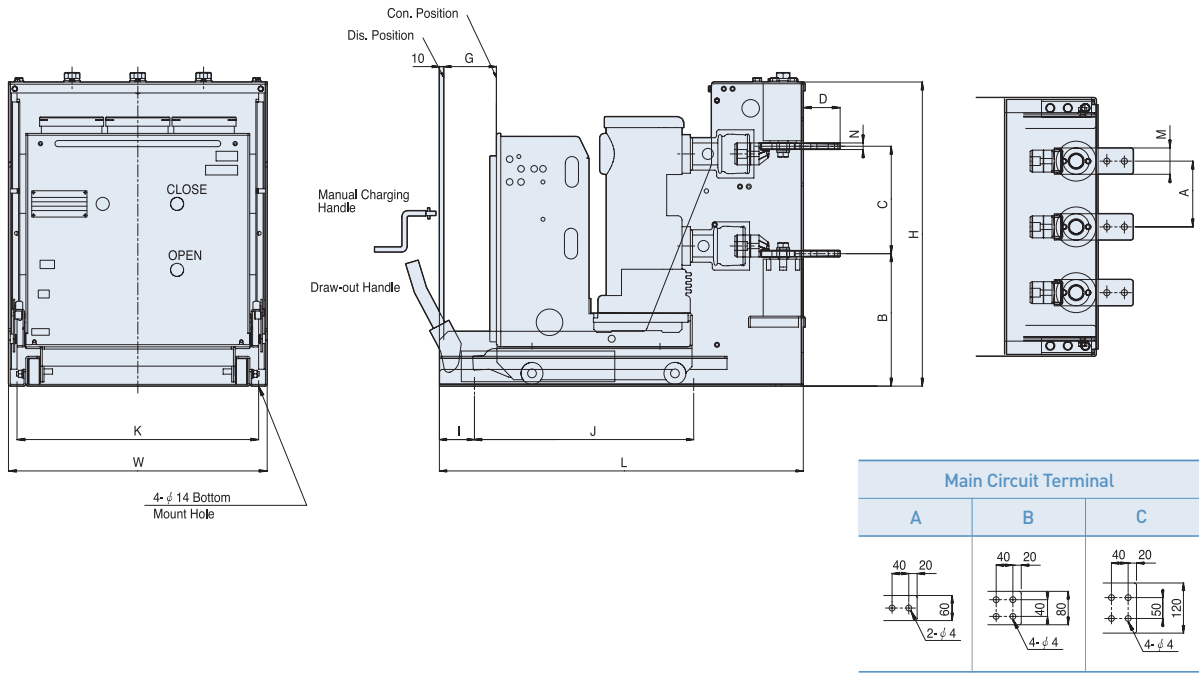
Type	2,000A	2,500A	3,150A
A	117	147	147
B	79	109	109

※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with ES/FS cradle]

HVF

(Unit: mm)



(Unit: mm)

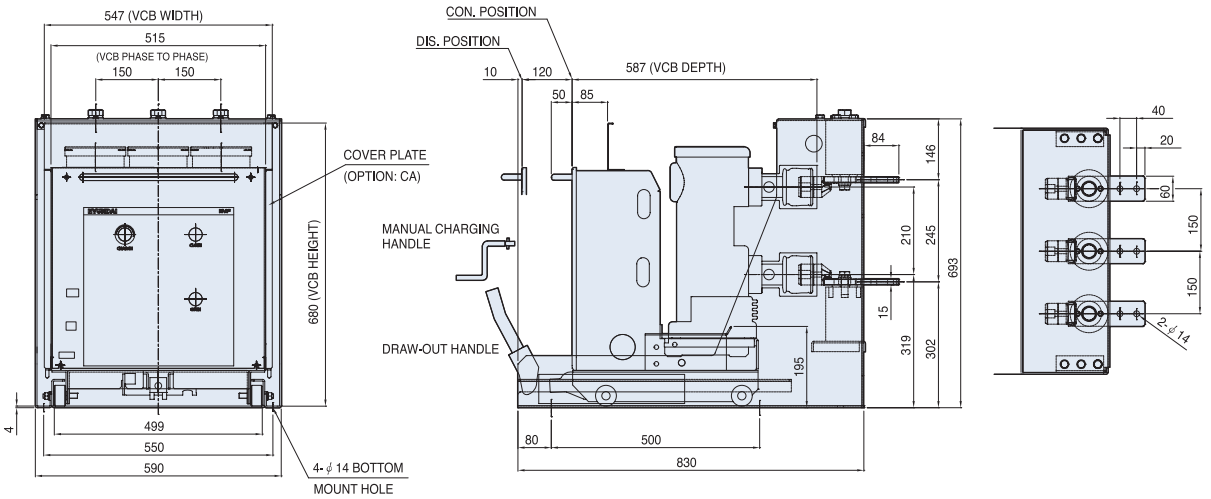
Dimensions / Model	W	H	L	A	B	C	D	G	I	J	K	M	N	Terminal
HVF1141/2	590	693	830	150	302	245	84	120	80	500	550	60	15	A
HVF1151/2	612	763	830	165	306	310	84	120	80	500	550	60	15	A
HVF1154	642	763	830	170	306	310	84	120	80	500	550	80	20	B
HVF1161/2	612	763	830	170	306	310	84	120	80	500	550	60	15	A
HVF1164	620	763	830	170	306	310	84	120	80	500	550	80	20	B
HVF1166/7	790	819	830	210	321	345	80	120	80	500	650	120	20	C
HVF2141/2	650	693	910	220	302	245	84	200	80	600	600	60	15	A
HVF2151/2	650	763	910	235	306	310	84	200	80	600	600	60	15	A
HVF2154	650	763	910	235	306	310	84	200	80	600	600	80	20	B
HVF2161/2	650	763	910	235	306	310	84	200	80	600	600	60	15	A
HVF2164	650	763	910	235	306	310	84	200	80	600	600	80	20	B
HVF2166/7	790	855	910	210	321	345	80	200	80	600	650	120	20	C
HVF3141/2	700	770	966	220	302	245	84	200	80	600	600	60	15	A
HVF3451/2	700	840	910	235	306	310	84	200	80	600	600	60	15	A
HVF3154	700	840	910	235	306	310	84	200	80	600	600	80	20	B
HVF3161/2	700	840	910	235	306	310	84	200	80	600	600	60	15	A
HVF3164	700	840	910	235	306	310	84	200	80	600	600	80	20	B
HVF6111/2	920	972	940	280(300)	370	345	84	230	100	670	650	60	15	A
HVF6141/2	920	972	940	280(300)	370	345	84	230	100	670	650	60	15	A
HVF6144	920	972	910	300	370	345	84	230	100	670	650	80	20	B

※ Dimensions may be revised without notice.

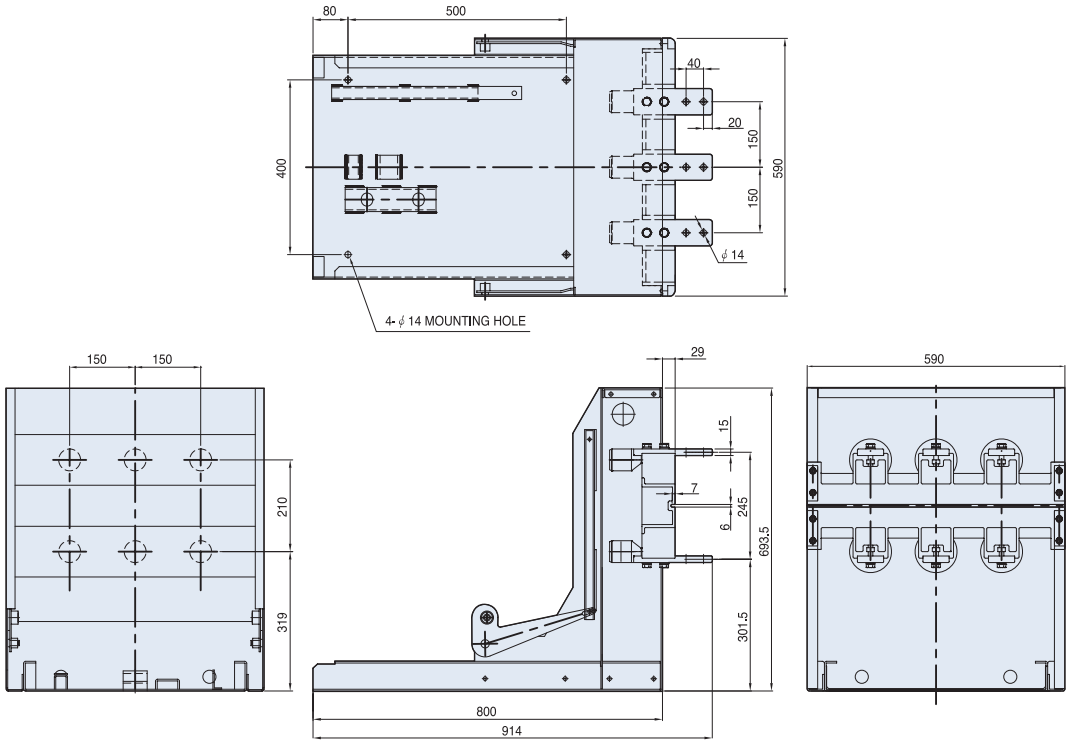
HVF

HVF1141, 1142

(Unit: mm)



< for breakers manufactured before July 31, 2009 >



< for breakers manufactured from August 1, 2009 >

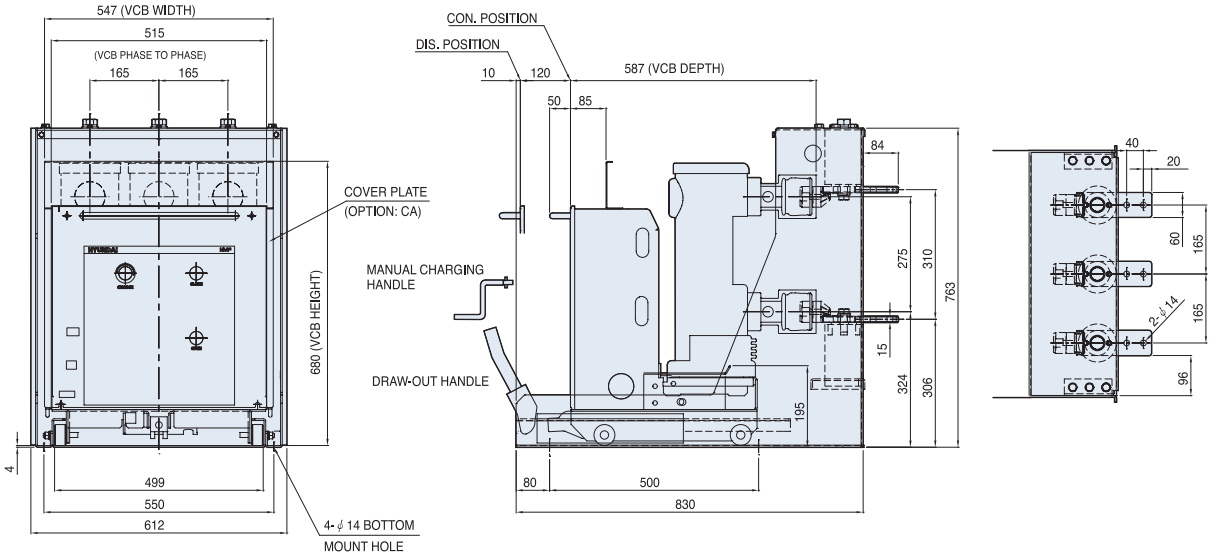
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with ES/FS cradle]

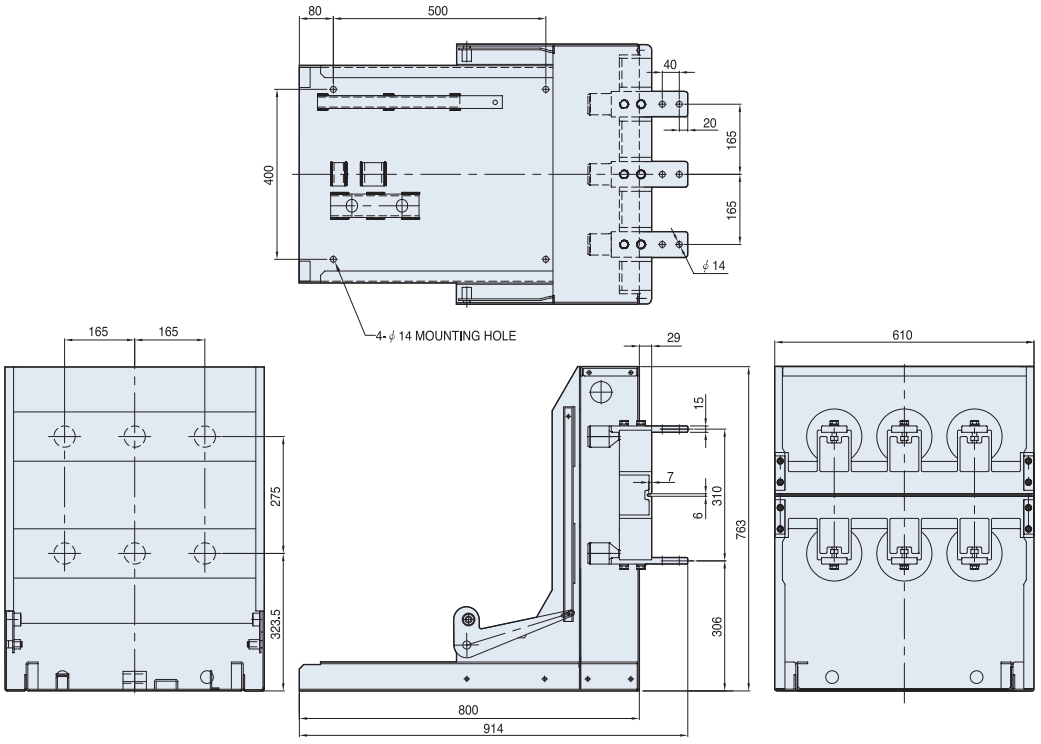
HVF

HVF1151, 1152, 1161, 1162

(Unit: mm)



< for breakers manufactured before July 31, 2009 >



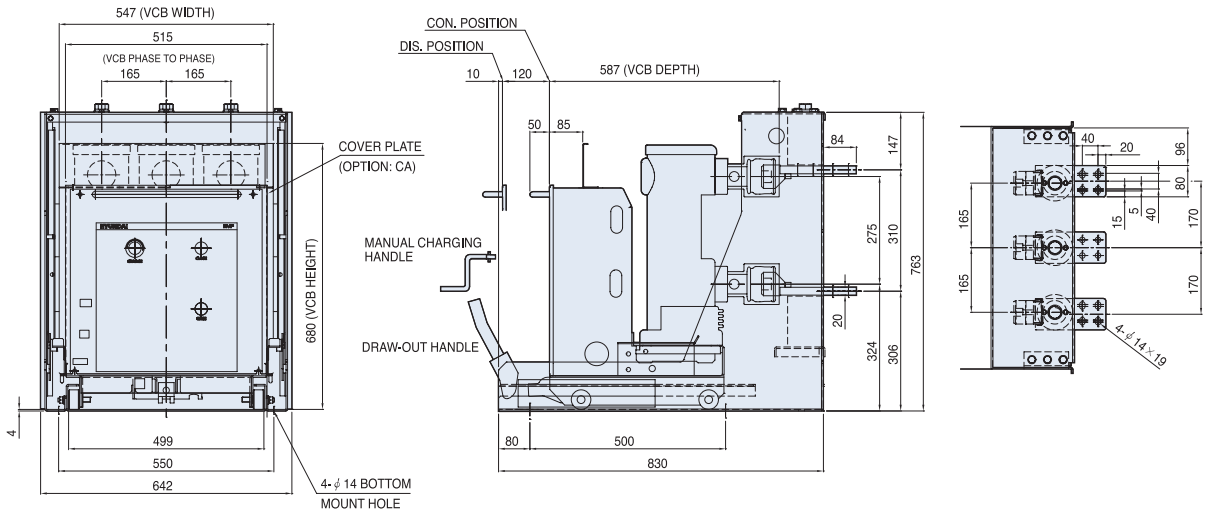
< for breakers manufactured from August 31, 2009 >

※ Dimensions may be revised without notice.

HVF

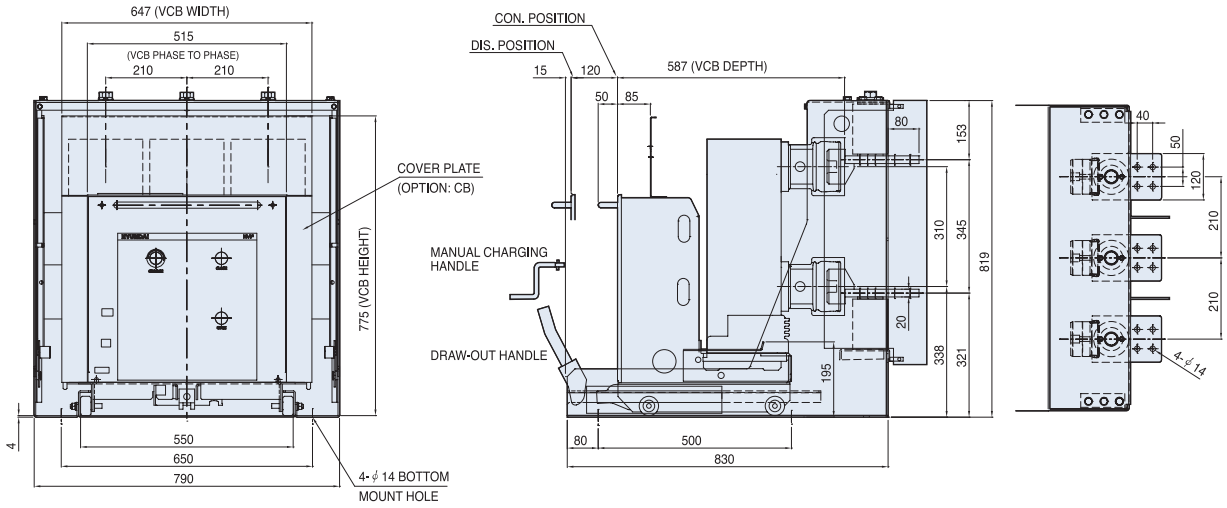
HVF1154, 1164

(Unit: mm)



HVF1166, 1167

(Unit: mm)



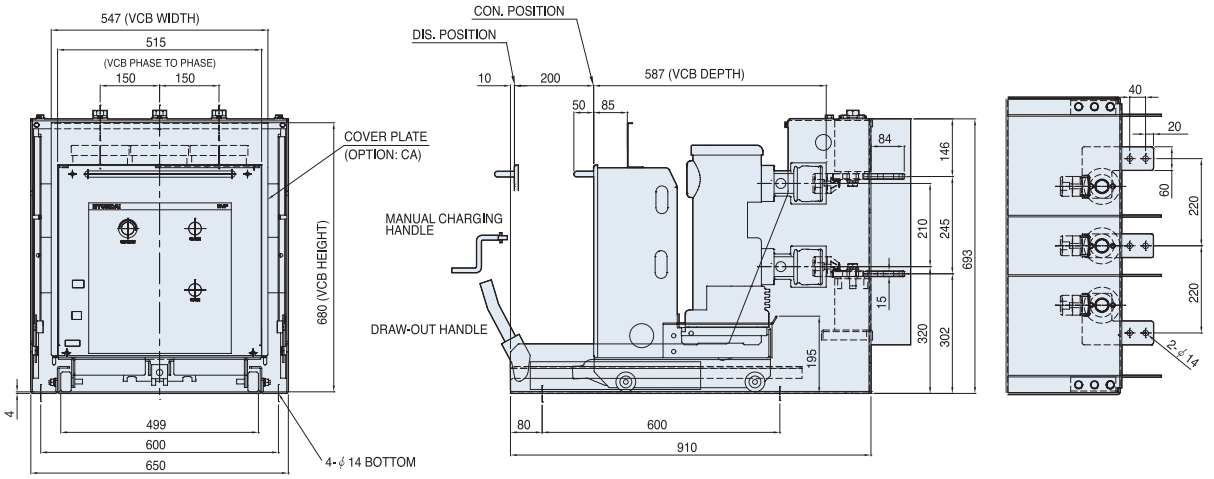
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with ES/FS cradle]

HVF

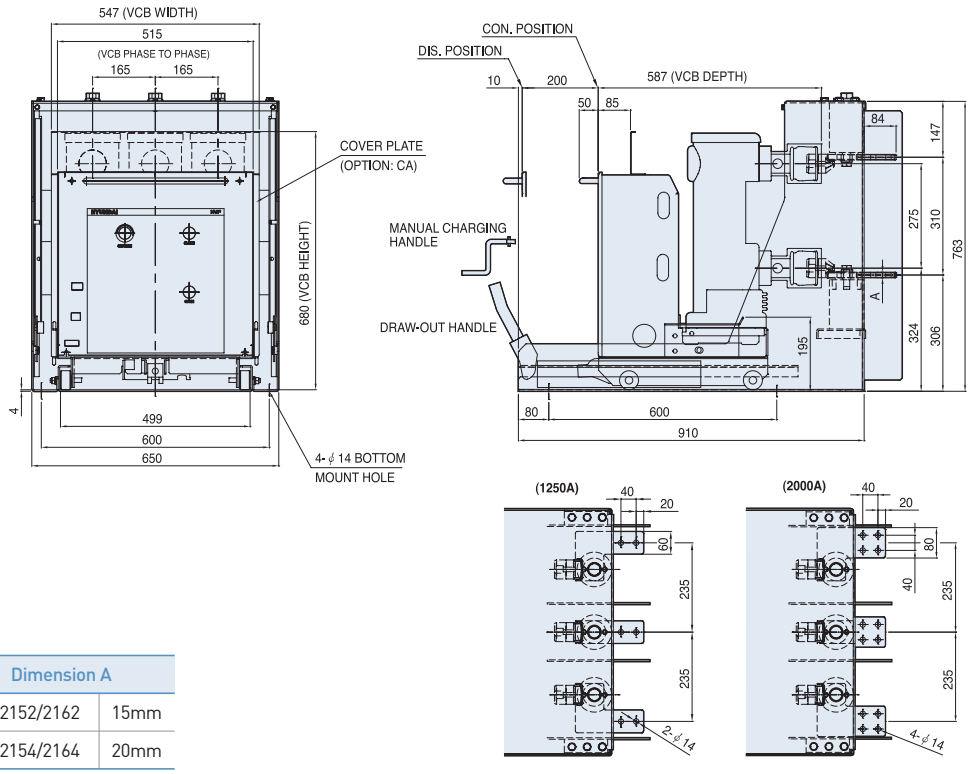
HVF2141, 2142

(Unit: mm)



HVF2152, 2154, 2162, 2164

(Unit: mm)



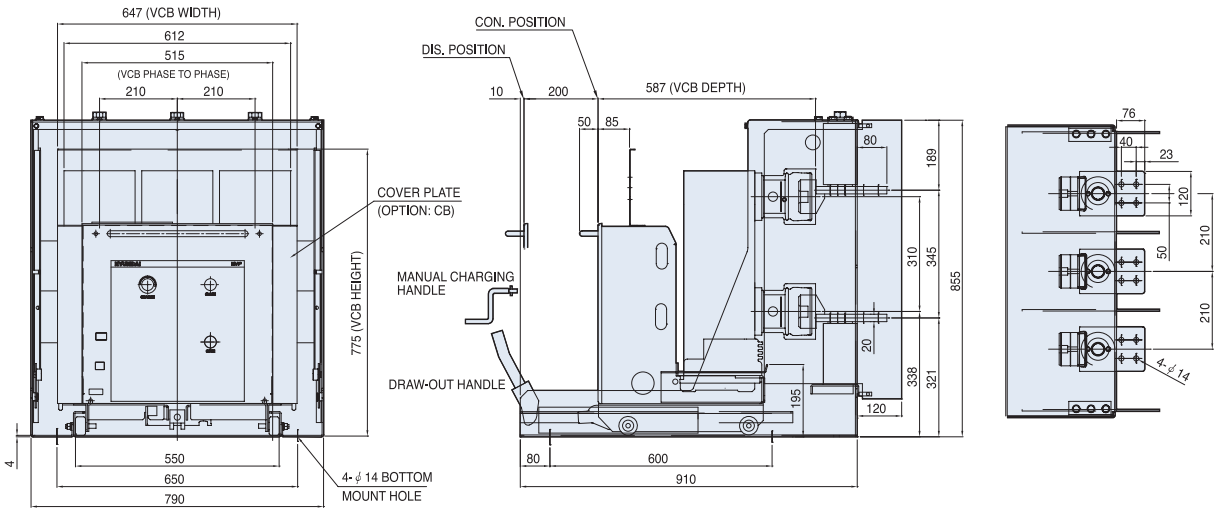
Dimension A	
HVF2152/2162	15mm
HVF2154/2164	20mm

※ Dimensions may be revised without notice.

HVF

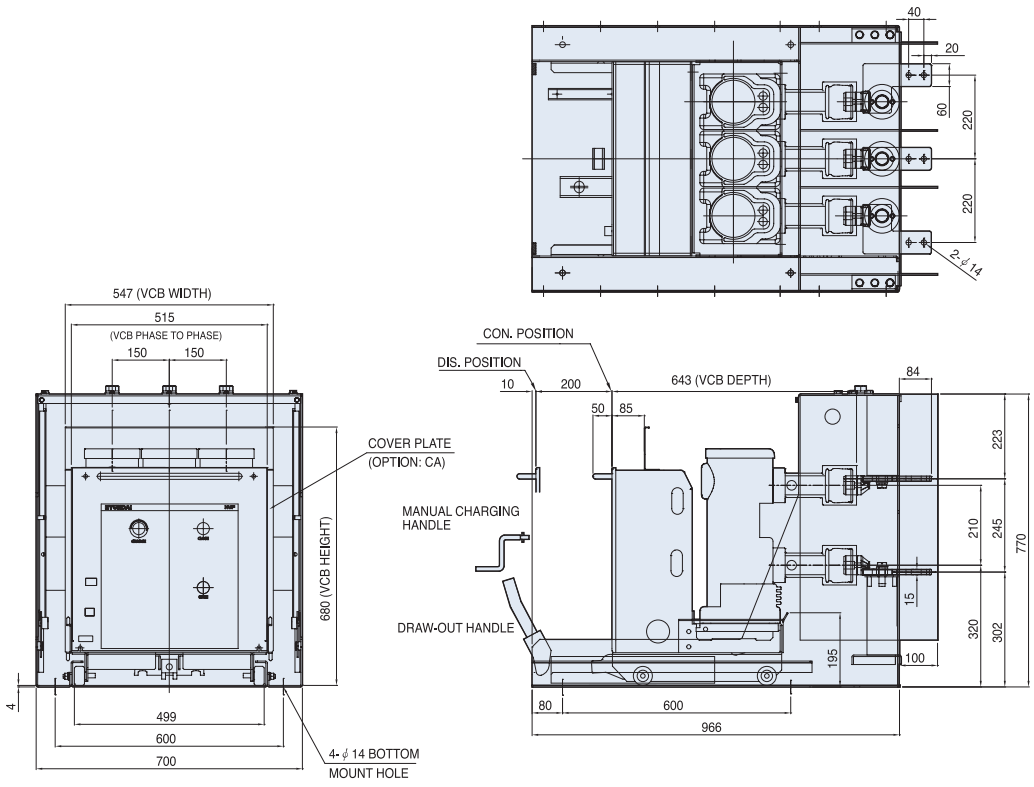
HVF2166, 2167

(Unit: mm)



HVF3141, 3142

(Unit: mm)



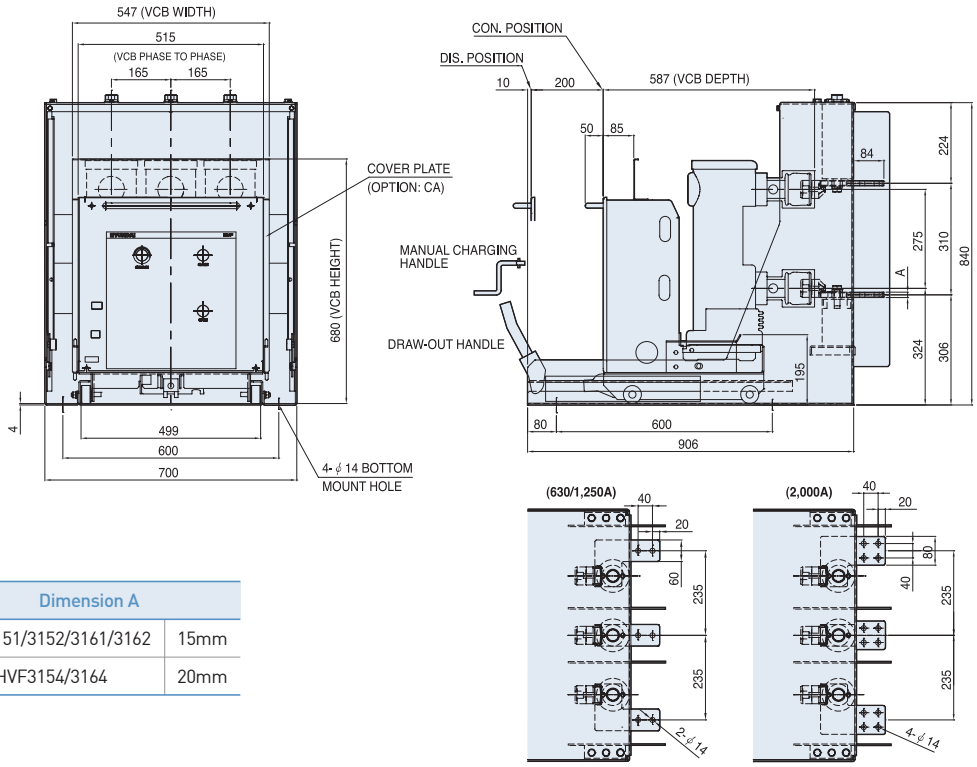
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with ES/FS cradle]

HVF

HVF3151, 3152, 3154, 3161, 3162, 3164

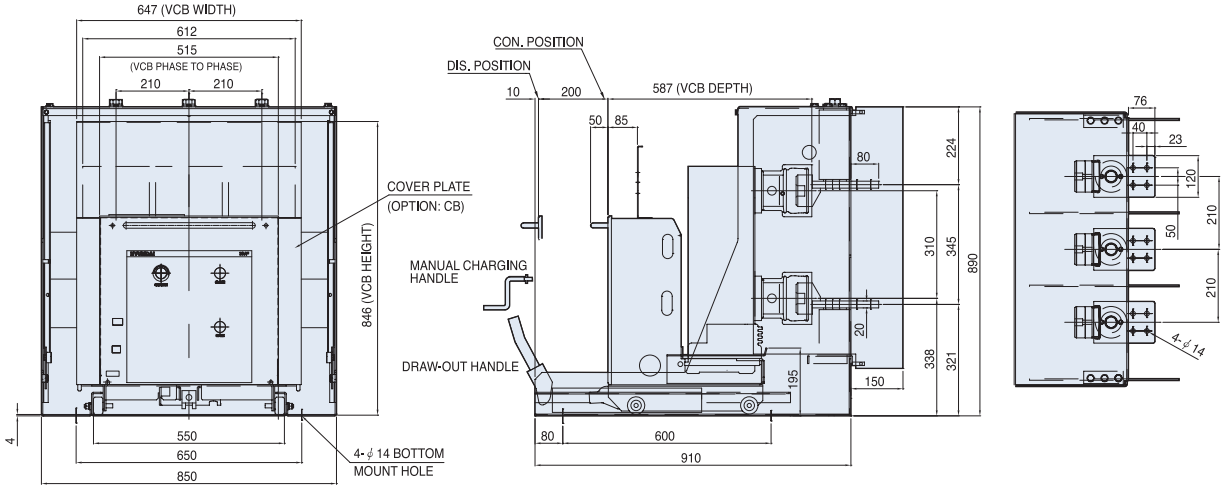
(Unit: mm)



Dimension A	
HVF3151/3152/3161/3162	15mm
HVF3154/3164	20mm

HVF3166, 3167

(Unit: mm)

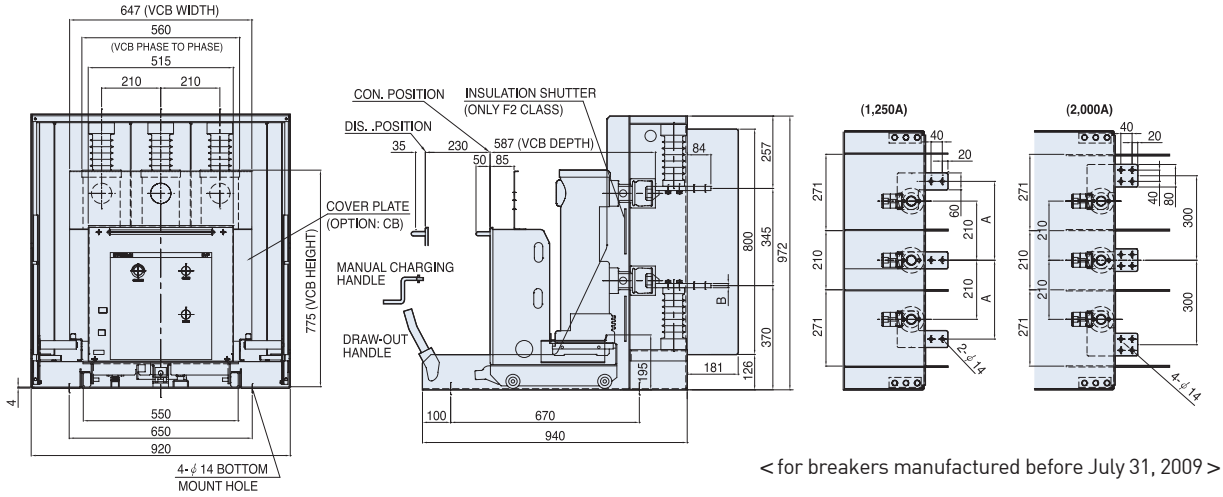


※ Dimensions may be revised without notice.

HVF6111, 6112, 6141, 6142, 6144

HVF

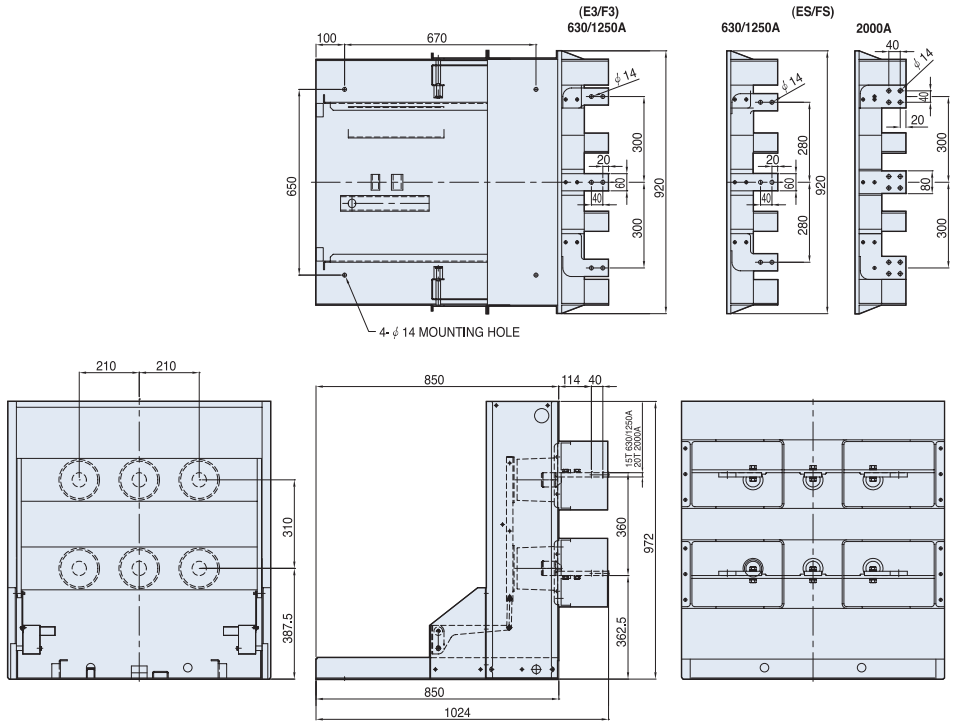
(Unit: mm)



< for breakers manufactured before July 31, 2009 >

Dimension A		
HVF6111-6142	ES/FS type	280mm
	E3/F3 type	300mm

Dimension B		
HVF6111-6142	ES/FS/E3/F3 type	15mm
HVF6144	ES/FS type	20mm



< for breakers manufactured from August 1, 2009 >

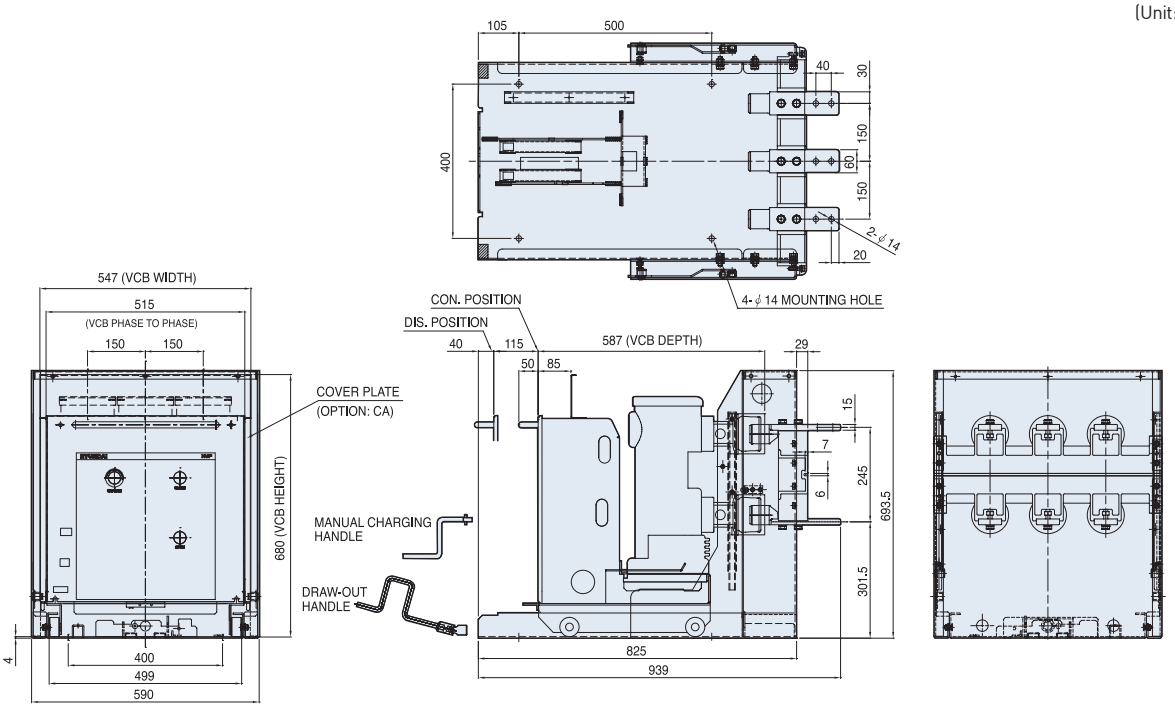
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with SF cradle]

HVF

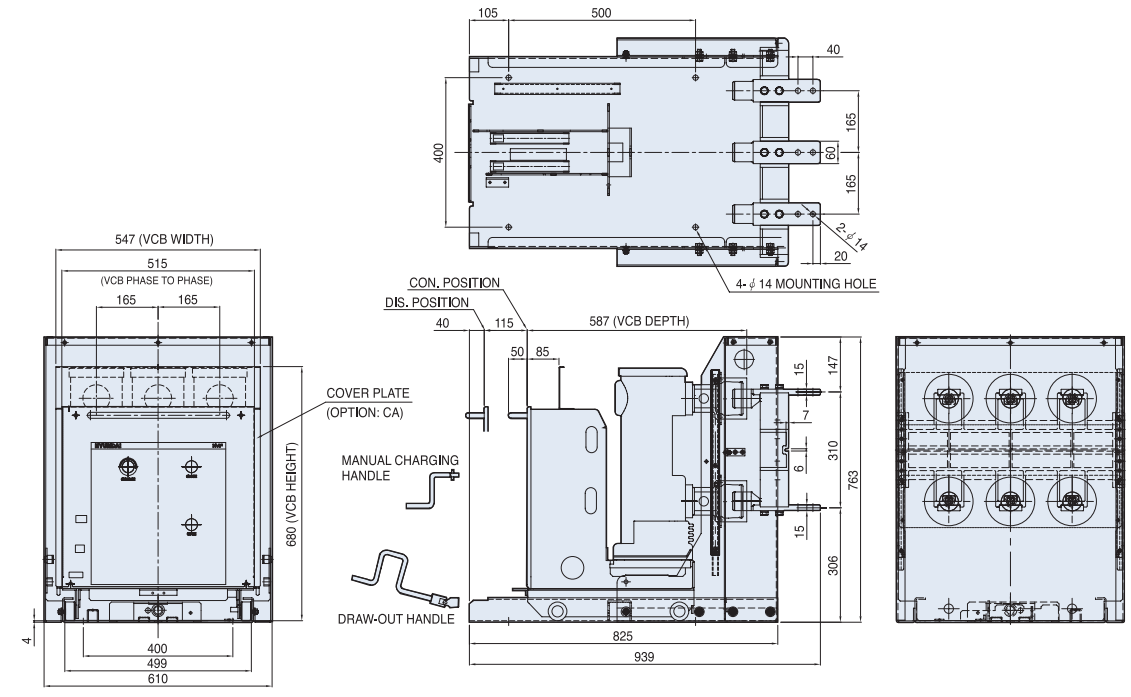
HVF1141, 1142

(Unit: mm)



HVF1151, 1152, 1161, 1162

(Unit: mm)

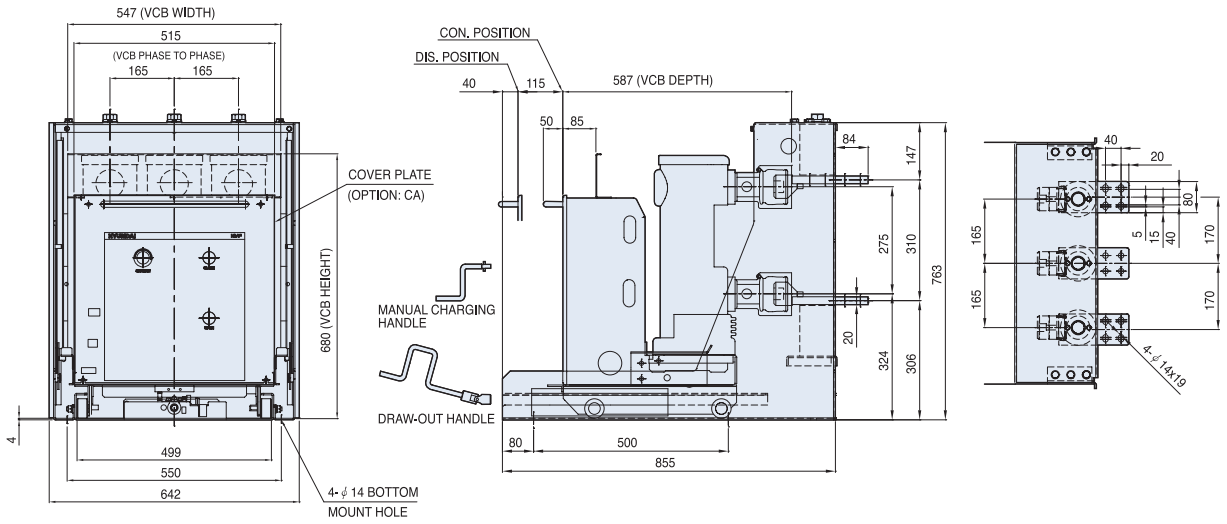


※ Dimensions may be revised without notice.

HVF

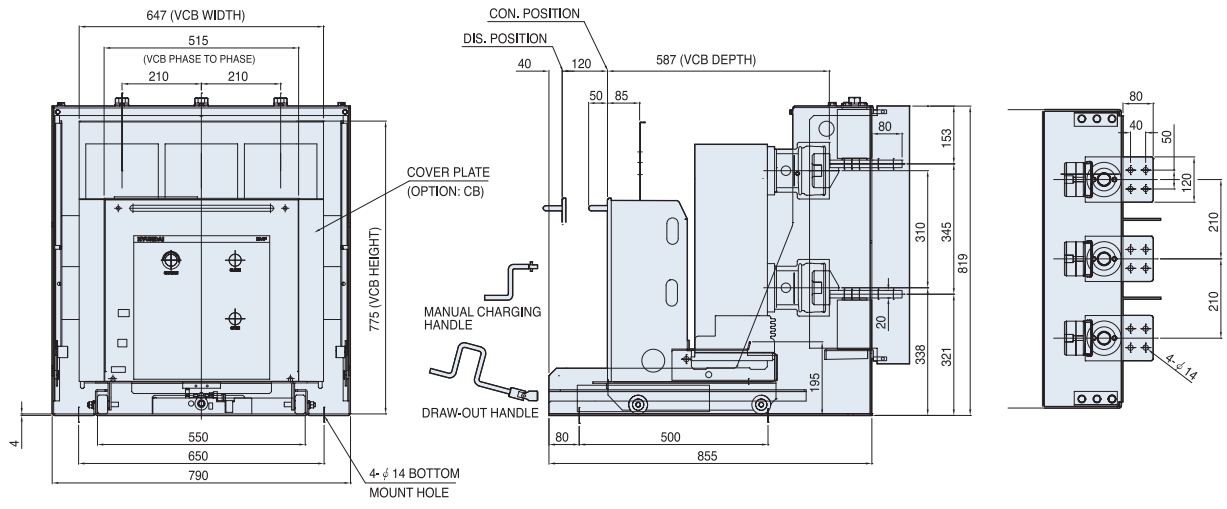
HVF1154, 1164

(Unit: mm)



HVF1166, 1167

(Unit: mm)



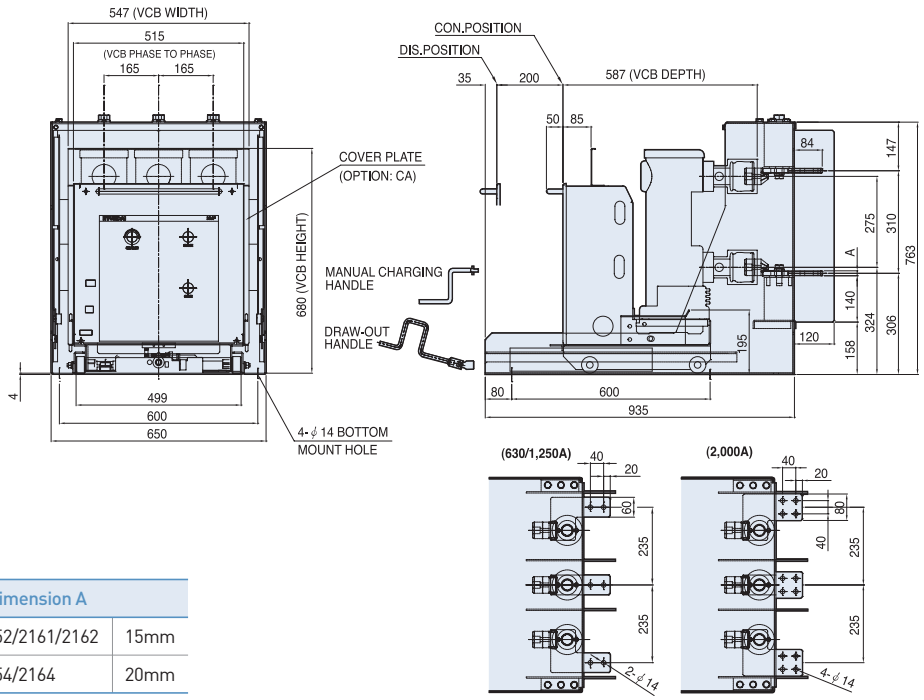
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with SF cradle]

HVF

HVF2151, 2152, 2154, 2161, 2162, 2164

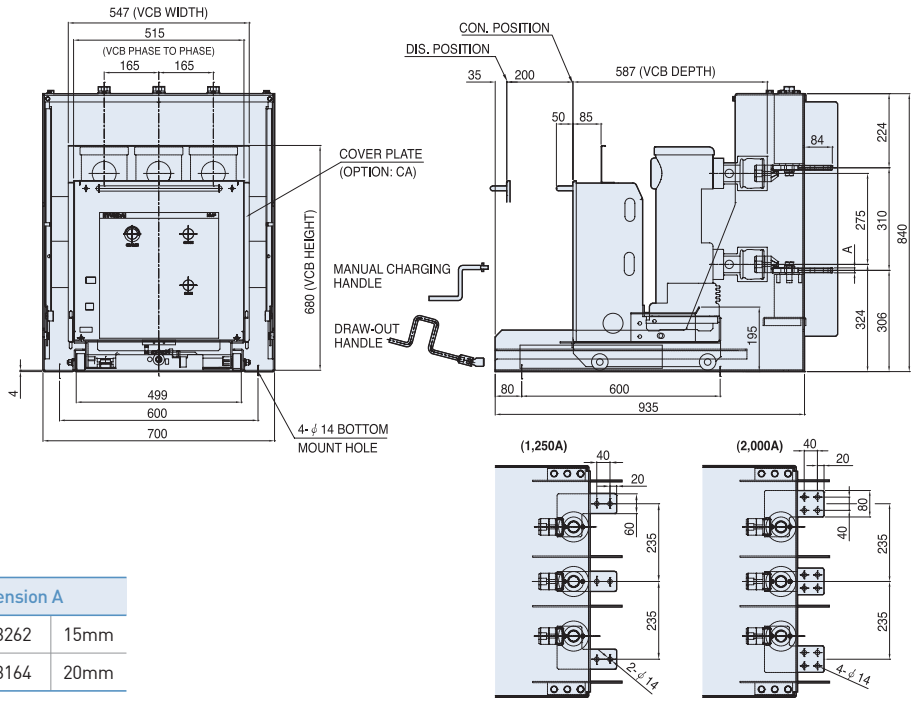
(Unit: mm)



Dimension A	
HVF2151/2152/2161/2162	15mm
HVF2154/2164	20mm

HVF3152, 3154, 3162, 3164

(Unit: mm)



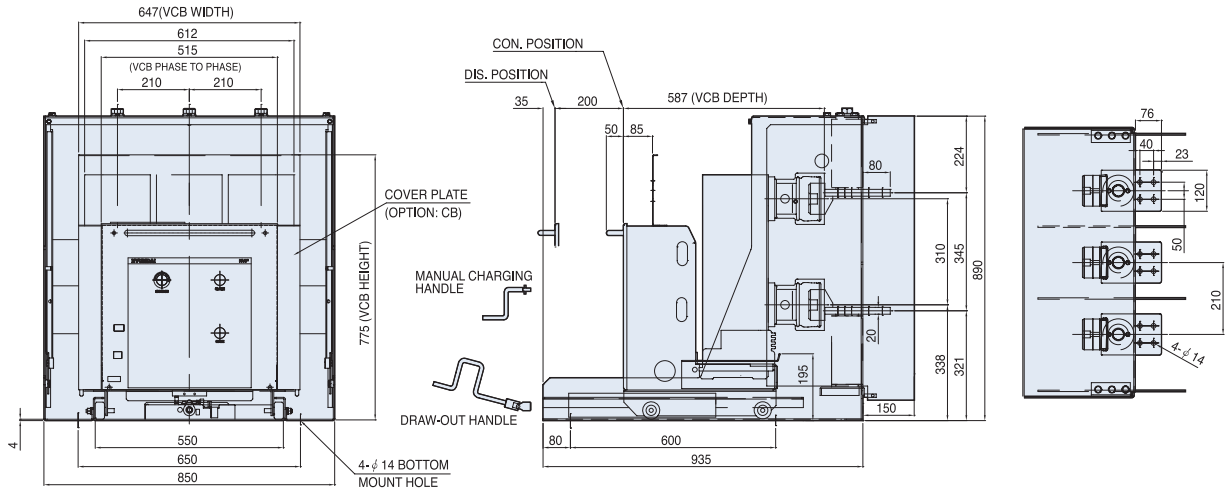
Dimension A	
HVF3152/3262	15mm
HVF3154/3164	20mm

※ Dimensions may be revised without notice.

HVF

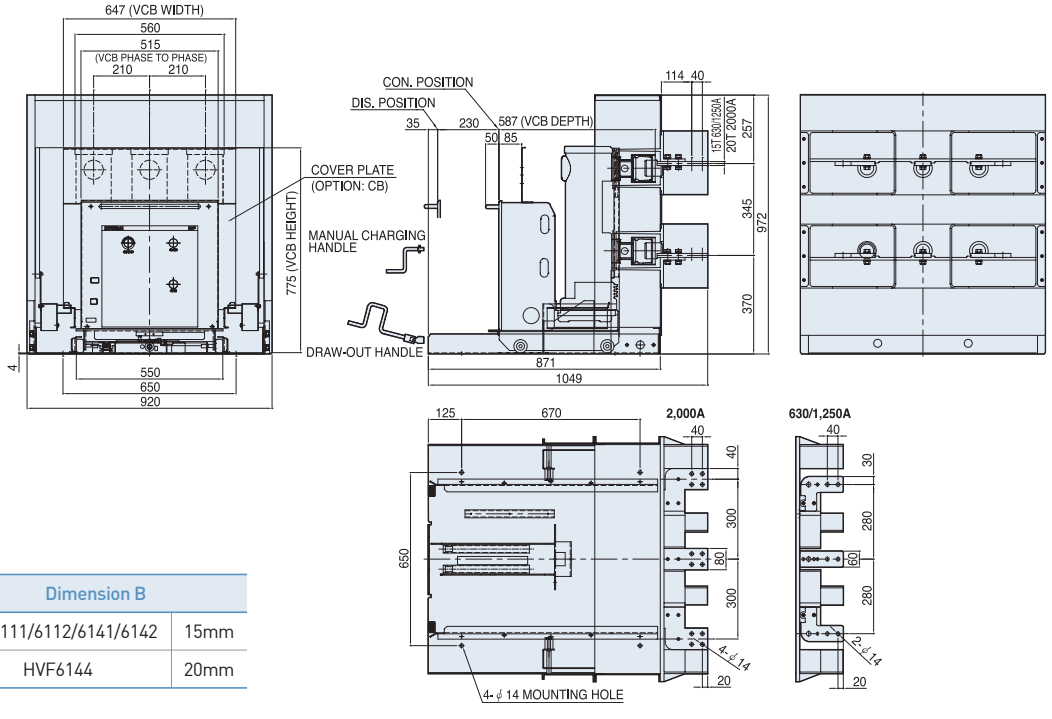
HVF3166, 3167

(Unit: mm)



HVF6111, 6112, 6141, 6142, 6144

(Unit: mm)



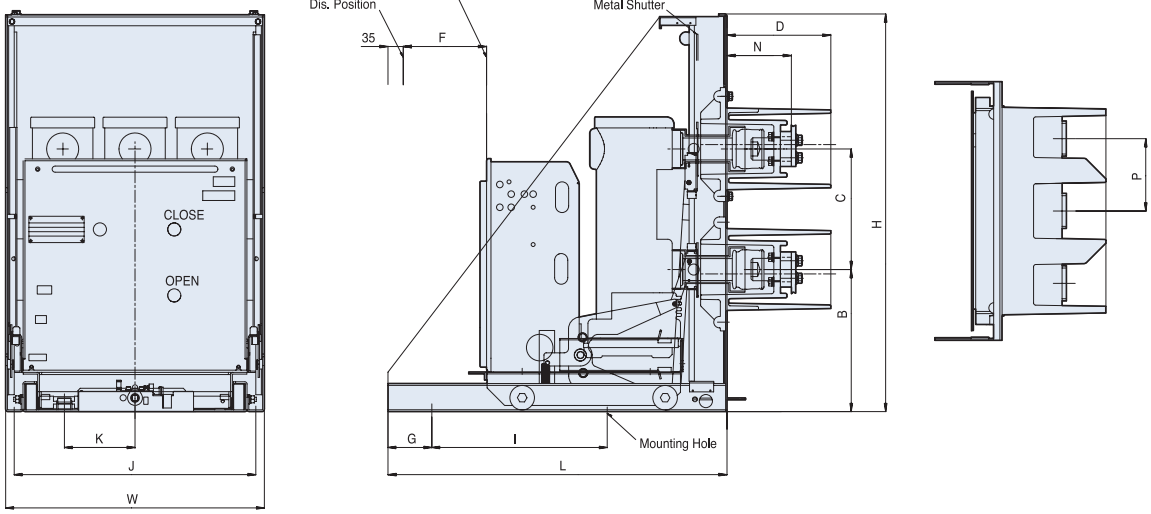
Dimension B	
HVF6111/6112/6141/6142	15mm
HVF6144	20mm

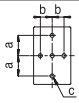
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with GS cradle]

HVF

(Unit: mm)



Model	a	b	c	Detail	
HVF1141/2141, HVF1142/1151/1152/1162/2141/2152/ 2162, HVF3152/3162, HVF6111/6112, HVF6141/6142	50	-	2-M12		A
HVF1154/1164/2154/2164/6144, HVF3166/3167	60	40	4-M12		B
HVF1167/2167/1166/2166	60	35	5-M12		C

(Unit: mm)

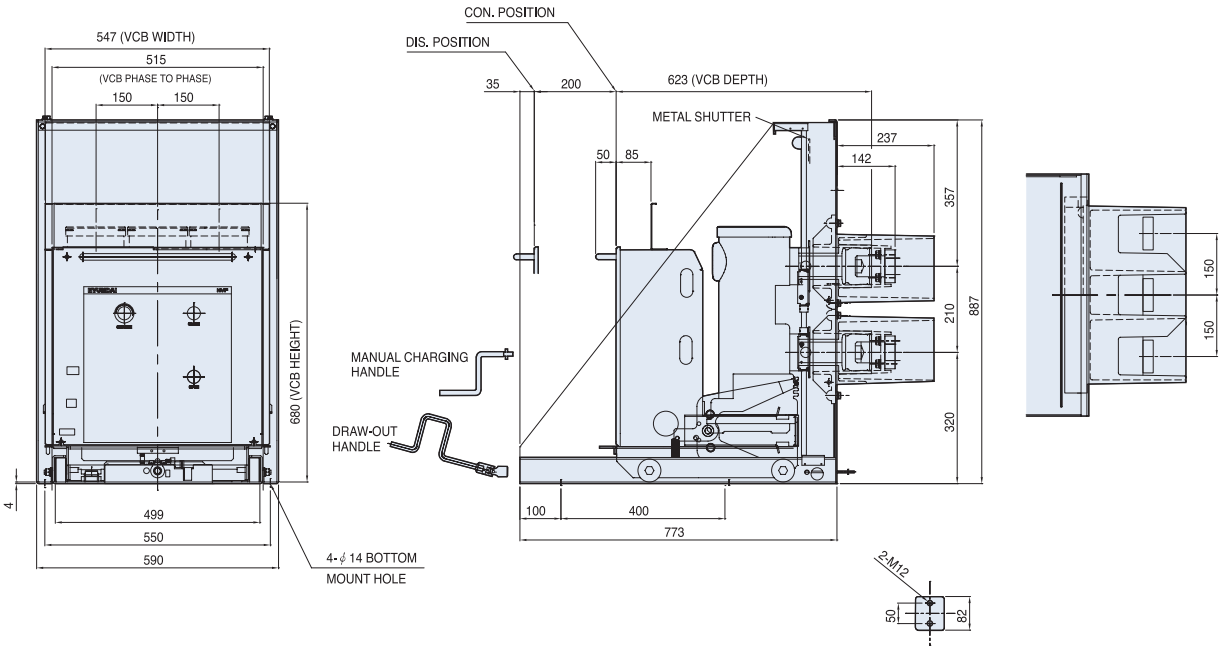
Dimensions / Model	P	W	H	L	B	C	D	F	G	I	J	K	N	Terminal
HVF1141/2	150	590	887	773	320	210	237	200	100	400	550	161	142	A
HVF1151/2	165	590	887	773	324	275	237	200	100	400	550	161	147	A
HVF1154	165	590	907	773	324	275	237	200	100	400	550	161	147	B
HVF1161/2	165	590	887	773	324	275	237	200	100	400	550	161	147	A
HVF1164	165	590	907	773	324	275	237	200	100	400	550	161	147	B
HVF1166/7	210	690	1023	743	339	310	264	200	100	400	600	161	196	C
HVF1168	275	1000	1200	765	589	310	279.7	200	50	665	960	154	179.7	-
HVF1178	275	1000	1200	765	589	310	279.7	200	50	665	960	154	179.7	-
HVF2141/2	150	630	887	773	320	210	237	200	100	400	550	161	142	A
HVF2168	275	1000	1200	765	589	310	279.7	200	50	665	960	154	179.7	-
HVF2178	275	1000	1200	765	589	310	279.7	200	50	665	960	154	179.7	-
HVF2152	165	630	907	773	324	275	237	200	100	400	551	161	147	A
HVF2154	165	630	907	773	324	275	237	200	100	400	551	161	147	B
HVF2162	165	630	907	773	324	275	237	200	100	400	551	161	147	A
HVF2164	165	630	907	773	324	275	237	200	100	400	551	161	147	B
HVF2167	210	690	1023	741	339	310	264	200	100	400	600	161	196	C
HVF3152	210	690	907	823	324	275	368.5	250	100	400	551	161	288.5	A
HVF3162	210	690	907	823	324	275	368.5	250	100	400	551	161	288.5	A
HVF3166/7	210	750	1023	813	339	310	267	230	100	400	600	161	197	C
HVF6111/2	210	780	1060	896	388	310	370	300	150	600	650	161	292	A
HVF6141/2	210	780	1060	896	388	310	370	300	150	600	650	161	292	A
HVF6144	210	780	1060	896	388	310	370	300	150	600	650	161	292	B
HVF7142/4	275	1090	1450	1270	602.5	403	401.5	420	50	575	950	161	298.5	-

※ Dimensions may be revised without notice.

HVF

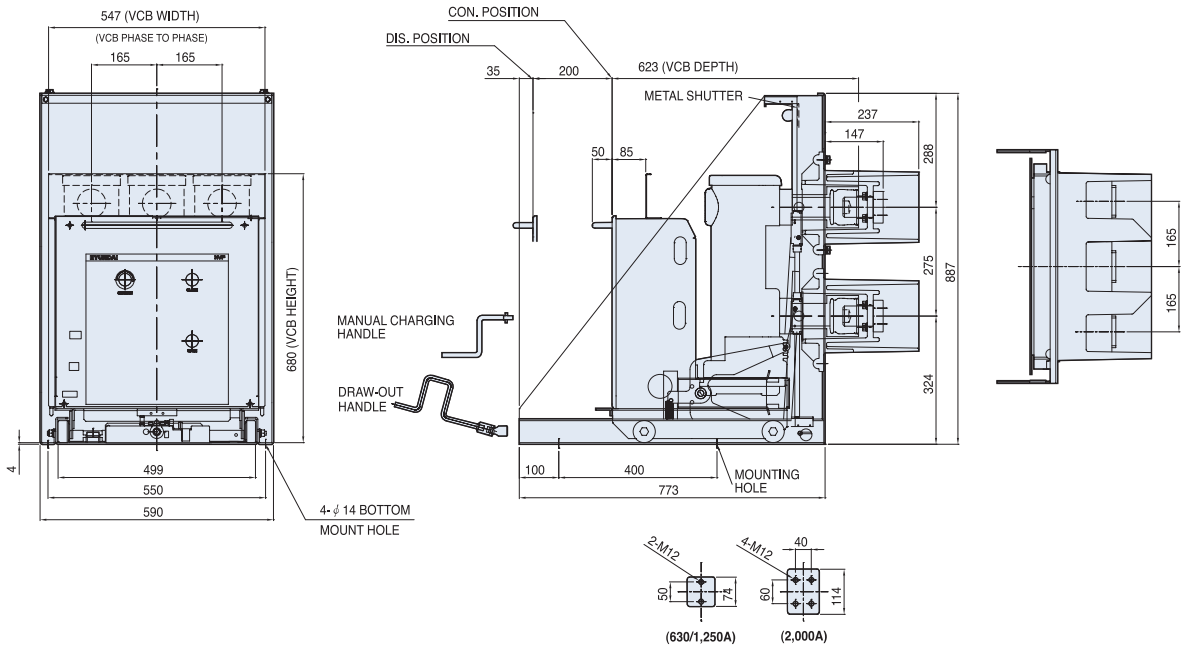
HVF1141, 1142

(Unit: mm)



HVF1151, 1152, 1154, 1161, 1162, 1164

(Unit: mm)



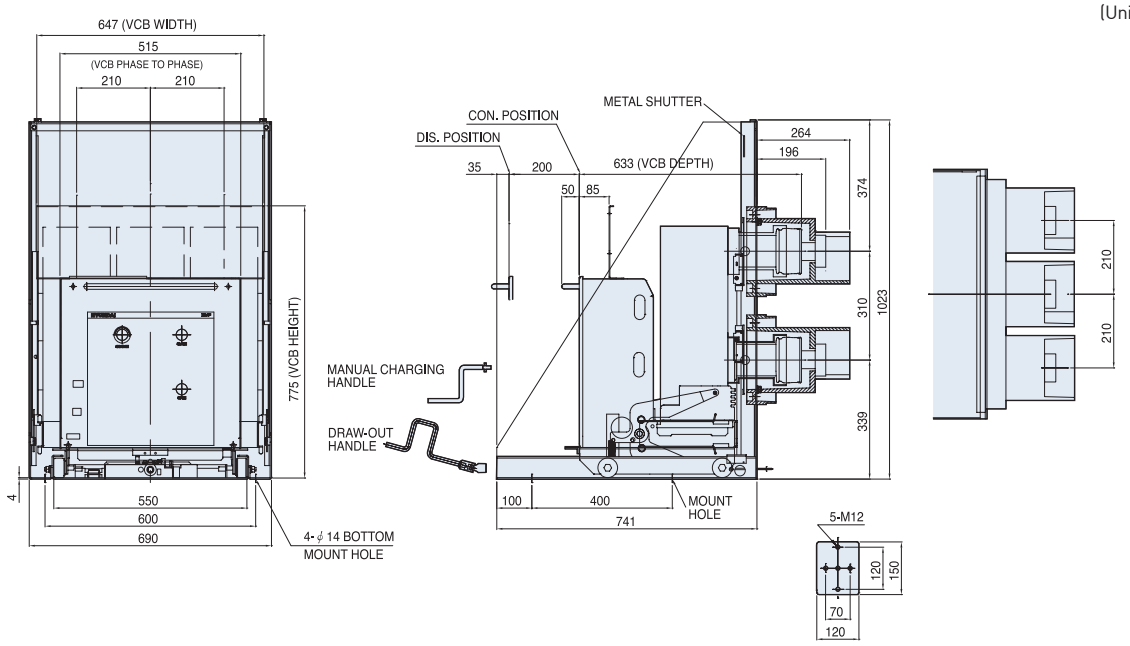
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with GS cradle]

HVF

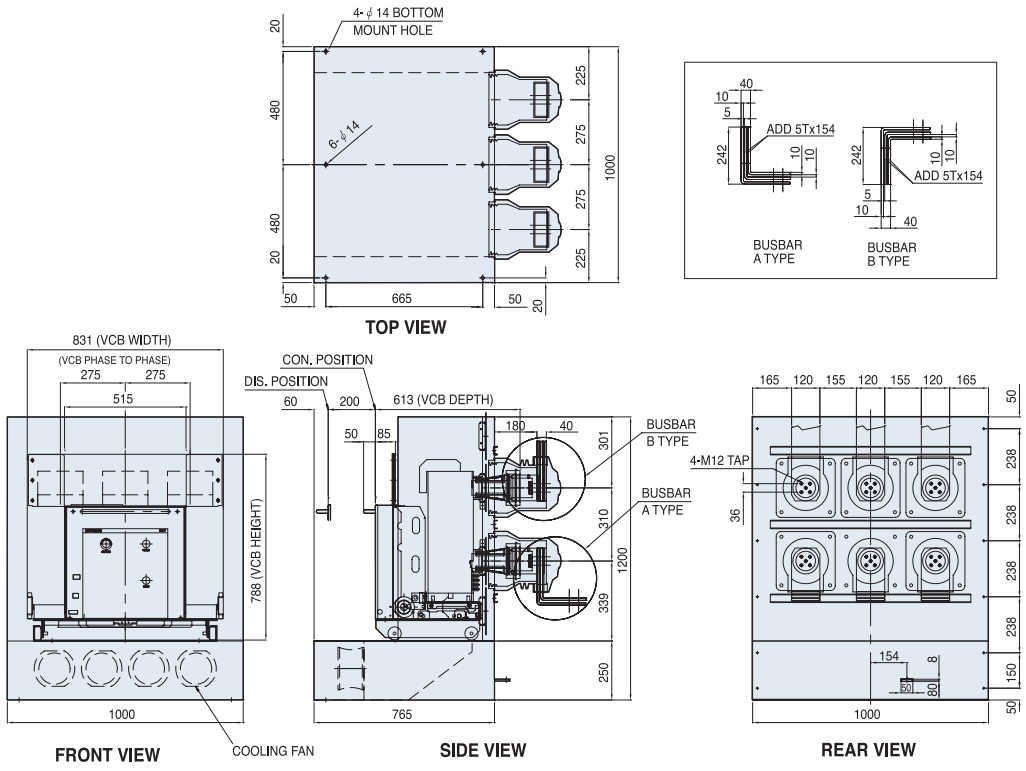
HVF1167, 2167

(Unit: mm)



HVF1168, 1178, 2168, 2178

(Unit: mm)

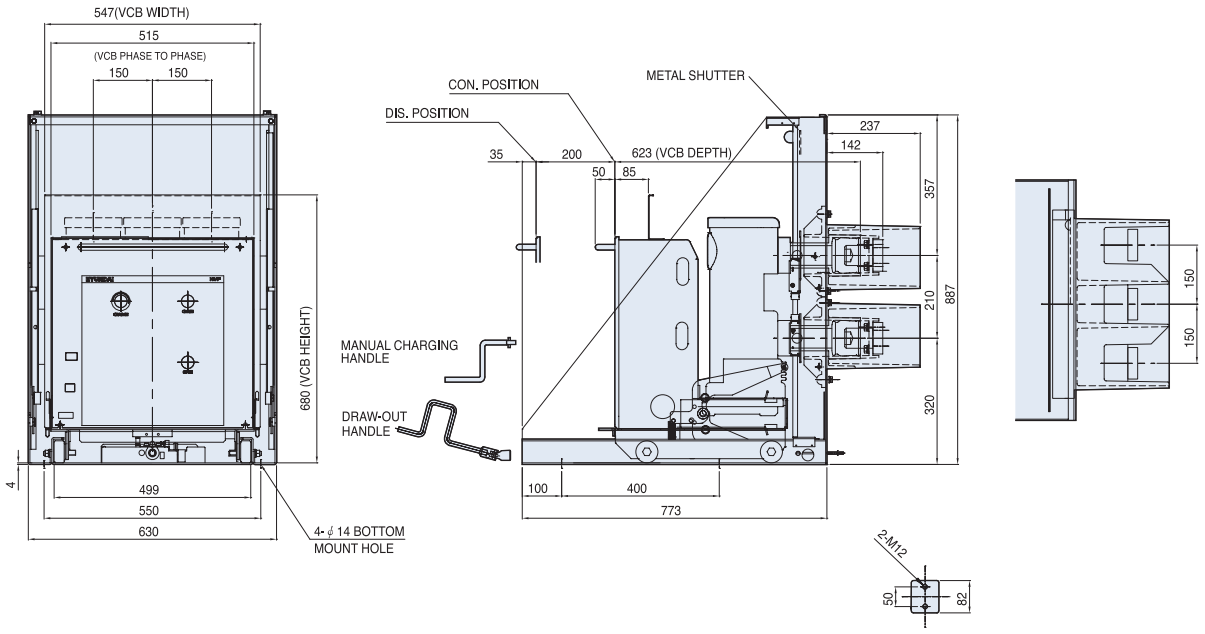


※ Dimensions may be revised without notice.

HVF

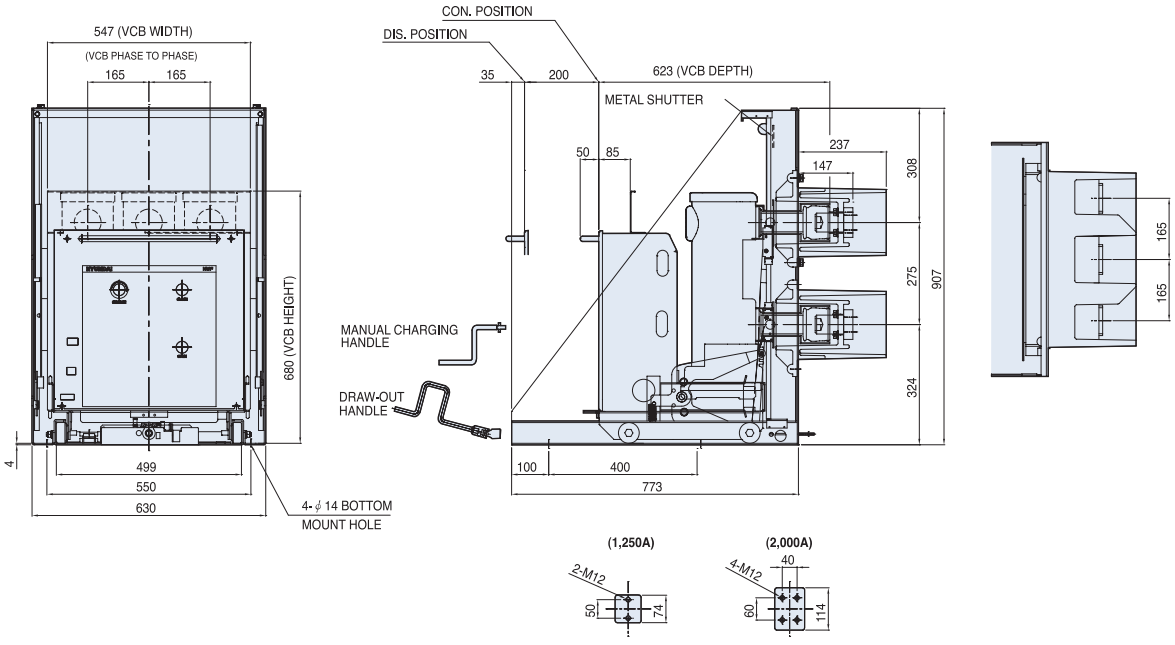
HVF2141, 2142

(Unit: mm)



HVF2152, 2154, 2162, 2164

(Unit: mm)



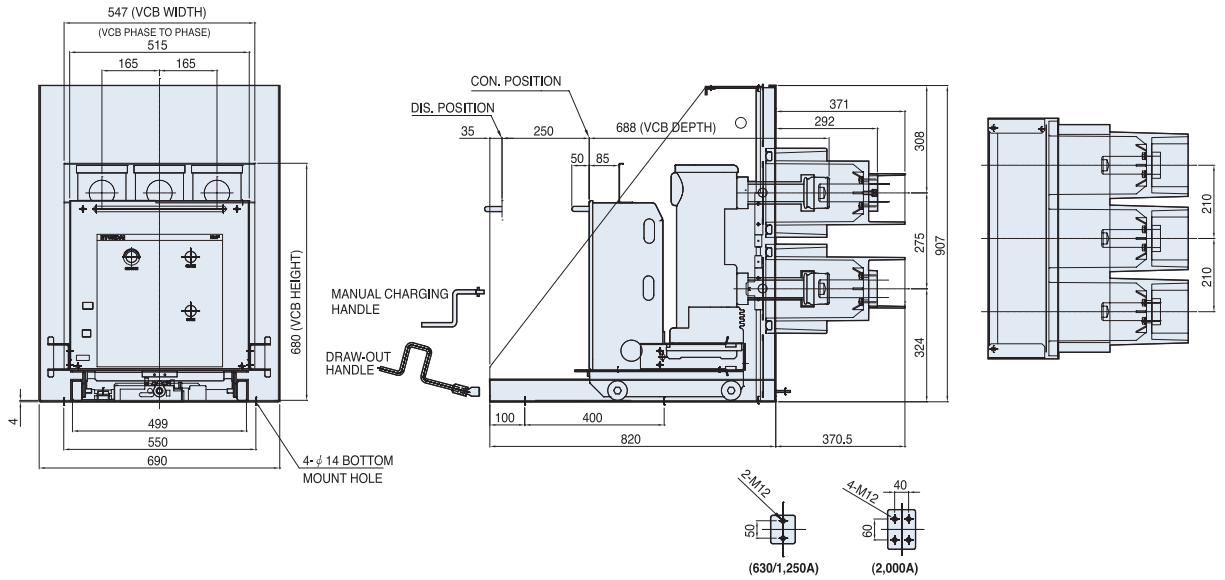
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with GS cradle]

HVF

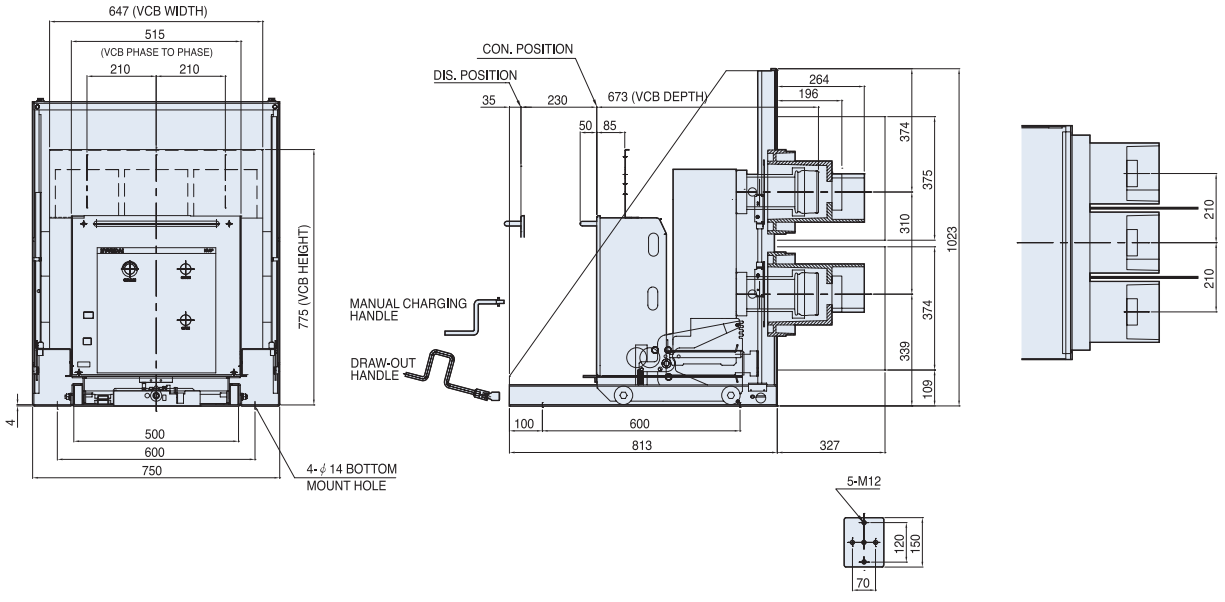
HVF3151, 3152, 3154, 3161, 3162, 3164

(Unit: mm)



HVF3166, 3167

(Unit: mm)

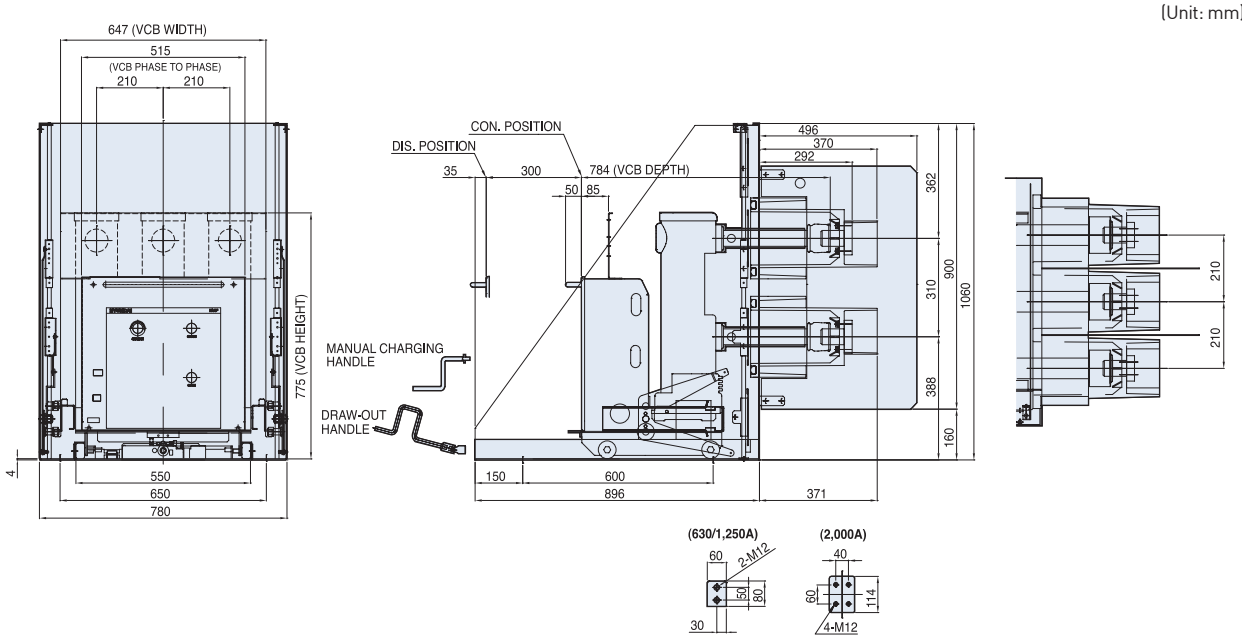


※ Dimensions may be revised without notice.

HVF

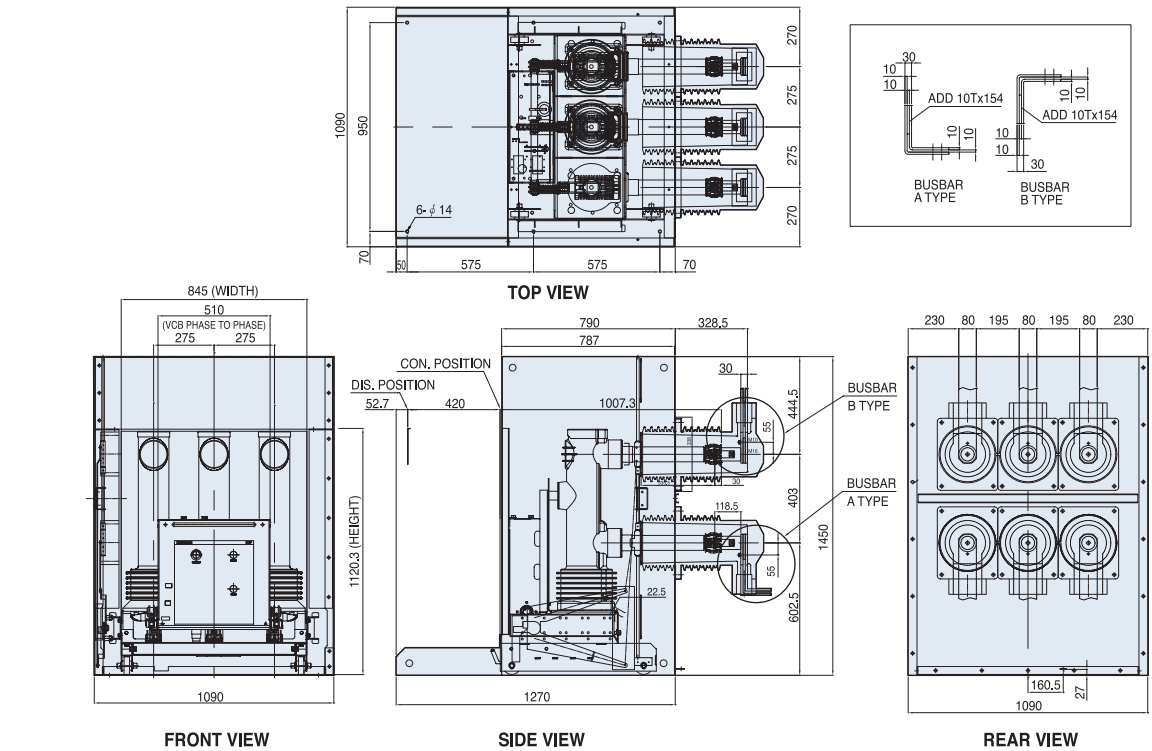
HVF6111, 6112, 6141, 6142, 6144

(Unit: mm)



HVF7142, 7144

(Unit: mm)



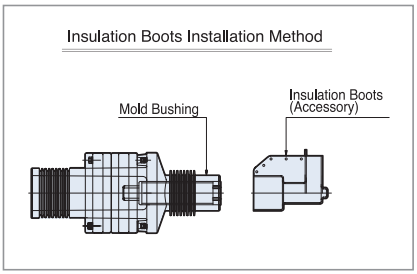
※ Dimensions may be revised without notice.

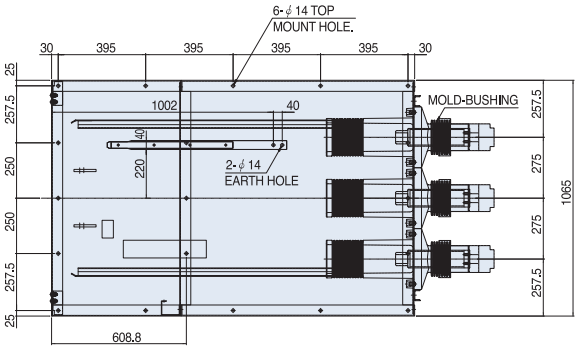
Dimensions [HVF draw-out type with MS cradle]

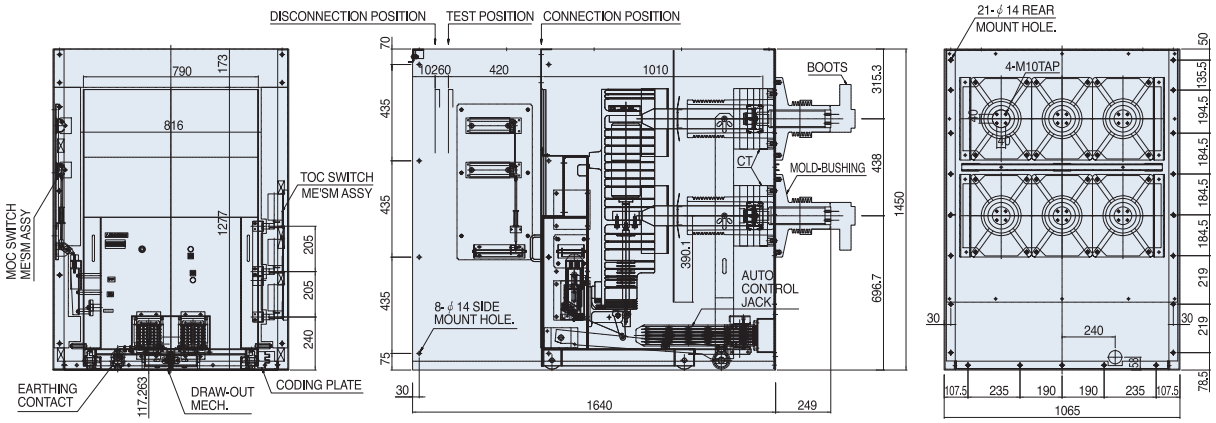
HVF7052, 7054, 7057, 7062, 7064, 7067 (ANSI)

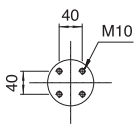
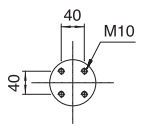
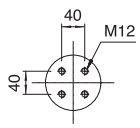
HVF

(Unit: mm)







Rated current	1,200A	2,000A	3,000A
Main circuit terminal			
Thickness	ϕ 80	ϕ 80	ϕ 95

※ Standard Acc'y

1) MOC Switch	5A+5B
2) TOC Switch	3A+3B
3) Metal Shutter	
4) Insulation Boots	6ea
5) Auto Control Jack	4NO+4NC

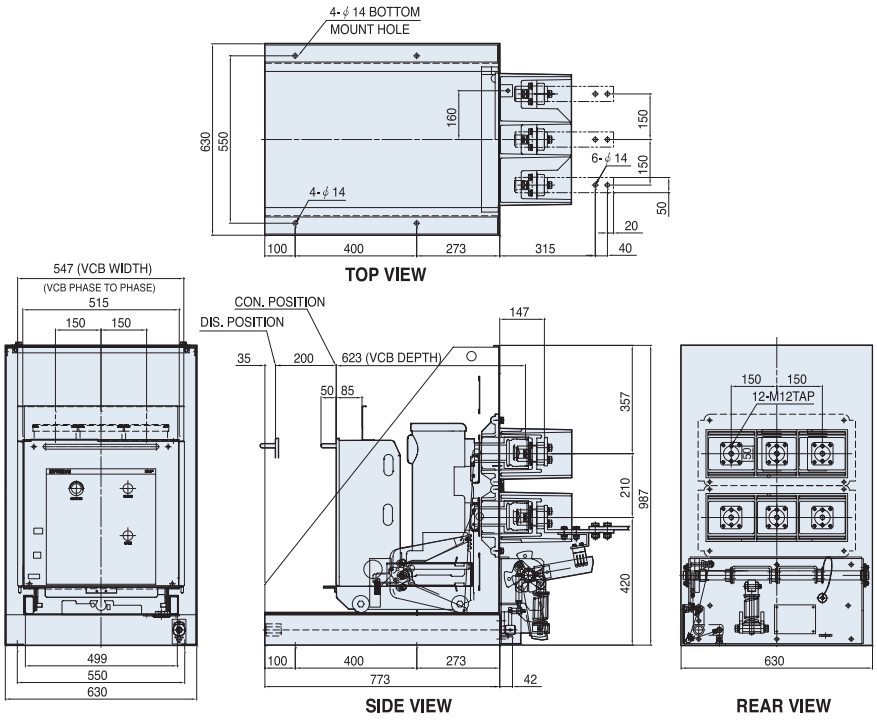
※ Dimensions may be revised without notice.

[HVF draw-out type with GE cradle]

HVF

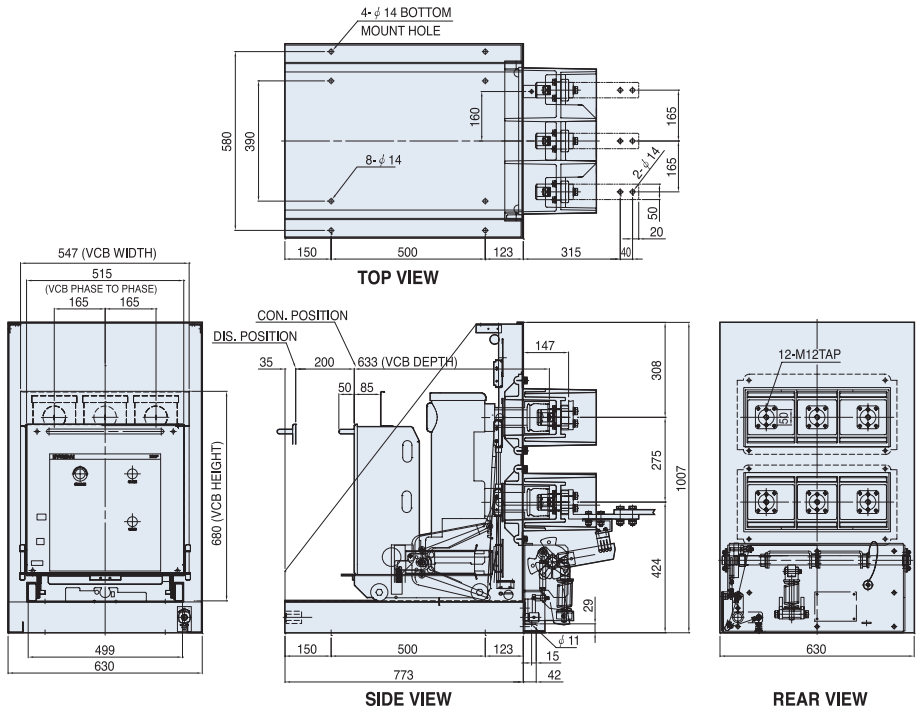
HVF1141, 1142

(Unit: mm)



HVF1151, 1152, 1161, 1162

(Unit: mm)



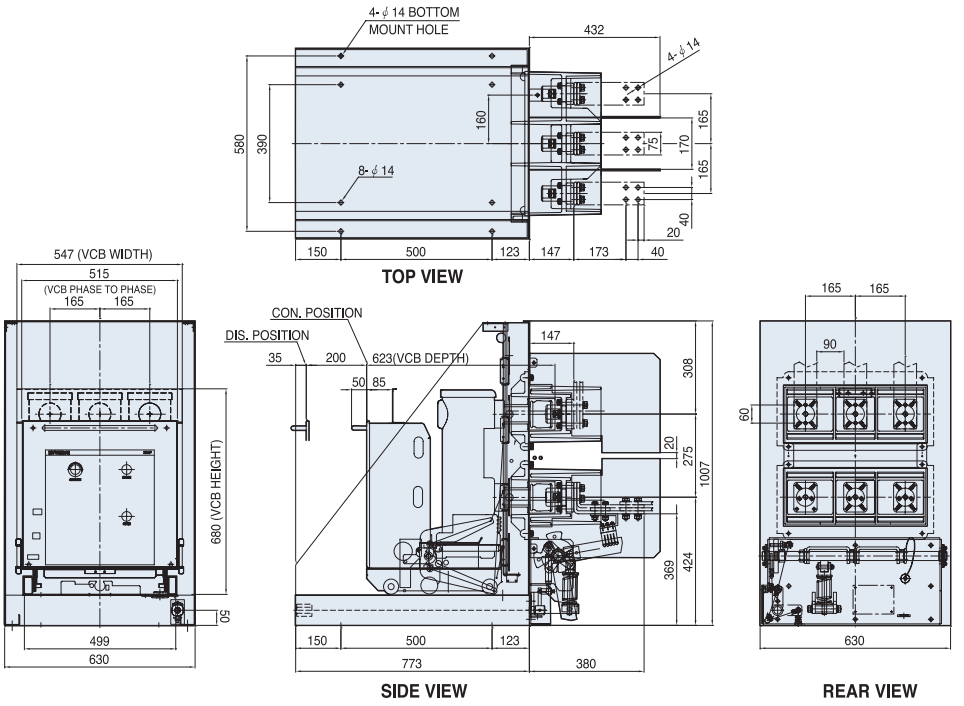
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with GE cradle]

HVF

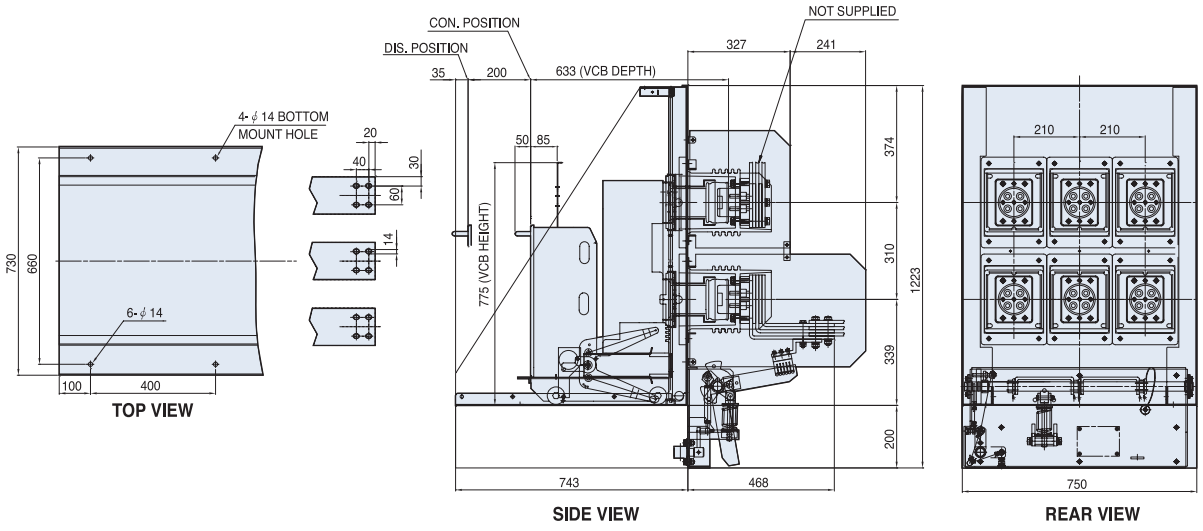
HVF1154, 1164

(Unit: mm)



HVF1166, 1167, 2166, 2167

(Unit: mm)

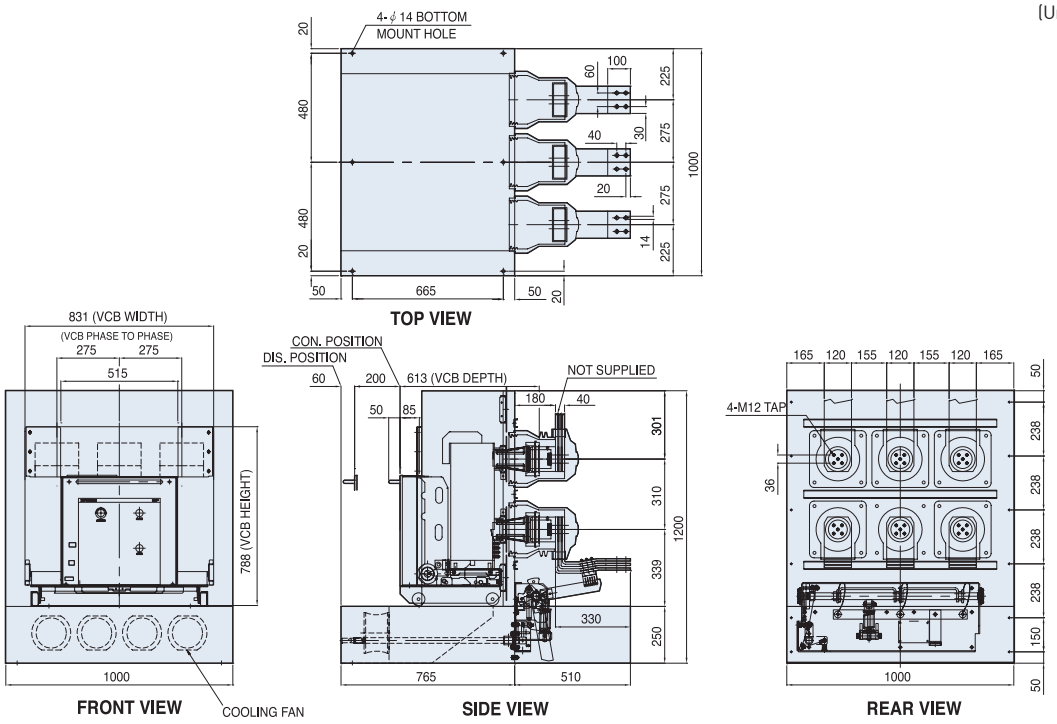


※ Dimensions may be revised without notice.

HVF

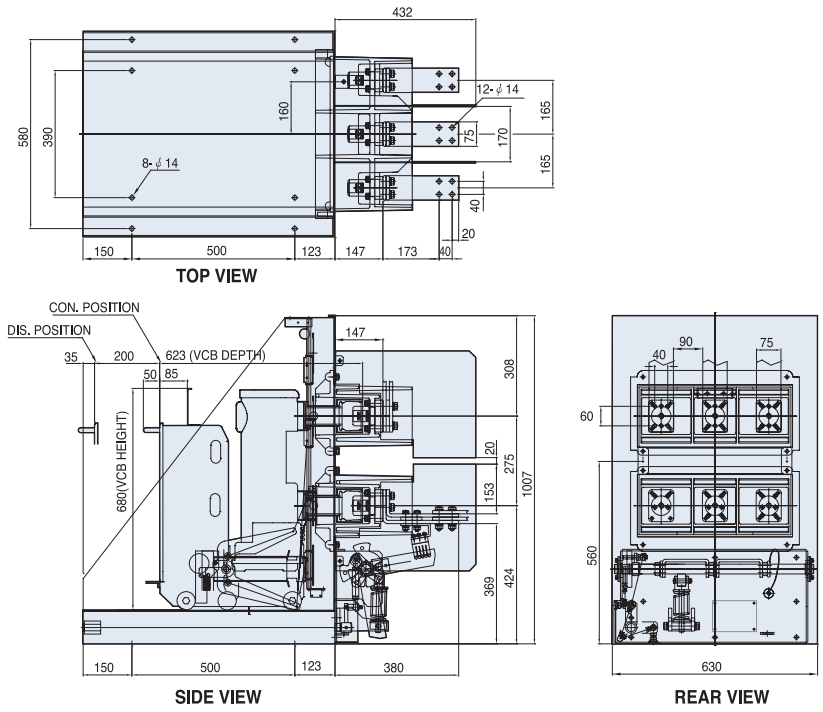
HVF1168, 1178, 2168, 2178

(Unit: mm)



HVF2154, 2164

(Unit: mm)



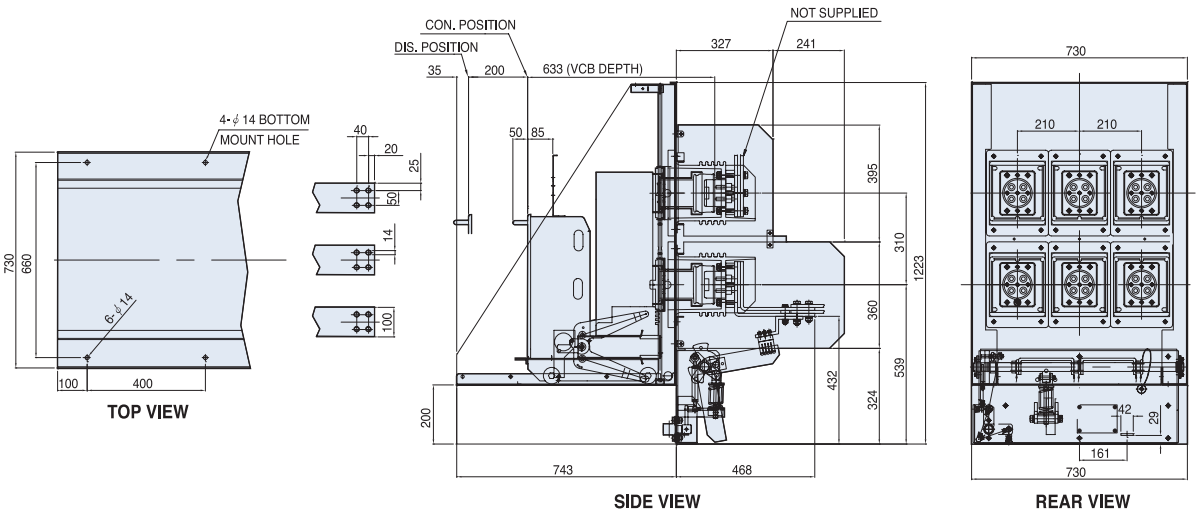
※ Dimensions may be revised without notice.

Dimensions [HVF draw-out type with GE cradle]

HVF

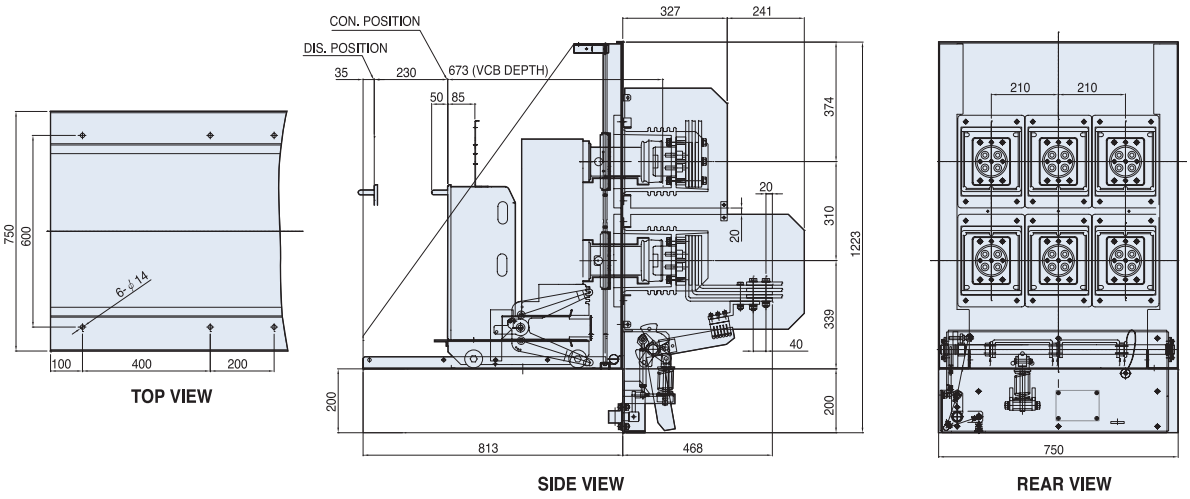
HVF2166, 2167

(Unit: mm)



HVF3167

(Unit: mm)

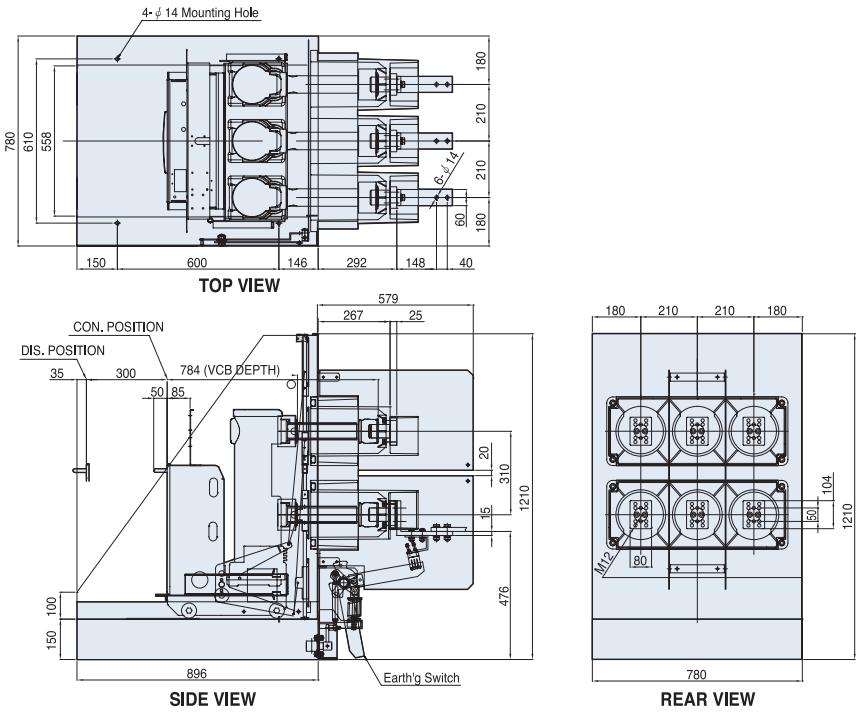


※ Dimensions may be revised without notice.

HVF

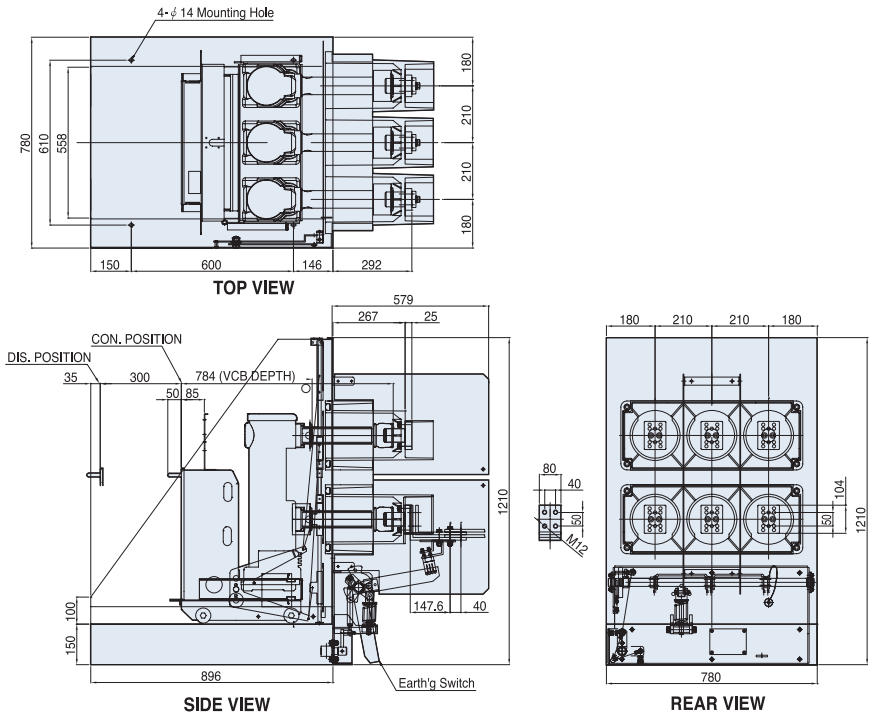
HVF6111, 6112, 6141, 6142

(Unit: mm)



HVF6144

(Unit: mm)



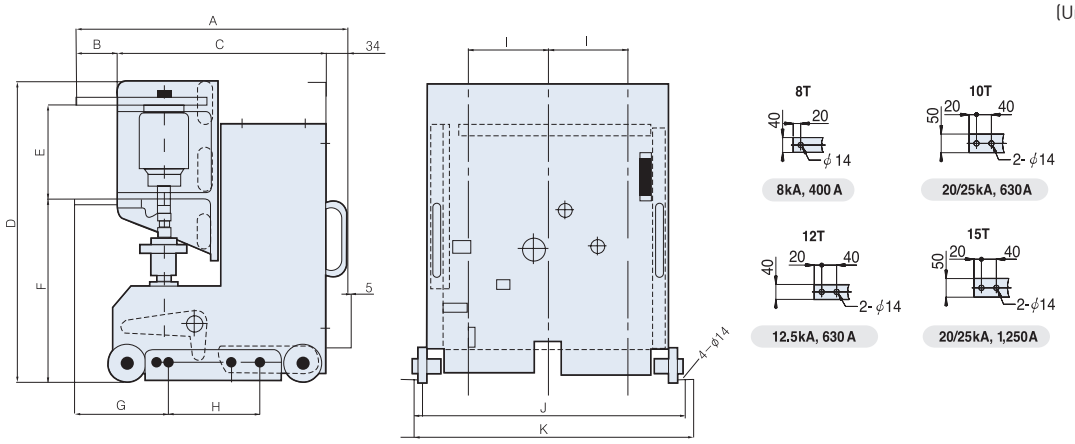
※ Dimensions may be revised without notice.

Dimensions [HVG type]

HVG

HVG Fixed type (XA)

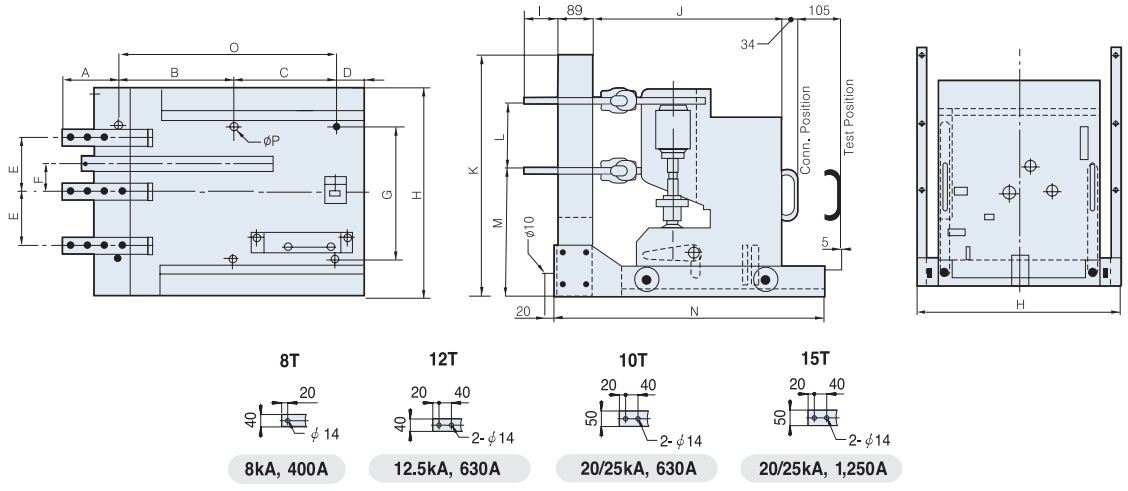
(Unit: mm)



Model		A	B	C	D	E	F	G	H	I	J	K	L
HVG1099	8kA 400A	443	61	348	488	155	296	147	151	130	450	480	390
HVG1011	12.5kA 630A	482	100										
HVG1131/2	20kA 630/1,250A									140			
HVG1141/2	25kA 630/1,250A												

HVG draw-out type with ES/FS cradle

(Unit: mm)



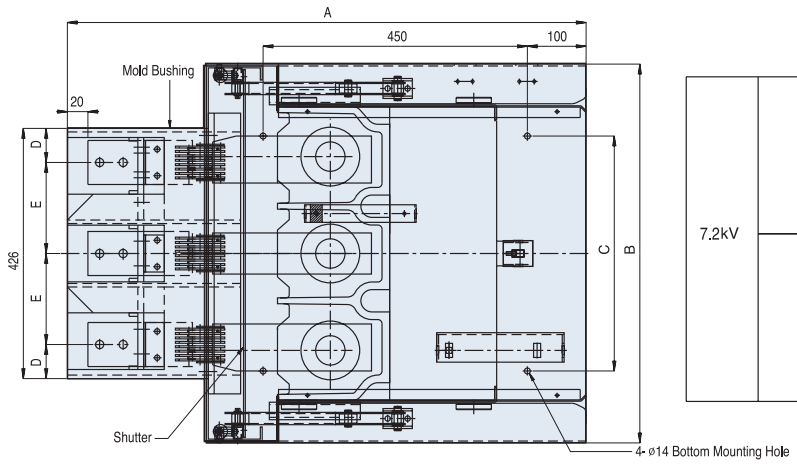
Model		A	D	E	F	G	H	I	J	K	L	M	N	O	ϕP
HVG1099	8kA 400A	96	70	130	68	320	500	40	464	570	155	299	660	530	4-ϕ 14
HVG1011	12.5kA 630A	136						80							
HVG1131	20kA 630A			140			540								
HVG1132	20kA 1,250A														
HVG1141	25kA 630A														
HVG1142	25kA 1,250A														

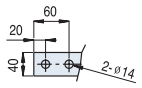
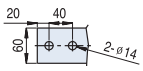
※ Dimensions may be revised without notice.

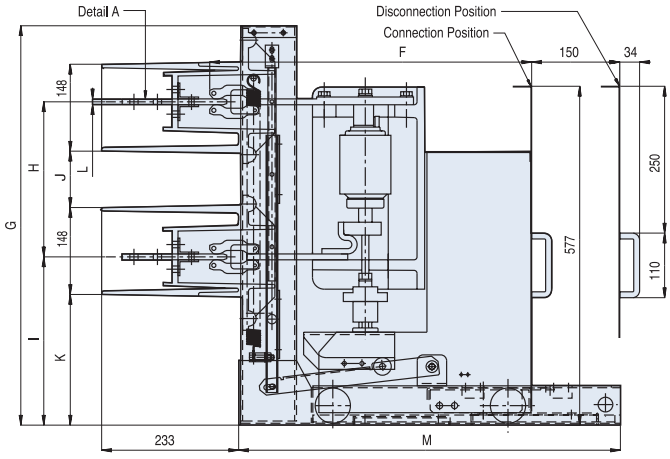
HVG

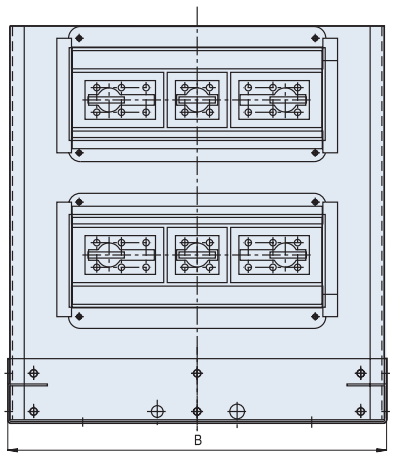
HVG draw-out type with GS cradle

(Unit: mm)



7.2kV	8/12.5kA	400A	8	
		630A	12	
	20/25kA	630A	10	
		1,250A	15	





Model		A	B	C	D	E	F	G	H	I	J	K	L	M
HVG1099	8kA 400A	874	540	320	83	130	525	660	220	294	75	217	8	640
HVG1011	12.5kA 630A												12	
HVG1131	20kA 630A		550		73	140			223	291	75	217	10	
HVG1132	20kA 1,250A												15	
HVG1141	25kA 630A												10	
HVG1142	25kA 1,250A												15	

※ Dimensions may be revised without notice.

Order Information

HVF		11[1]		4[1]		1[1]		
Code	Type	Code	Rated voltage	Code	Rated breaking current	Code	Rated current IEC	Rated current ANSI
HVG	HVG	10	7.2kV	9	8kA	9	400A	400A
HVF	HVF	11	7.2kV	1	12.5kA	1	630A	600A
		21	12kV	4	25kA	2	1,250A	1,200A
		31	17.5kV	5	31.5kA	4	2,000A	2,000A
		61	24kV	6	40kA	6	2,500A	2,500A
		70	36/38kV	7	50kA	7	3,150A	3,000A
		71	36kV			8	4,000A	4,000A

※ 1) For correct application, please refer to page 54 and 55.

C[1]		ES[1]		
Code	Pole distance of VCB body	Code	Mounting Structure	
A	130mm	XA	Body	Fixed type
B	140mm	EA	Body part of ES cradle	
C	150mm	ES	ES cradle (without shutter)	
D	165mm	FA	Body part of FS cradle	
E	178mm	FS	FS cradle (nonmetallic partition with shutter)	
F	210mm	SA	Body part of SF cradle	
G	250mm	SF	FS cradle (nonmetallic partition with shutter) with screw type draw-in/out mechanism)	
H	254mm			
I	275mm	GA	Body part of GS cradle	Draw-out type
J	300mm	GS	GS cradle (metallic partition with shutter and bushing)	
K	350mm	GE	GS cradle with earthing switch	
		CS	GS cradle for marine application (HVF 7.2/12kV)	
		E3	ES cradle for 300mm pole distance (HVF 24kV 630/1250A)	
		F3	FS cradle for 300mm pole distance (HVF 24kV 630/1250A)	
		MA	for HHI standard switchgear	
		MS	GS cradle for 38kV ANSI type	
		WA	GS cradle for 4.76kV ANSI type	

Spare parts for HVF type

Code	Name	Specification
HAFS-K1□	Anti-pumping relay	1: DC24V, 2: DC48V, 3: DC60V 4: DC110V, 5: DC125V, 6: DC220V 7: AC110V, 9: AC220V
HAFS-M□	Charging motor	
HAFS-L0□	Lockout relay	
HAFS-SOL□	Closing solenoid	
HVFS-SOL□	Tripping solenoid	
HVFS-UV□	Under voltage release	
HVFS-UVE	UVT operating mechanism	
HVFS-T4	Condensor trip device	DC110V
HVFS-T6	Condensor trip device	DC220V
HVFS-T7	Condensor trip device	AC110V
HVFS-T9	Condensor trip device	AC220V
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	Position switch	1NO+1NC
HAFS-C/ME	Closing mechanism	
HAFS-T/ME	Tripping mechanism	
HAFS-CT1	CT operated release	0.5A
HAFS-CT2	CT operated release	1A
HAFS-22JACK	Control jack	4NO+4NC, fixed type, plug and socket only
HAFS-44JACK	Control jack	4NO+4NC, cable type, plug and socket only
HAFS-HANDLE	Charging handle	
HVFS-EFHANDLE	Draw-out handle	ES, FS, SF cradle
HVFS-MGHANDLE	Draw-out handle	GS, CS, MS cradle
HVFS-VC9	Vacuum checker	AC220V

4		4		4		C		
Code	Motor control voltage	Code	Closing control voltage	Code	Tripping control voltage	Code	Control jack	
							Auxiliary switch	Structure
2	DC48V	2	DC48V	2	DC48V	A	4NO+4NC	Fixed on VCB body
3	DC60V	3	DC60V	3	DC60V	B	7NO+7NC	Fixed on VCB body
4	DC110V	4	DC110V	4	DC110V	C	4NO+4NC	0.8m cable type
5	DC125V	5	DC125V	5	DC125V	D	10NO+10NC	0.8m cable type
6	DC220V	6	DC220V	6	DC220V	X	Without control jack	
7	AC110V	7	AC110V	7	AC110V	W	Auto jack	
9	AC220V	9	AC220V	9	AC220V			
L	DC250V	L	DC250V	L	DC250V			

P2U4		
Code	Additional options	Application
P0	Cam for position switch	HVF/HVG
U□*	Under voltage release	HVF
R□*	Second shunt release	HVF
L□*	Lockout relay	HVF
V□*	Varistor module	HVF/HVG
P2[1]	Position switch	HVF/HVG
KL[1]	Position padlock key	HVF/HVG
TP[2]	Trip padlock key	HVF
EL	Electrical local closing	HVF
C0	Cut-out switch	HVF
CP	Closing padlock key	HVF
S1	Spring charged signal (S41)	HVF
C1	CT operated release 0.5A	HVF
C2	CT operated release 1A	HVF
EE	Earthing switch operation indicator contact	HVF
TC	Trip coil supervision signal	HVF
E9	BIL 38/95kV for 12kV VCB	HVF
CA[3]	Cover plate / type A[4]	HVF
CB[3]	Cover plate / type B[5]	HVF
ZZ	Special application	HVF/HVG

※ *1: DC24V, 2: DC48V, 3: DC60V, 4: DC110V, 5: DC125V, 6: DC220V, 7: AC110V, 9: AC220V
1) Position switch and position padlock cannot be installed at same time.
2) Key is not supplied.
3) For the space between front cover of breaker and ES/FS/SF cradle.
4) Type A: for 7.2-17.5kV up to 31.5kA 2,000A
5) Type B: for 7.2-17.5kV 40/50kA 2,500-4,000A, 24/36kV

Spare parts for HVG type

Code	Name	Specification
HAFS-K1□	Anti-pumping relay	1: DC24V, 2: DC48V, 3: DC60V 4: DC110V, 5: DC125V, 6: DC220V 7: AC110V, 9: AC220V
HVGS-M□	Charging motor	
HVGS-CS□	Closing solenoid	
HVGS-TS□	Tripping solenoid	
HVFS-T4	Condensor trip device	DC110V
HVFS-T6	Condensor trip device	DC220V
HVFS-T7	Condensor trip device	AC110V
HVFS-T9	Condensor trip device	AC220V
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
HVGS-P/S	Position switch	1NO+1NC
HVGS-CAM	Cam for position switch	Attached in breaker body
HVGS-22JACK	Control jack	4NO+4NC, fixed type, plug and socket only
HVGS-44JACK	Control jack	7NO+7NC, fixed type, plug and socket only
HVGS-PL1099	Plug-in contact	8kA 400A
HVGS-PL1131-41	Plug-in contact	20/25kA 630A
HVGS-PL1011	Plug-in contact	12.5kA 630A
HVGS-PL1132-42	Plug-in contact	20/25kA 1,250A
HVGS-CHANDLE	Charging handle	
HVGS-DHANDLE	Draw-out handle	
HVFS-VC9	Vacuum checker	AC220V

Order Information

Slection table for rating, pole distance and mounting

Type	Specification				Model	Order code	Applicable mounting			
	Rated voltage (kV)	Rated breaking current (kV)	Rated current (kV)	Pole distance of VCB body (mm)			Fixed type	Draw-out type cradle		
1. IEC62271-100										
HVG	7.2	8	400	130	HVG1099	HVG1099 A	XA	EA, ES, FA, FS	GA, GS	
		12.5	630	130	HVG1011	HVG1011 A	XA	EA, ES, FA, FS	GA, GS	
		20	630	140	HVG1131	HVG1131 B	XA	EA, ES, FA, FS	GA, GS	
			1,250	140	HVG1132	HVG1132 B	XA	EA, ES, FA, FS	GA, GS	
		25	630	140	HVG1141	HVG1141 B	XA	EA, ES, FA, FS	GA, GS	
			1,250	140	HVG1142	HVG1142 B	XA	EA, ES, FA, FS	GA, GS	
HVF	7.2	25	630	150	HVF1141	HVF1141 C	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	150	HVF1142	HVF1142 C	XA	EA, ES, FA, FS, SF	GA, GS	GE
		31.5	630	165	HVF1151	HVF1151 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	165	HVF1152	HVF1152 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,000	165	HVF1154	HVF1154 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
		40	630	165	HVF1161	HVF1161 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	165	HVF1162	HVF1162 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
				210		HVF1162 F	∗non-standard, please ask to HHI.			
			2,000	165	HVF1164	HVF1164 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
				210		HVF1164 F	∗non-standard, please ask to HHI.			
				275		HVF1164 I	∗non-standard, please ask to HHI.			
			2,500	210	HVF1166	HVF1166 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
				275		HVF1166 I	∗non-standard, please ask to HHI.			
			3,150	210	HVF1167	HVF1167 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
				275		HVF1167 I	∗non-standard, please ask to HHI.			
			4,000	275	HVF1168	HVF1168 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
		50	1,250	210	HVF1172	HVF1172 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,000	275	HVF1174	HVF1174 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,500	275	HVF1176	HVF1176 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
			3,150	275	HVF1177	HVF1177 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
			4,000	275	HVF1178	HVF1178 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
	12	25	630	150	HVF2141	HVF2141 C	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	150	HVF2142	HVF2142 C	XA	EA, ES, FA, FS, SF	GA, GS	GE
		31.5	630	165	HVF2151	HVF2151 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	165	HVF2152	HVF2152 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,000	165	HVF2154	HVF2154 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,500	210	HVF2156	HVF2156 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
		40	630	165	HVF2161	HVF2161 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	165	HVF2162	HVF2162 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
				210		HVF2162 F	∗non-standard, please ask to HHI.			
			2,000	165	HVF2164	HVF2164 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
				210		HVF2164 F	∗non-standard, please ask to HHI.			
				275		HVF2164 I	∗non-standard, please ask to HHI.			
			2,500	210	HVF2166	HVF2166 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
				275		HVF2166 I	∗non-standard, please ask to HHI.			
			3,150	210	HVF2167	HVF2167 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
				275		HVF2167 I	∗non-standard, please ask to HHI.			
			4,000	275	HVF2168	HVF2168 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
		50	1,250	210	HVF2172	HVF2172 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,000	275	HVF2174	HVF2174 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,500	275	HVF2176	HVF2176 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
			3,150	275	HVF2177	HVF2177 I	XA	EA, ES, FA, FS, SF	GA, GS	GE
			4,000	275	HVF2178	HVF2178 I	XA	EA, ES, FA, FS, SF	GA, GS	GE

∗ For models and codes not listed, please ask to HHI.

Type	Specification				Model	Order code	Applicable mounting			
	Rated voltage (kV)	Rated breaking current (kV)	Rated current (kV)	Pole distance of VCB body (mm)			Fixed type	Draw-out type cradle		
HVF	17.5	25	630	150	HVF3141	HVF3141 C	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	150	HVF3142	HVF3142 C	XA	EA, ES, FA, FS, SF	GA, GS	GE
		31.5	630	165	HVF3151	HVF3151 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	165	HVF3152	HVF3152 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,000	165	HVF3154	HVF3154 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,500	210	HVF3156	HVF3156 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
		40	630	165	HVF3161	HVF3161 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	165	HVF3162	HVF3162 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
				210		HVF3162 F	∗non-standard, please ask to HHI.			
			2,000	165	HVF3164	HVF3164 D	XA	EA, ES, FA, FS, SF	GA, GS	GE
				210		HVF3164 F	∗non-standard, please ask to HHI.			
			2,500	210	HVF3166	HVF3166 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
			3,150	210	HVF3167	HVF3167 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
				275		HVF3167 I	∗non-standard, please ask to HHI.			
	24	12.5	630	210	HVF6111	HVF6111 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	210	HVF6112	HVF6112 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,000	210	HVF6114	HVF6114 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
		25	630	210	HVF6141	HVF6141 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
			1,250	210	HVF6142	HVF6142 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,000	210	HVF6144	HVF6144 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
			2,500	210	HVF6146	HVF6146 F	XA	EA, ES, FA, FS, SF	GA, GS	GE
	36	25	1,250	275	HVF7142	HVF7142 I	XA	EA, ES, FA, FS	GA, GS	GE
			2,000	275	HVF7144	HVF7144 I	XA	EA, ES, FA, FS	GA, GS	GE
			2,500	275	HVF7146	HVF7146 I	XA	EA, ES, FA, FS	GA, GS	GE
		31.5	1,250	275	HVF7052	HVF7052 I	XA	EA, ES, FA, FS	GA, GS	GE
			2,500	275	HVF7056	HVF7056 I	XA	EA, ES, FA, FS	GA, GS	GE
			3,150	275	HVF7057	HVF7057 I	XA	EA, ES, FA, FS	GA, GS	GE
2. ANSI										
HVF	4.76	50	1,200	178	HVF1372	HVF1372 E	XA	EA, ES, FA, FS	GA, GS	GE
			4,000	275	HVF1378	HVF1378 I	XA	EA, ES, FA, FS	GA, GS	GE
	15	40	1,200	254	HVF3362	HVF3362 H	XA	EA, ES, FA, FS	GA, GS	GE
			2,000	254	HVF3364	HVF3364 H	XA	EA, ES, FA, FS	GA, GS	GE
	38	31.5	1,200	275	HVF7052	HVF7052 I	XA	EA, ES, FA, FS	GA, GS	GE
			2,000	275	HVF7054	HVF7054 I	XA	EA, ES, FA, FS	GA, GS	GE
			3,000	275	HVF7057	HVF7057 I	XA	EA, ES, FA, FS	GA, GS	GE
		40	1,200	275	HVF7062	HVF7062 I	XA	EA, ES, FA, FS	GA, GS	GE
			2,000	275	HVF7064	HVF7064 I	XA	EA, ES, FA, FS	GA, GS	GE
			3,000	275	HVF7067	HVF7067 I	XA	EA, ES, FA, FS	GA, GS	GE
3. IEC60056										
HVF	7.2	31.5	630	165	HVF1051	HVF1051 D	XA	EA, ES, FA, FS	GA, GS	GE
			1,250	165	HVF1052	HVF1052 D	XA	EA, ES, FA, FS	GA, GS	GE
			2,000	210	HVF1054	HVF1054 F	XA	EA, ES, FA, FS	GA, GS	GE
	12	25	630	165	HVF2041	HVF2041 D	XA	EA, ES, FA, FS	GA, GS	GE
			1,250	165	HVF2042	HVF2042 D	XA	EA, ES, FA, FS	GA, GS	GE
			2,000	210	HVF2044	HVF2044 F	XA	EA, ES, FA, FS	GA, GS	GE
	24	40	1,250	275	HVF6062	HVF6062 I	XA	EA, ES, FA, FS	GA, GS	GE
			2,000	275	HVF6064	HVF6064 I	XA	EA, ES, FA, FS	GA, GS	GE
			2,500	275	HVF6066	HVF6066 I	XA	EA, ES, FA, FS	GA, GS	GE
			3,150	275	HVF6067	HVF6067 I	XA	EA, ES, FA, FS	GA, GS	GE

∗ For models and codes not listed, please ask to HHI.

HHIS-WC-LE-B45-04, 2011.12 Designed by MERMONT

www.hyundai-elec.com

We build a better future
HYUNDAI HEAVY INDUSTRIES CO.,LTD.

ELECTRO ELECTRIC SYSTEMS

Head Office	1, Jeonha-dong, Dong-gu, Ulsan, Korea Tel: 82-52-202-8101~8	Fax: 82-52-202-8100
Seoul (Sales & Marketing)	140-2, Gye-dong, Jongno-gu, Seoul, Korea Tel: 82-2-746-8519, 7510	Fax: 82-2-746-7441
Atlanta	6100 Atlantic Blvd. Suite 201, Norcross, GA30097, U.S.A. Tel: 1-678-823-7842	Fax: 1-678-823-7553
New Jersey	300 Sylvan Avenue, Englewood Cliffs, NJ, 07632, U.S.A. Tel: 1-201-816-0286, 8028	Fax: 1-201-816-4083
London	2nd Floor, The Triangle, 5-17 Hammersmith Grove, London, W6 0LG, UK Tel: 44-20-8741-0501	Fax: 44-20-8741-5620
Tokyo	8th Fl., Yurakucho Denki Bldg.1-7-1, Yuraku-Cho, Chiyoda-Ku, Tokyo, 100-0006, Japan Tel: 81-3-3212-2076, 3215-7159	Fax: 81-3-3211-2093
Osaka	I-Room 5th Fl. Nagahori-Plaza Bldg. 2-4-8, Minami Senba, Chuo-Ku, Osaka, 542-0081, Japan Tel: 81-6-6261-5766, 5767	Fax: 81-6-6261-5818
Riyadh	2nd Floor, the Plaza, P.O.Box 21840 Riyadh 11485, Saudi Arabia Tel: 966-1-462-2331	Fax: 966-1-464-4696
Dubai	205, Building 4, Emaar Square, Sheikh Zayed Road, Pobox 252458, Dubai, UAE Tel: 971-4-425-7995	Fax: 971-4-425-7996
Kuwait	Floor 15, Al Sour Tower, Al Sour Street, Al-Qiblah, Kuwait Tel: 965-2291-5354	Fax: 965-2291-5355
Moscow	World Trade Center, Ent. 3, #1902, Krasnopresnenskaya Nab.12, Moscow, 123610, Russia Tel: 7-495-258-1381	Fax: 7-495-258-1382
Madrid	Paseo De La Castellana 216, Planta 0, 28046 Madrid, Spain Tel: 34-91-732-0454	Fax: 34-91-733-2389
Sofia	1271, Sofia 41, Rojen Blvd., Bulgaria Tel: 359-2-803-3200, 3220	Fax: 359-2-803-3203
Montgomery	201 Folmar Parkway, Montgomery, AL 36105, U.S.A. Tel: 1-334-230-9921	Fax: 1-334-240-6869
Yangzhong	No.9 Xiandai Road, Xinba Scientific and Technologic Zone, Yangzhong, Jiangsu, P.R.C. Zip: 212212, China Tel: 86-511-8842-0666, 0212	Fax: 86-511-8842-0668, 0231