

TYPE VPR SERIES VACUUM CIRCUIT BREAKERS (3.6~24kV)



Introducing the VPR-D Series rated at 24kV 16/25kA



Type 20-VPR-16D/25D 630, 1250A VCB

- Above-mentioned VCBs utilizes a new, low-maintenance and more simple and compact operating mechanism (BH-1H mechanism).
- VPR-D series conforms to the latest JEC-2300 and IEC 62271-100.
- Also now available with a rated current of 2,500A.

Introducing the 10-VPR-50C(D) rated at 12kV 40/50kA 4000A

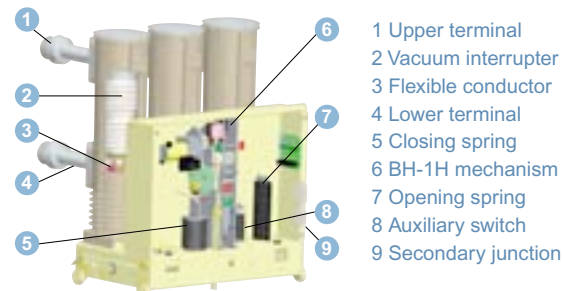


Type 10-VPR-50C(D) 4000A VCB

- 10-VPR-50C(D) VCB is installed with the BH-2H operating mechanism for a larger capacity breaker.
- 10-VPR-50C(D) VCB designed to the latest JEC-2300, IEC 62271-100, and Chinese standards.
- 4,000 A rated current without cooling fans.

Vacuum Circuit Breaker

Each Vacuum Switch Tube (VST) is insulated by a molded frame that allows minimal separation between pole units. The frame is made of an anti-tracking bulk mold compound that has been specially developed for breakers. The moving contacts are mechanically connected to the lower conductors by flexible conductors to prevent rubbing damage.



Construction of type 20-VPR-16D/25D 630, 1250A VCB

Vacuum Switch Tube

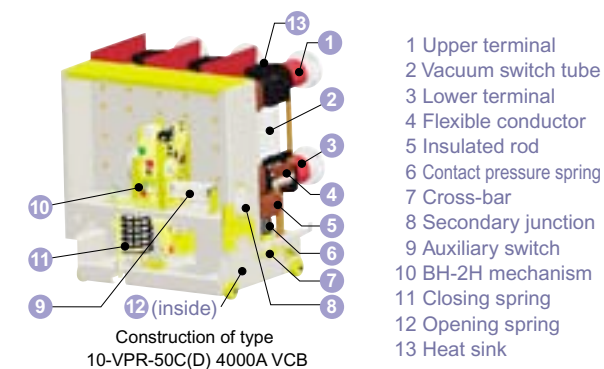
Mitsubishi Electric has more than 40 years of experience manufacturing VSTs and is currently producing approximately 140,000 units per year. Mitsubishi's VST design integrates a vast amount of test data based on thousands of studies and electrical field analysis. VPR-D's (rated at 24kV 16/25kA) VSTs use spiral-type contacts to provide the lowest resistance.



Internal structure of VSTs

Vacuum Circuit Breaker

Mounting the VSTs vertically increases the efficiency of the natural convection cooling cycle. In addition, the unit has heat sinks that increase the heat transfer characteristics which make the use of additional cooling devices, such as fans, unnecessary. The circuit breaker is suitable for operations in the most severe environmental conditions. The design exceeds applicable IEC requirements for creepage and insulation distance.



Construction of type 10-VPR-50C(D) 4000A VCB

Vacuum Switch Tube

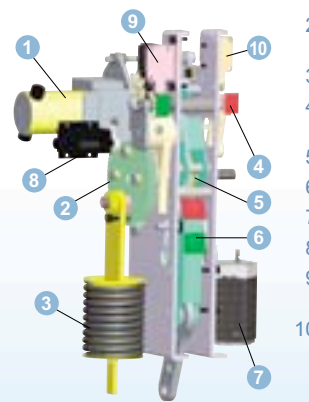
Mitsubishi Electric has over 40 years of experience manufacturing VSTs and currently produces about 140,000 units per year. Mitsubishi VSTs design integrates vast amounts of test data based on thousands of studies and electrical field analysis. 10-VPR-50C(D)'s VSTs use axial magnetic field-type contacts to be applied for large current ratings.



Internal structure of VSTs

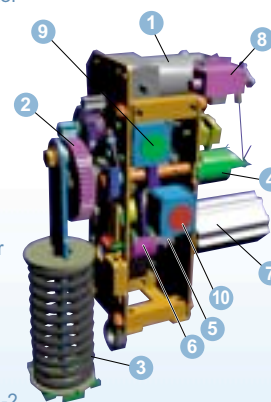
Operating Mechanism

Mitsubishi's BH-1H mechanism design is based on simple operating principles with a compact construction and is suitable for a wide range of ratings. The mechanism is used for auto-reclosing and multi-shot applications without any additional parts. The BH-1H uses a universal charging motor (AC / DC). Special surface treatments are used in the moving parts that extend the maintenance interval of the unit. The use of long-life grease extends the mechanism inspection intervals from three to six years and reduces maintenance costs. Mitsubishi's BH-1H unit is engineered for safety. The manual charging device for the closing spring prevents impact to the operator even when the electric motor is energized or if the breaker is operated during manual charging.



BH-1H operation mechanism
(For type 20-VPR-16D/25D 630, 1250A VCB)

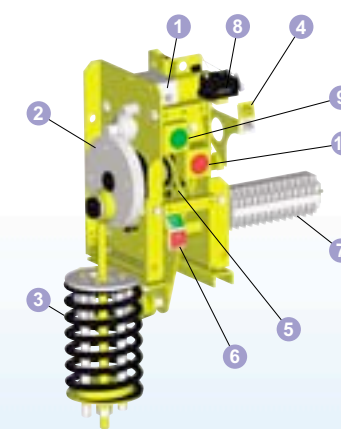
- 1 Closing spring charging motor
 - 2 Closing spring charging mechanism
 - 3 Closing spring
 - 4 Closing spring charged indicator
 - 5 Operation mechanism
 - 6 ON-OFF indicator
 - 7 Auxiliary switch
 - 8 Mechanically operation counter
 - 9 Manual closing button (Closing control coil)
 - 10 Manual tripping button (Tripping control coil)
- Opening spring
(In case of the BH-1H and BH-2, it's installed in crossbar side.)



BH-2 operation mechanism
(Reference: For existing VPR-C series and type 20-VPR-25D 2500A VCB)

Operating Mechanism

The BH-2H operating mechanism's design incorporating simple operating principles and is suitable for a wide range of ratings. The mechanism is used for auto-reclosing and multi-shot applications without any additional parts. The BH-2H uses a universal charging motor (AC / DC). Gears are treated with a greaseless, low-friction coating. A special long-life grease is used on the other surfaces to extend the maintenance interval. The Mitsubishi's BH-2H unit is engineered for safety. The manual charging device for the closing spring prevents impact to the operator even when the electric motor is energized or if the breaker is operated during manual charging.



BH-2H operation mechanism
(For type 10-VPR-50C(D) 4000A VCB)

- 1 Closing spring charging motor
- 2 Closing spring charging mechanism
- 3 Closing spring
- 4 Closing spring charged indicator
- 5 Operation mechanism
- 6 ON-OFF indicator
- 7 Auxiliary switch
- 8 Mechanically operation counter
- 9 Manual closing button (Closing control coil)
- 10 Manual tripping button (Tripping control coil)

EQUIPMENT

Standard equipment	Additional standard equipment on withdrawable breaker
<ul style="list-style-type: none"> ■ Trip and close control circuit including auxiliary switches, solenoids and anti-pumping relay ■ Electric charging motor and control circuit ■ Manuals push button for trip and close ■ ON/OFF indicator ■ Indicator for charging condition of closing spring ■ Operation counter ■ Auxiliary contacts for customer----5a5b (10-VPR-40C(D) 4000A, when secondary connector code is B----6a6b) (10-VPR-50C(D) 4000A, when secondary connector code is B----10a10b) 	<ul style="list-style-type: none"> ■ Mechanical and electrical interlock device for withdrawing ■ Shutter control devices ■ Breaker wheels for withdrawing

Options

- Mechanical interlock device for control circuit plugs for withdrawable breakers
- Auxiliary contact for spring charged indication - - 1C (max 2C)

FEATURES

Increased Dielectric Performance

The 10-VPR-40C(D)/50C(D) 4000AVCB exceeds IEC standard applicable requirements including longer creepage and longer insulation distance that ensures breaker operation even under the most severe environmental conditions.

New Technology Improves Maintenance

The design of the BH-1H incorporates low maintenance technology such as a newly developed low friction greaseless surface treatment and long-life lubrication (lubrication cycle of six years).

Safety first

Mitsubishi's design features multiple mechanical and electric interlock systems that ensure safe operation and maintenance.

Our proven supply record proves our top quality

More than 500,000 Mitsubishi Vacuum Circuit Breakers have been produced since 1969.

Design for worldwide applications

The compact design of the VCB and optional mounting frame with shutter makes the unit suitable for a wide range of replacements for existing or obsolete metal-clad and switchboard units.

FRAME SIZE

3/6/10/20-VPR series

3.6kV 600/630A to 24kV 2000A circuit breakers are either L, M or H size. 12kV 4000A and 24kV 2500A circuit breakers are R size.

Rated current		600/630A	1200/1250A	1600A	2000A	2500A	3000/3150A	4000A
Rated voltage / Rated short-circuit breaking current								
3.6kV	20kA	L size						
	25kA			M size				
	31.5kA							
	40kA							
7.2kV	20kA	L size						
	25kA			M size				
	31.5kA							
	40kA							
12kV	25kA							
	31.5kA							
	40kA, 40/50kA							R size
24kV	16kA	H size						
	25kA					R size		

SELECTION CRITERIA

BASIC DESIGNATION (Example:10-VPR-25C)

Rated voltage	Type name	Rated short-circuit breaking current	Series code	Type of VST	Mounting configuration
10	VPR	25	C	-	D
3	3.6kV	16	(see Note 5)		L Fixed (with wheels)
6	7.2kV	20	C C Series		C Withdrawable (with Class CW mounting frame)
10	12kV	25	D D Series		D Withdrawable (with Class PW mounting frame)
20	17.5kV, 24kV	32			G Withdrawable (with Class MW mounting frame)
		40			(see Notes 3,4)
		50			- Standard
					G Low surge
					(see Notes 1,2)

- Notes: 1. Different VSTs are installed on standard type and low surge type VCBs.
 2. Low surge types are only available for 600/630/1200/1250A of 3/6-VPR VCBs except 6-VPR-25C(S).
 3. Mounting configuration "L" is available for 600/630/1200/1250 and 2000A VCBs except 20-VPR.
 4. For 20-VPR, only mounting configurations "C" and "D" are available.
 5. Type 20-VPR, refer to table 1 for details.

SELECTION CRITERIA

Table 1 IEC, JEC standard (see Note 1)

Rated voltage	Rated short-circuit breaking current	16kA	20kA	25kA	31.5kA	40kA	40/50kA
3.6kV			3-VPR-20C	3-VPR-25C	3-VPR-32C	3-VPR-40C	
7.2kV			6-VPR-20C	6-VPR-25C (For 1600, 2000A) 6-VPR-25C(S) (For 600-1250A)	6-VPR-32C	6-VPR-40C	
12kV			10-VPR-25C 10-VPR-25C(F) (For 600-1250A)		10-VPR-32C	10-VPR-40C 10-VPR-40C(D) (For 4000A)	10-VPR-50C(D)
17.5kV			20-VPR-25D (For 600-1250A and 2500A) 20-VPR-25C (For 2000A)				
24kV		20-VPR-16D					

- Notes: 1. IEC : International standards, IEC 60056 (1987, Insulation level series 1) and IEC 62271-100 (2003, Insulation level series 1)
 JEC : Japanese standard, JEC-2300 (1998)

- Remarks: 1. Consult your dealer for information on the applicability of other foreign standards, including U.S. standard ANSI and Chinese standards GB, DL.
 2. Refer to the catalog (A-AL1-5-C1283-B) for VCBs of rated voltage 36kV.

■ Table 2 Ratings and Performance (JEC/IEC standards)

Type name	Standard	3-VPR-20C	3-VPR-25C	3-VPR-32C	3-VPR-40C	6-VPR-20C	6-VPR-25C(S) (Note 2)	6-VPR-32C	6-VPR-40C	10-VPR-25C(F) (Note 3)	10-VPR-32C	10-VPR-40C (Note 4, 13)	10-VPR-50C(D) (Note 13)	20-VPR-16D	20-VPR-25D (Note 12)	
	Low surge (Note 1)	3-VPR-20CG	3-VPR-25CG	3-VPR-32CG	3-VPR-40CG	6-VPR-20CG	6-VPR-25C	6-VPR-32CG	6-VPR-40CG	10-VPR-25C	10-VPR-32C	10-VPR-40C	10-VPR-50C(D)	20-VPR-16D	20-VPR-25C	
Closing operation mechanism	Motor-spring charged mechanism															
Standards (Note 5)	JEC-2300/IEC 60056						JEC-2300/IEC 62271-100		JEC-2300/IEC 60056			JEC-2300/IEC 62271-100 (Note 12)				
Rated voltage (kV)	3.6					7.2			12				24			
Rated current (A)	600 / 630 1200 / 1250 1600 2000	600 / 630 1200 / 1250 1600 2000	600 / 630 1200 / 1250 1600 2000 2500 3000 / 3150	600 / 630 1200 / 1250 1600 2000 2500 3000 / 3150	600 / 630 1200 / 1250 1600 2000	600 / 630 1200 / 1250 1600 2000	600 / 630 1200 / 1250 1600 2000	600 / 630 1200 / 1250 1600 2000 2500 3000 / 3150	600 / 630 1200 / 1250 1600 2000 2500 3000 / 3150	600 / 630 1200 / 1250 1600 2000 2500 3000 / 3150	600 / 630 1200 / 1250 1600 2000 2500 3000 / 3150	600 / 630 1200 / 1250 1600 2000 2500 3000 / 3150	4000	600 / 630 1200 / 1250	600 / 630 1200 / 1250 2500 2000	
Rated frequency (Hz)	50 / 60															
Rated short-circuit breaking current (kA)	20	25	31.5	40	20	25	31.5	40	25	31.5	40	40	40/50	16	25	
Rated making current (kA)	50	63	80	100	50	63	80	100	63	80	100	100	104/130	40	63	
Rated short-time withstand current (kA, 3sec.)	20	25	31.5	40	20	25	31.5	40	25	31.5	40	40	40/50	16	25	
Rated opening time (sec.)	0.03															
Rated breaking time (cycles)	3												3	3		
Rated withstand voltage (kV)	AC	16			22			28			28 (42)		50			
	Impulse	45			60			75			75		125			
Operating duty	O-0.3sec.-CO-1min.-CO (R) O-1min.-CO-3min.-CO (A) CO-15sec.-CO (B)															
No-load closing time (sec.)	0.1															
Closing operation and control current (A) (Note 6)	Charging motor Current (Time)	1 (8sec.) ... 600~1250A 1.2 (6sec.) ... 1600, 2000A		1.2 (6sec.)		1 (8sec.) ... 600~1250A 1.2 (6sec.) ... 1600, 2000A		1.2 (6sec.)		1.2 (6sec.)		6 (6sec.) 1.5 (10sec.)		1 (6sec.)		1 (6sec.) ... 600~1250A 1.2 (6sec.) ... 2000A 1 (5sec.) ... 2500A
	Control current (CC coil)	2.4 ... 600~1250A 4 ... 1600, 2000A		4		2.4 ... 600~1250A 4 ... 1600, 2000A		4		4		5		3.2		3 3 ... 600~1250A 3.4 ... 2000A 4 ... 2500A
Tripping device	Voltage-tripping device (STC)															
Opening control current (A) (STC coil) (Note 6)	2 ... 600~1250A 4 ... 1600, 2000A		4		2 ... 600~1250A 4 ... 1600, 2000A		4		4		5		3.2		3 3 ... 600~1250A 3.4 ... 2000A 4 ... 2500A	
External aux. contacts (Note 7,8)	5a5b											6a6b	10a10b	5a5b		
Operating counter (Mechanically)	Standard equipment															
Mounting configuration	Fixed (L) Withdrawable (C, D, G)		Fixed (L) 600~2000A Withdrawable (C, D, G) ... 600~3150A		Fixed (L) Withdrawable (C, D, G)		Fixed (L) 600~2000A Withdrawable (C, D, G) ... 600~3150A		Fixed (L) 600~2000A Withdrawable (C, D, G) ... 600~3150A		Fixed (L) 600~2000A Withdrawable (C, D, G) ... 600~3150A		Withdrawable (C, D, G)		Withdrawable (C, D)	
Mass (kg) (Note 9)	55 (600/630A) 62 (1200/1250A) 140 (1600, 2000A)		120 (600~1250A) 140 (1600, 2000A) 190 (2500~3150A)		55 (600/630A) 62 (1200/1250A) 140 (1600, 2000A)		120 (600~1250A) 140 (1600, 2000A) 190 (2500~3150A)		120 (600~1250A) 140 (1600, 2000A) 190 (2500~3150A)		120 (600~1250A) 140 (1600, 2000A) 190 (2500~3150A)		510 440		94 (600/630A) 110 (1200/1250A) 135 (2000A) 330 (2500A)	

Notes: 1. Different VSTs are installed on standard type and low surge type VCBs.
2. For 600/630A and 1200/1250A 6-VPR-25C, "(S)" is added to the end of the type name.
3. For 600/630A and 1200/1250A 10-VPR-25C, "(F)" is added to the end of the type name.
4. For 4000A 10-VPR-40C, "(D)" is added to the end of the type name.
5. IEC : International standards, IEC 60056 (1987, Insulation level series I) and IEC 62271-100 (2003, Insulation level series I)
JEC : Japanese standard, JEC-2300 (1998)
6. Closing operation, control and tripping control currents indicated are based on DC100V.
7. Additional auxiliary contacts cannot be added.
8. For 600/630A and 1200/1250A of 3-VPR-20C, 3-VPR-25C, 6-VPR-20C, and 6-VPR-25C, when the control voltage is AC•DC200/220V 4a4b contacts only are available.
9. The mass of the circuit breaker only is indicated.
10. Consult your dealer for information on the applicability of other foreign standards, including U.S. standard ANSI and Chinese standards GB, DL.
11. Refer to the catalog (A-AL1-5-C1283-B) for VCBs of the rated short-circuit breaking current 50kA or the rated voltage 36kV.
12. The application standard of 20-VPR-25C(2000A) is JEC-2300/IEC 60056.
13. The number of auxiliary contacts shows the maximum when the secondary connector code is B.

OUTLINES AND DIMENSIONS (Dimension in mm)

Frame size L

600/630A : 3/6-VPR-20C/25C (Circuit breaker)

3/6-VPR-20C□L,3-VPR-25C□L,6-VPR-25C(S)L (Fixed: Type L)

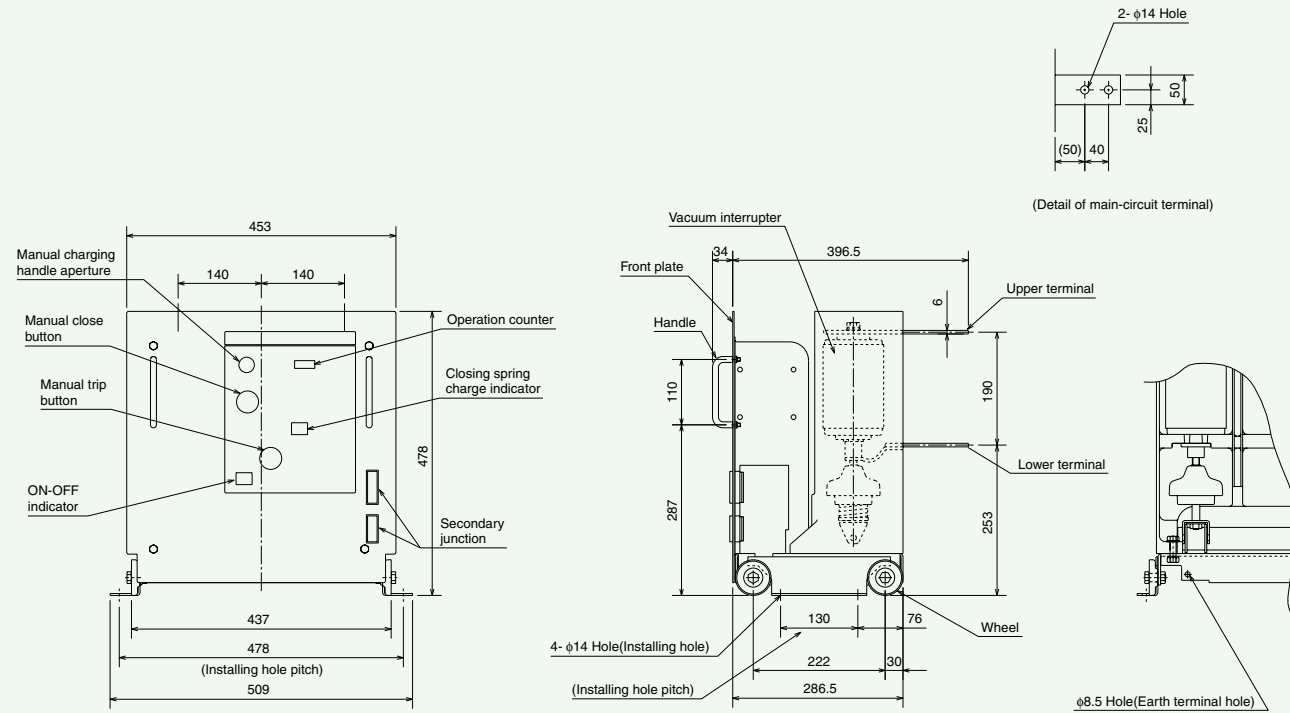


Fig. 1

3/6-VPR-20C□□,3-VPR-25C□□,6-VPR-25C(S)□ (Withdrawable: Type C, D, and G)

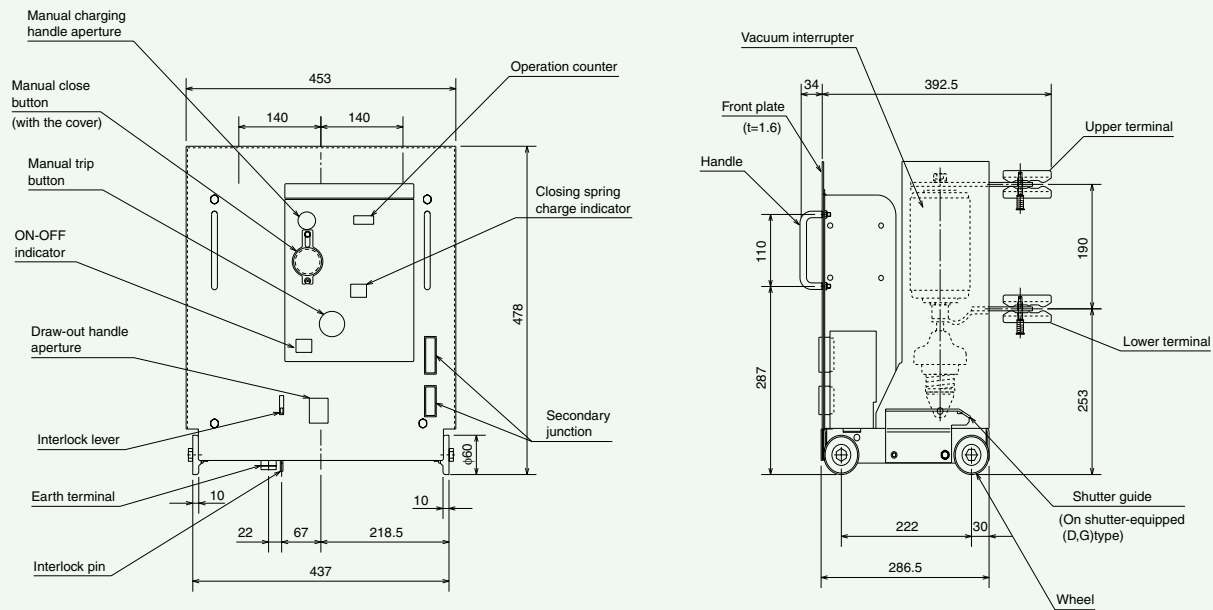


Fig. 2

600/630A : 3/6-VPR-20C/25C (Mounting frame)

(Class CW: Type C)

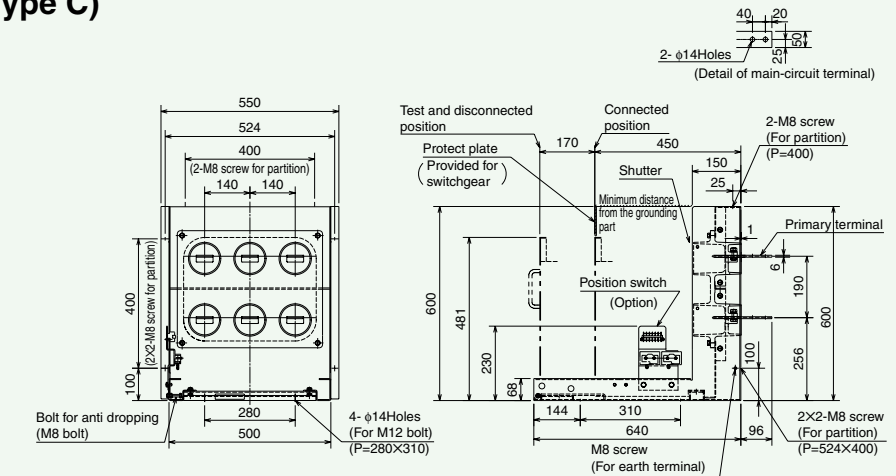
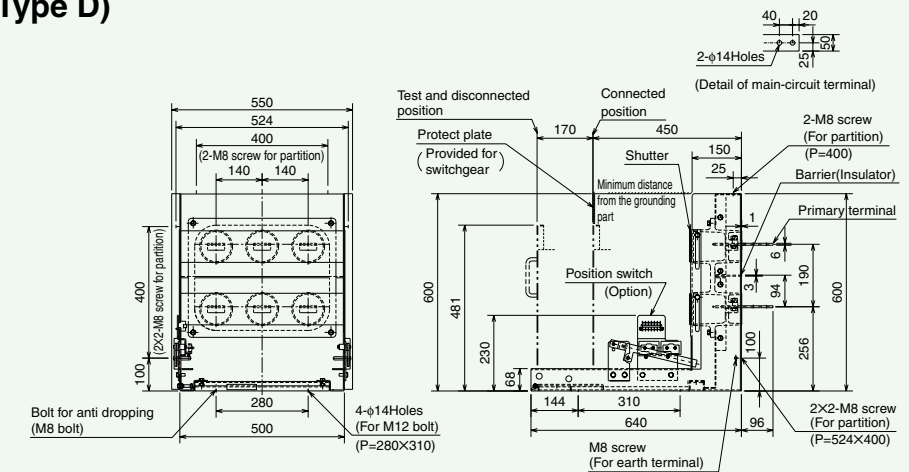


Fig. 3

(Class PW: Type D)



(Class MW: Type G)

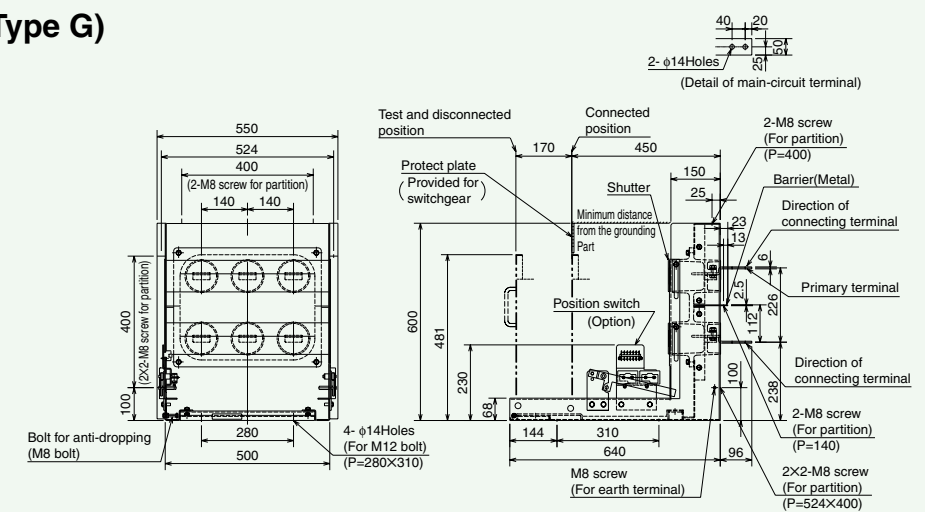


Fig. 4

OUTLINES AND DIMENSIONS (Dimension in mm)

Frame size L

1200/1250A : 3/6-VPR-20C/25C (Circuit breaker)

3/6-VPR-20C□L,3-VPR-25C□L,6-VPR-25C(S)L (Fixed: Type L)

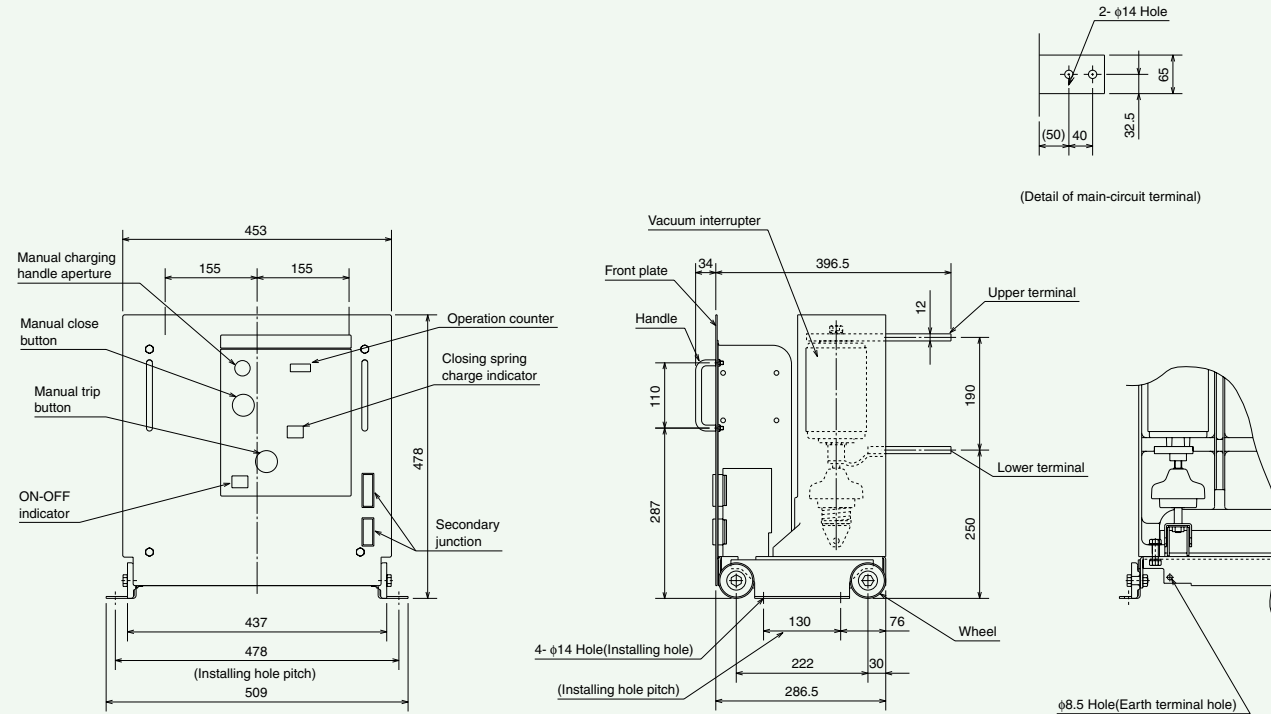


Fig. 5

3/6-VPR-20C□□,3-VPR-25C□□,6-VPR-25C(S)□ (Withdrawable: Type C, D, and G)

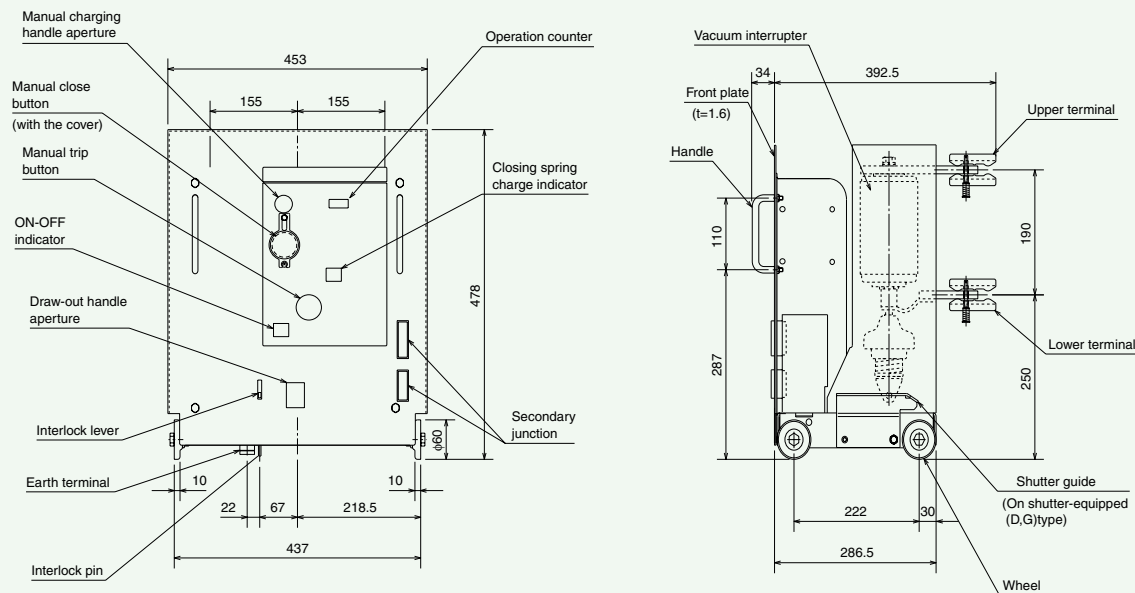


Fig. 6

1200/1250A : 3/6-VPR-20C/25C (Mounting frame)

(Class CW: Type C)

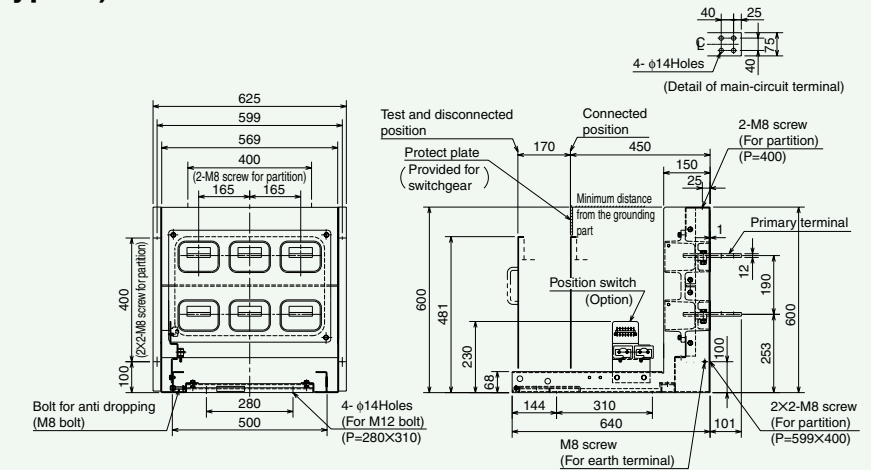
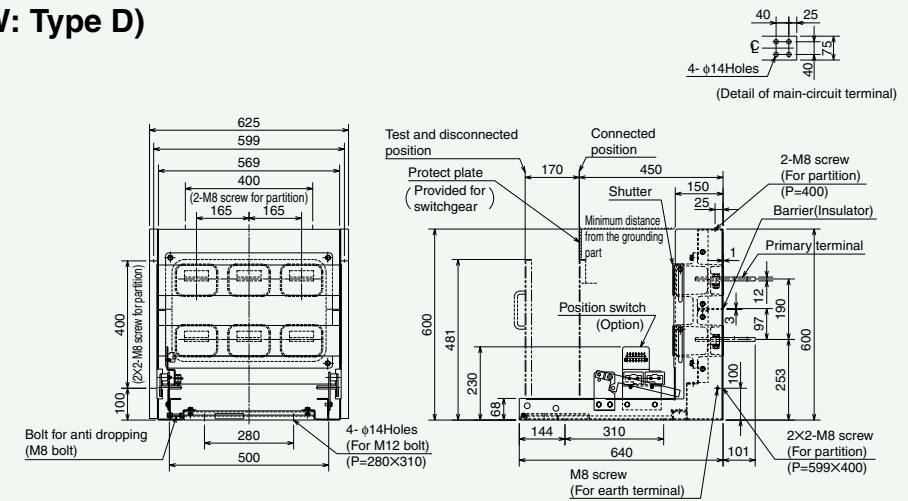


Fig. 7

(Class PW: Type D)



(Class MW: Type G)

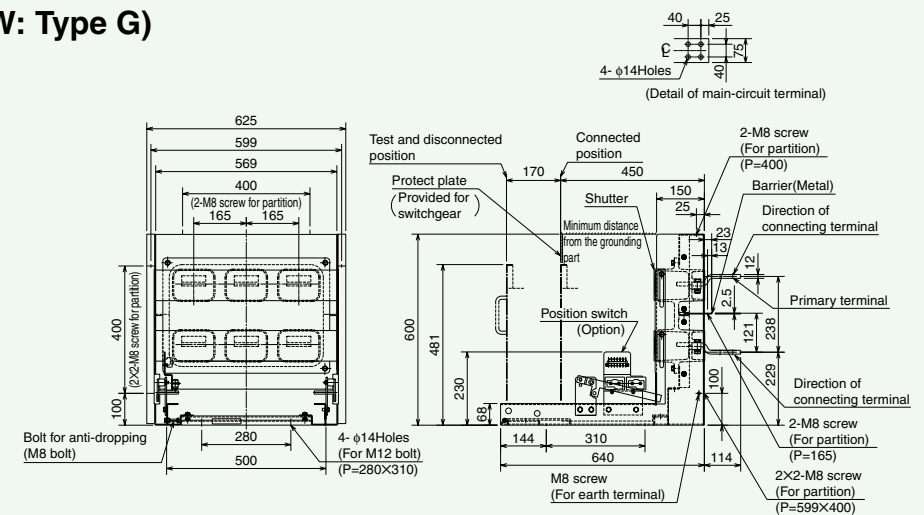


Fig. 8

OUTLINES AND DIMENSIONS (Dimension in mm)

Frame size M

600/630A and 1200/1250A : 10-VPR-25C(F) (Circuit breaker)

10-VPR-25C(F)-L (Fixed: Type L)

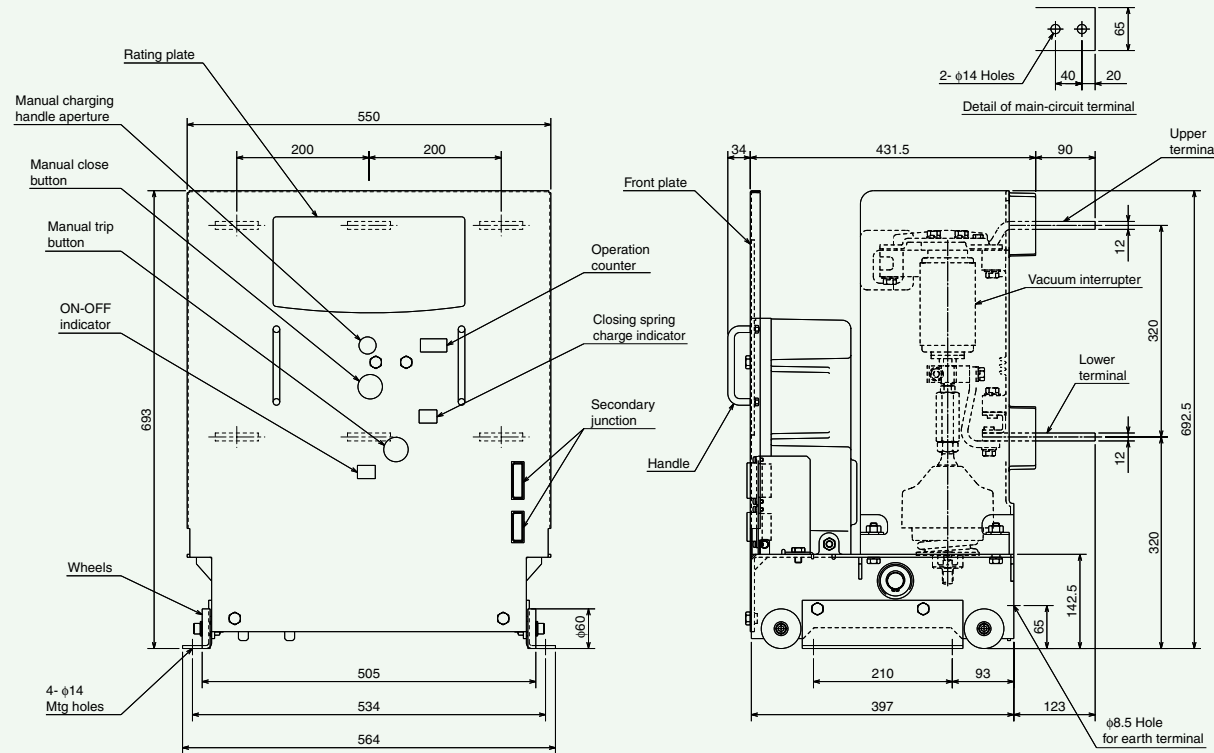


Fig. 9

10-VPR-25C(F)-□ (Withdrawable: Type C, D, and G)

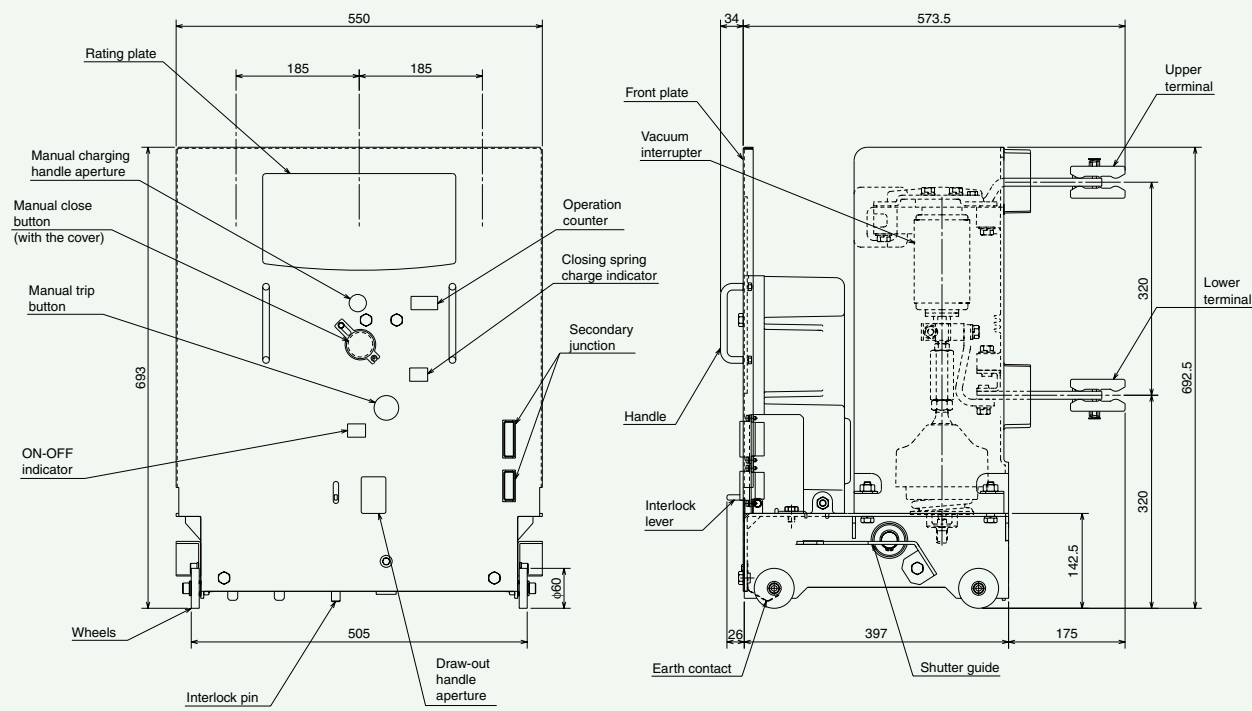


Fig. 10

600/630A and 1200/1250A : 10-VPR-25C(F) (Mounting frame)

(Class CW: Type C)

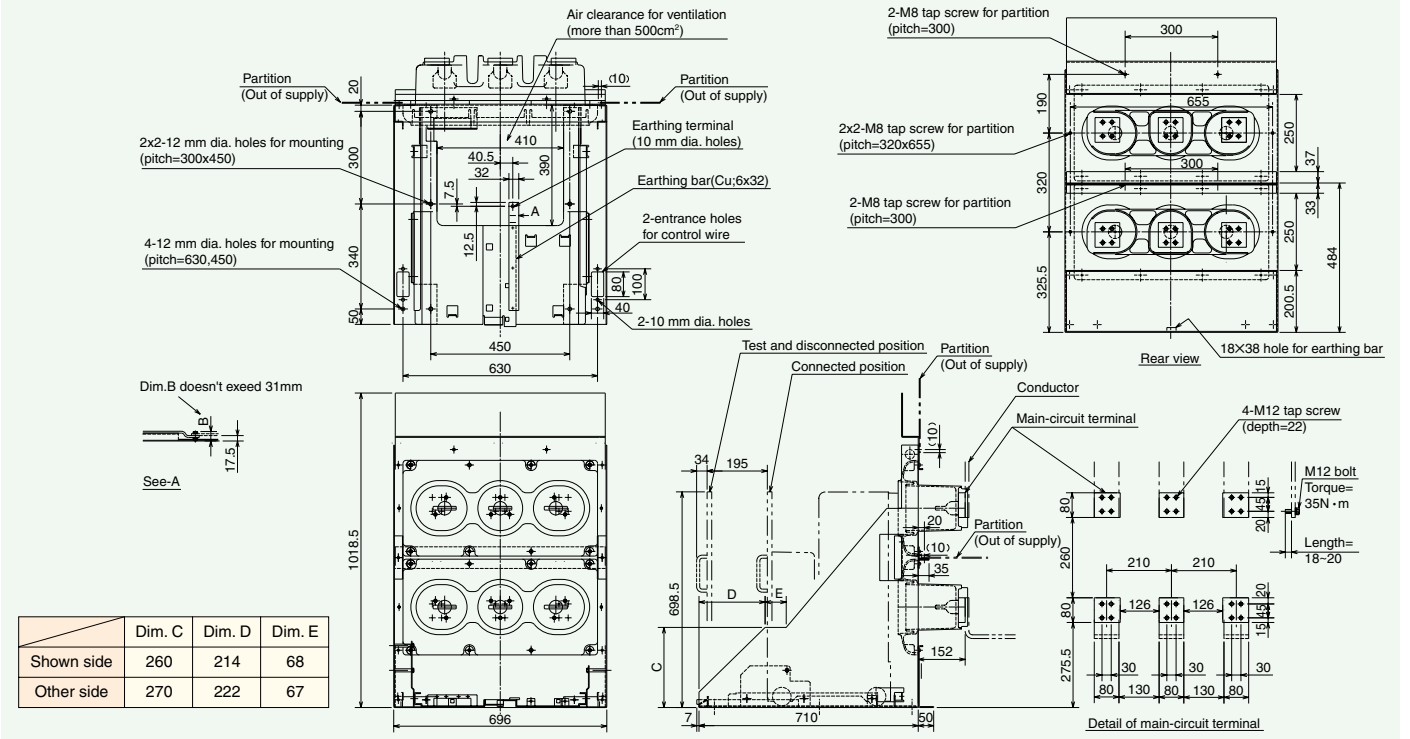


Fig. 11

(Class PW and MW: Type D and G)

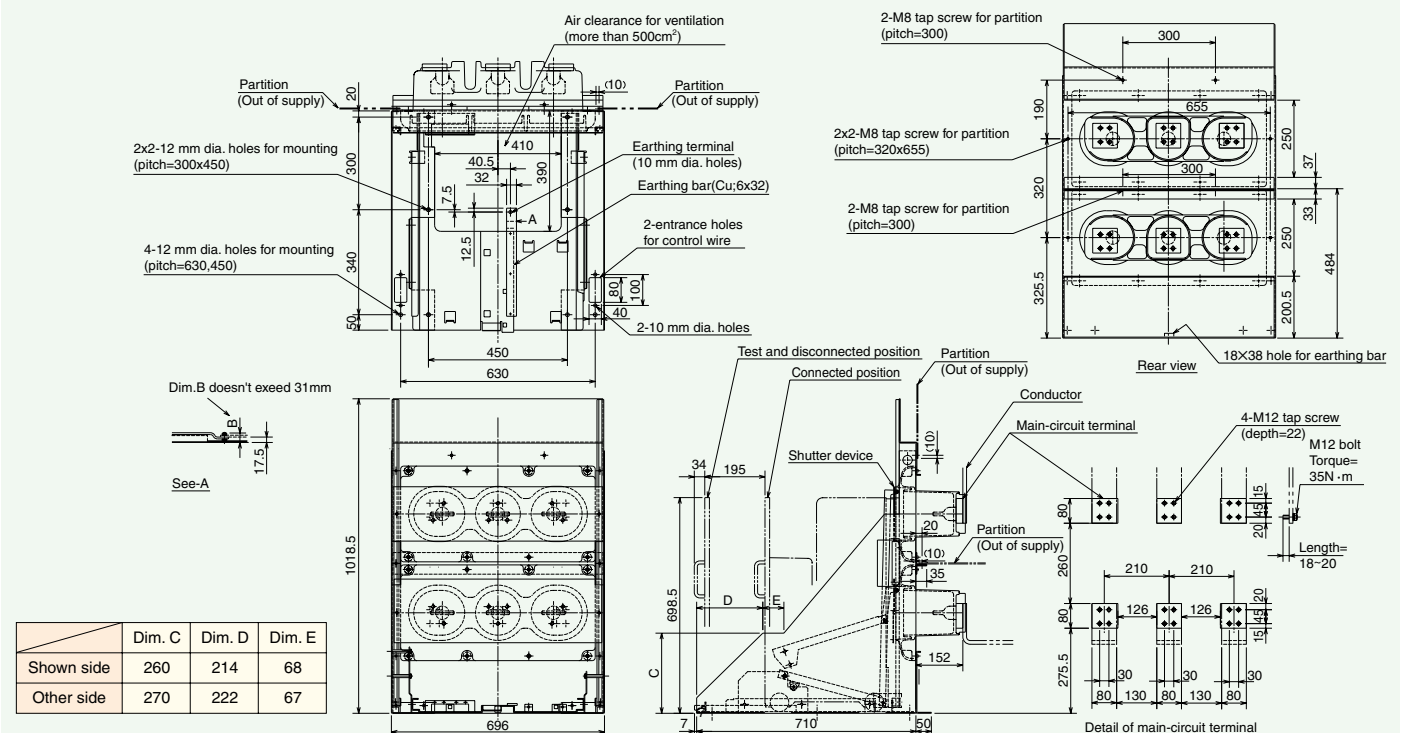


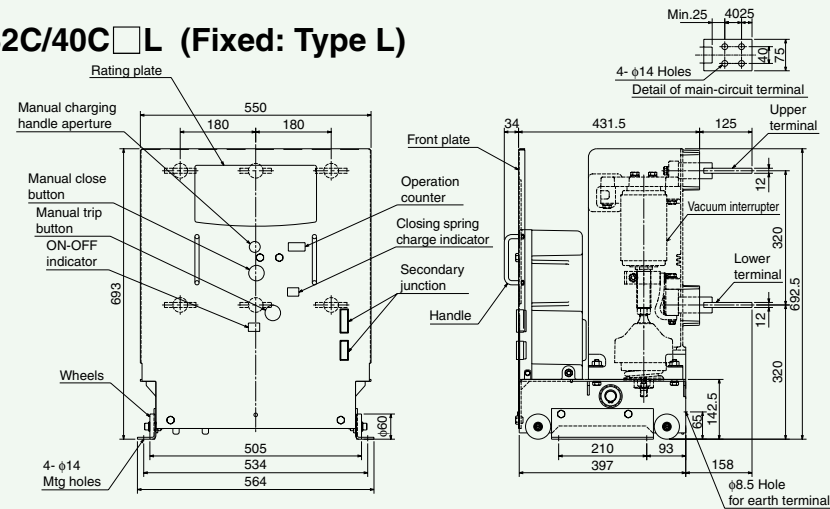
Fig. 12

OUTLINES AND DIMENSIONS (Dimension in mm)

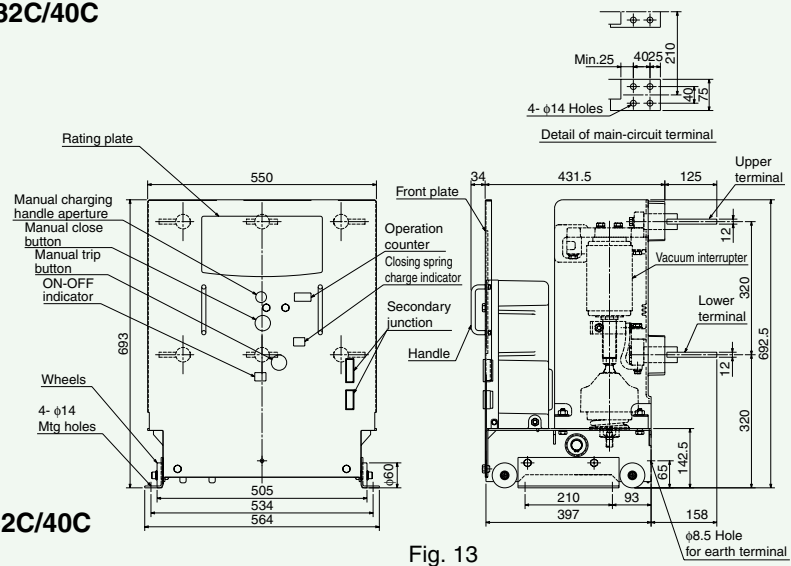
Frame size M

600/630A, 1200/1250A : 3/6/10-VPR-32C/40C (Circuit breaker)

3/6/10-VPR-32C/40C □ L (Fixed: Type L)



Type of 3/6-VPR-32C/40C



Type of 10-VPR-32C/40C

Fig. 13

3/6/10-VPR-32C/40C □ □ (Withdrawable: Type C, D, and G)

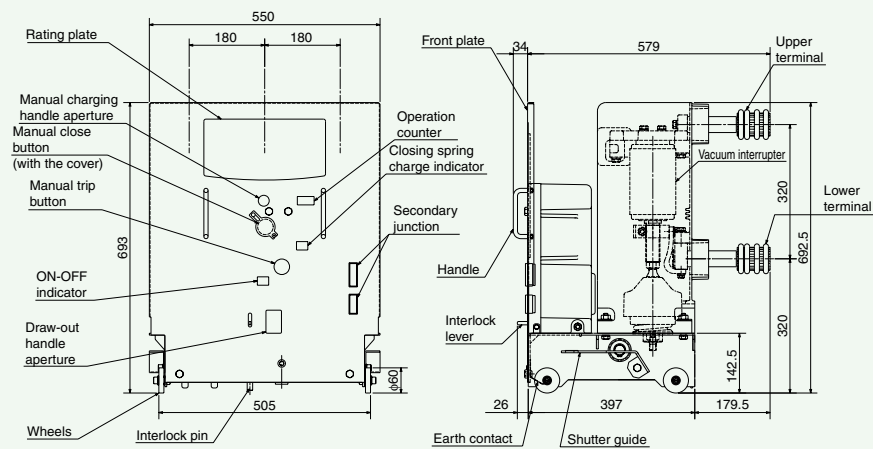
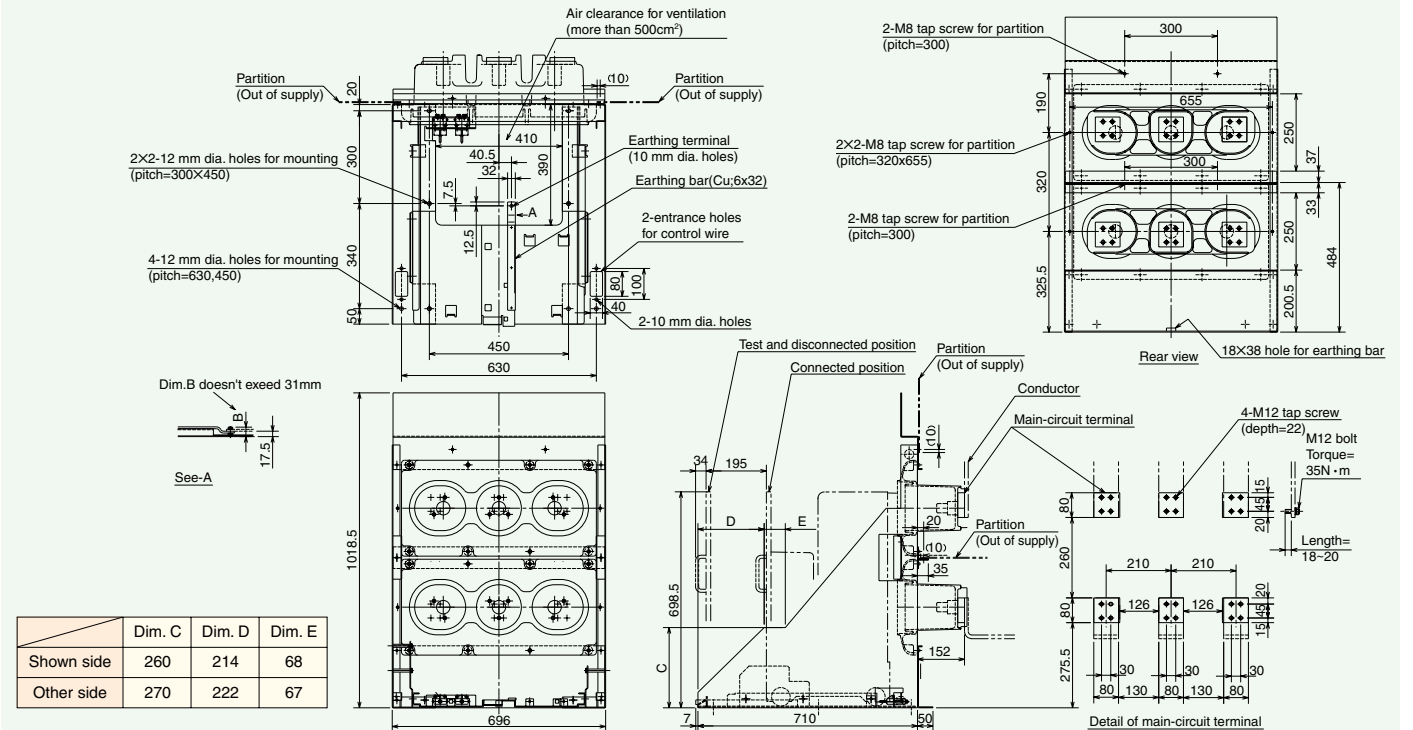


Fig. 14

600/630A, 1200/1250A : 3/6/10-VPR-32C/40C (Mounting frame)

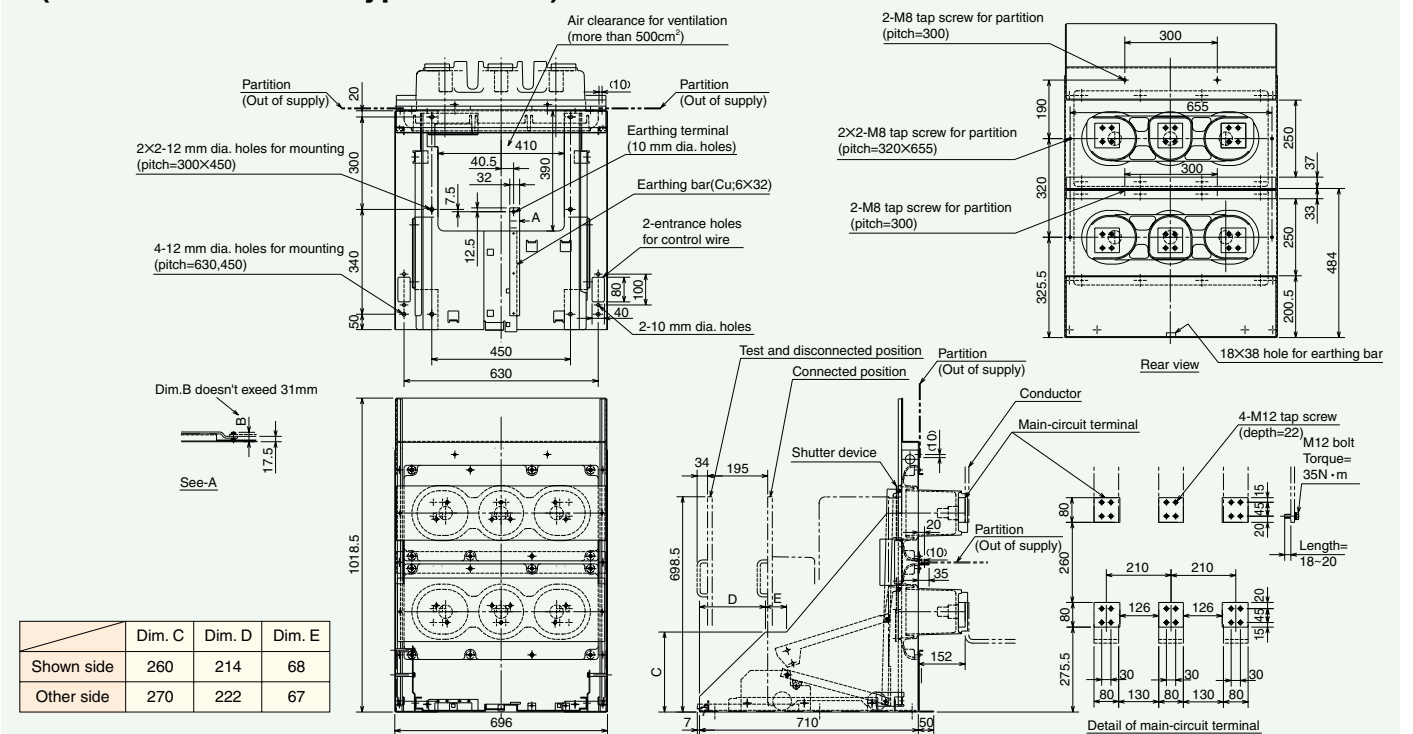
(Class CW: Type C)



	Dim. C	Dim. D	Dim. E
Shown side	260	214	68
Other side	270	222	67

Fig. 15

(Class PW and MW: Type D and G)



	Dim. C	Dim. D	Dim. E
Shown side	260	214	68
Other side	270	222	67

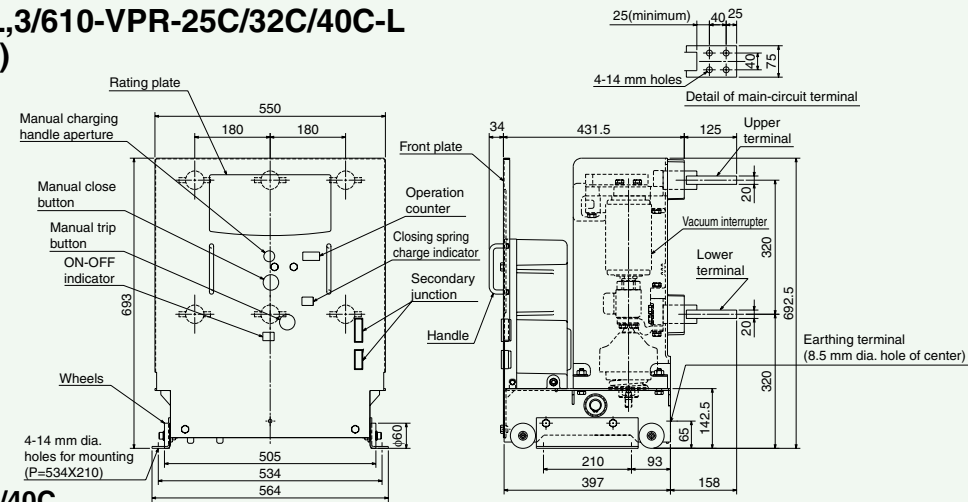
Fig. 16

OUTLINES AND DIMENSIONS (Dimension in mm)

■ Frame size M

■ 1600A, 2000A : 3/6-VPR-20C, 3/6/10-VPR-25C/32C/40C (Circuit breaker)

3/6-VPR-20C-L, 3/6/10-VPR-25C/32C/40C-L (Fixed: Type L)



3/6-VPR-20C, 3/6-VPR-25C/32C/40C

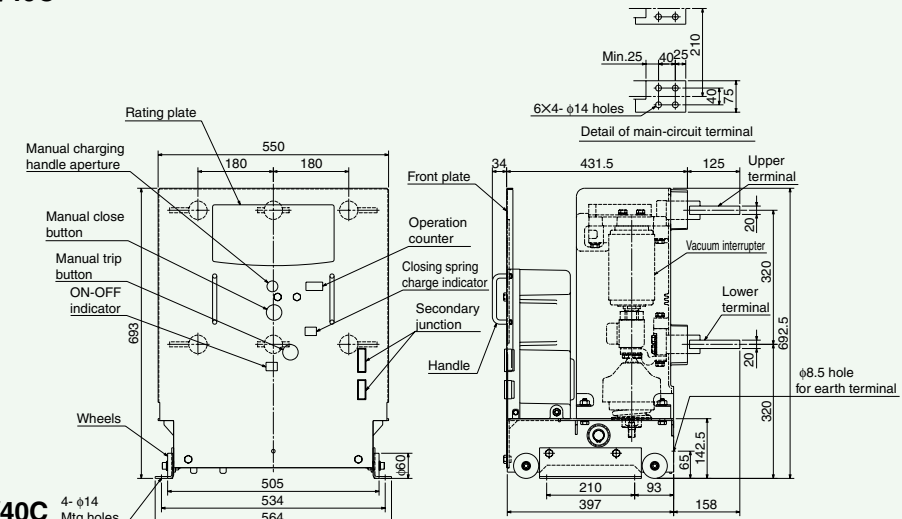


Fig. 17

10-VPR-25C/32C/40C

3/6-VPR-20C-□, 3/6/10-VPR-25C/32C/40C-□ (Withdrawable: Type C, D, and G)

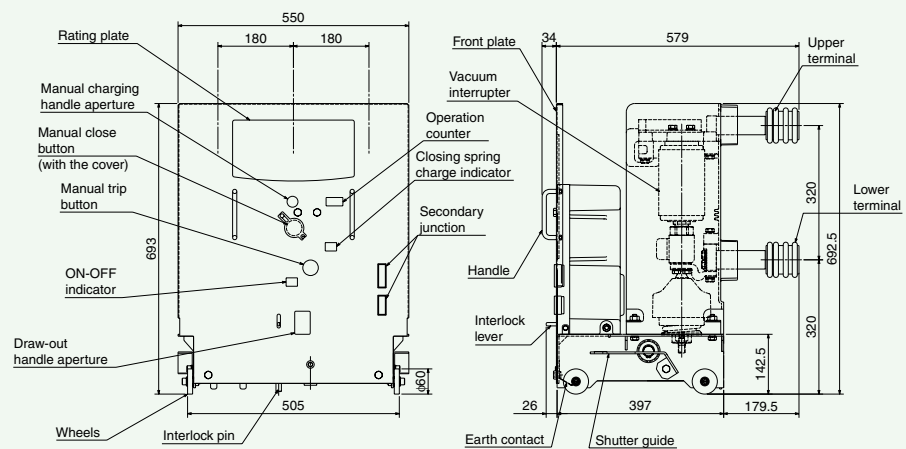
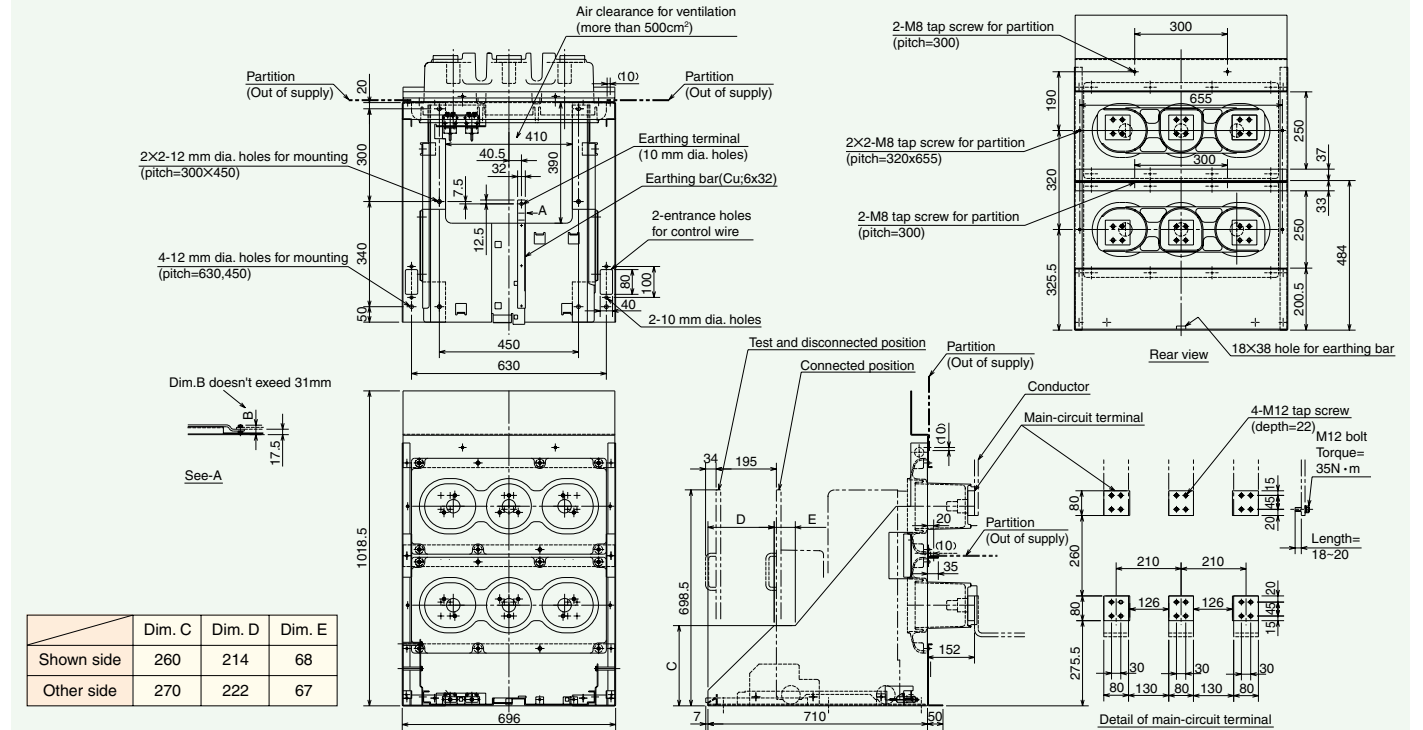


Fig. 18

■ 1600A, 2000A : 3/6-VPR-20C, 3/6/10-VPR-25C/32C/40C (Mounting frame)

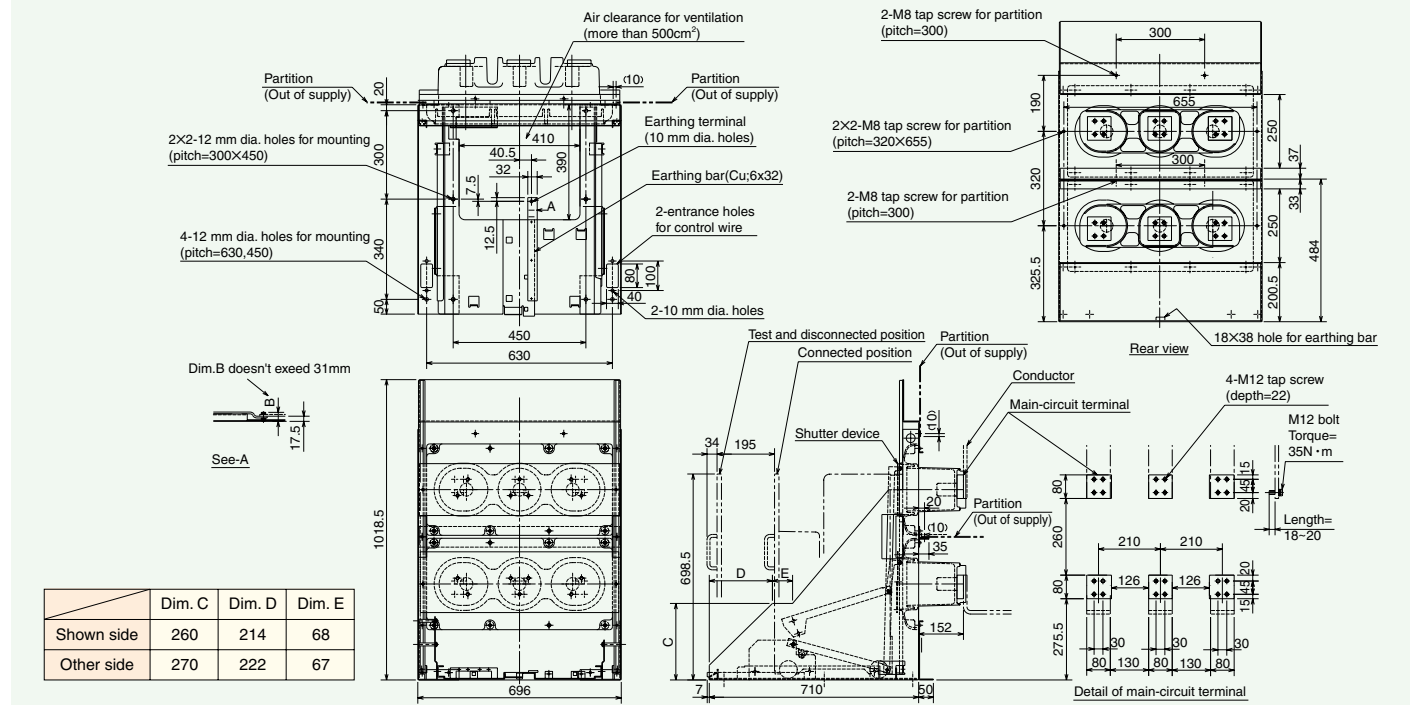
(Class CW: Type C)



	Dim. C	Dim. D	Dim. E
Shown side	260	214	68
Other side	270	222	67

Fig. 19

(Class PW and MW: Type D and G)



	Dim. C	Dim. D	Dim. E
Shown side	260	214	68
Other side	270	222	67

Fig. 20

OUTLINES AND DIMENSIONS (Dimension in mm)

Frame size M

2500A, 3000/3150A : 10-VPR-25C, 3/6/10-VPR-32C/40C (Circuit breaker)

10-VPR-25C-□, 3/6/10-VPR-32C/40C-□ (Withdrawable: Type C, D, and G)

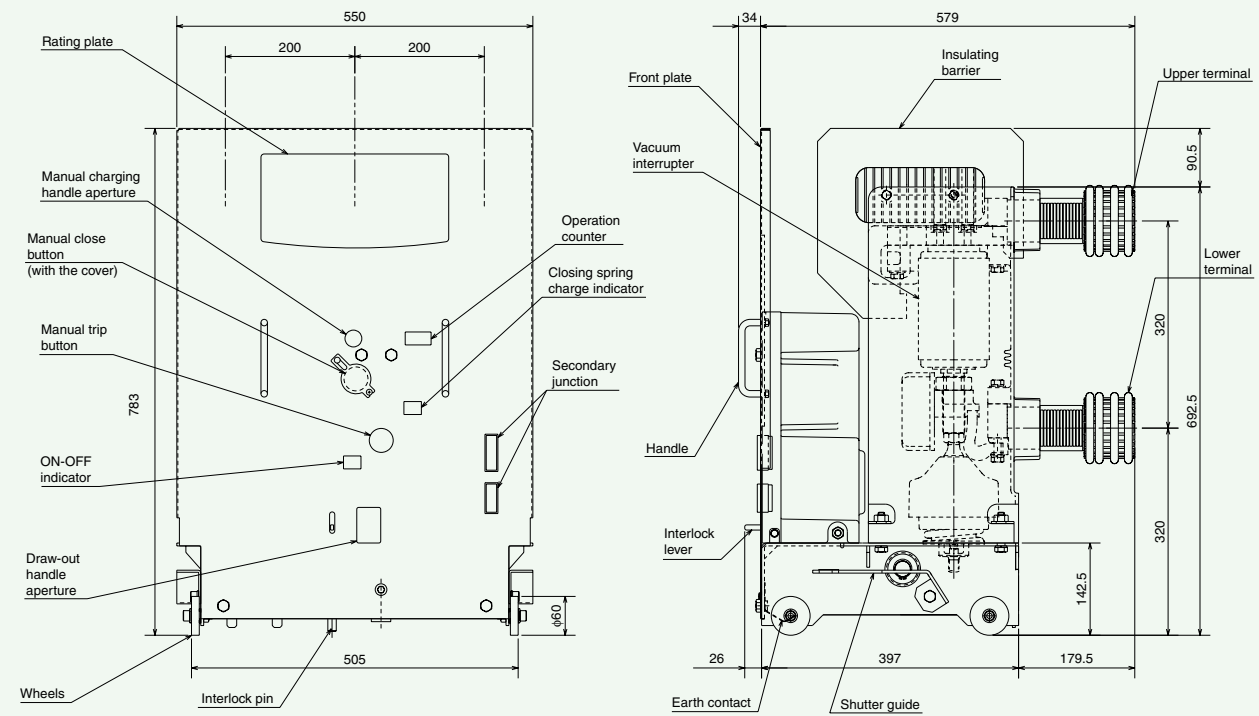


Fig. 21

2500A, 3000/3150A : 10-VPR-25C, 3/6/10-VPR-32C/40C (Mounting frame)

(Class CW: Type C)

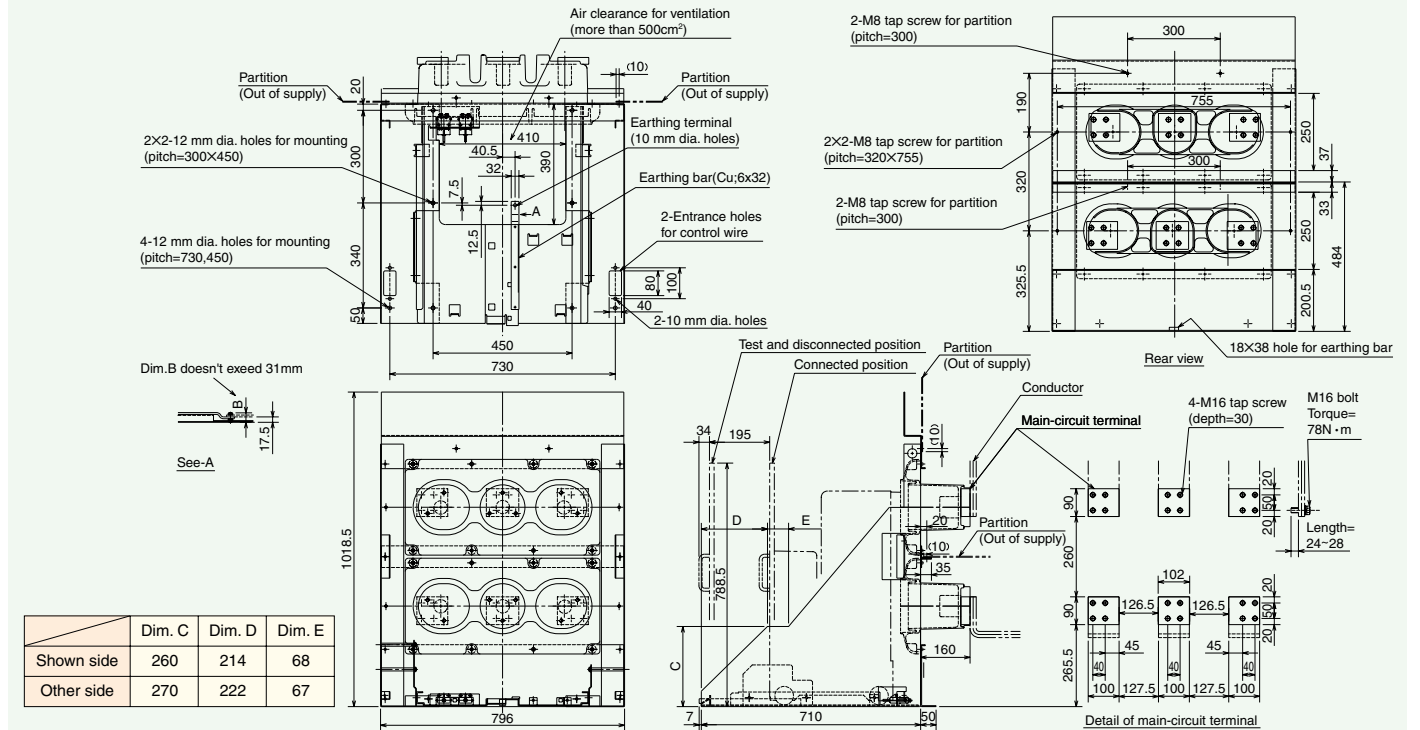


Fig. 22

(Class PW and MW: Type D and G)

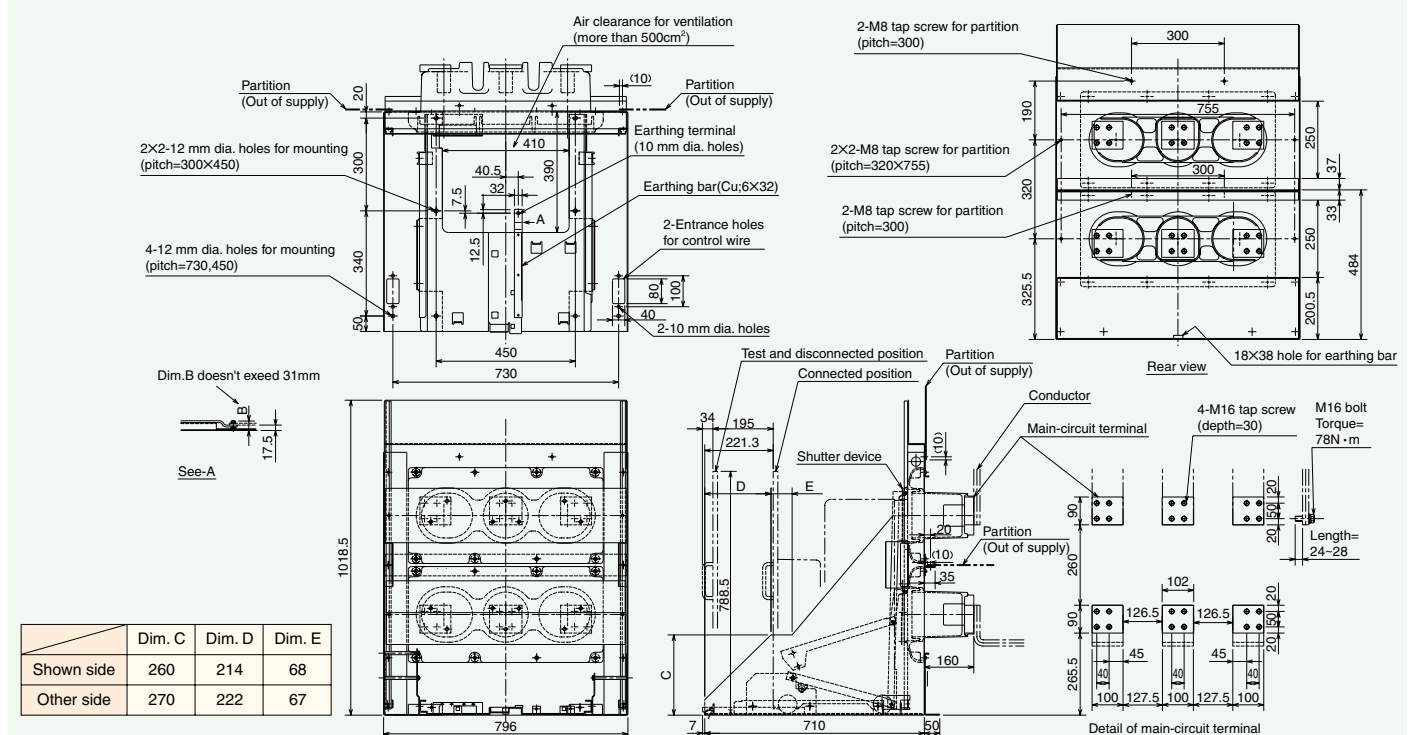


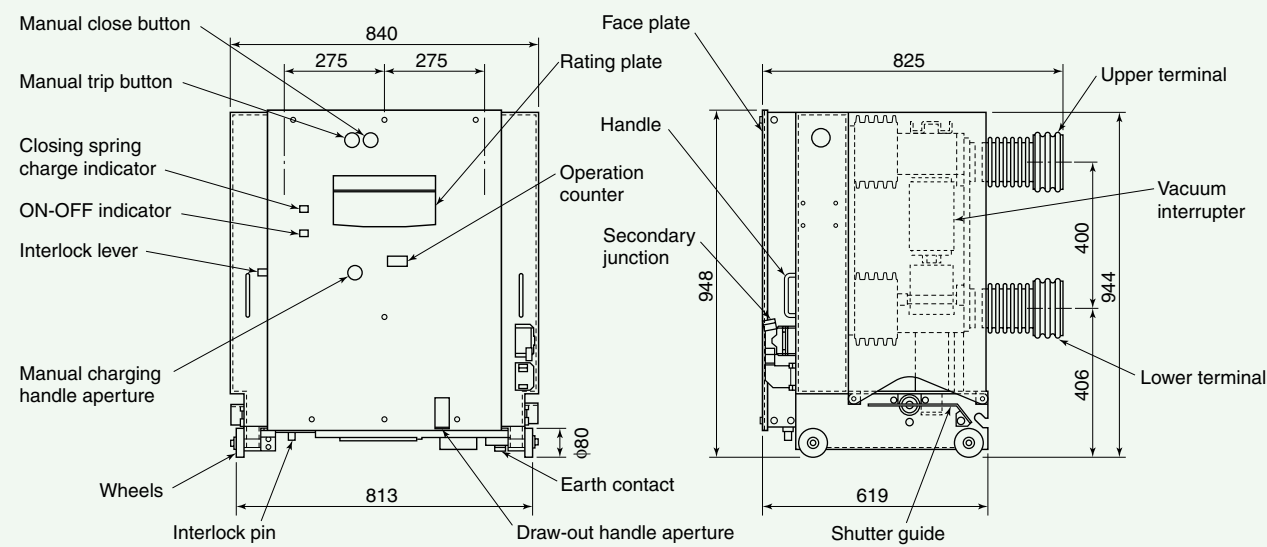
Fig. 23

OUTLINES AND DIMENSIONS (Dimension in mm)

Frame size R

4000A : 10-VPR-40C(D)

Circuit breaker (Withdrawable: Type C, D, and G)



Mounting frame (Class CW, PW, and MW: Type C, D, and G)

(Class CW: Shutter device is not equipped.)

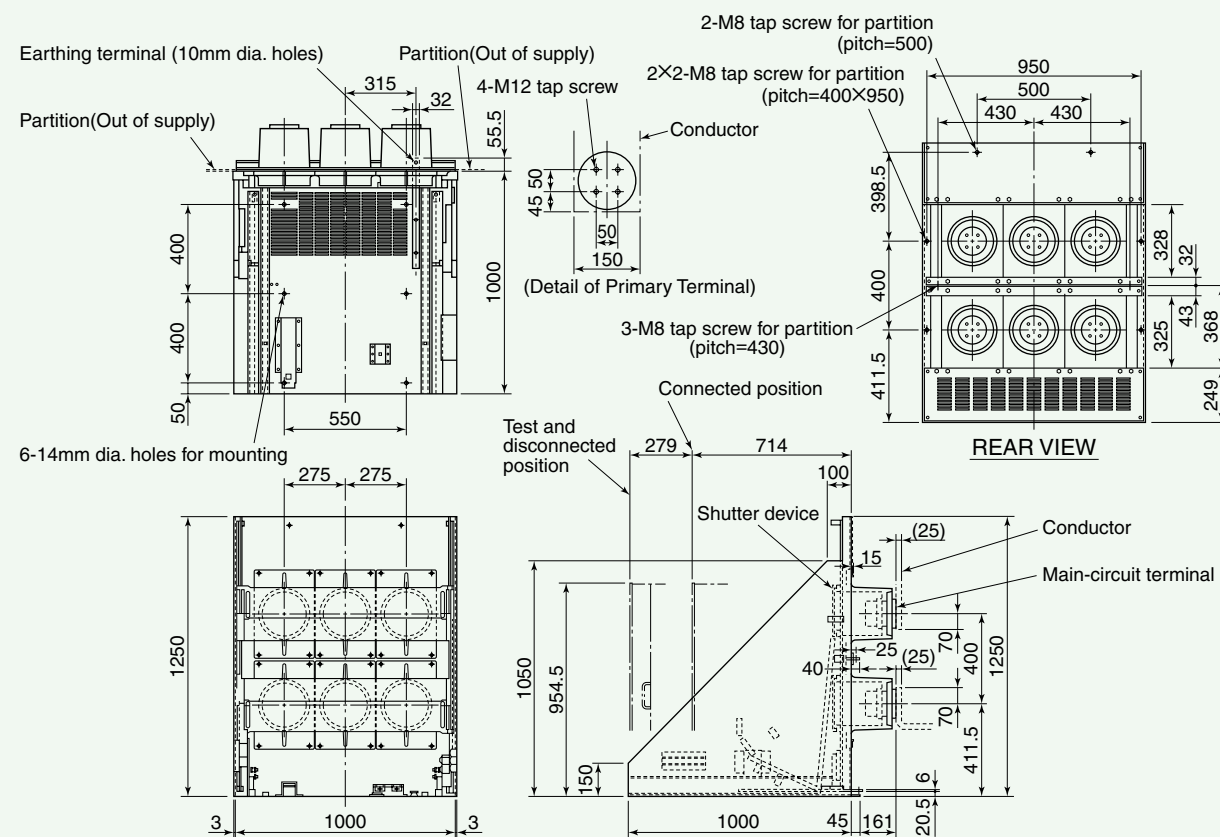
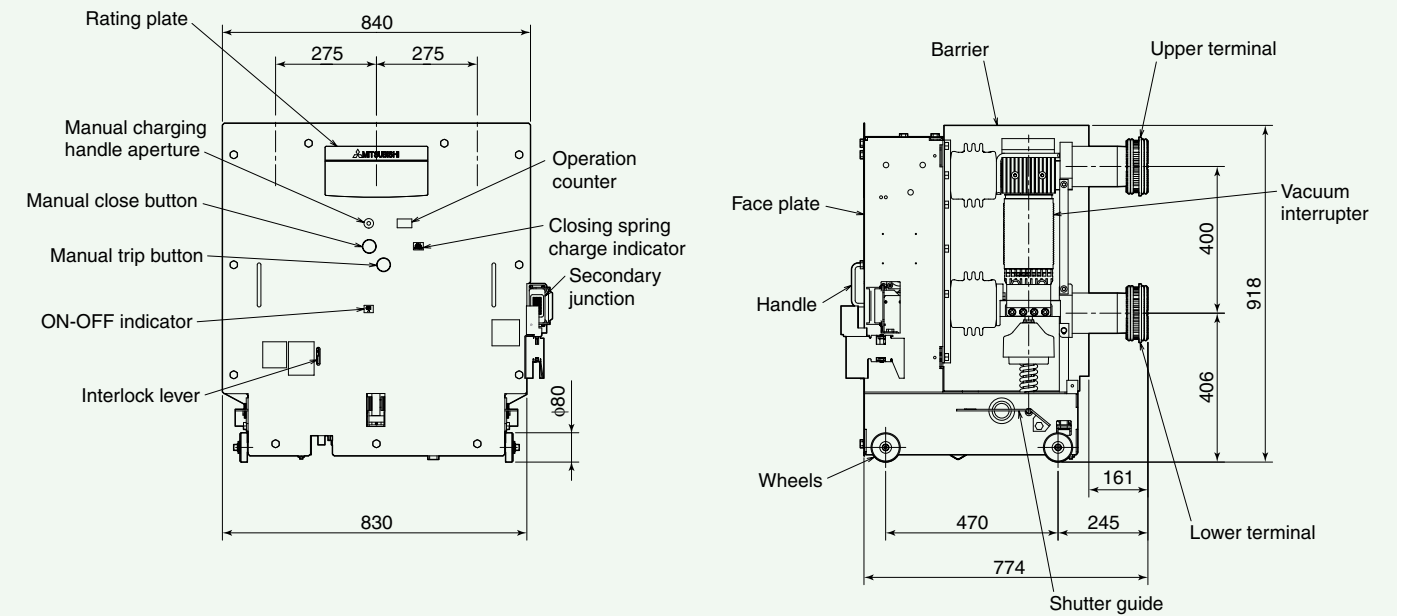


Fig. 24

Frame size R

4000A : 10-VPR-50C(D)

Circuit breaker (Withdrawable: Type C, D, and G)



Mounting frame (Class CW, PW, and MW: Type C, D, and G)

(Class CW: Shutter device is not equipped.)

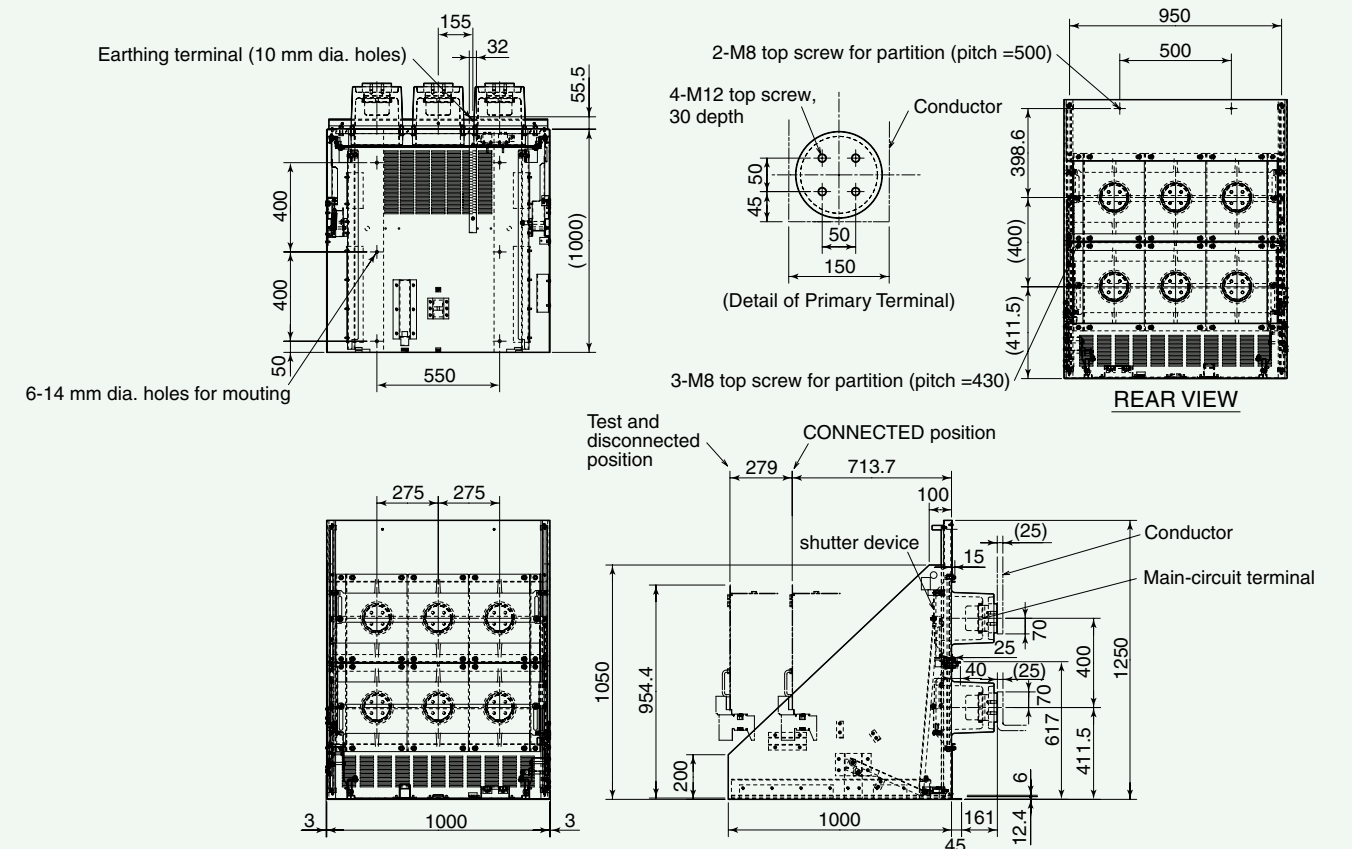


Fig. 25

OUTLINES AND DIMENSIONS (Dimension in mm)

■ Frame size H

■ 600/630A, 1200/1250A : 20-VPR-16D/25D (Circuit breaker)

20-VPR-16D/25D-□ (Withdrawable: Type C, D)

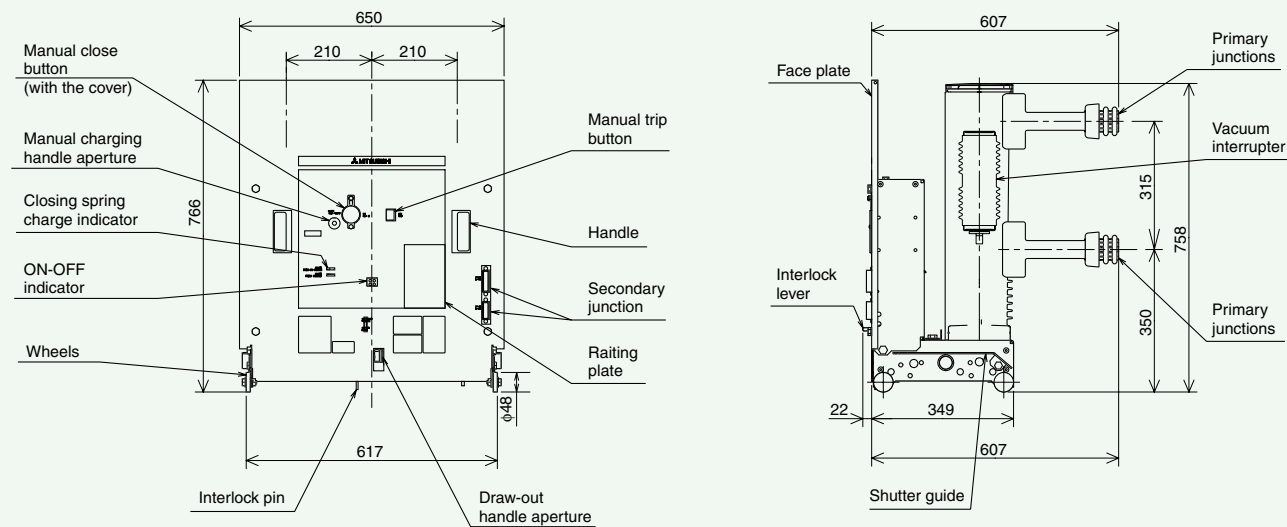


Fig. 26

■ 600/630A, 1200/1250A : 20-VPR-16D/25D (Mounting frame)

(Class CW and PW: Type C and D)

(Class CW: Shutter device is not equipped.)

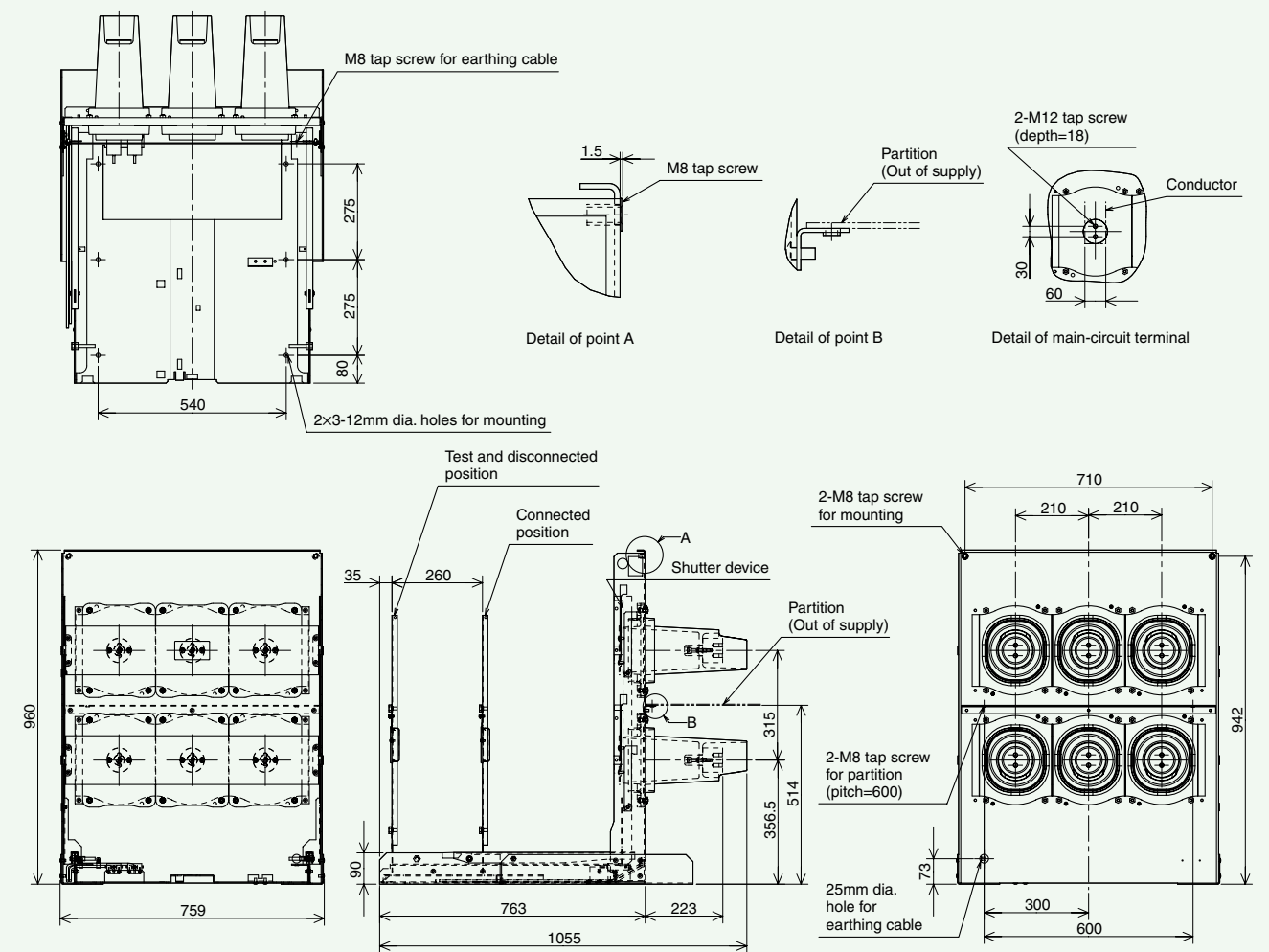


Fig. 27

OUTLINES AND DIMENSIONS (Dimension in mm)

Frame size H

1600/2000A : 20-VPR-25C (Circuit breaker)

20-VPR-25C-□ (Withdrawable: Type C, D)

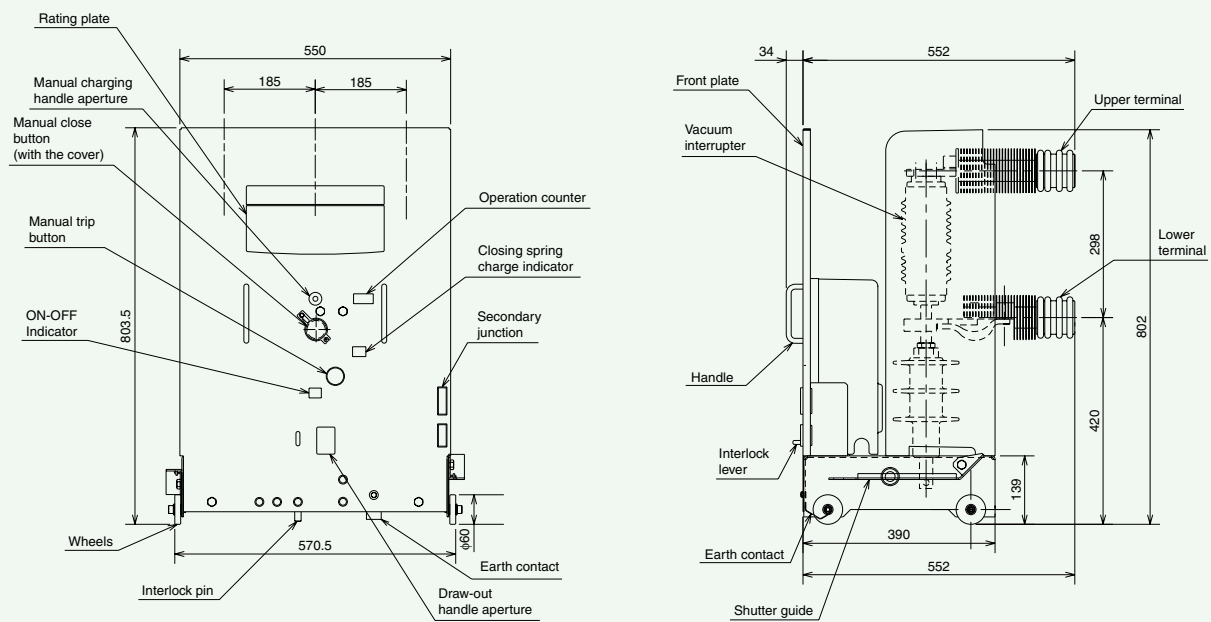


Fig. 28

1600/2000A : 20-VPR-25C (Mounting frame)

(Class CW: Type C)

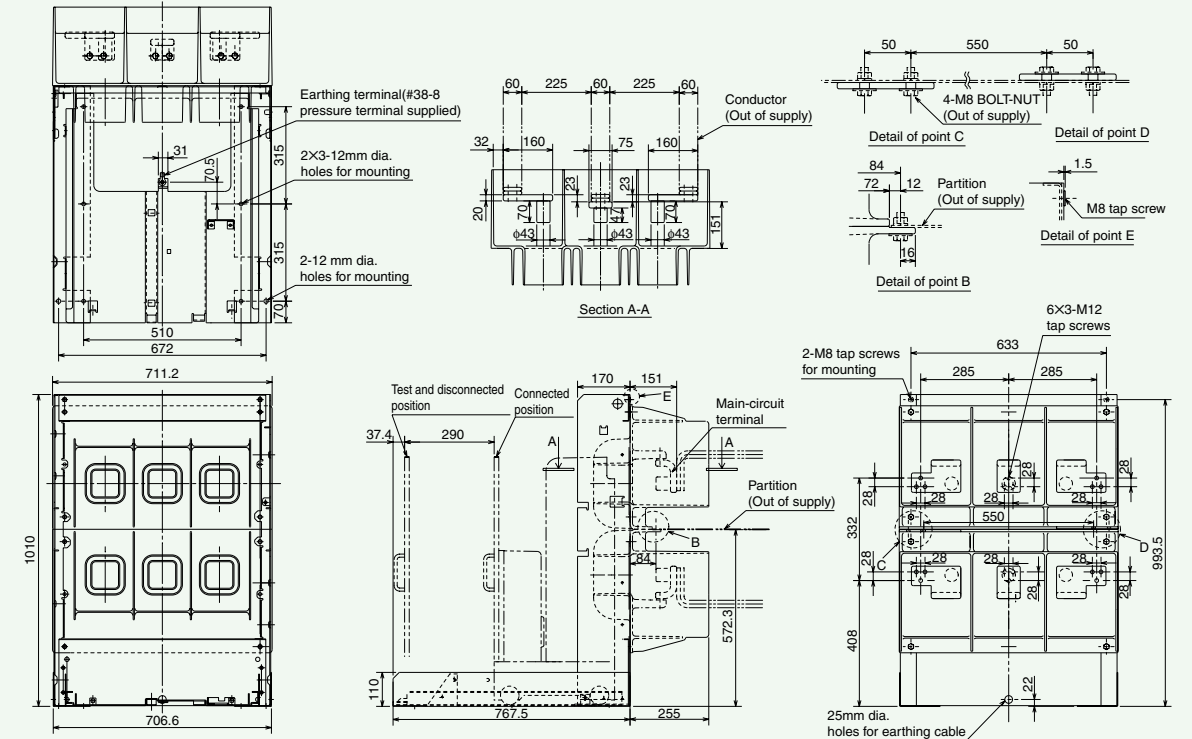


Fig. 29

(Class PW: Type D)

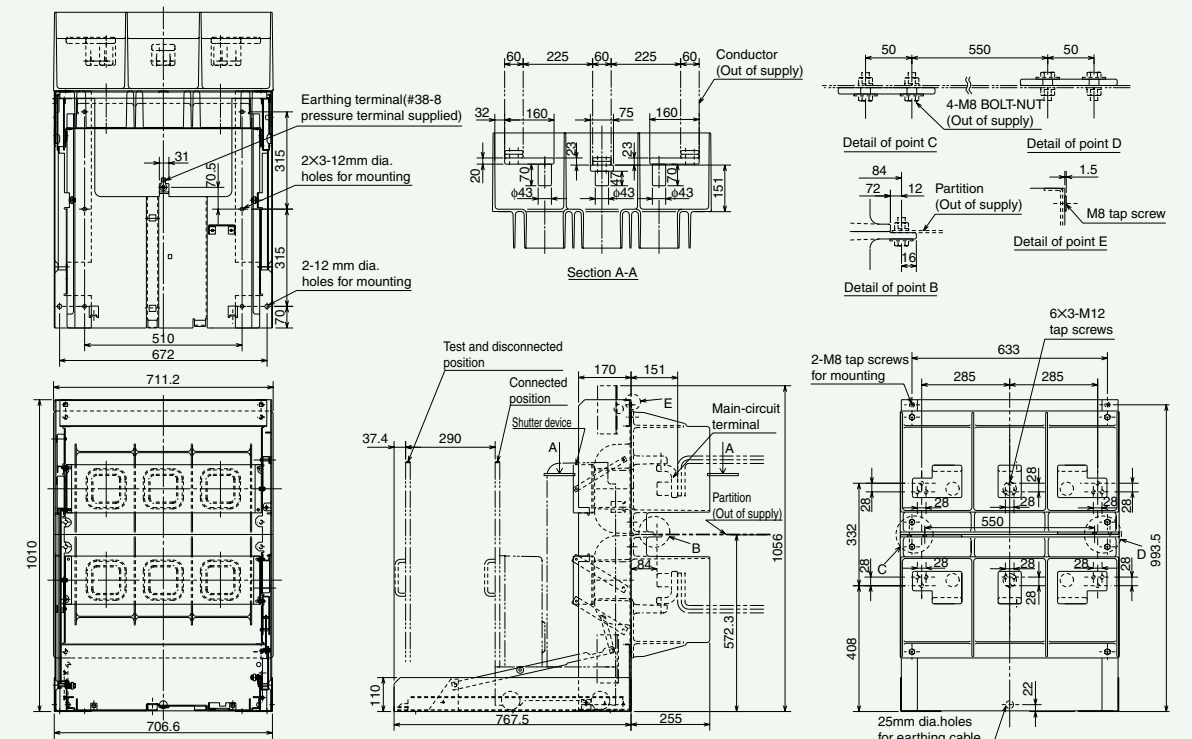


Fig. 30

OUTLINES AND DIMENSIONS (Dimension in mm)

■ Frame size R

■ 2500A : 20-VPR-25D (Circuit breaker)

20-VPR-25D-□ (Withdrawable: Type C, D)

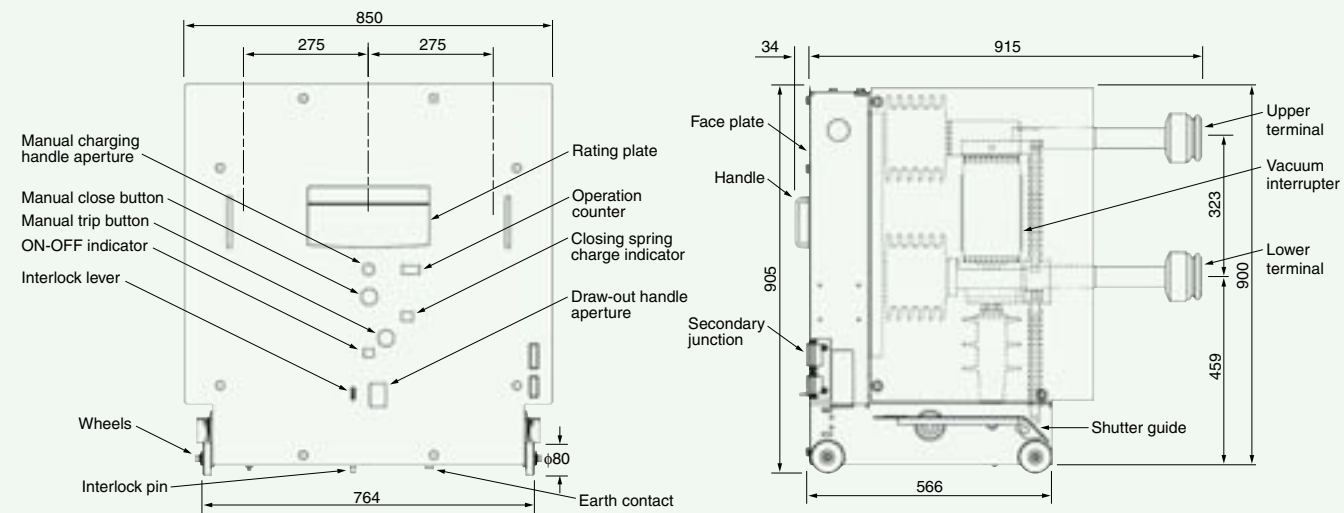


Fig. 31

■ 2500A : 20-VPR-25D (Mounting frame)

(Class CW and PW: Type C and D)

(Class CW: Shutter device is not equipped.)

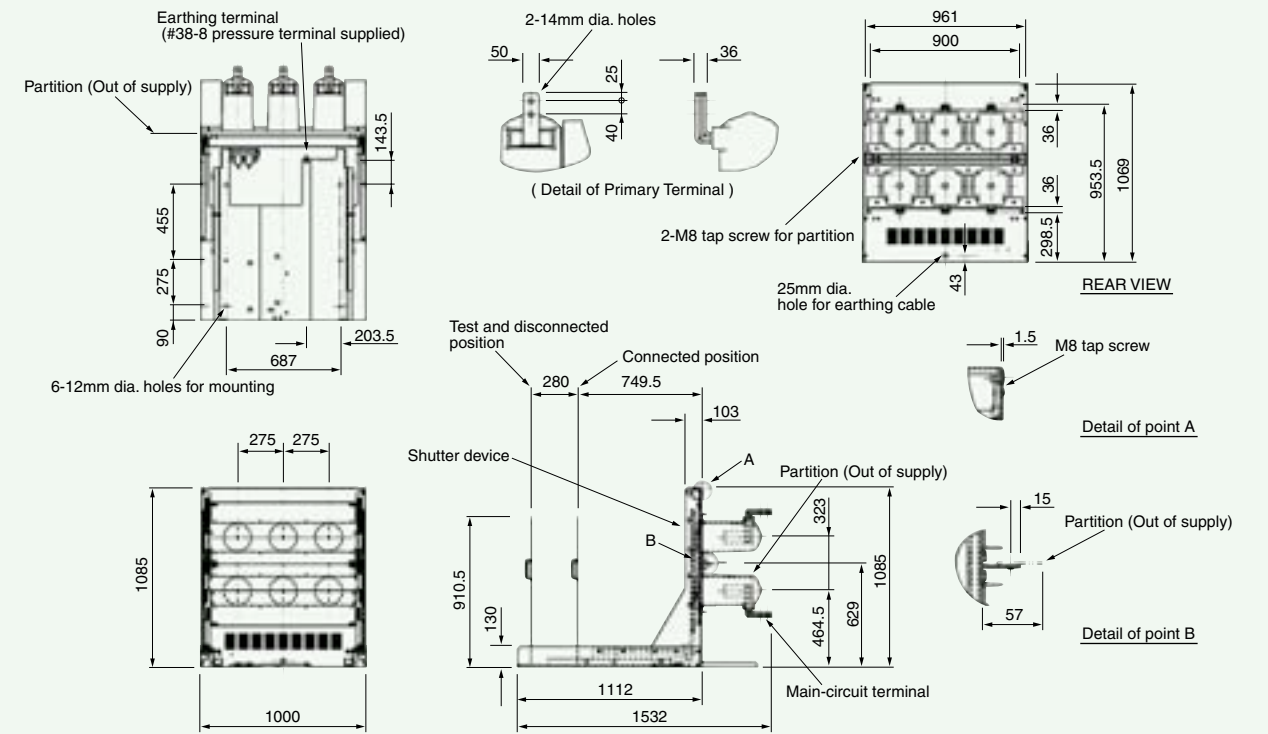
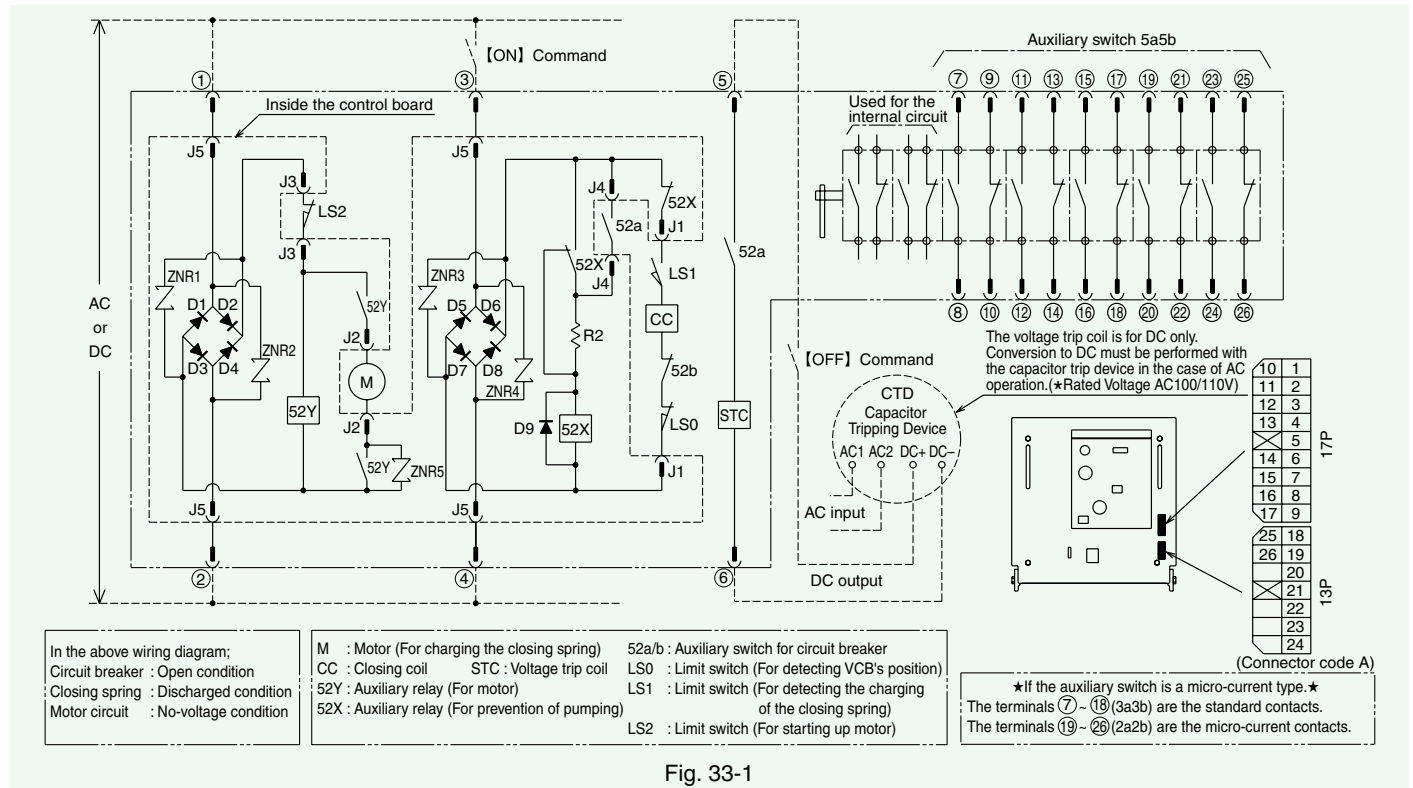


Fig. 32

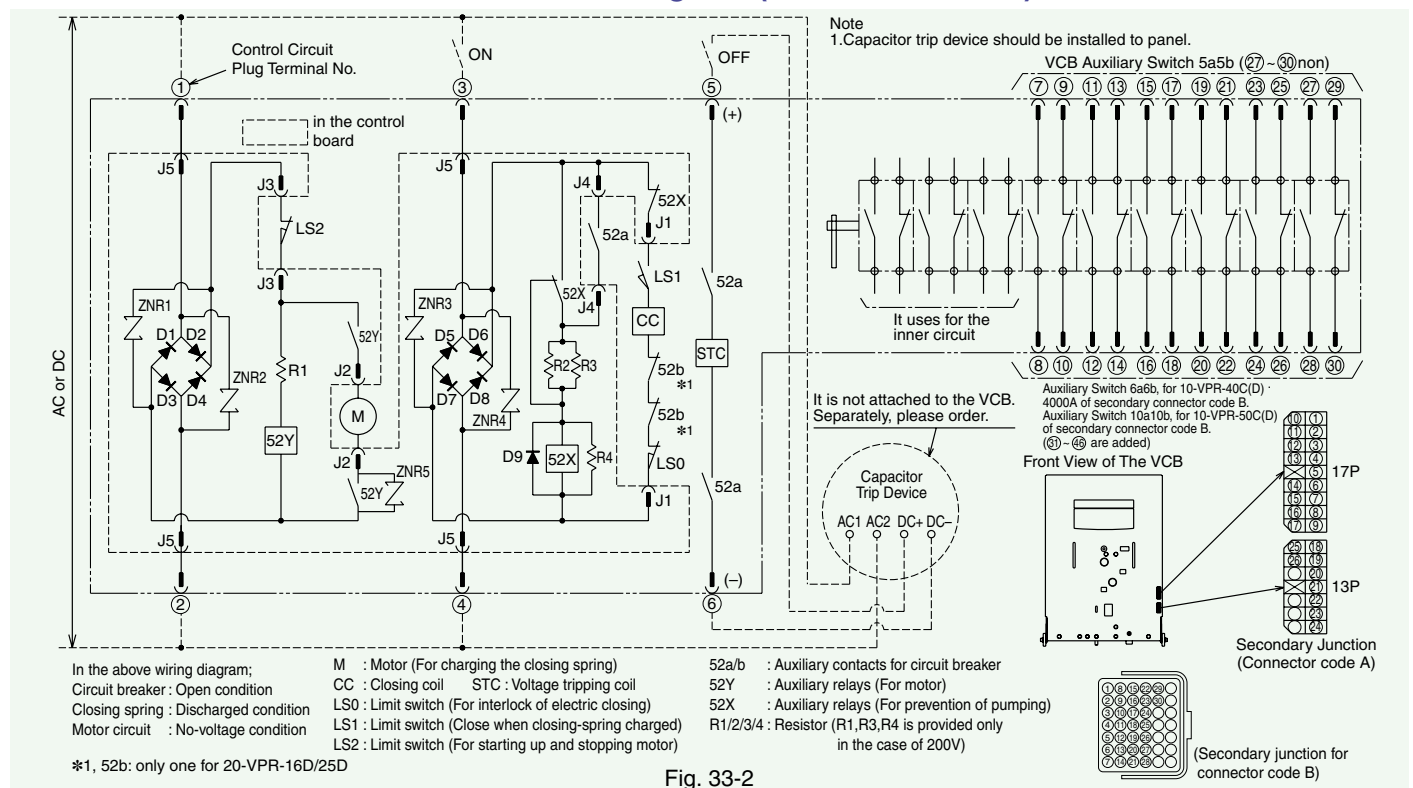
CONNECTION DIAGRAM

3/6-VPR-20C/25C (600/630A, 1200/1250A)

Withdrawable: Standard connection diagram (AC•DC100~125V) (Note: There is no LS0 in a fixed type.)



3/6-VPR-20C/25C (1600A, 2000A) ■ 10-VPR-25C ■ 10-VPR-50C(D) 3/6/10-VPR-32C/40C ■ 20-VPR-25C (1600A, 2000A) ■ 20-VPR-16D/25D Withdrawable: Standard connection diagram (AC•DC100~125V) (Note: There is no LS0 in a fixed type.)



ACCESSORIES

Table 3 Accessories

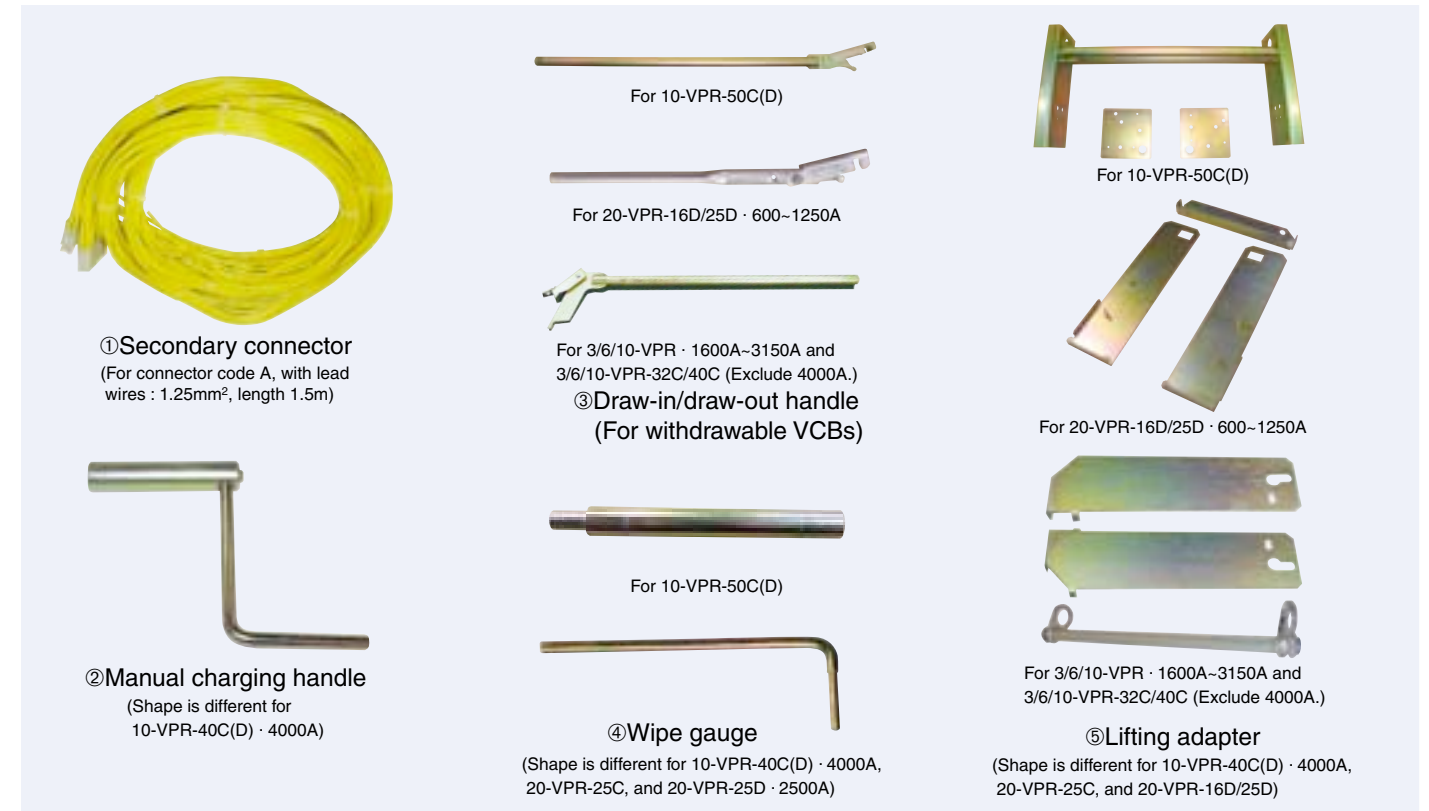


Table 4 Accessories

Accessories	Circuit breaker Type name	3-VPR-20C/25C 6-VPR-20C/25C(S) 600~1250A	10-VPR-25C(F) 600~1250A	3/6-VPR-20C/25C 1600A, 2000A 3/6/10-VPR-32C/40C 600~2000A	10-VPR-25C 3/6/10-VPR-32C/40C 2500A, 3000/3150A	10-VPR-40C(D) 10-VPR-50C(D) 4000A	20-VPR-25C 1600A, 2000A 20-VPR-25D 2500A	20-VPR-16D 20-VPR-25D
①Secondary connector		1 unit per each VCB (Please specify length when the lead wire of the length of 2m or more is necessary.)						
②Manual charging handle		1 per 1~5 VCBs (min. 1)						
③Draw-in/draw-out handle		1 per 1~5 VCBs (min. 1)	1 per 1~5 VCBs (min. 1)					
④Wipe gauge		1 per 1~5 VCBs (min. 1)						
⑤Lifting adapter		Not shown in list above. (Eyebolt M12) 2pcs		1 per 1~5 VCBs (min. 1)				
⑥Sloped platform		Not shown in list above.						

Notes: 1. The bolt, washer and the nut for the connection of main circuit of fixing frame are not attached.
 2. Please order separately if a higher quantity than indicated above required.

Table 5 Auxiliary switch (10a10b for 10-VPR-50C(D) of the secondary connector code B) (6a6b for 10-VPR-40C(D) · 4000A of the secondary connector code B) (5a5b for 10-VPR-40C(D) · 4000A of the secondary connector code A and others)

Standard contact	Rated operational current (A)	Rated insulation voltage (V)		Rated operational voltage (V)	
		AC	DC	AC	DC
Standard contact	5	AC100~110	AC200~220	AC	AC/DC250
		DC48	DC100~110	DC	AC/DC220
	5 (time constant 40 ms)	DC200~220	DC200~220	AC/DC	5 (power factor 0.3~0.4)
		AC/DC100	AC/DC24	DC	5 (power factor 0.3~0.4)
Minimum operational current (mA)	30	50	5 (time constant 40 ms)	1 (time constant 40 ms)	
	50	50	0.5 (time constant 40 ms)	0.5 (time constant 40 ms)	
For micro current	Rated continuous current (A)		5		
	Rated operational current (mA)	Rated operational voltage (V)		AC/DC220	
		AC	DC	AC	DC
	1~200	1~200	AC24~220	DC24~220	1~200
Rated continuous current (A)		2			

Notes: 1. Avoid use for DC48V/200mA or less in the case of standard contact.
 2. Additional auxiliary contacts can not be added to the standard 5a5b or 6a6b or 10a10b contacts.
 3. For 600/630/1200/1250A of 3-VPR-20C, 3-VPR-25C, 6-VPR-20C and 6-VPR-25C(S), when the control voltage is AC•DC200/220V 4a4b contacts only are available.

OPTIONAL ACCESSORIES

■ Closing Spring Charged Indication Switch (Option for circuit breaker)

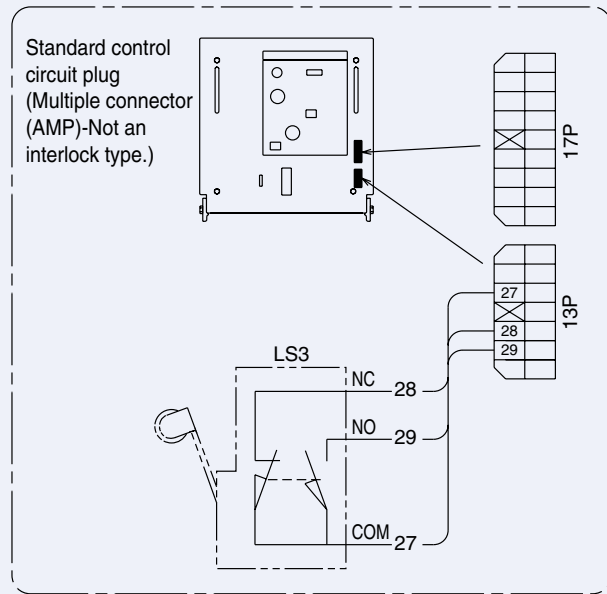


Fig. 34

Table 6 Ratings of limit switch

Rated voltage (V)	Resistive load	Inductive load
AC/DC 125	10A	6A

Notes: 1. Refer to page 27 for an internal connection of VCB.
2. In Fig. 34, closing spring is in discharged condition.
3. LS3 is OMRON type X-10GW22-B.

■ Position Switch (Option for mounting frame of 3/6-VPR-20C/25C 600/630A, 1200/1250A)

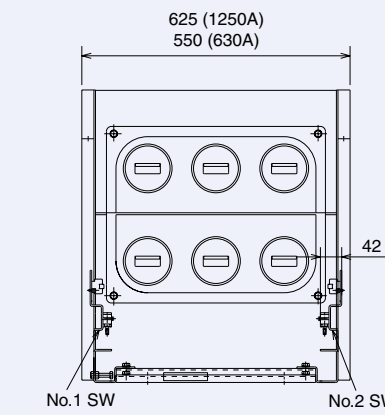
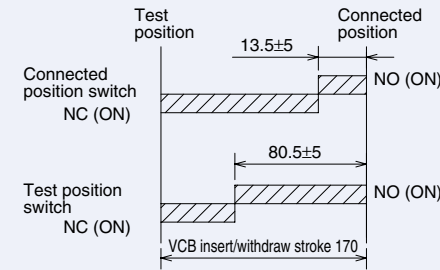
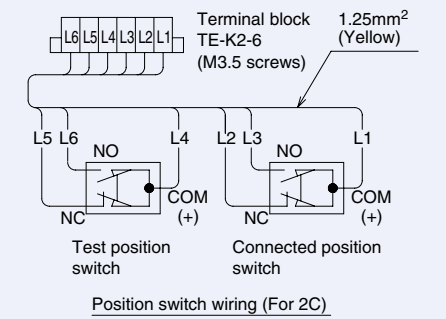


Table 9 Ratings of limit switch

Rated voltage (V)	Resistive load (A)	Inductive load (A)
AC100~125	15	10
DC100~125	0.5	0.05

1 Unit	Each 1C for test and connected position Only the switch of No.1 is installed for 2C.
2 Units	Each 2C for test and connected position No.1 and No.2 are installed for 4C.



Note 1. The terminal code of No.2 switch are R1~R6.

Fig. 38

■ Capacitor Trip Power Device (CTD) Sold Separately

The installation and the performance of KF-100CD and KF-200CD are compatible with past KF-100C and KF-200C.

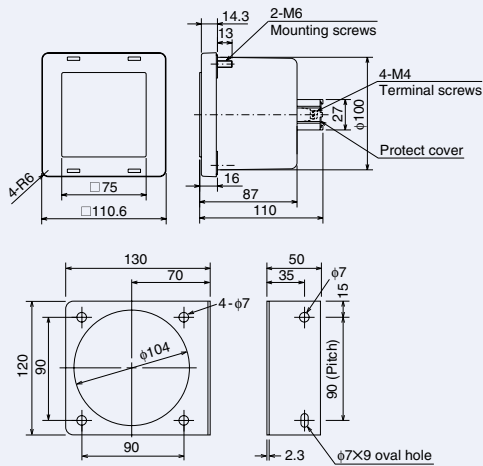


Fig. 35 Dimension of CTD and the device-mounting fixture

Table 7 Constant of element of CTD

Type name	Capacitor C	Resistance R1	Resistance R2	Resistance R3
KF-100CD	820 F	10W300Ω	10W100Ω	0.5W240kΩ
KF-200CD	820 F	10W300Ω	10W100Ω	0.5W240kΩ

Table 8 Ratings of CTD

Item	KF-100CD	KF-200CD
Rated voltage (V)	AC100/110	AC200/220
Rated frequency (Hz)	50/60	
Rated output voltage (V)	DC140/155	
Burden (VA)	1 or less	

Notes: 1. When a Type KF device is specified with a VCB, a panel-mounting type will be supplied, however no device-mounting fixture is included.
2. The device-mounting fixture allows mounting of the device pointing left, right, up or down.

Warning

The output voltage of the KF-200CD is DC140/155V, and it can not open circuit breakers with tripping control voltage of DC200/220V which may result in accidents.

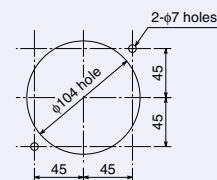


Fig. 37 Example of the device-mounting fixture

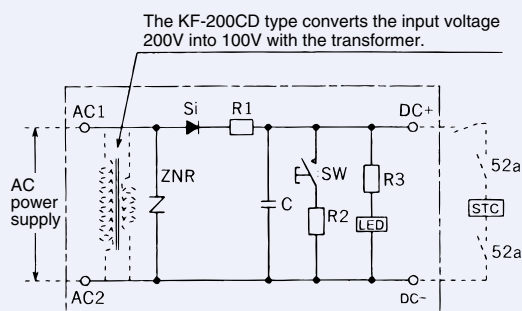


Fig. 36 Connection diagram of CTD

■ Position Switch (Option for mounting frame of 3/6-VPR-20C/25C 1600, 2000A, 10-VPR-25C, 10-VPR-32C/40C, 20-VPR-16C/25C, 20-VPR-25C, 20-VPR-16D/25D)

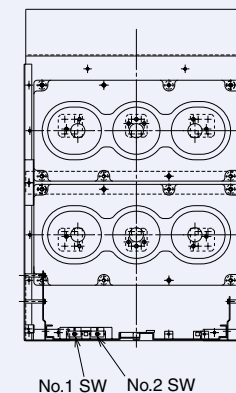
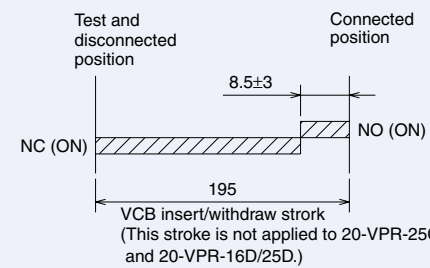
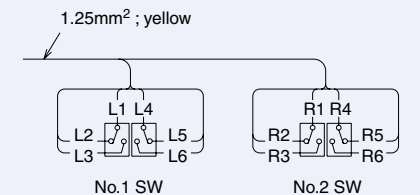


Table 10 Ratings of limit switch

Rated voltage (V)	Resistive load (A)	Inductive load (A)
AC100~125	15	10
DC100~125	0.5	0.05

1 Unit	For 2C	No.1 SW
2 Units	For 4C	No.1 and No.2 SW



Position switch wiring connection diagram

Fig. 39

■ Arresters (for 3.6kV, 7.2kV) Sold Separately

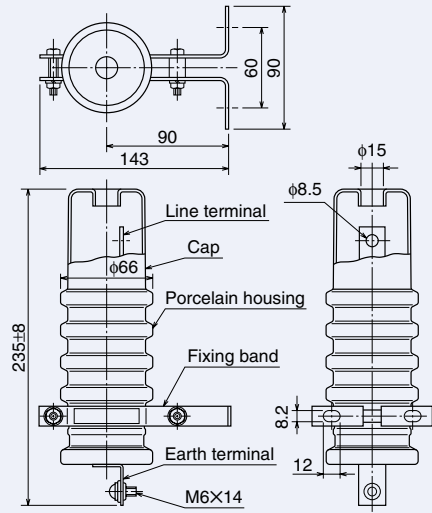


Fig. 40 Arrester (Type GL)

Table 11 Ratings of Arrester

Brand name	Otowa GL arrester	
Usage	Indoor	
Type name	GLI-3G	GLI-6G
Rated voltage (kV)	4.2	8.4
Applicable circuit voltage (kV)	3.3	6.6
AC discharge starting voltage (kV crest)	6.3	12.6
Impulse discharge starting voltage (kV peak)	17	33
Official discharge current (A)	2500	2500
Mass (kg)	1.2	1.3

Warning
Disconnect wiring to perform withstand voltage test.

■ Arresters (for 12kV, 24kV) Sold Separately

If information on the arrester of this class is necessary, please consult your dealer.

■ Surge absorbing capacitor (CR suppressor) Sold Separately

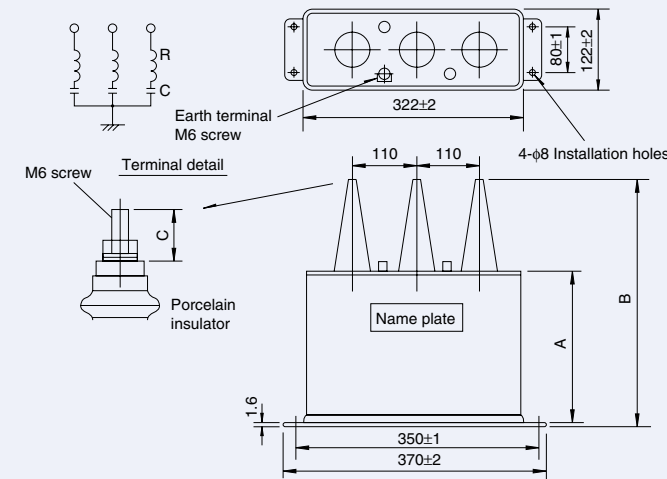


Fig. 42-1 Type CR-3 and CR-6

Table 13 Ratings of CR suppressor

Type name	CR-3	CR-6	CR-12
Applicable circuit voltage (kV)	3.3	6.6	11
Dimensions	A	150	200
	B	237	337
	C	16	20
Rated capacitance (F)	0.05/φ	0.05/φ	0.1/φ
Series resistance (Ω)	100/φ	100/φ	100/φ
Mass (kg)	8.5	10	31
Figure	Fig. 42-1		Fig. 42-2

Warning
1. Remove connecting wires of CR suppressor during withstand voltage testing.
2. Note: Separately consultation is required when high electric strength performance is necessary.

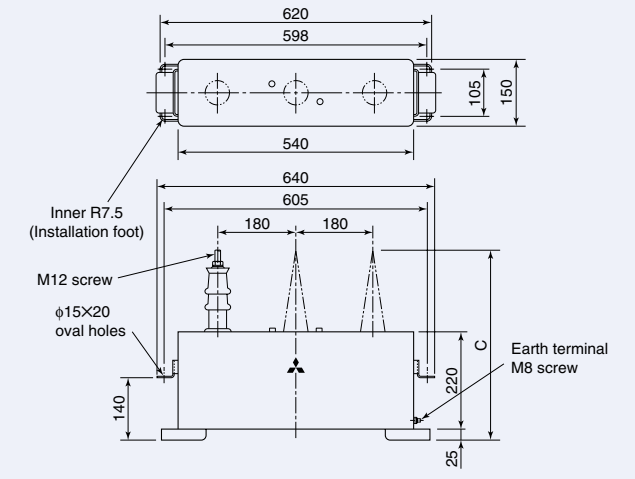


Fig. 42-2 Type CR-12

3. Application to circuit where higher harmonics wave is included
The effect value of a synthetic current including the higher harmonics wave should be below the value of the table below (1.3 times the ratings value) when used for such a circuit.

Type name	CR-3	CR-6	CR-12
Permissible value of synthetic current including higher harmonics wave	0.05Arms /phase	0.1Arms /phase	0.37Arms /phase

4. Attention on withstand voltage test
When the capacity of the transformer of the withstand voltage test is small, it is not likely to be able to test by a lot of currents' flowing too much.
When the withstand voltage test is executed with the CR suppressor installed in the panel, it is necessary to cut off the CR suppressor from a main circuit.

Permissible testing voltage of CR suppressor

Rated testing voltage	AC	Type name		CR-3	CR-6	CR-12
		Between T-T	1 minute	6.6kV	13.2kV	24kV
		Between T-C	7.6kV	14.2kV	28kV	
	Between T-C	10 minutes	4.95kV	9.9kV	18kV	

T: Terminal, C: Case
5. Replacement recommendation service life
When 15 years have passed since it manufactured it.

■ Vacuum checker Sold Separately

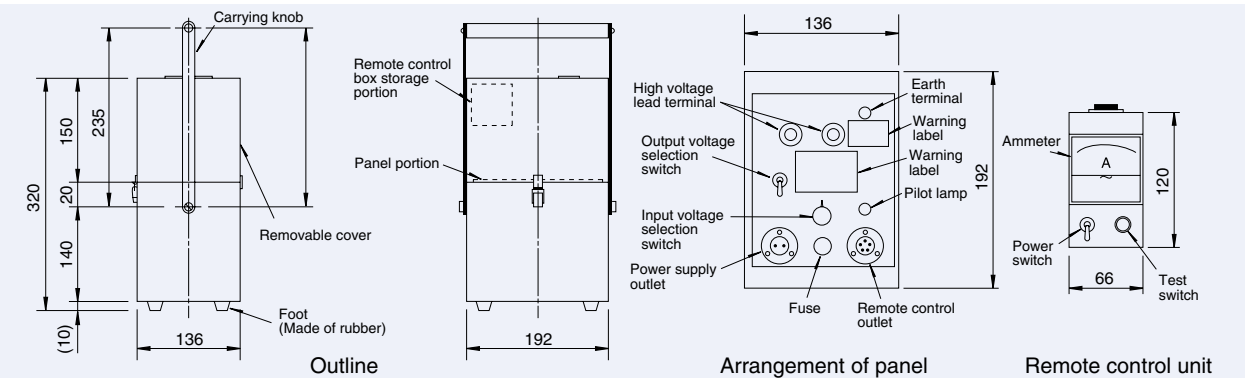


Table 14 Specifications of Vacuum Checker

Type name	Input voltage (V AC)	Output voltage (kV AC)
V-1C	100/110/120	20 (For 3/6/10-VPR)
V-2C	200/220/240	20 (For 3/6/10-VPR)
V-3C	100/110/120/200/220/240	30 (For 20-VPR-25C and 20-VPR-16D/25D)

Fig. 43 Vacuum checker

■ Lifter **Sold Separately**

For 3/6-VPR-20C/25C 600~1250A

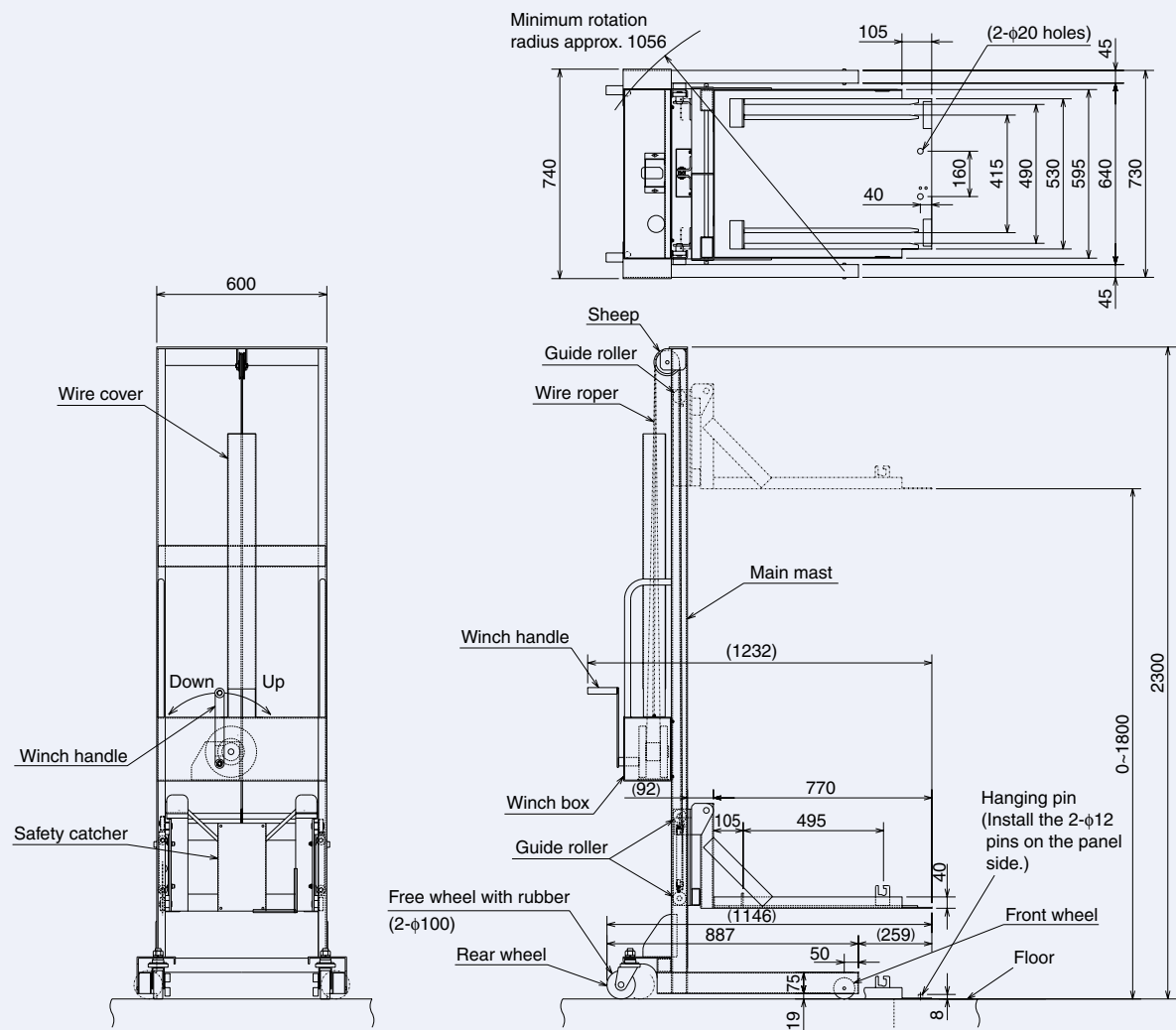


Fig. 44 Type F-2C lifter

■ Lifter **Sold Separately**

For 3/6-VPR-20C/25C 1600,2000A, 10-VPR-25C, 3/6/10-VPR-32C/40C

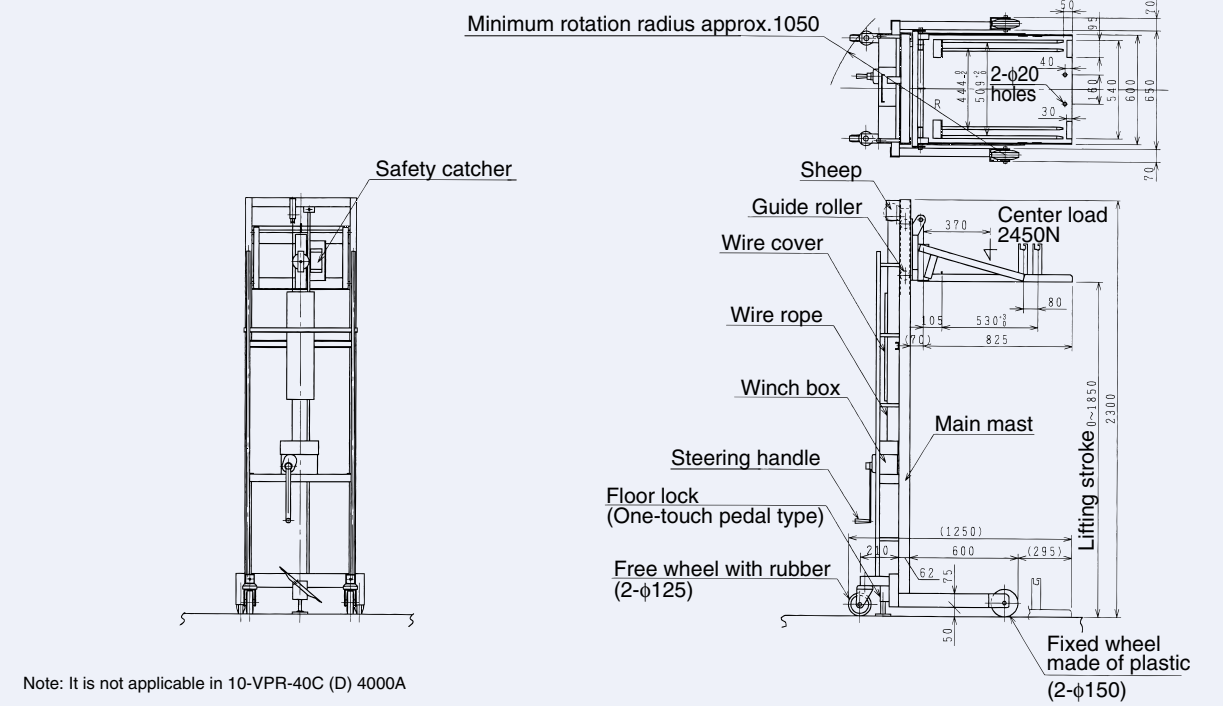


Fig. 45 Type F-3C lifter

For 20-VPR-25C

※If information on the lifter for 20-VPR-16D/25D is necessary, please consult your dealer.

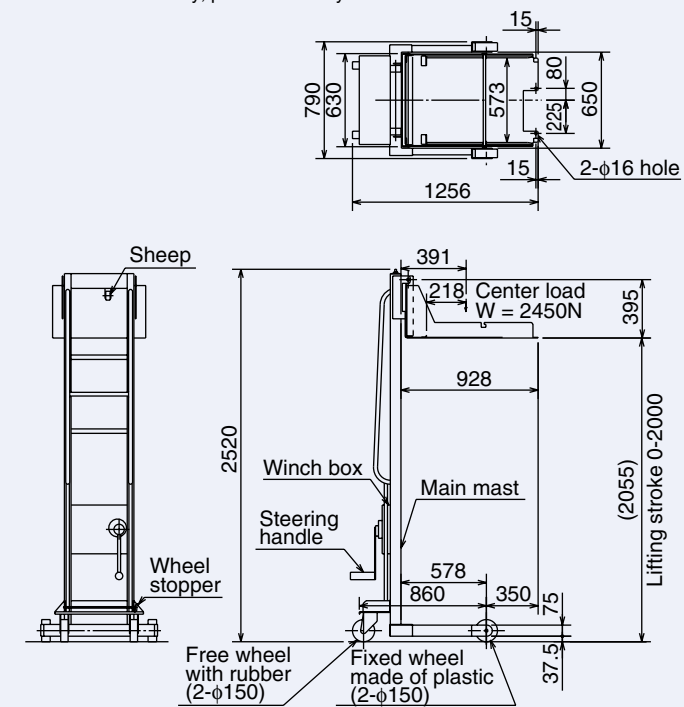


Fig. 46 Lifter for 20-VPR-25C

Operation and control circuit

Electrical closing and tripping operation

Fig. 47, shows the circuit breaker in an opened circuit state and with the closing spring in a discharged state.

●Closing Operation

①When the power supply is connected, auxiliary relay 52Y is excited via the limit switch LS2 and the contact of auxiliary relay 52Y closes which activates the motor via LS2 and the contact of auxiliary relay 52Y starts to charge the closing spring. When the closing spring is completely charged, limit switch LS2 opens and the motor stops and the limit switch LS1 closes (the closed control circuit is formed).

②By closing the closing command switch CS1 in this state, the closing coil [CC] is excited and the closing latch at the operating mechanism is released and the circuit breaker closes by the charged closed spring energy. The discharging of the closed spring, LS2 is closed and LS1 is opened.

③By the limit switch LS2 closing, the motor activates and performs charging of the closing spring and to prepare for the next closing operation.

④When the circuit breaker is closed, circuit breaker auxiliary contact 52b opens and shuts off excitation of closing coil [CC]. At the same time auxiliary contact 52a closes and forms a trip circuit of the voltage tripping coil [STC] and at the same time excites the auxiliary relay (for anti-pumping prevention) [52X].

●Tripping Operation

①By closing the trip command switch CS2, the voltage tripping coil [STC] is excited and engagement of tripping latch at the operating mechanism is released and the circuit breaker opens.

●Trip Free Operation

If the closing command and trip command are given simultaneously when the circuit breaker is in an opened state and the closing spring is in a charged state (closing preparation):

①Operation takes place in order of ②, ③ and ④ of the electrical (closing) operation. Then because the trip command is being continued, operation ① of the electrical (trip) operation takes place.

②Electrical (circuit closing) operation ① is returned but since the auxiliary relay [52X] is continuously being excited, closed circuit is not formed by contact 52Xb and the circuit remains in the opened state.

③When performing the closing operation, it is necessary to release the closing command by closing command switch CS1 and restore auxiliary relay [52X].

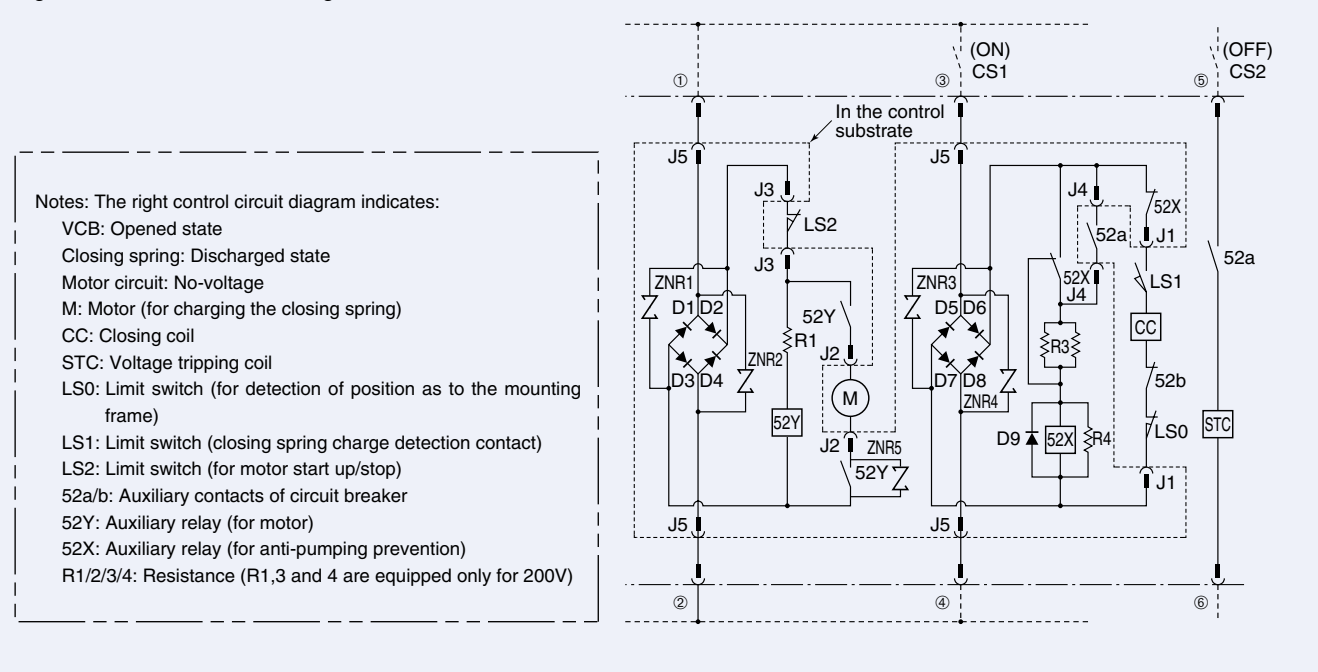
If the closing command and trip command are given simultaneously when the circuit breaker is in a closed state and the closing spring is in a charged state (closing preparation):

①Since the auxiliary contact 52b is opened, closed control circuit is not formed and electric (trip) operation ① occurs.

②Electrical (circuit closing) operation ② is returned but since the auxiliary relay [52X] is continuously being excited, closed circuit is not formed by contact 52Xb and the circuit remains in the opened state.

③When performing the closing operation, it is necessary to release the closing command by closing command switch CS1 and restore auxiliary relay [52X].

Fig. 47 Basic control circuit diagram



Operation and control voltages (currents)

●Table 15 Operation and control voltage fluctuation range

Classification	Standard	JEC-2300	IEC 60056 and IEC 62271-100
	Closing operation/control voltage	DC	75~125%
AC		85~110%	
Tripping control voltage	DC	60~125%	70~110%
	AC		85~110%

●Table 16 Closing and tripping control current vs. current-flow time (see Fig. 48)

VCB type name	Control voltage (V)	DC (V)	
		100	
		I (A)	T (sec.)
3/6-VPR-20C/25C 600~1250A	Closing	2.4	0.05
	Tripping	2	0.03
3/6-VPR-20C/25C 1600A, 2000A 10-VPR-25C, 3/6/10-VPR-32C/40C	Closing	4	0.05
	Tripping	4	0.03
10-VPR-40C (D) 4000A	Closing	5	0.05
	Tripping	2.2	0.035
10-VPR-50C (D)	Closing	3.2	0.08
	Tripping	3.2	0.03
20-VPR-25C 1600A, 2000A	Closing	3.4	0.05
	Tripping	3.4	0.03
20-VPR-16D/25D 600~1250A	Closing	3.4	0.05
	Tripping	3	0.03
20-VPR-25D 2500A	Closing	4.5	0.05
	Tripping	4	0.03

●Table 17 Motor-operation control current vs. current-flow time (see Fig. 49)

VCB type name	Control voltage (V)	DC (V)			
		100			
		I ₁ (A)	I ₂ (A)	T ₁ (sec.)	T ₂ (sec.)
3/6-VPR-20C/25C 600~1250A		5	1	0.1	8
3/6-VPR-20C/25C 1600A, 2000A 10-VPR-25C, 3/6/10-VPR-32C/40C 20-VPR-25C 1600A, 2000A		5	1.8	0.1	5
10-VPR-40C (D) 4000A		11.5	6	0.1	6
10-VPR-50C (D)		6	1.5	0.1	10
20-VPR-16D/25D 600~1250A		4	1	0.1	6
20-VPR-25D 2500A		5	1	0.1	5

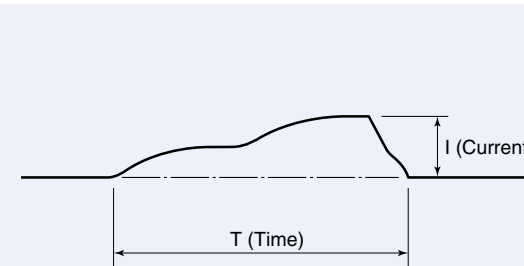


Fig. 48

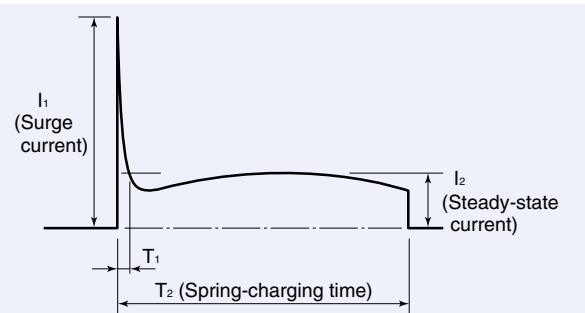


Fig. 49

Operation and control voltages (currents)

●Table 18 Burden VA of Closing Coil and Electrifying Time in Alternating Current (AC) Operation

Model name	Control Voltage (V)	
	Burden (VA)	Electrifying time (sec)
3/6-VPR-20C/25C 600~1250A	480	0.05
Excluding the above	680	0.05

●Table 19 Motor burden VA and Drive Time in Alternating Current (AC) Operation

Model name	Control Voltage (V)	
	Burden (VA)	Electrifying time (sec)
3/6-VPR-20C/25C 600~1250A	150	8
Excluding the above	180	6

●Table 20 VT Capacity, and Number of VCBs Operable at the same time in Alternating Current (AC) Operation

Model name	VT type name	
	PD-50/100HF (Notes1,3)	PD-200KFH (Notes2,3)
3/6-VPR-20C/25C 600~1250A	2 units	3 units
Excluding the above	1 unit	2 units

Notes: 1. For PD-50/100HF, all-time load of 50VA is considered in addition to VCB operation.
 2. For PD-200HF, all-time load of 200VA is considered in addition to VCB operation.
 3. The operation duty of O-1min-CO-3min-CO or O-3min-CO-3min-CO is considered. If operated more than this, keep enough interval.
 4. 10-VPR-40C(D) 4000A is not included in the above-mentioned table.

Applicable Standards

Special Environment and Application

●Operation Environment

VPR type vacuum circuit breaker conforms to the JEC-2300 and IEC 60056 or IEC 62271-100 (high voltage alternating current circuit breaker) and designed/manufactured as an indoor unit. Therefore, this circuit breaker should be operated under normal environments specified in table 21. Daily and periodical check and maintenance should be carried out enough according to VCB's instruction manuals. If it is necessary to operate this circuit breaker under special condition not listed in table 21, consult the manufacture.

●Instructions for Installation

If it is necessary to operate this circuit breaker in a dusty place, a place with corrosive gas, at a location exposed to abnormal vibration or impact, or in an outdoor panel environment, etc., special care must be paid to deal with items such as dust, corrosion, vibration, impact, water drops, condensation, and etc.

●Table 21

Normal operation condition
1. Altitude: 1,000 m or less
2. Ambient temp: -5°C ~ 40°C (The average temperature for 24 hours must not exceed 35°C.)
3. Relative humidity: 45% ~ 85% (Relative humidity; there must be no dew condensation.)
4. Degree of pollution: There must be no pollution. (As a guideline, the equivalent salt deposit density should be less than 0.01 mg/cm ²)
5. Poisonous gas etc.: There must be no corrosive gas.
6. Powder dust: There must be no excessive powder dust. (As a guideline, the powder dust should be less than 2 mg/m ³)

Application of Surge Protection Device

For the actual applications of vacuum circuit breaker, the surge protection standards for the load circuit so used, and actual application will be shown as table 22. Use the as table 22 of standard bellows as reference when selecting models.

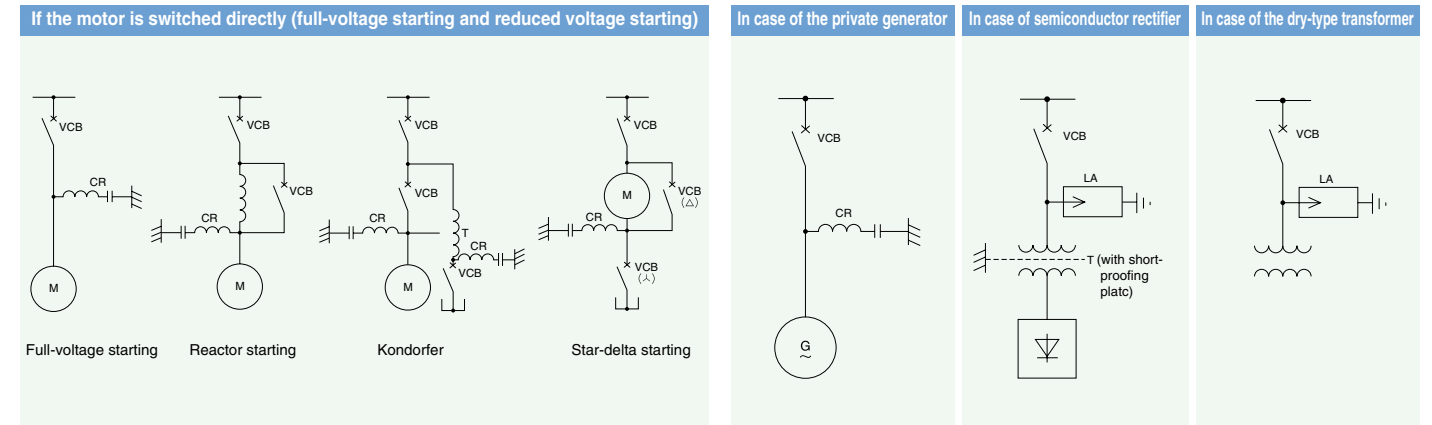
●Surge Protection Standards

●Table 22

VCB type	Load	Generator	Motor	Dry-type transformer	Oil transformer	Mitsubishi molded transformer and oil transformer (Note 4)	Phase-advance capacitor
		3/6/10-VPR-C 10-VPR-50C(D)	CR suppressor	CR suppressor	Lightning arrester (Note 1)	Not required (Note 1)	Not required (Notes 1,2) (10-VPR is not applicable)
	20-VPR-C/D	Not applicable	Not applicable	Ditto	Ditto	Not applicable	Not required
	Low-surge product (3/6-VPR-CG)	Not required	Not required (Note 3)	Not required	Ditto	Not required	Not required

Notes: 1. To directly switch the semiconductor rectifier unit (for example, electric power thyristor rectifier unit) in the secondary side of a transformer, use the transformer with contact-protective plate. Provide a general-purpose arrester in the primary side and the surge protective device such as a filter capacitor in the secondary side.
 2. Avoid interrupting the no-load excitation inrush current of molded transformer. When such currents must be interrupted, apply general-purpose arrester. To use any molded transformer made by other manufactures, consult the manufacturer. However, low-surge VCBs require no general-purpose arrester.
 3. For motors in applications where inching is the predominant switching duty (cranes, conveyor, etc.), use CR suppressor.
 4. Mitsubishi molded transformer and oil transformer are for 6kV with the impulse withstand voltage 60kV and for 3kV with the impulse withstand voltage 45kV.
 5. In case of kondorfer starting system, carry out the switching operation of the neutral point of the auto-transformer after the starting current become the stationary.

Fig.50 Surge Protection Standards (In case of general-purpose VCB)



Service Life and Application

The service life of vacuum circuit breaker is specified in the terms of the vacuum service life of vacuum switch tubes, electrical and mechanical service lives.

●Vacuum Service Life of Vacuum Switch Tubes (VST)

Since the vacuum circuit breaker maintains the switching characteristics and insulation characteristics by using high vacuum in VST, it is most important to maintain such vacuum. VST produced by our own original quality control is checked severely by full-lot testing, and therefore can be operated safely for a long time. It is also possible to check the vacuum in a simple way by voltage-resistance method in periodical maintenance. Portable type vacuum checkers are also available.

●Electrical Service Life of VST (see Table 23)

The electrical service life of VST is determined by the electrode consumption and the number of switchings. In VCB, such service life can be judged by the number of load switchings, because the electrode consumption is extremely small.

●Mechanical Service Life (see Table 23)

This can be determined by the operation counter provided in the vacuum circuit breaker (provided in all types as standard specification).

●Replace when having reached at the service life

When it reached mechanical life or 20 years have passed since it was manufactured, it is necessary to replace the VCB.

●Table 23 List of switching service lives

Model name	Item	Load switching service life (times)	Mechanical switching service life (times)
3-VPR 6-VPR 10-VPR 20-VPR		10,000	10,000

Remarks: 1. When the switching times reached the value of table 23, it is necessary to replace the VCBs.

●Table 24 List of capacities for which capacitor is applicable

Model name	Item	Max. switching capacity (kvar)	Multiple switching capacity (kvar)
3-VPR		2,500	1,500
6-VPR		5,000	3,000
10-VPR		7,000	4,000
20-VPR-16D		12,000	6,000
20-VPR-25C, 20-VPR-25D		17,000	8,500

Remarks: 1. The electrical service life for the max. switching capacity is about 2,000 times, and multiple switching capacity is 10,000 times.
 2. Applicable capacities with 6 ~ 13% series-connected reactor are shown.

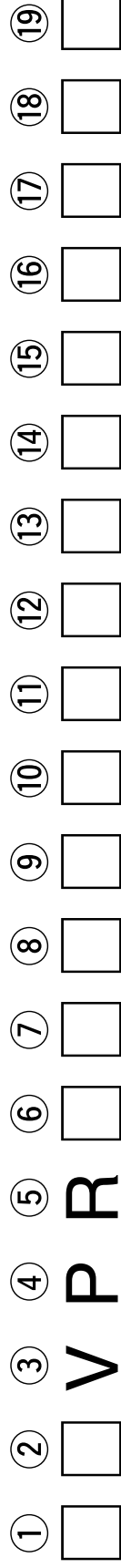
Polarity of Main Circuit Connection

It is needless to classify the polarity in the power/load sides in connecting the top and bottom main circuit terminals of the vacuum circuit breaker. (Electrical or mechanical performance is not changed whether it is connected to the power side or load side.)

ORDERING INFORMATION

1 0 V P R 2 5 C - 1 D 1 2 1 1 1 A 0 1

Type name code



Selection specification

Rated voltage	03 : 3.6kV 06 : 7.2kV 10 : 12kV 20 : 24kV
Type name	VPR
Rated short-circuit breaking current	20 : 20kA 25 : 25kA 32 : 31.5kA 40 : 40kA 50 : 40/50kA
Series name	C D
VST selection	- : Standard G : Low surge
Standard met	J : JEC I : IEC
Mounting configuration	L : Fixed type mounting P : With out frame CW class C : With CW class D : With PW class G : With MW class
Rated current	06 : 600/630A 12 : 1200/1250A 16 : 1600A 20 : 2000A 25 : 2500A 30 : 3000/3150A 40 : 4000A
Closing operation/control voltage	1 : DC100/110V 2 : DC200/220V 7 : DC24V 8 : DC48V 5 : AC 100/110V 6 : AC 200/220V
Tripping control voltage(STC)	3 : AC 100/110V with CTD 4 : AC 200/220V with CTD
Closing spring charged indication switch	0 : None 1 : With 1C
Auxiliary switch	0 : Standard S : With contact for small current
Secondary connector	[Standard] A : Without interlock (Option) B : With interlock (Option) C : Automatic self-aligning *Code B and C cannot be selected for fixed type.
Position switch	0 : None 1 : 1 unit (2C) 2 : 2 units (4C)

Specification list

3	VPR	20	C	-	J,I	L P, C, D, G	06, 12 16, 20	1 2 3 4 7 8	0 1 2	A B C	0 : Standard S : With contact for small current	03 : 3.6kV 06 : 7.2kV 10 : 12kV 20 : 24kV
6	VPR	25	C(S) C	-	J,I	L P, C, D, G	06, 12 16, 20 25, 30	1 2 3 4 7 8	0 1 2	A B C	0 : Standard S : With contact for small current	03 : 3.6kV 06 : 7.2kV 10 : 12kV 20 : 24kV
10	VPR	32	C	-	J,I	L P, C, D, G	06, 12 16, 20 25, 30	1 2 3 4 7 8	0 1 2	A B C	0 : Standard S : With contact for small current	03 : 3.6kV 06 : 7.2kV 10 : 12kV 20 : 24kV
20	VPR	40	C(D) C(D)	-	J,I	L P, C, D, G	06, 12 16, 20 25, 30	1 2 3 4 7 8	0 1 2	A B	0 : Standard S : With contact for small current	03 : 3.6kV 06 : 7.2kV 10 : 12kV 20 : 24kV



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 **Safety Warning**

To ensure proper use of the products listed in this catalog,
please be sure to read the instruction manual prior to use.