



Changes for the Better

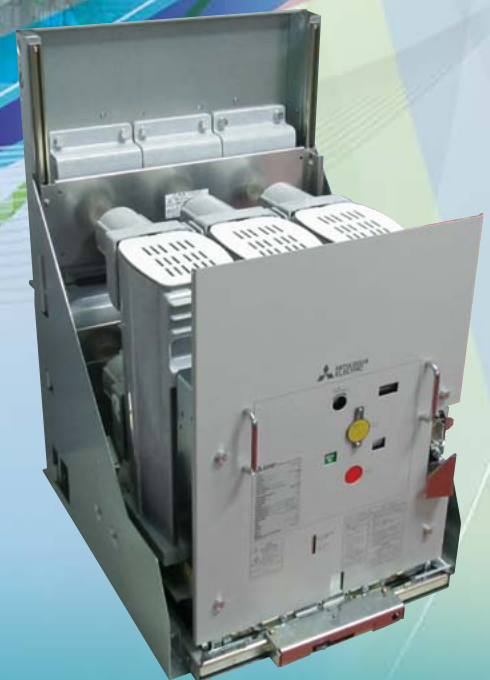
for a greener tomorrow



VPR Series Vacuum Circuit Breakers 10-VPR-D



Safety & Quality



High Levels of Reliability and Safety Achieved Through Use of the Latest Technologies Vacuum Circuit Breakers Designed for the Future with Enhanced Environmental Measures and Maintenance Features.

The All-new 10-VPR-D Series

Outstanding Reliability

- Incorporates Mitsubishi Electric vacuum interrupter technology, realizing a more compact vacuum interrupter (VI) 16% smaller than in the previous type* and high reliability (class E2).
- Self-cooling vacuum circuit breakers (VCBs) that do not require a fan to be mounted on the panel. Available in a wide range, from rated current of 600 to 3,150A.
- Compliant with IEC 62271-100-2012 and has passed type tests for classes M2, E2 and C2, which represent the highest levels of quality.

*The VI in 10-VPR-32D (1,250A).

High-level Safety

- Exposure of live parts in the main circuit has been minimized even in VCBs with a 3,150A rating. This enhances safety through prevention of potential hazards such as short circuits caused by intrusion of small animals.

Simple Maintenance

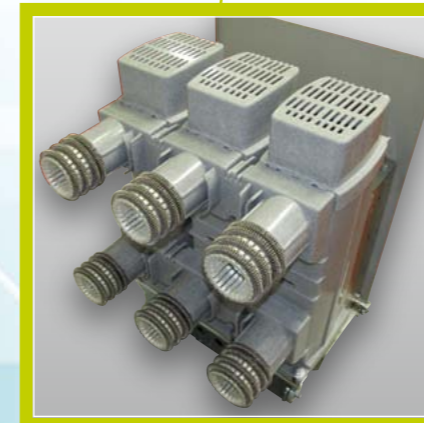
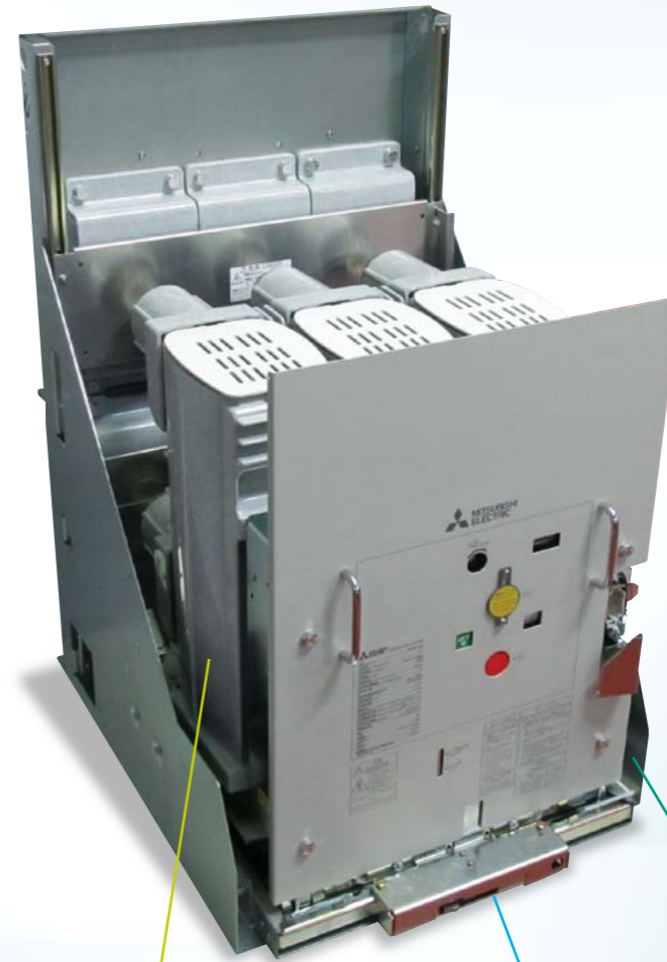
- The mechanical parts are coated with a long-life grease that contributes to the prevention of oxidation degradation and oilless bearings has been adopted for the bearing section of latch, thus extending the lubrication cycle to mechanical parts from three to six years and reducing the time required for maintenance.
- Includes a new withdrawable with door closed* (in addition to the conventional lever-based insert/draw-out mechanism) with cam-slide mechanism that reduces operating effort, saves time and enhances VCB safety.

*Mechanism used to insert/draw-out the circuit breaker from the external panel based on IEC 62271-200 switchgear standards.

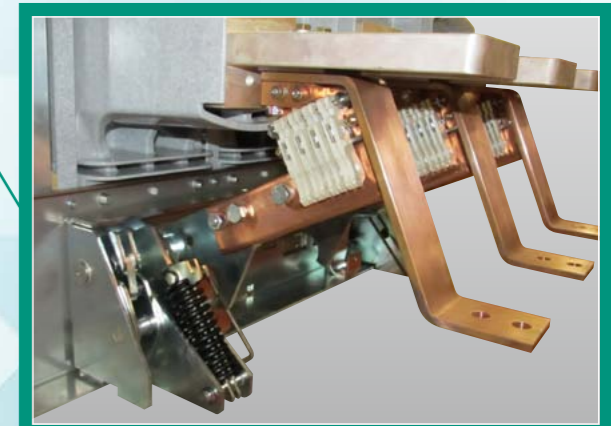
- Enhanced options including additional auxiliary switch and earthing switch.
- VCB with the rated normal current up to 3,150A is transported together with a panel by shipping clamps.
- Compatibility with mounting frame of previous 10-VPR-C Series (positions of mounting holes, terminals and partitions are the same).

Environmental Measures

- No use of the six hazardous substances (mercury, cadmium, lead, hexavalent chromium, PBB and PBDE), a measure that exceeds the requirements of RoHS standards. One example is use of a rust-proofing treatment for small parts such as pins and screws that is free of hexavalent chromium, a substance known to contaminate soil.
- Marking of main resin materials to facilitate recycling.



Minimizing exposure to the live part of a main circuit



Earthing switch



Withdrawable with door closed (Type-M)

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10-VPR-D

1. VCB Structure

- Through use of thermal fluid analysis, we have realized efficient release of heat to the cylinder-shaped insulation frame covering the VCB main circuit part, enabling a self-cooling mechanism up to a rated current of 3,150A.
- Compound insulation of insulated parts and air has been optimized through analysis and testing, resulting in a basic impulse level (BIL) up to 95kV, yet at a size equivalent to the previous 10-VPR-C Series.
- Materials with superior tracking resistance have been adopted and a cylindrical shape realized through stress analysis of the insulation frame and cutting-edge molding technology.
- Improved safety through insulation of live parts to prevent short circuits caused by intrusion of small animals.

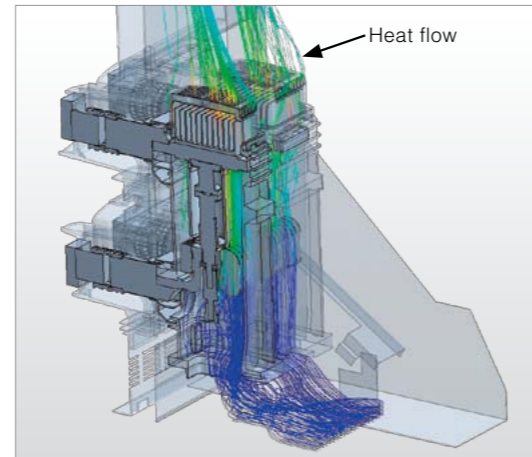


Fig.1 Example of thermal fluid analysis.

2. Vacuum Interrupter (VI)

- VIs with even higher reliability through utilization of computer-aided engineering (CAE) technology and backed by record of manufacturing 3.5 million*1 VIs in over 40 years of manufacturing experience that has seen us capture the top share of the market in Japan.
- In addition to adopting spiral contacts, improvements in contact materials, and tests utilizing electromagnetic analysis and arc behavior observations have realized a 16% size reduction compared to the VI in the previous 10-VPR-32D type.

*1 As of 2012

Optical Observation for Arc Behavior

Arc behavior was observed via a high-speed camera at the time of interruption between the fixed and moving contacts (see Fig. 4).

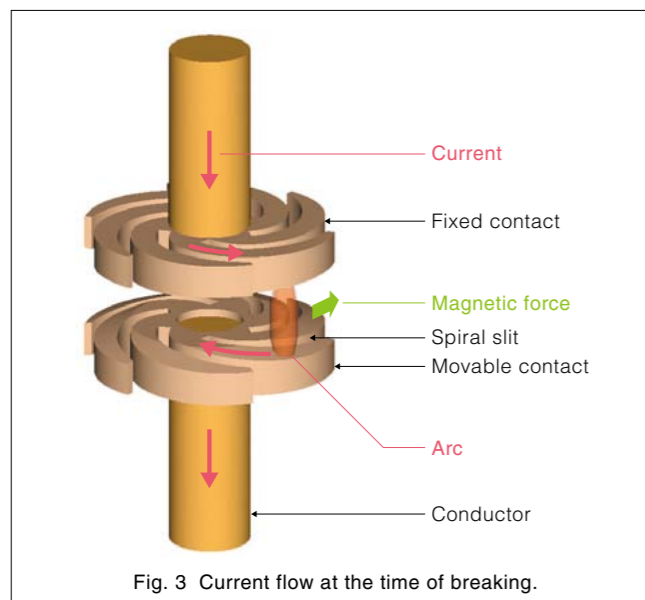


Fig. 3 Current flow at the time of breaking.

Current flows along the spiral electrode causing a radial magnetic field which generates an electromagnetic force circumferentially towards the contacts. This results in arcs that rotate circumferentially on the contact surface.

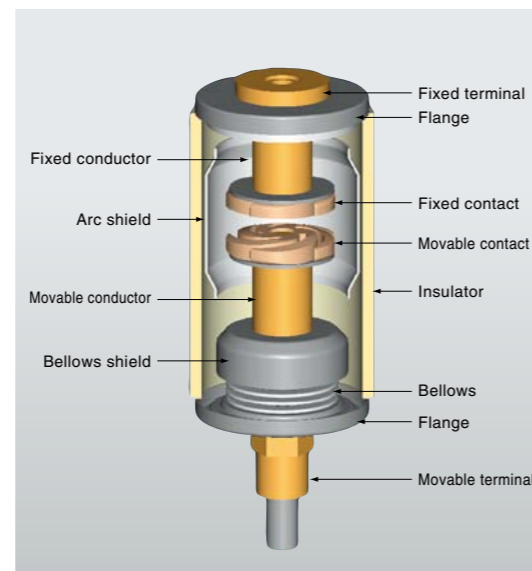


Fig. 2 Three-dimensional model of a VI.

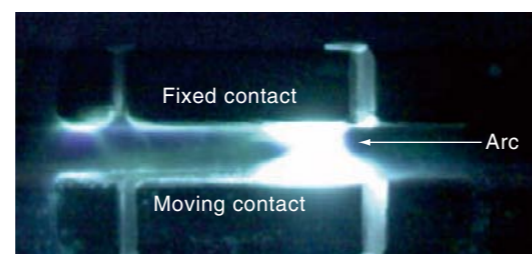


Fig. 4 Observation of arc behavior in an internal VI.

3. Operating Mechanism

- Greater performance reliability and extension of the lubrication cycle from three to six years through measures for the operating mechanism such as minimizing the number of parts, reducing the number of moving parts, adopting oilless bearings and use of a long-life grease.
- More reliable distribution of operating friction (which, due to the addition of a spring load, is difficult to verify/evaluate) has been achieved thanks to utilization of a three-dimensional mechanical simulation used to switch operation from the operating mechanism to a VI contact.

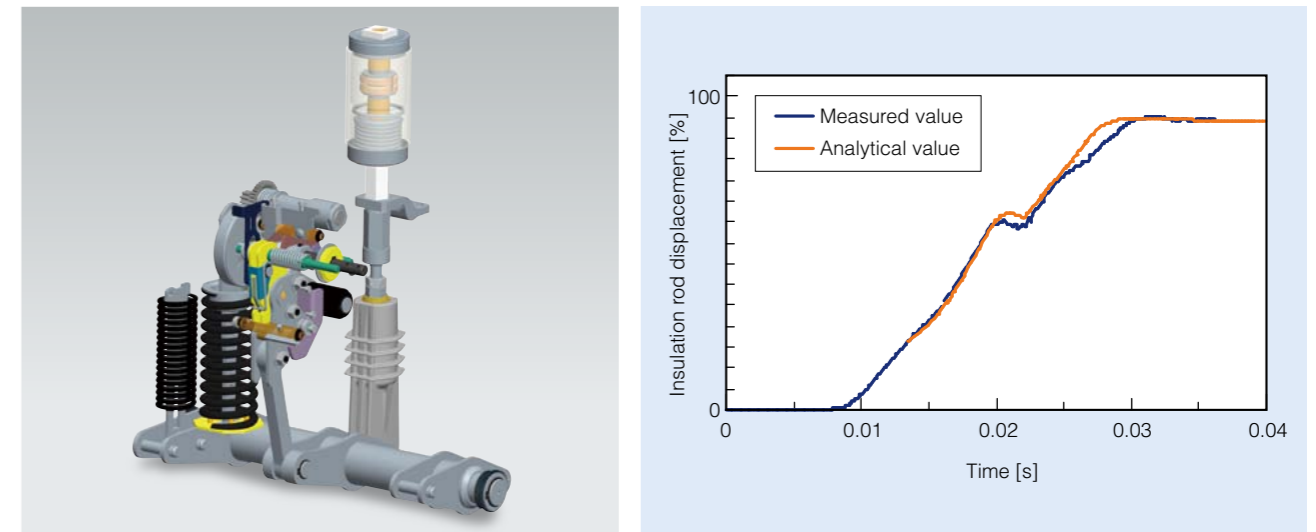


Fig. 5 Example of the three-dimensional mechanism simulation.

4. Withdrawable with Door Closed (Type-M) Operation Mechanism of VCB

- VCBs can be inserted in three simple steps: ① insert the insertion/draw-out handle, ② slide in the direction of the cross and ③ pull out the handle with the panel door closed. A cam-slide mechanism shortens the time required for insert/draw-out.

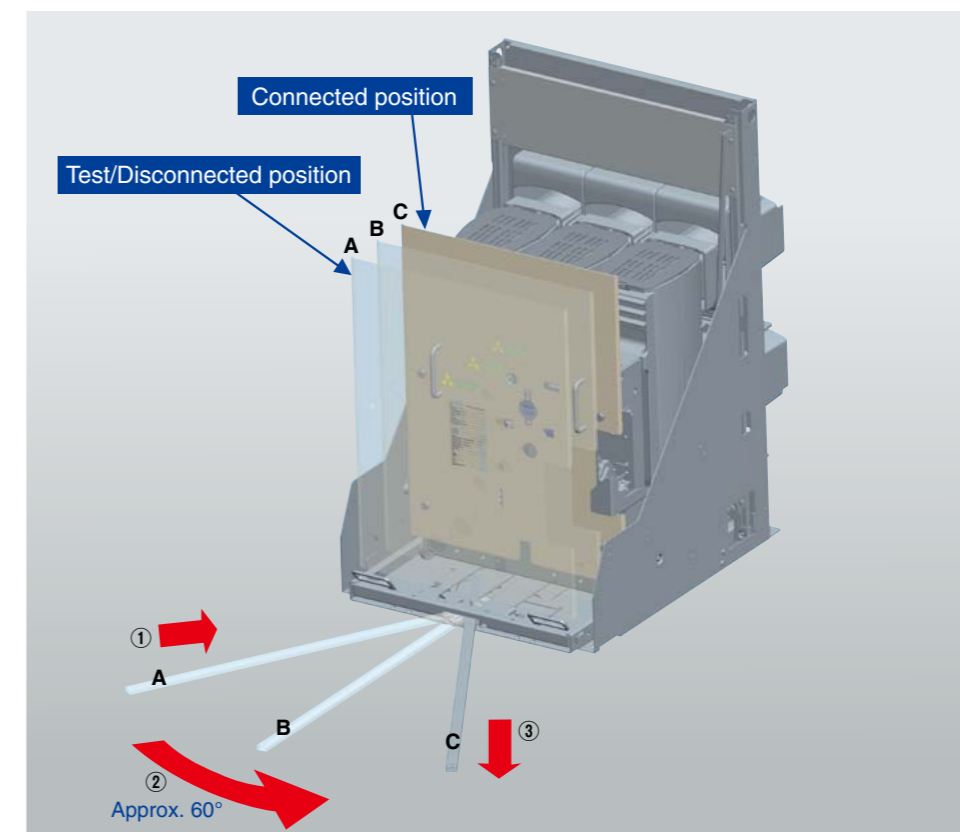


Fig. 6 Withdrawable with door closed (Type-M) operation mechanism.

Classification as for Mechanical Endurance (M1 and M2)

The IEC standards broadly divide the mechanical operating test into classes M1 and M2. At the control voltages shown in Table 1, class M1 requires the rated operation sequence to be performed 2,000 times in total while class M2 requires the rated operation sequence to be performed 10,000 times in total. At five times the actuating cycle of class M1, class M2 represents a highly reliable operation class.

Table 1 M1 and M2 operating sequence.

Sequence	Control voltage	Actuating cycle	
		M1	M2
C-O	85%	500	2,500
C-O	100%	500	2,500
C-O	110%	500	2,500
O-CO-C	100%	250	1,250

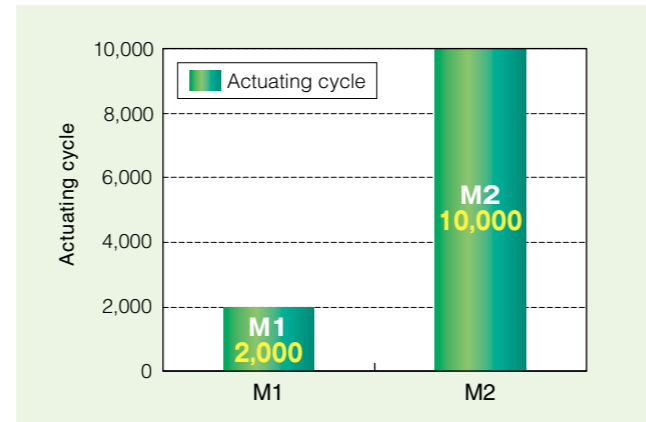


Fig. 7

Classification as for Electrical Endurance (E1 and E2)

Electrical endurance test that is specified in the IEC standards is broadly divided into classes E1 and E2. Class E2 has a longer breaking times than class E1, and is a highly reliable class due to huge energy arcs.

Table 2 E1 and E2 operating sequence.

Testing current (percentage of rated short-circuit breaking current)	Operating sequence	Number of operating sequence	
		E1	E2 ^(*)
10%	O-CO-CO	1	1
30%	O-CO-CO	1	1
60%	O	—	15
	O-CO-CO	1	15
100% (symmetry)	O-CO-CO	1	2
100% (asymmetry)	O-O-O	1	—

* Class E2 contains the number of breaking test of class E1.

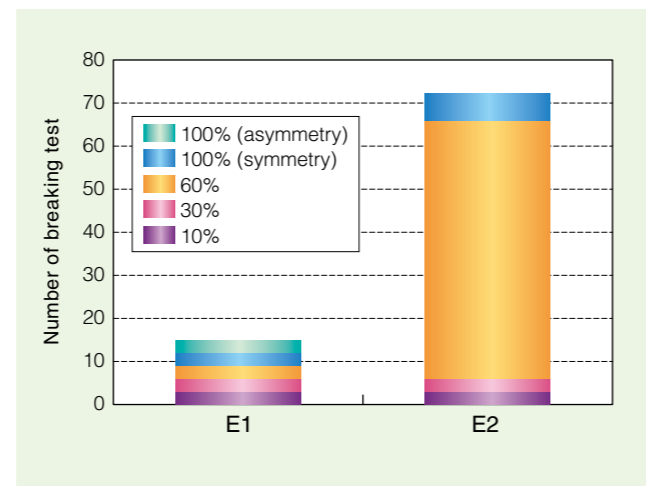


Fig. 8

Probability of Restrike during Capacitive Current Switching (C1 and C2)

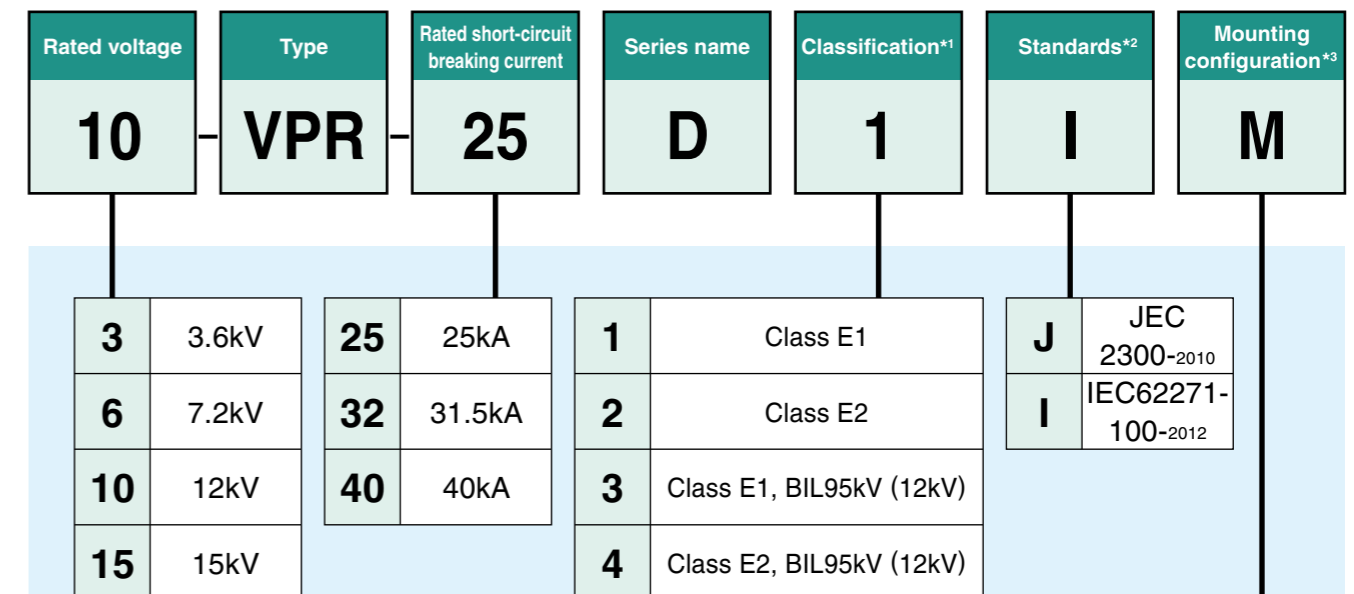
Performance in capacitive current switching test is broadly divided into classes C1 and C2; class C2 is highly reliable.

Class C1: Low probability of arc restrike at the time of capacitive current switching test (2 restrikes are allowed during O 24 operations and CO 24 operations).

Class C2: Very low probability of arc restrike at the time of capacitive current switching test (Restrikes is not allowed during O 24 operations and CO 24 operations).

*Arc restrike is the phenomenon that occurs when current flows later than a 1/4 of a cycle after zero when there are insufficiencies in the VCB arc extinction or in insulation stress between VCB poles for recovery voltage.

3/6/10/15-VPR-25D/32D/40D Series*3



Type	Description	High-voltage switchgear standards (IEC62271-200)
M	Withdrawable with door closed and mounting frame (class MW)	LSC2B-PM
C	Withdrawable with door open and mounting frame (class CW)	LSC1
D	Withdrawable with door open and mounting frame (class PW)	LSC2B-PI
G	Withdrawable with door open and mounting frame (class MW)	LSC2B-PM
L	Fixed type	LSC1

*1 Rated short-circuit breaking current of 40kA with E2 class cannot be manufactured. And basic impulse level (BIL) with rated voltage 12kV has BIL75kV (classification 1 or 2) and BIL95kV (classification 3 or 4).

*2 When selecting JEC 2300-2010 for standard, select class E1 for classification.

*3 Fixed (type-L) with rated current of 2,500A or 3,000/3,500A cannot be manufactured.

*4 Please refer to the JNEC-SI-0150 catalog for 3/6-VPR-25D type with a rating of 1,250A or lower for information regarding class E1, withdrawable (types C,D and G) and fixed type-L.

LSC1 : No partition
LSC2B-PI : Partitions in all compartments
LSC2B-PM : Partitions in all compartments

2. Ratings

■ Table 3 List of Ratings (JEC/IEC Standards).

Type	3-VPR-25D*6	3-VPR-32D	3-VPR-40D	6-VPR-25D*6	6-VPR-32D	6-VPR-40D	
Closing operating mechanism	Motor-spring charged mechanism						
Standards*1	JEC-2300-2010 / IEC 62271-100-2012						
Rated voltage (kV)	3.6			7.2			
Rated normal current (A)	600 / 630	600 / 630	600 / 630	600 / 630	600 / 630	600 / 630	
	1,200 / 1,250	1,200 / 1,250	1,200 / 1,250	1,200 / 1,250	1,200 / 1,250	1,200 / 1,250	
	1,600	1,600	1,600	1,600	1,600	1,600	
	2,000	2,000	2,000	2,000	2,000	2,000	
	2,500	2,500	2,500	2,500	2,500	2,500	
	3,000 / 3,150	3,000 / 3,150	3,000 / 3,150	3,000 / 3,150	3,000 / 3,150	3,000 / 3,150	
Rated frequency (Hz)	50 / 60						
Rated short-circuit breaking current (kA)	25	31.5	40	25	31.5	40	
Rated making current (kA)	JEC	63	80	100	63	80	100
	IEC	65	81.9	104	65	81.9	104
Rated short-time withstand current (kA)	JEC, 2s	25	31.5	40	25	31.5	40
	IEC, 3s	25	31.5	40	25	31.5	40
Rated opening time (s)	0.03						
Rated breaking time (cycles)	3						
Rated withstand voltage (kV)	Power frequency (JEC/IEC)	16 / 10			22 / 20		
	Lightning impulse(JEC/IEC)	45 / 40			60 / 60		
Type test class*2	Mechanical	M2					
	Electrical	E1, E2		E1	E1, E2		E1
	Small capacitive current switching	C2					
Rated operating sequence	JEC	O-1min-CO-3min-CO (A), CO-15s-CO (B), O-0.3s-CO-1min-CO (R)					
	IEC	O-3min-CO-3min-CO, CO-15s-CO, O-0.3s-CO-1min-CO					
No-load closing time (s)	0.1						
Closing operation/control current (A)*3	Motor	1.2 (motor charging time: 6s)					
	Control current (Closing coil)	3.5					
Tripping device	Shunt tripping coil (STC)						
Opening control current (A) (STC)*3	4						
Auxiliary switch	5a5b (10a10b)*4						
Operating counter (mechanical)	Standard equipment						
Mounting configuration*7	Fixed (type-L) / Withdrawable (types M, C, D and G)						
Mass (kg)*5	124 (600~1,250A)						
	152 (1,600A, 2,000A)						
	200 (2,500A~3,150A)						

*1 : JEC: Japanese standard JEC 2300-2010, IEC: International standards, IEC 62271-100-2012.

*2 : Type test class described in IEC62271-100 (see page 5)

*3 : Closing operation/control current and opening control current show the value of 110V DC.

*4 : Auxiliary switches are available up to 10a10b by adding 5a5b.

In addition, when selecting additional shunt tripping coil from optional accessories, the switches are 3a3b and will be 8a8b by adding 5a5b.

*5 : Mass of VCB units (including 12kg of the type-M) (excluding for options).

*6 : Refer to the catalog (JNEC-SL-0150) for class E1 of 25kA, standard draw-out operation (types C,D and G), and the fixed (type-L), for the rated current of 1,250A and lower of products rated at 3.6/7.2kV.

*7 : Fixed (type-L) is not compatible with the rated voltage 15kV BIL95kV and code B. In addition, withdrawable (type M) is not compatible with the mounting configuration of class CW.

■ Table 4 List of Ratings (JEC/IEC Standards).

Type	10-VPR-25D	10-VPR-32D	10-VPR-40D	15-VPR-25D	15-VPR-32D	15-VPR-40D	
Closing operating mechanism	Motor-spring charged mechanism						
Standards*1	JEC-2300-2010 / IEC 62271-100-2012			IEC 62271-100-2012			
Rated voltage (kV)	12			15			
Rated normal current (A)	600 / 630	600 / 630	600 / 630	600 / 630	600 / 630	600 / 630	
	1,200 / 1,250	1,200 / 1,250	1,200 / 1,250	1,200 / 1,250	1,200 / 1,250	1,200 / 1,250	
	1,600	1,600	1,600	1,600	1,600	1,600	
	2,000	2,000	2,000	2,000	2,000	2,000	
	2,500	2,500	2,500	2,500	2,500	2,500	
	3,000 / 3,150	3,000 / 3,150	3,000 / 3,150	3,000 / 3,150	3,000 / 3,150	3,000 / 3,150	
Rated frequency (Hz)	50 / 60						
Rated short-circuit breaking current (kA)	25	31.5	40	25	31.5	40	
Rated making current (kA)	JEC	63	80	100	63	80	100
	IEC	65	81.9	104	65	81.9	104
Rated short-time withstand current (kA)	JEC, 2s	25	31.5	40	25	31.5	40
	IEC, 3s	25	31.5	40	25	31.5	40
Rated opening time (s)	0.03						
Rated breaking time (cycles)	3						
Rated withstand voltage (kV)	Power frequency (JEC/IEC)	28 / 28			— / 36		
	Lightning impulse(JEC/IEC)	75 / 75, 95			— / 95		
Type test class*2	Mechanical	M2					
	Electrical	E1, E2		E1	E1, E2		E1
	Small capacitive current switching	C2					
Rated operating sequence	JEC	O-1min-CO-3min-CO (A), CO-15s-CO (B), O-0.3s-CO-1min-CO (R)					
	IEC	O-3min-CO-3min-CO, CO-15s-CO, O-0.3s-CO-1min-CO					
No-load closing time (s)	0.1						
Closing operation/control current (A)*3	Motor	1.2 (motor charging time: 6s)					
	Control current (Closing coil)	3.5					
Tripping device	Shunt tripping coil (STC)						
Opening control current (A) (STC)*3	4						
Auxiliary switch	5a5b (10a10b)*4						
Operating counter (mechanical)	Standard equipment						
Mounting configuration*7	Fixed (type-L) / Withdrawable (types M, C, D and G)						
Mass (kg)*5	124 (600~1,250A)						
	152 (1,600A, 2,000A)						
	200 (2,500A~3,150A)						

*1 : JEC: Japanese standard JEC 2300-2010, IEC: International standards, IEC 62271-100-2012.

*2 : Type test class described in IEC62271-100 (see page 5)

*3 : Closing operation/control current and opening control current show the value of 110V DC.

*4 : Auxiliary switches are available up to 10a10b by adding 5a5b.

In addition, when selecting additional shunt tripping coil from optional accessories, the switches are 3a3b and will be 8a8b by adding 5a5b.

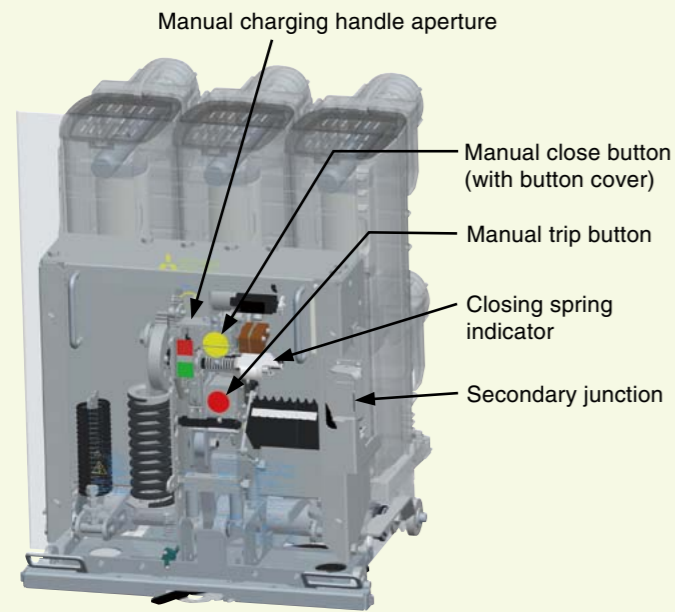
*5 : Mass of VCB units (including 12kg of the type-M) (excluding for options).

*6 : Refer to the catalog (JNEC-SL-0150) for class E1 of 25kA, standard draw-out operation (types C,D and G), and the fixed (type-L), for the rated current of 1,250A and lower of products rated at 3.6/7.2kV.

*7 : Fixed (type-L) is not compatible with the rated voltage 15kV BIL95kV and code B. In addition, withdrawable (type M) is not compatible with the mounting configuration of class CW.

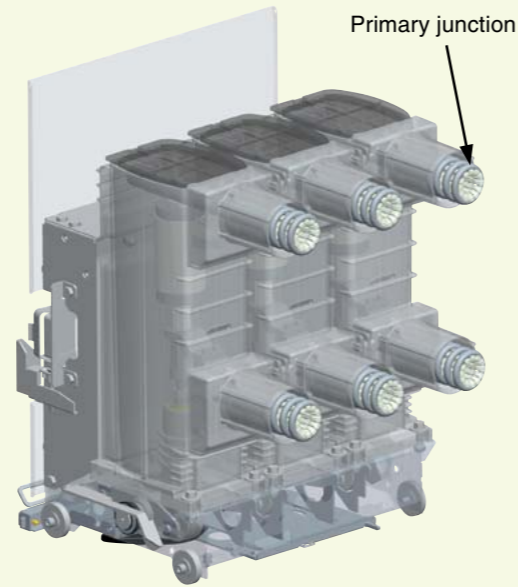
3. Description and Structure

VCB Configuration



Front view of VCB

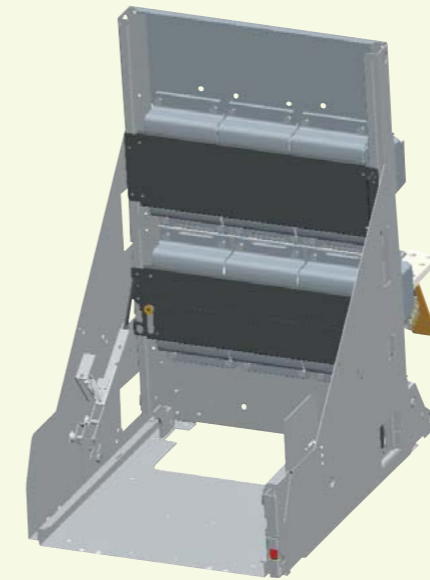
Fig. 9



Rear view of VCB

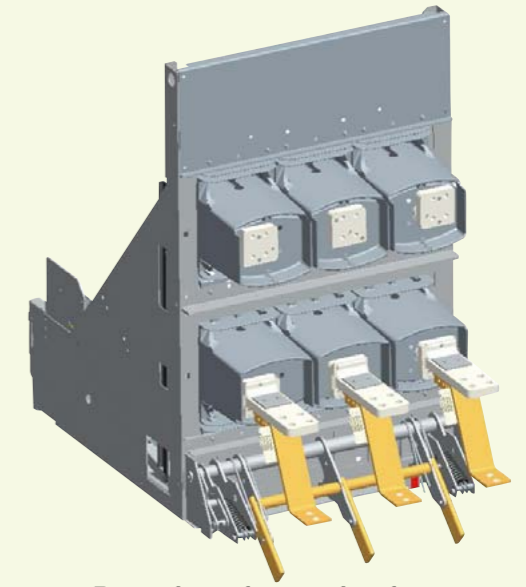
Fig. 10

Mounting Frame Configuration



Front view of mounting frame (with earthing switch)

Fig. 17



Rear view of mounting frame (with earthing switch)

Fig. 18

Closing spring charged indication switch (page 21)

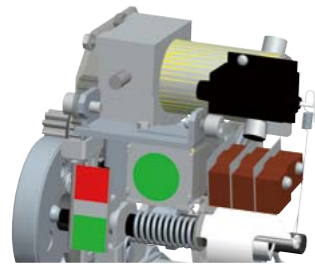


Fig. 11

Additional auxiliary switch (page 22)

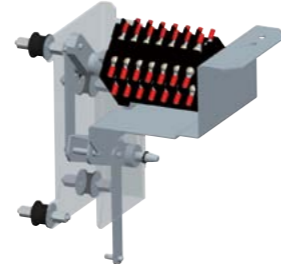


Fig. 12

Padlock device for close and trip button (page 22)



Fig. 19

Short-circuit capacity earthing (page 24)

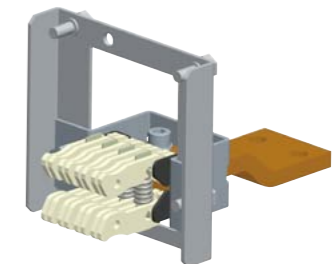


Fig. 20

Mechanical locking device (page 21)

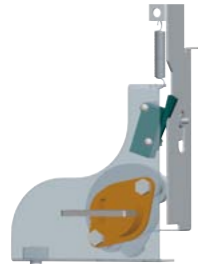


Fig. 13

Additional shunt tripping coil (page 22)



Fig. 14

Position switch (page 23)

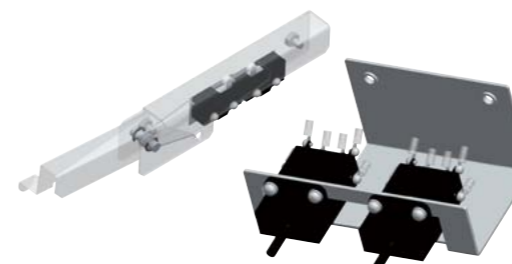
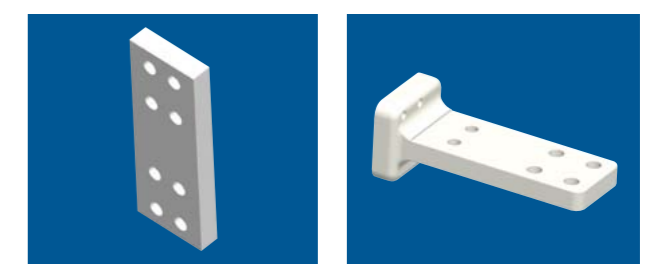


Fig. 21

Optional terminal (V: Vertical, H: Horizontal) (page 24)



(Vertical)

Fig. 22

(Horizontal)

Tripping coil disconnection monitoring (page 21)

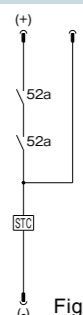


Fig. 15

Draw-out mechanism padlock device (page 22)



Fig. 16

Earthing switch (page 23)



Fig. 23

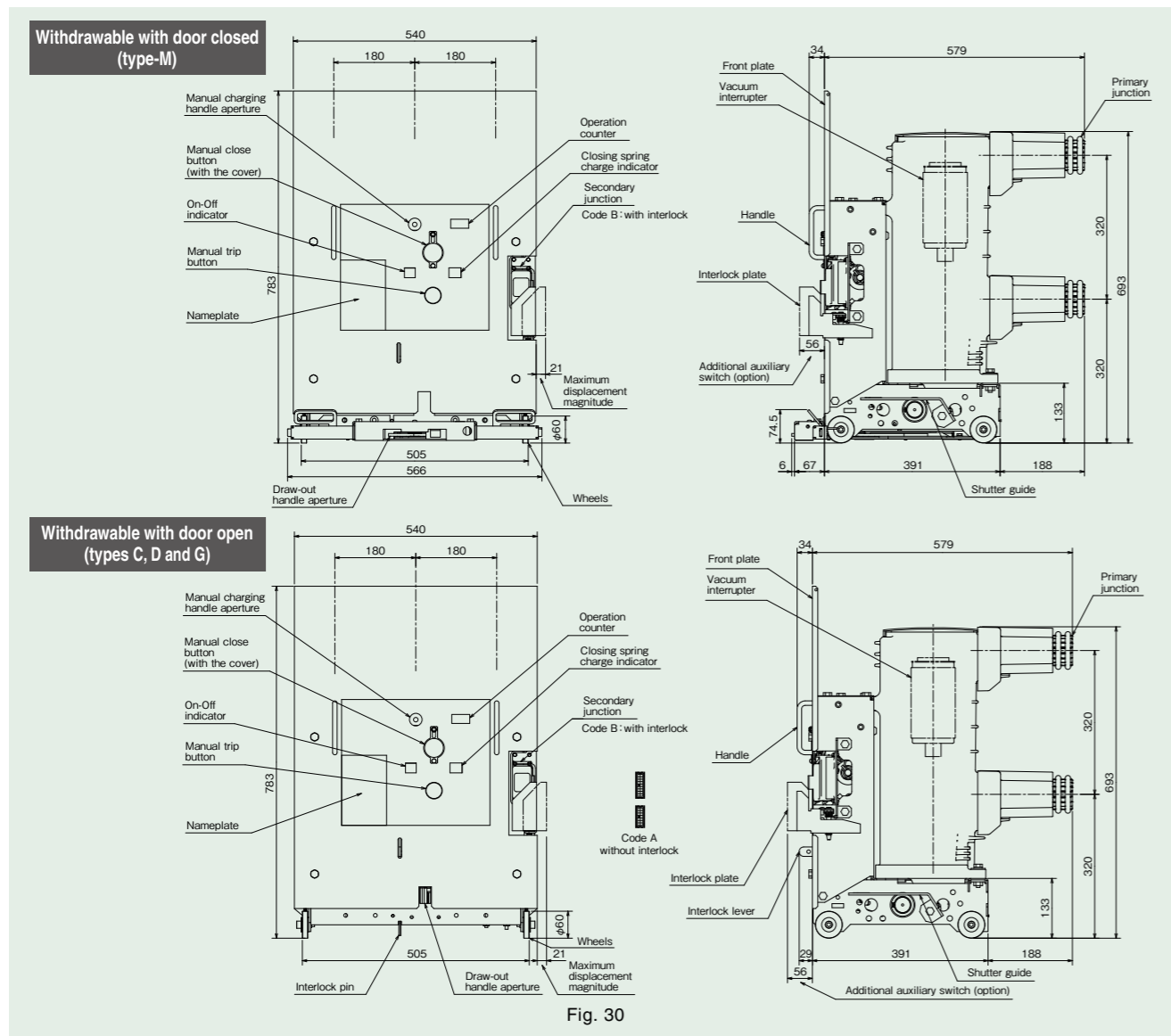
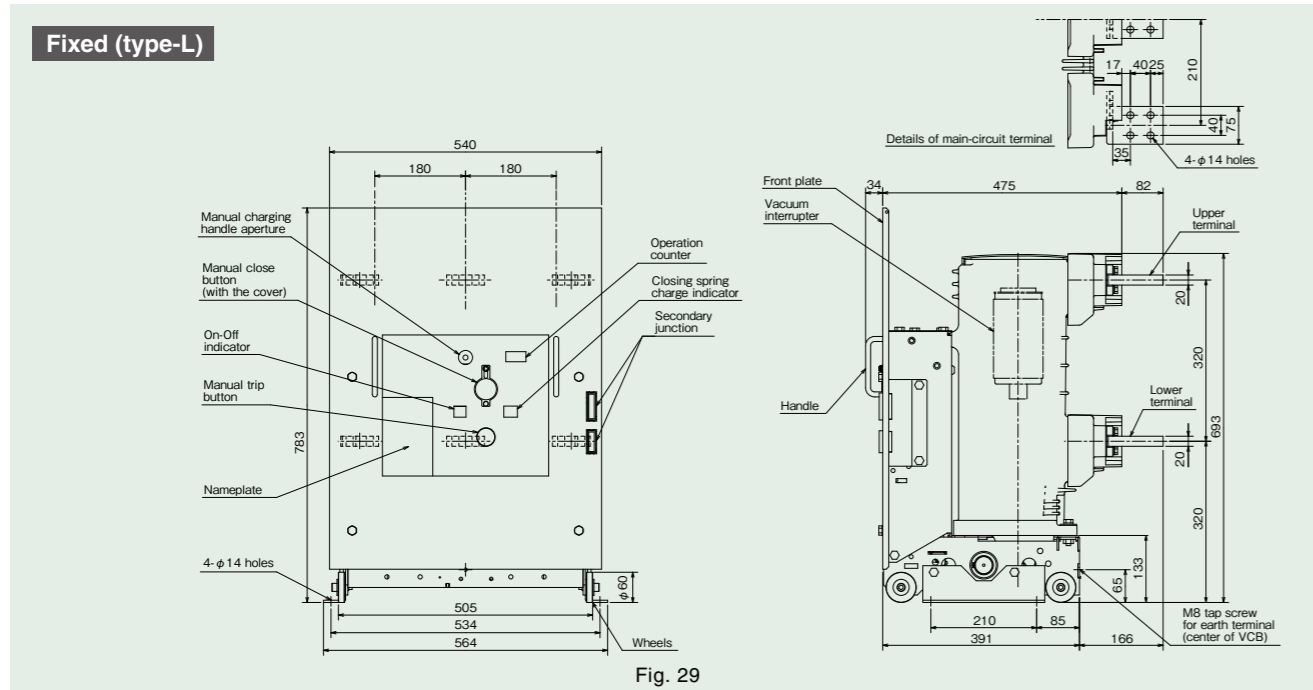
Shutter padlock device (page 24)



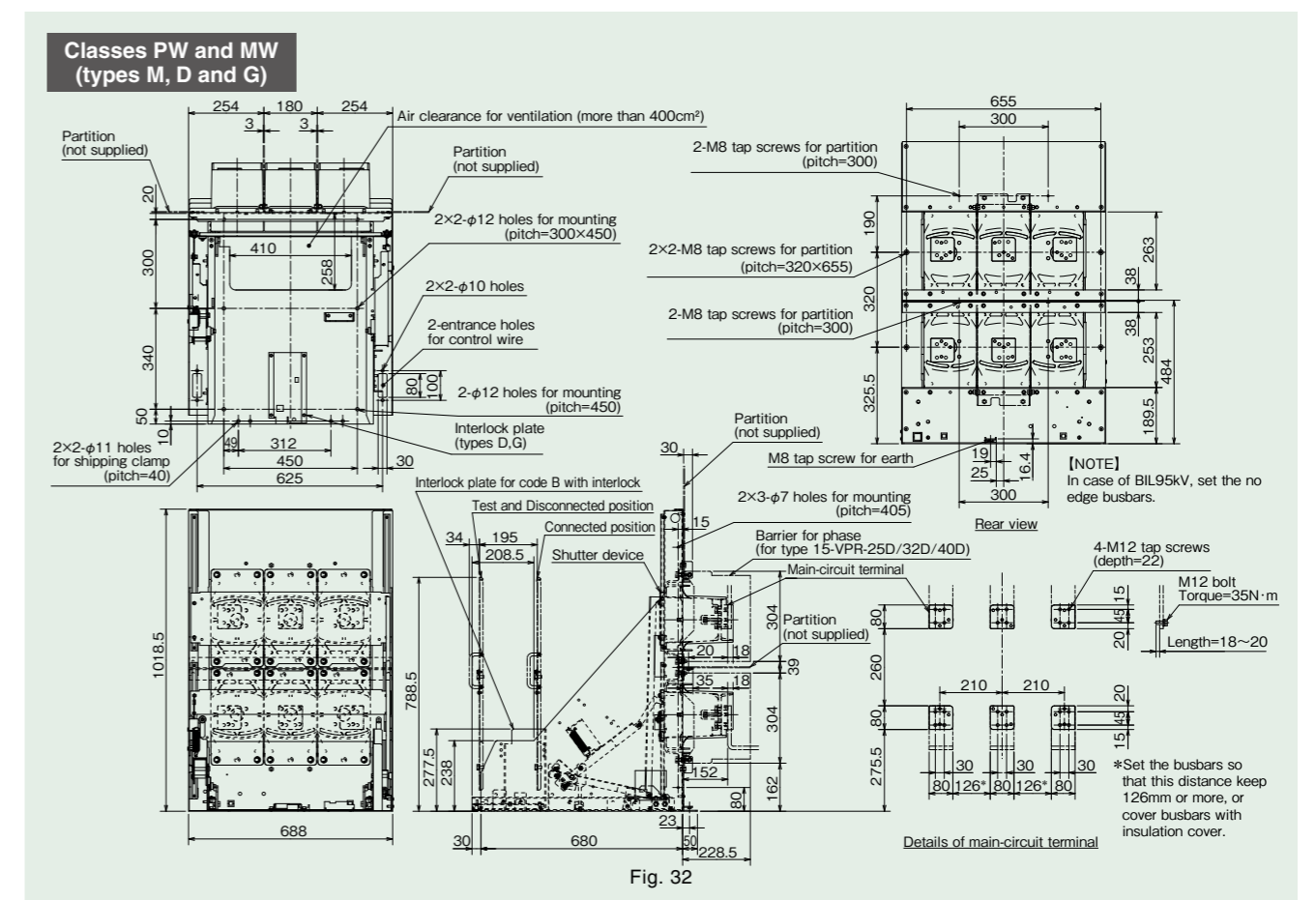
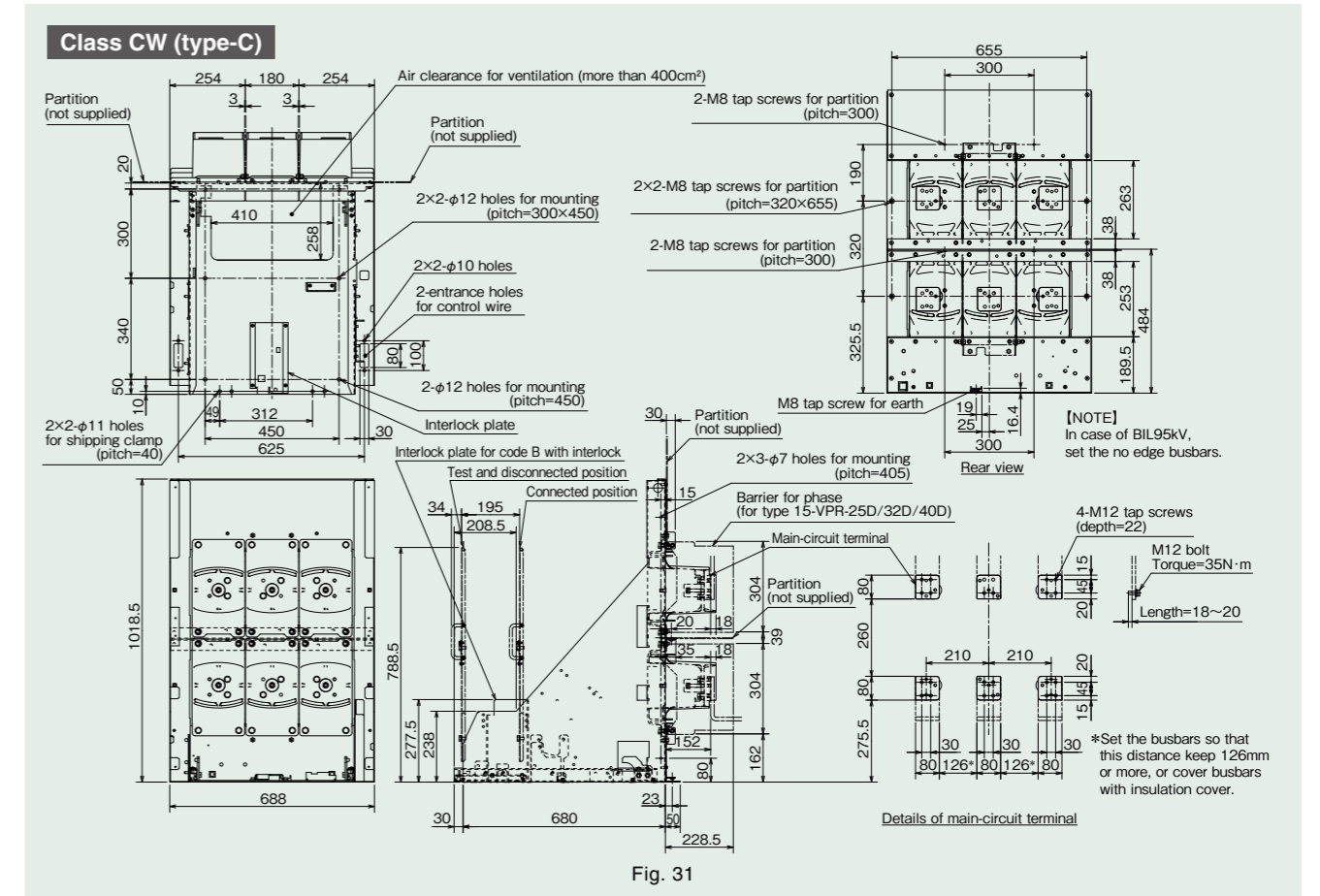
Fig. 24

4. External Dimensions (2)

1,600A, 2,000A Rating: External Dimensions (Circuit Breaker)

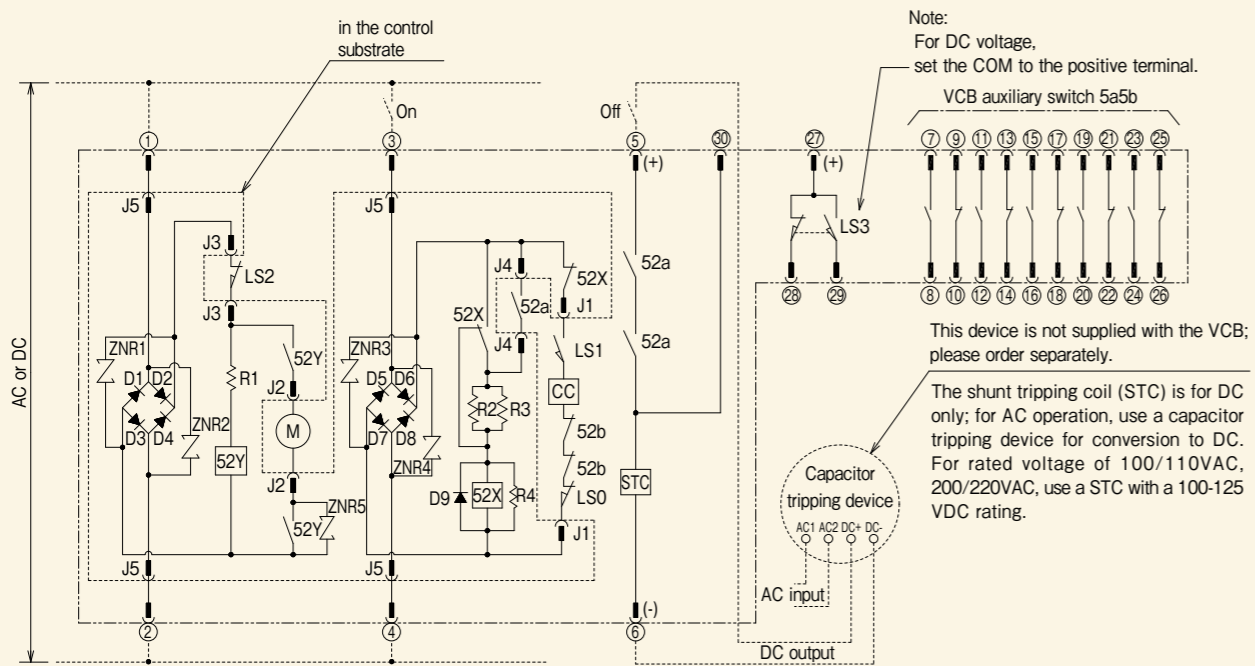


1,600A, 2,000A Rating: External Dimensions (Mounting Frame)



5. Connection Diagrams

Withdrawable: Standard Connection Diagram (Code A) Note: There is no LS0 in a fixed (type-L).



When the auxiliary switch has micro current specifications, terminals ⑦ ~ ⑱ (3a3b) are standard contacts and terminals ⑲ ~ ⑳ (2a2b) are contacts for micro current.

Note:
The following are VCB options:
the micro current specification auxiliary switch,
the tripping coil disconnection monitoring
(terminal No. 30),
the capacitor tripping device and LS3.

In the above wiring diagram;
Circuit breaker : Opened state
Closing spring : Discharged state
Motor circuit : No-voltage condition

- | | |
|--|---|
| M : Motor (for charging the closing spring) | LS0 : Limit switch (for detecting VCB's position) |
| CC : Closing coil | STC : Shunt tripping coil |
| 52Y : Auxiliary relays (for motor) | LS1 : Limit switch (for detecting the charging of the closing spring) |
| 52X : Auxiliary relays (for prevention of pumping) | LS2 : Limit switch (for starting up and stopping motor) |
| 52a/b : Auxiliary contacts for circuit breaker | LS3 : Limit switch (for closing spring charged indication) |
| | R1/2/3/4 : Resistor (R3 and R4 200/220V only) |

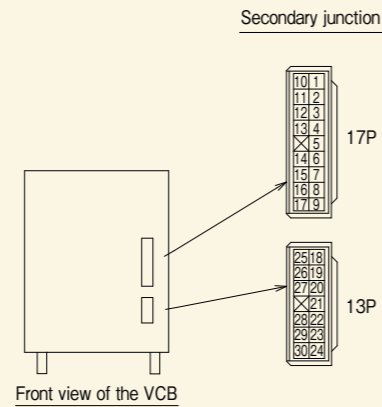
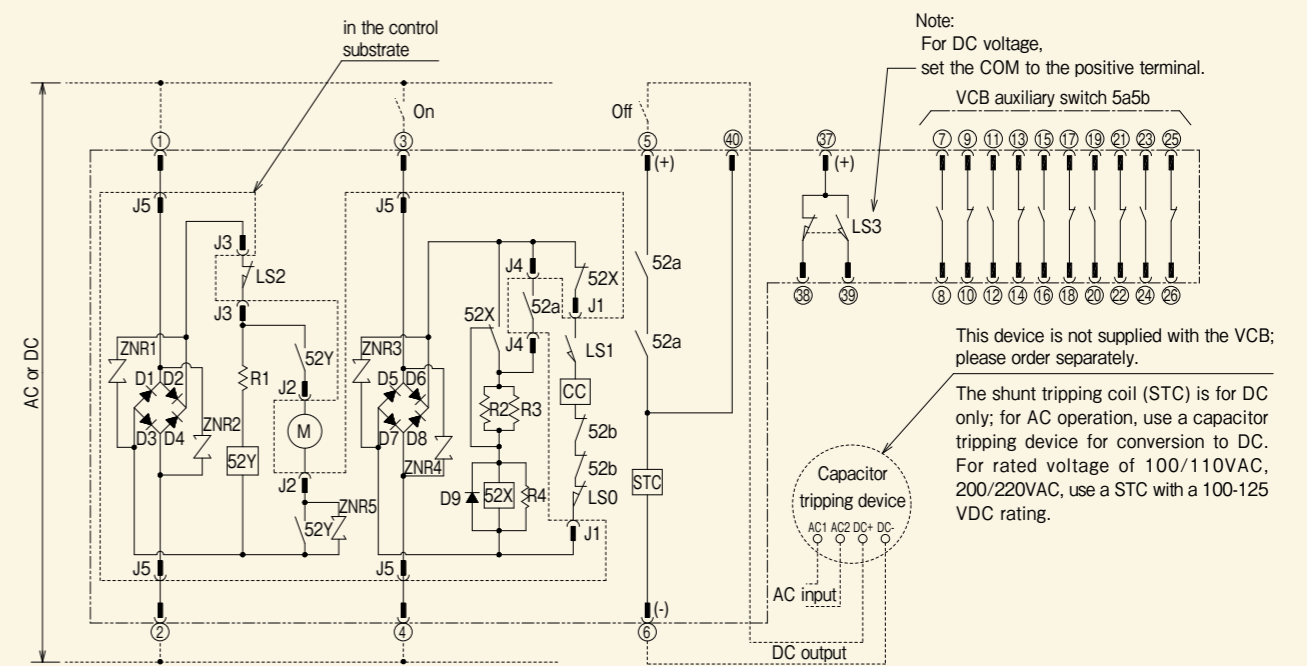


Fig. 36

Withdrawable: Standard Connection Diagram (Code B) Note: There is no LS0 in a fixed (type-L).



When the auxiliary switch has micro current specifications, terminals ⑦ ~ ⑱ (3a3b) are standard contacts and terminals ⑲ ~ ⑳ (2a2b) are contacts for micro current.

Note:
The following are VCB options:
the micro current specification auxiliary switch,
the tripping coil disconnection monitoring
(terminal No. 40),
the capacitor tripping device and LS3.

In the above wiring diagram;
Circuit breaker : Opened state
Closing spring : Discharged state
Motor circuit : No-voltage condition

- | | |
|--|---|
| M : Motor (for charging the closing spring) | LS0 : Limit switch (for detecting VCB's position) |
| CC : Closing coil | STC : Shunt tripping coil |
| 52Y : Auxiliary relays (for motor) | LS1 : Limit switch (for detecting the charging of the closing spring) |
| 52X : Auxiliary relays (for prevention of pumping) | LS2 : Limit switch (for starting up and stopping motor) |
| 52a/b : Auxiliary contacts for circuit breaker | LS3 : Limit switch (for closing spring charged indication) |
| | R1/2/3/4 : Resistor (R3 and R4 200/220V only) |

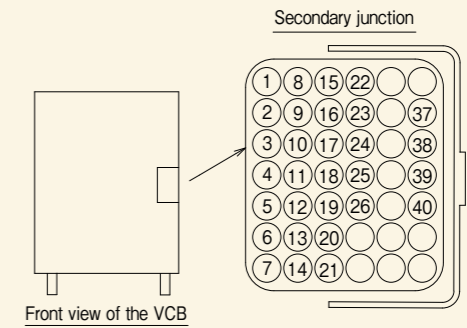


Fig. 37

6. Accessories

Secondary Connector



Code A



Code B



The panel side lead wires connect the input voltage and VCB unit. They are inserted in the control plug section of the VCB.

Number of accessories:
1 per unit

Manual Charging Handle



This handle enables the closed spring to be charged manually by inserting the handle in the front manual charging handle aperture and rotating clockwise for approximately 15 rotations.

Number of accessories:
1 per 1-5 VCBs (min. 1)

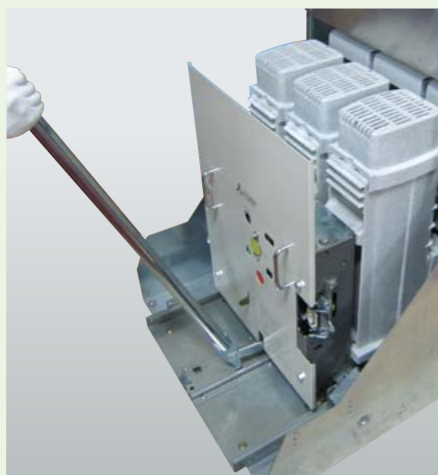
Insertion / Draw-out Handles



600-1,250A



1,600-3,150A
For types C, D and G



This is a insertion / draw-out handle to move the VCB unit between the test position and the connected position.

Number of accessories:
1 per 1-5 VCBs (min. 1)



For type-M



Lifting Adapter



Lifting

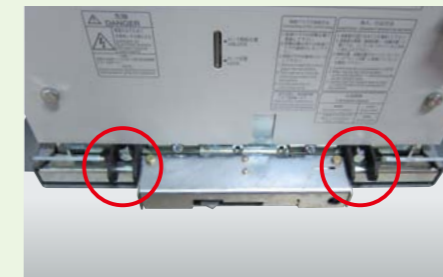
A lifting adapter used to lift the VCB. Please refer to the directions for use in the instruction manual.

Number of accessories:
1 per 1-5 VCBs (min. 1)

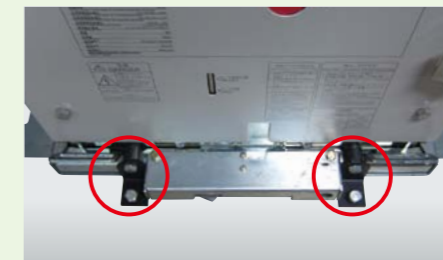
Shipping Clamp



600-2,000A



2,500-3,150A
For type-M



3,150A rating
(shipped with a panel)

These are fixtures for shipping the VCB and a mounting frame together. Use them as described in the instruction manual.

Number of accessories:
1 per unit

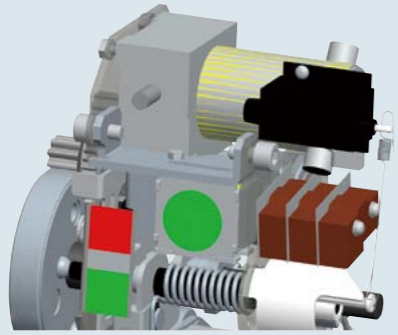


For types C, D and G



7. Optional Accessories

■ Closing Spring Charged Indication Switch



Used for charging/discharging output of closing springs. The contact number is 1C.

Table 5 Contact ratings.

Rated voltage (V)	Resistance load (A)	Inductive load (A)
125AC/DC	5.5	5.5
250AC/DC	3	1.5

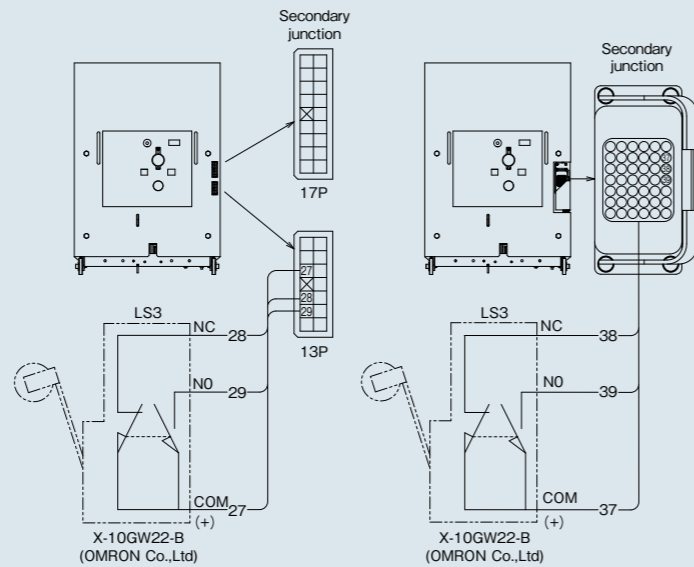
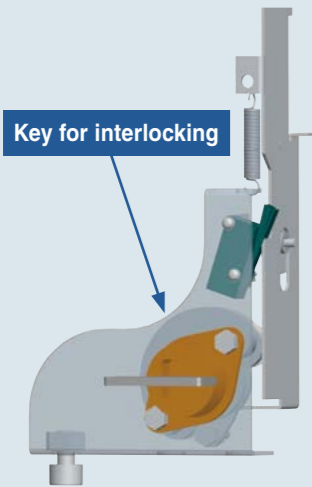


Fig. 38 Wiring diagram

- *1: Please refer to the standard connection diagram for the VCB (P17 and P18).
- *2: Fig. 38 shows a closed spring in a discharged state.
- *3: LS3 (limit switch for the spring charge indicator)
- *4: For DC voltage, set the COM to the positive electrode.

■ Mechanical Locking Device



The interlock system is configured to lock the VCB in the off position. To shut down the VCB either automatically or manually requires the VCB to be locked using the key. The key can only be removed after the VCB has been opened and locked. The VCB cannot be closed in this state.

Note that users are responsible for preparing the interlock key; a key will not be supplied by the manufacturer. In addition, note that this feature cannot be used together with the draw-out mechanism padlock device.

Table 6 Specifications of key for interlocking.

Manufacturer	Castell
Model	FS1
Lock portion symbol	User option
Key rotation	90 degrees clockwise to trap
Spigot dimensions	9.5mm ² X 22mm long

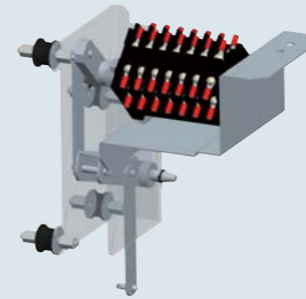
■ Tripping Coil Disconnection Monitoring



Fig. 39

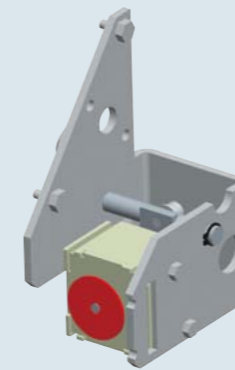
This function monitors disconnection of the tripping coil and control connector based on output from the input terminal. The disconnection monitoring current is 30mA or below.

■ Additional Auxiliary Switch (Additional 5a5b)



The switch makes it possible to add 5a5b to a standard 5a5b contact number to create a 10a10b arrangement (the additional auxiliary contact has no settings for micro current contact). It is also possible to create an 8a8b configuration by adding 5a5b to the standard 3a3b contact number through use of the optional additional shunt tripping coil.

■ Additional Shunt Tripping Coil



An additional shunt tripping coil can be arranged through addition of an independent tripping coil. If one of the tripping coils malfunctions, the other tripping coil can still perform tripping.

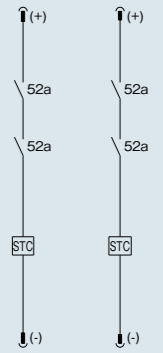
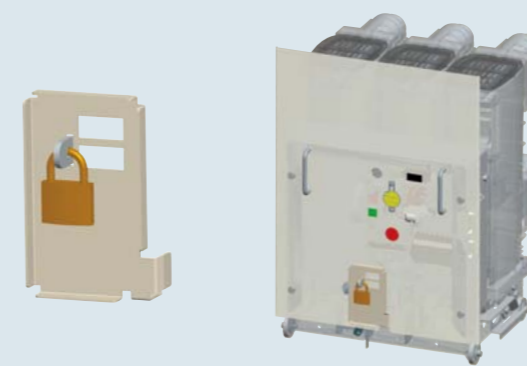


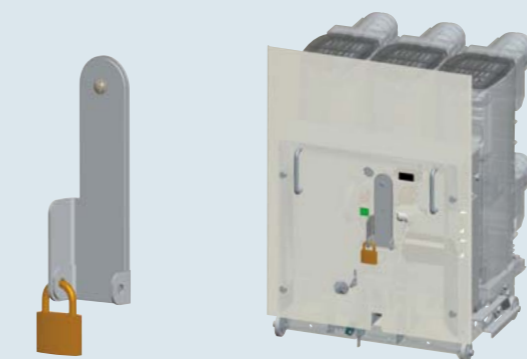
Fig. 40

■ Draw-out Mechanism Padlock Device



This padlock can be used to lock the VCB in the connected position or test / disconnected position. Note that users are responsible for preparing a padlock; a padlock will not be supplied by the manufacturer.

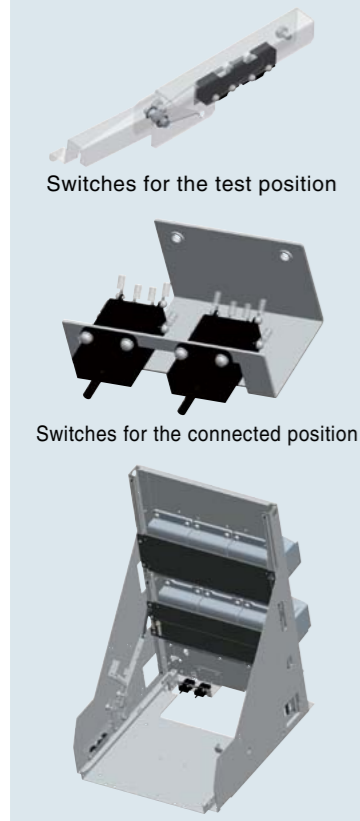
■ Padlock Device for Close and Trip Button



This padlock board can be used to cover the VCB closing and tripping buttons and prevent manual switching operations. Note that users are responsible for preparing a padlock; a padlock will not be supplied by the manufacturer.

7. Optional Accessories

Position Switch (Connected Position / Test and Disconnected Position)



Output of the test and disconnected position as well as the connected position of the circuit breaker. The maximum output contact number is 2C for the test and disconnected position and 4C for the connected position.

Table 7 Test and disconnected position contact ratings (switching).

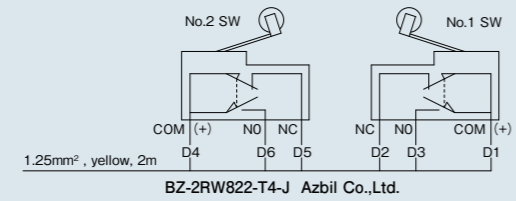
Rated voltage (V)	Resistance load (A)	Inductive load (A)
100~125AC	10	6
100~125DC	0.5	0.05
200~250DC	0.25	—

Table 8 Connected position contact ratings (switching).

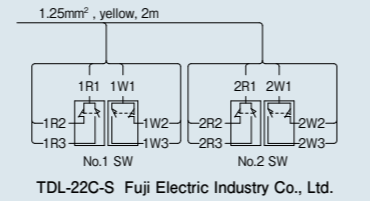
Rated voltage (V)	Resistance load (A)	Inductive load (A)
100~125AC	15	10
100~125DC	0.5	0.1
200~250DC	0.3	—

1 unit	2 units
2C for test and disconnected position	2C for test and disconnected position
2C for connected position	4C for connected position

Wiring diagram of test and disconnected position contact



Wiring diagram of connected position contact



Position detecting switch timing

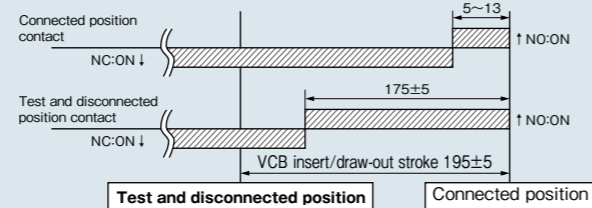
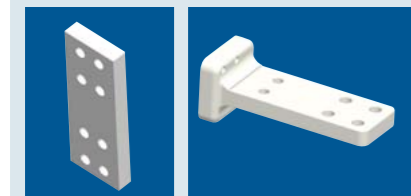
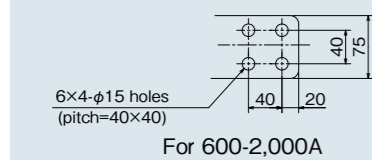


Fig. 41

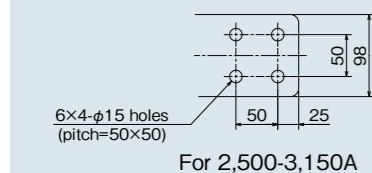
Optional Terminal (V: Vertical, H: Horizontal)



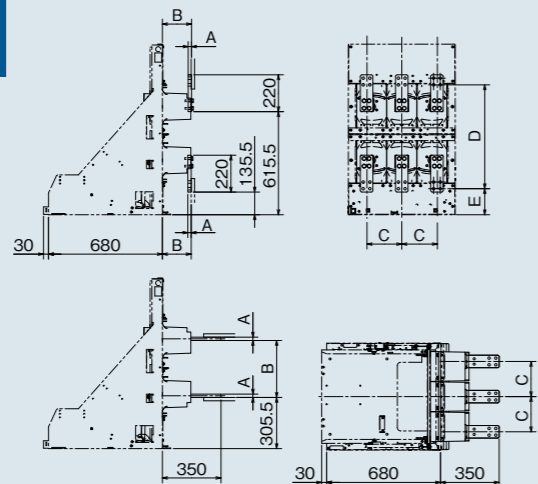
Conductors can be installed vertically and horizontally inside panels through use of horizontal and vertical terminals in the mounting frame terminal area.



For 600-2,000A



For 2,500-3,150A

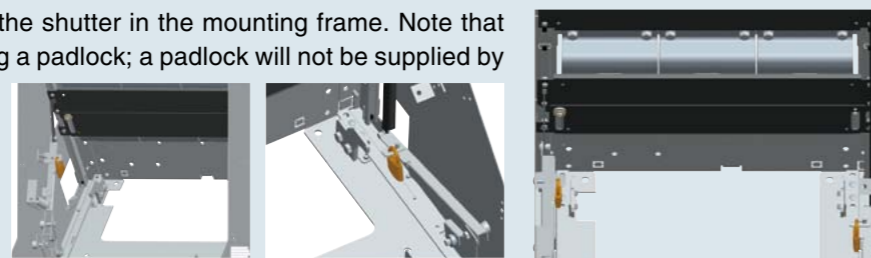


	600A~2,000A	2,500A~3,150A
A	20	24
B	172	184
C	210	224
D	620	600
E	155.5	160.5

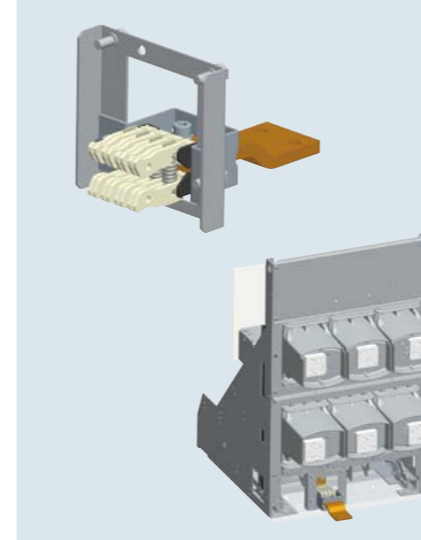
	600A~2,000A	2,500A~3,150A
A	20	24
B	340	336
C	210	224

Shutter Padlock Device

This padlock prevents release of the shutter in the mounting frame. Note that users are responsible for preparing a padlock; a padlock will not be supplied by the manufacturer.



Short-circuit Capacity Earthing



The ground-fault current to the VCB frame flows into the earth bus on the panel side at the VCB's connected position. Current flow of 40kA-3 seconds.

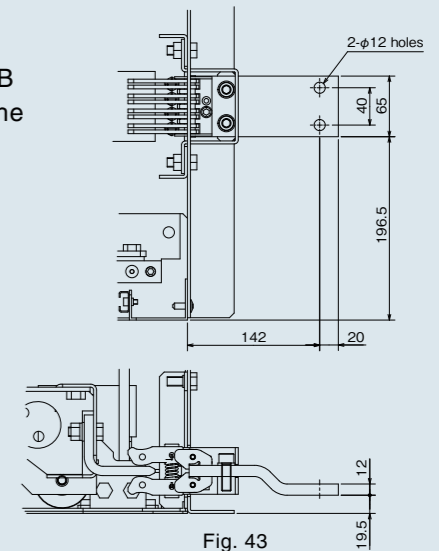


Fig. 43

Earthing Switch (ES)



This earthing switch is used to ground the main circuit part (lower side of the mounting frame). It enables simple safety checks at the time of maintenance and inspections.

Class E2 (40kA / 3s)
Applicable standards: IEC 62271-102-2012
Accessories: Operating handle: 1 piece / 1-5 ES unit (s)

Table 9 Coil ratings.

Rated voltage	Current flow
100 / 110V DC	63mA

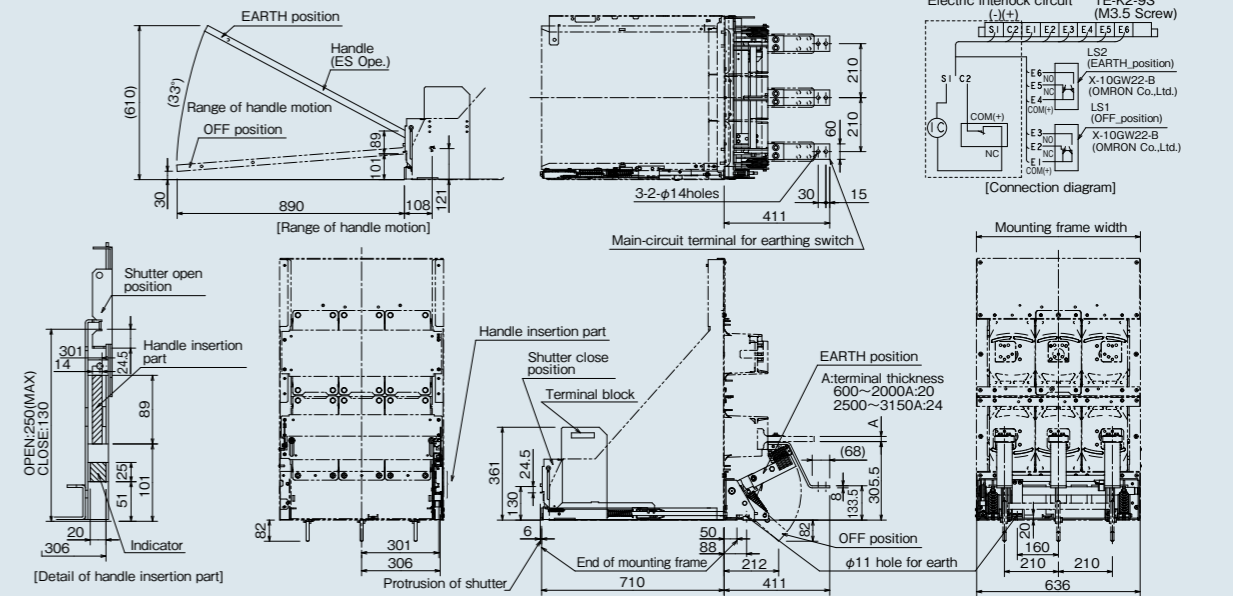


Fig. 42-1

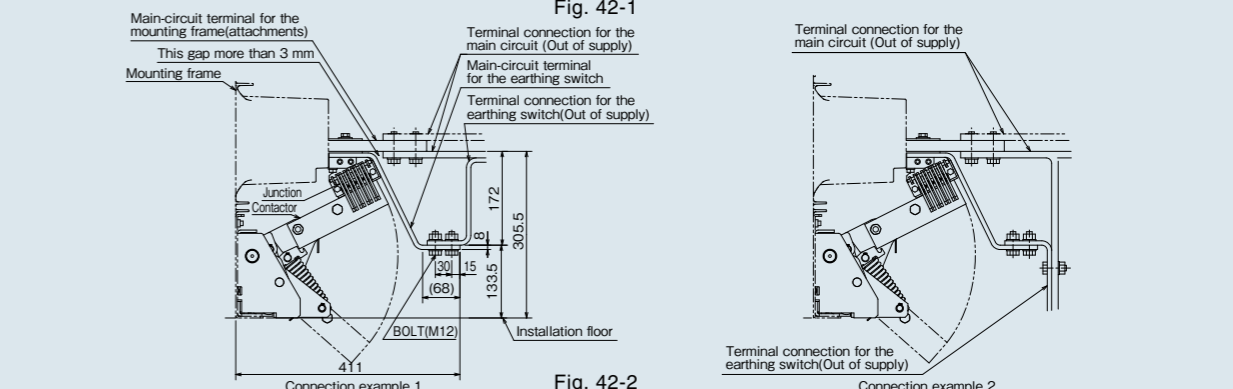


Fig. 42-2

8. Relevant Devices

Capacitor Tripping Device (CTD) Sold Separately

This device makes it possible to trip the circuit breaker electrically within a fixed time via remote control even when the control power is out.

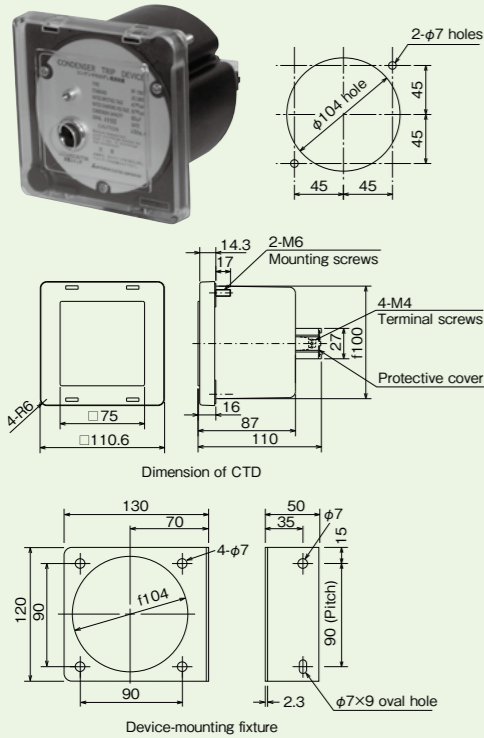


Fig. 48

Table 15 Ratings.

Type	Condenser C	Resistance R1	Resistance R2	Resistance R3
KF-100E	820 μ F	10W300 Ω	10W100 Ω	0.5W240k Ω
KF-200CD	820 μ F	10W300 Ω	10W100 Ω	0.5W240k Ω

Table 16 Table of ratings.

Items	KF-100E	KF-200CD
Rated working voltage (V)	100/110AC	200/220AC
Rated frequency (Hz)	50/60	
Rated output voltage (V)	140/155DC	
Power consumption (steady state) (W)	0.1 or less	
Electric charge time constant	1	2.3
VCB operational voltage (V)	100~125DC	

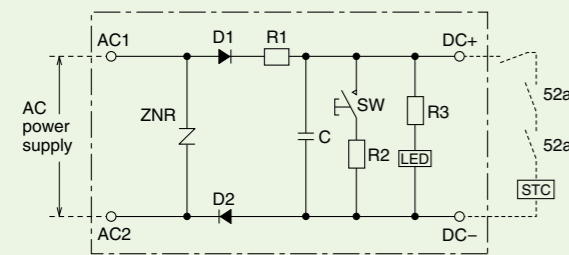


Fig. 49 Circuit diagram (KF-100E).

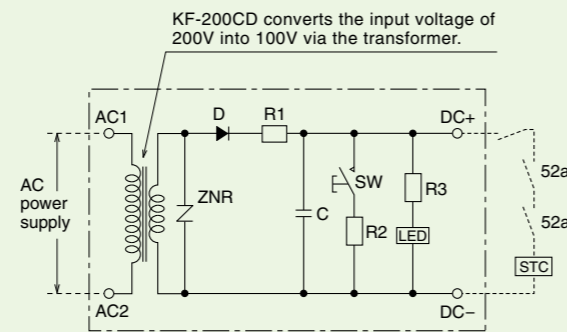


Fig. 50 Circuit diagram (KF-200CD).

Remarks

1. Capacitor tripping devices are mounted on the panel as standard.
2. Mounting fixtures that enable installation inside the panel are optional. The device can be installed facing the left, right, up or down according to the direction of the mounting fixtures.

Caution:

1. Please note that the KF-200CD output voltage is 140/155VDC. It cannot be used to open circuit breakers with a tripping voltage of 200/220VDC and may cause an accident in this case.
2. Be sure to completely charge a capacitor before performing opening operation or giving the opening command.
3. The sole purpose of this device is tripping a VCB. Do not use for any other purpose.
4. One device is required per VCB unit.
5. Recommended replacement period: 6 years

9. Interlocking Process for the Panel Door When Using Withdrawable with Door Closed (Type-M) Operation Mechanism

Through optional processing of the panel door, the VCB unit can be installed together with the following interlock function.

Interlock function with panel door

Function

VCB can only be moved when the panel door is in the closed state.

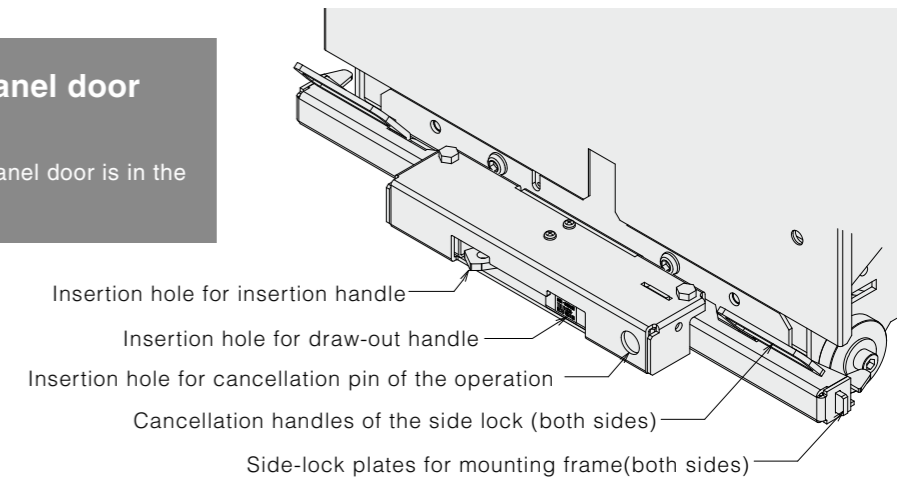


Fig. 51

Function

VCB can only be moved when the panel door is in the closed state.

An insertion/draw-out handle (for type-M) can be used to move the VCB after closing the panel door with the unlocking pin attached to the door.

Unlocking pin must be installed

Example of processing procedure

* In this example, the distance between the inside of the panel door and edge of the mounting frame is 53mm.

- Install a ϕ 5mm unlocking pin (figure below shows M5 screw) in the position shown in the figure below (dimensions: 117mm, 32.5mm).
- Use an unlocking pin with a length that enables it to be inserted in a position 11mm from the edge of the mounting frame.

Please process the handle aperture for a panel cover of 160x25 mm or larger.

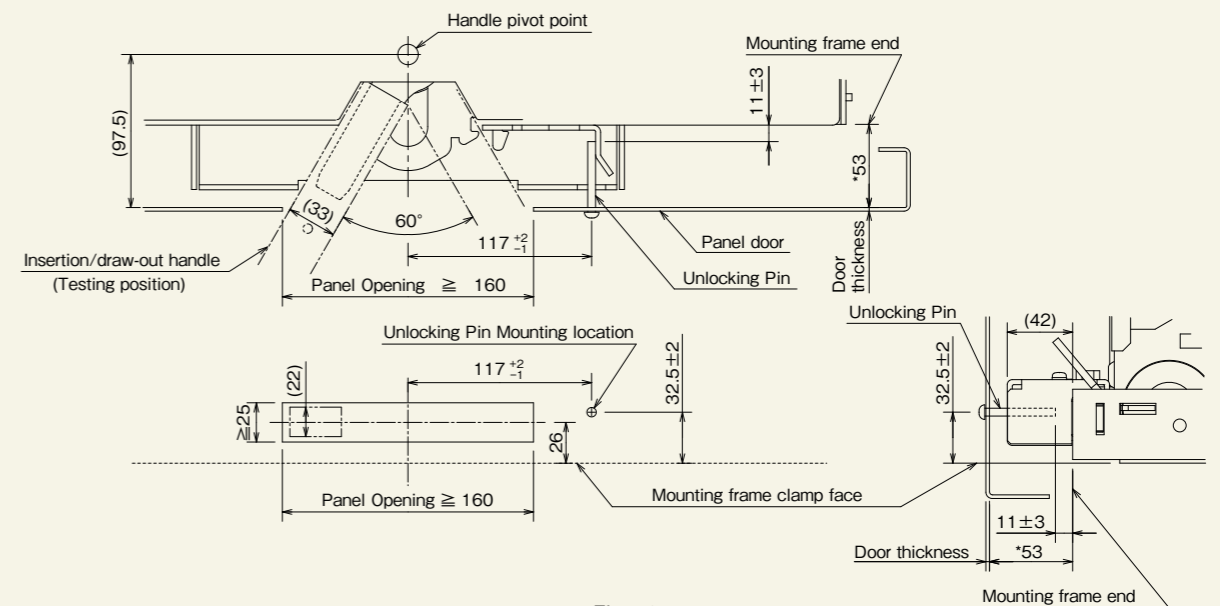


Fig. 52

Operation Mechanism and Operating Principles

Closing Operation

Fig. 53 shows the state where the circuit breaker is opened and the closing spring is discharged.

Electrical (Closing) Operation

- When the power supply is connected, auxiliary relay 52Y is excited via limit switch LS2 and the contact of auxiliary relay 52Y closes, which then 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, the motor then stops and limit switch LS1 closes (the closed control circuit is formed).
- By closing the closing command switch CS1 in this state, the closing coil **CC** is excited, the closing latch of the operating mechanism is released and the circuit breaker closes as a result of the energy from the charged closed spring. Through discharging the closed spring, LS2 is closed and LS1 is opened.
- When limit switch LS2 closes, the motor activates and charges the closing spring to prepare for the next closing operation.
- When 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 shunt tripping coil **STC** and at the same time excites the auxiliary relay (for anti-pumping prevention) **52X**.

When Closing Commands are Consecutively Given While Charging Closed Spring

If consecutive closing commands are given to the closing operation switch CS1 while charging the closed spring (charge time of motor: 6 seconds): limit switch LS1 closes, the closing coil **CC** is excited, and the circuit breaker closes after completing the charging of the closing spring.

Tripping Operation

- By closing the trip command switch CS2, the shunt tripping coil **STC** is excited, the engagement of the tripping latch at the operating mechanism is released and the circuit breaker opens.
- When the circuit breaker is opened (tripped), circuit breaker auxiliary contact 52a opens and shuts off excitation of **STC** to prepare for the next closing operation.

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):

- Operation takes place in the 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 occurs.
- Electrical (closing) operation ① is returned but since the auxiliary relay **52X** is continuously being excited, a closed circuit is not formed by contact 52Xb and the circuit remains in the opened state.
- When performing the closing operation, it is necessary to release the closing command by closing command switch CS1 and then restore auxiliary relay **52X**.

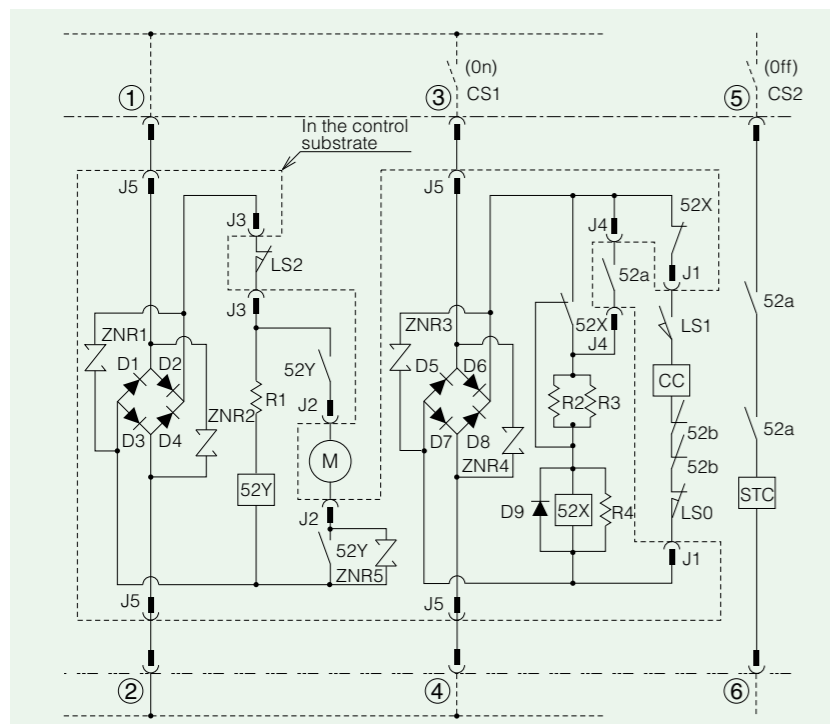


Fig. 53 Basic control circuit diagram.

The wiring diagram on the left indicates:

Circuit breaker : Opened state
Closing spring : Discharged state
Motor circuit : No-voltage condition

- CS1 : Closing command switch
- CS2 : Trip command switch
- M : Motor (for charging closing spring)
- CC : Closing coil
- STC : Shunt tripping coil
- LS0 : Limit switch
(for detecting VCB's position)
- LS1 : Limit switch
(for detecting spring charge)
- LS2 : Limit switch (for starting/stopping motor)
- 52a/b : Auxillary contacts for circuit breaker
- 52Y : Auxiliary relay (for motors)
- 52X : Auxiliary relay (for pumping prevention)
- R1/2/3/4 : Resistor
(R3 and R4 are equipped only for 200/220V)

Operation / Control Voltage (Current)

Table 17 Variation range of operation/control voltage.

Items	Standard	JEC-2300	IEC-62271-100
		Closing operation voltage (motor circuit)	DC AC
Closing control voltage (closing circuit)	DC	75~125%	85~110%
	AC	85~110%	
Opening control voltage (tripping circuit)	DC	60~125%	70~110%
	AC		85~110%

*Due to electric spring operation

Table 18 Closing and tripping control current and current-flow time for DC and AC (see Fig. 54)*2.

«Closing control current»

Control voltage (V)	VDC										VAC			
	24		48		100/110		125		200/220		100/110		200/220	
	I	T	I	T	I	T	I	T	I	T	I	T	I	T
Type														
3/6/10/15-VPR-25D/32D/40D Closing	12	0.05	7	0.05	3.5	0.05	4.5	0.05	1.5	0.05	4	0.05	1.8	0.05

«Opening control current»

Control voltage (V)	VDC										VAC*1										
	24		48		100/110		125		200/220		100/110		200/220								
	I	T	Is	I	T	Is	I	T	Is	I	T	Is	I	T	Is						
Type																					
3/6/10/15-VPR-25D/32D/40D Tripping	13	0.03	0.03	8	0.03	0.03	4	0.03	0.03	5	0.03	0.03	2	0.03	0.03	-	0.03	-	-	0.03	-

Is: Maximum flowing current at the time of disconnection monitoring

*1 CTD used.

*2 When VCB and fault indicator are combined, please perform operation check of VCB and fault indicator.

Table 19 Motor operation control current and current-flow time for DC and AC (see Fig. 55).

Control voltage (V)	VDC										VAC																	
	24		48		100/110		125		200/220		100/110		200/220		100/110		200/220											
	I1	I2	T1	T2	I1	I2	T1	T2	I1	I2	T1	T2	I1	I2	T1	T2	I1	I2	T1	T2								
Type																												
3/6/10/15-VPR-25D/32D/40D	18	6.5	0.1	6	12	2.5	0.1	6	6	1.2	0.1	6	7.5	1.5	0.1	6	3.5	0.6	0.1	6	8.5	3	0.1	6	4.5	1.5	0.1	6

Operation / Control Current Waveform for DC.

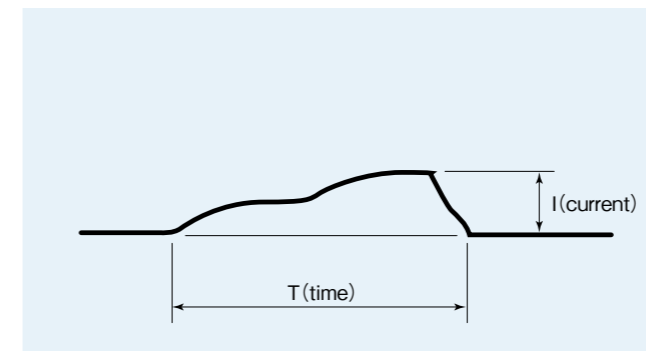


Fig. 54 Closing / tripping control current waveform.

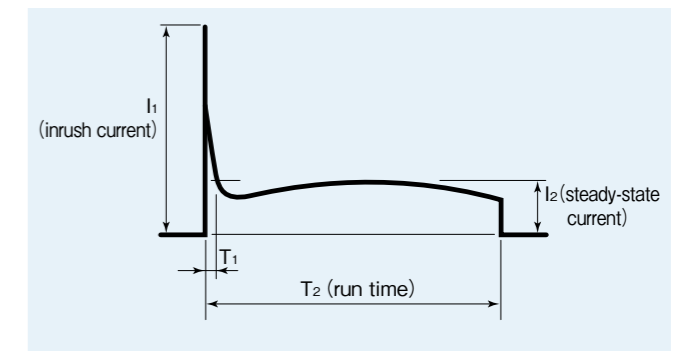


Fig. 55 Motor operation current waveform.

Operation / control Voltage (Current)

Table 20 Burden VA of closing coil and electrifying time for AC operation.

Type	Control voltage (V)	100 / 110V AC	
		Burden (VA)	Resistance welding time (s)
3/6/10/15-VPR-25D/32D/40D		680	0.05

Table 21 Motor burden VA and drive time for AC operation.

Type	Control voltage (V)	100 / 110V AC	
		Burden (VA)	Resistance welding time (s)
3/6/10/15-VPR-25D/32D/40D		180	6

■ Table 22 Table of auxiliary switch ratings.

Ratings and specifications				Type
Rated insulation voltage (V)				3/6/10/15-VPR-25D/32D/40D 250 AC/DC
Standard contact	Rated working voltage (V)			220 AC/DC
	Rated operational current (A)	AC	100~125V AC	5 (power factor 0.3~0.4)
			200~220V AC	4 (power factor 0.3~0.4)
		DC	24~55V DC	6 (time constant 40ms)
			100~110V DC	3 (time constant 40ms)
	Minimum operational current (mA)	AC/DC	100V AC / V DC	30
			24V AC / V DC	50
Rated continuous current (A)				5
For micro current	Rated operational voltage (V)			125 AC/DC
	Rated operational current (mA)	AC ratings	100~125V AC	1~500
		DC ratings	24~125V DC	1~500
Rated continuous current (A)				0.5

Sequence Timing

● Operating sequence

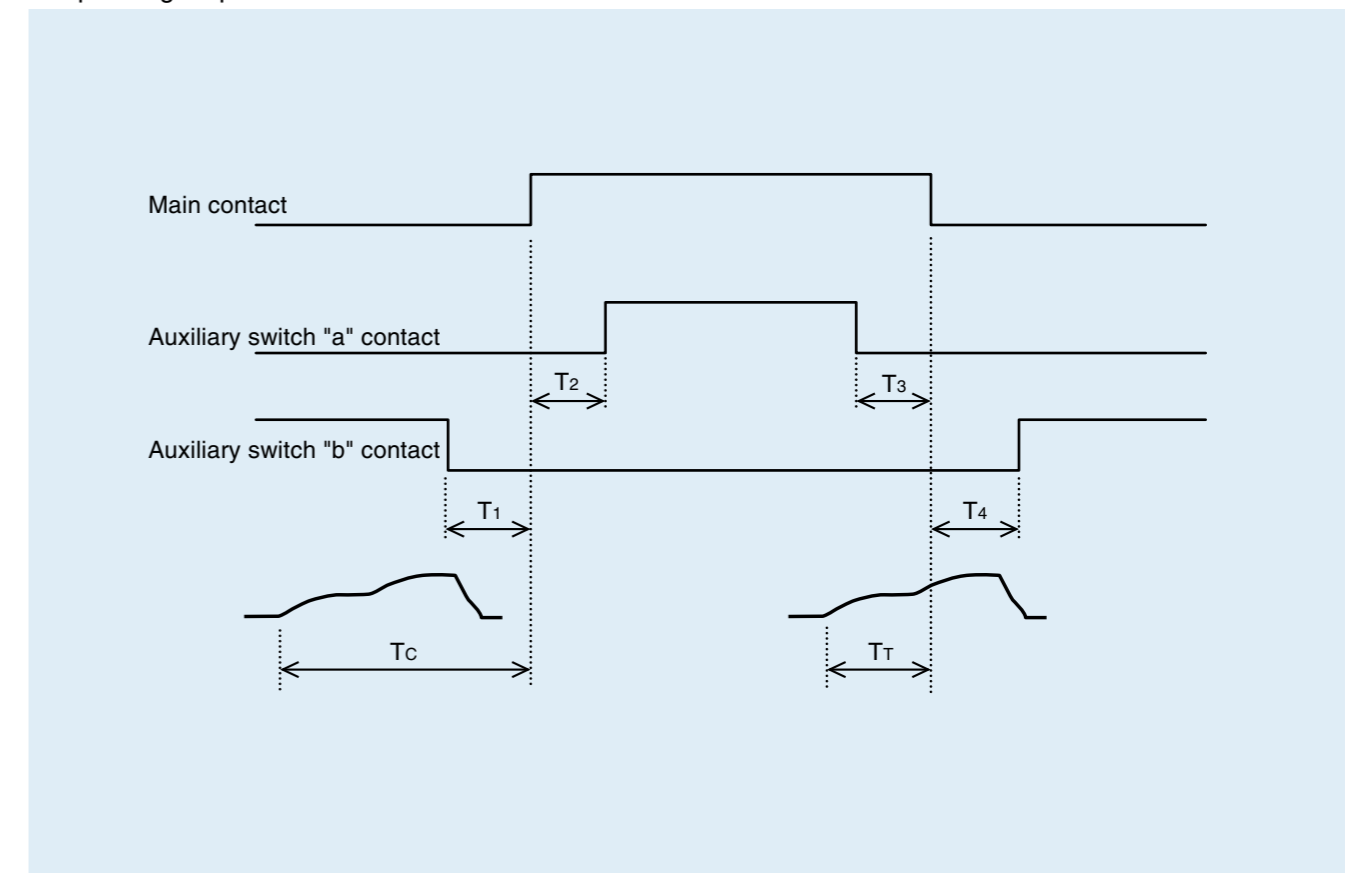


Fig. 56

Table 23 Operating time (reference).

Code	Code descriptions	Time (ms)
Tc	Closing time	30~60
T1	Auxiliary switch "b" contact off — main contact on	0~8
T2	Main contact on — Auxiliary switch "a" contact on	2~10
Tr	Opening time	10~30
T3	Auxiliary switch "a" contact off — main contact off	0~8
T4	Main contact off — Auxiliary switch "b" contact on	0~8

11. Applicable Standards

Operating Environment and Application

Operating Environment

10-VPR-D VCBs are designed and manufactured as an indoor unit and comply with JEC-2300 (AC circuit breakers) and IEC 62271-100. Accordingly, these VCBs require a normal service conditions specified in Table 24. Furthermore, sufficient maintenance and inspections must be performed in accordance with the VCB instruction manual. Please consult the manufacturer regarding operation of VCBs under special conditions.

Caution for Installation Site and Surrounding Environment

The VCB service conditions must comply with the specifications shown in Table 24. Do not use the VCBs in environments that do not meet these conditions. For use in outdoor panels and special environments where there is excessive dust, corrosive gas, water/condensation or abnormal vibration/shock, be sure to take appropriate countermeasures. Non-adherence to these cautions may result in damage to the products or degraded performance in areas such as switching, current carrying capacity and insulation.

Table 24 Normal service conditions.

1	Ambient temperature	-5°C - 40°C (The average temperature for 24 hours must not exceed 35°C.)
2	Influence of solar radiation	There must be no influence of solar radiation.
3	Altitude	1,000m or lower
4	Powder dust	There must be no excessive powder dust. (As a guideline, the powder dust should be 2mg/m ³ or less.)
5	Humidity	Relative humidity: 45 - 85% (There must be no dew condensation.)
6	Vibration	There must be no excessive vibration.
7	Degree of pollution	There must be no pollution. (As a guideline, the equivalent salt deposit density should be less than 0.01mg/cm ² .)
8	Poisonous gas	There must be no corrosive gas.

Application of Surge Protection Device

Table 22 outlines surge protection standards for the load circuit. Please use this table as a reference when selecting VCB types for actual applications.

Surge Protection Standards

Table 25

Type	Load device	Generator	Motor	Dry transformer	Oil transformer	Mitsubishi Electric molded transformer	Phase-advanced capacitor
3/6/10/15-VPR-D		CR suppressor used		General purpose arrester used	Not required	General-purpose arrester used	Not required

*1: To directly switch the semiconductor rectifier unit (for example, a electric power thyristor rectifier unit) to the secondary side of a transformer, use a transformer with a contact-protective plate. Use a general-purpose arrester on the primary side and the surge protective device (such as a filter capacitor) on the secondary side.

*2: Avoid interrupting the no-load excitation inrush current of a molded transformer oil transformer. When such current must be interrupted, use a general-purpose arrester. Before using any oil transformer or molded transformer made by other manufacturers, consult the manufacturer.

*3: For motors in applications where inching operation is frequently performed and inching is the predominant switching duty (cranes, conveyors, etc.), use a CR suppressor.

Surge Voltage for Breaking Current

Surge voltage at the time of interrupting current generally includes the current chopping surge when interrupting an inductive small current. If small current is interrupted by a switch that is superior in arc extinction capacity like the vacuum circuit breaker, the arc suddenly dissipates before forcing the current to zero and then interrupts current. This is called the current chopping phenomenon, and a high surge voltage may be generated if the phenomenon occurs at the time of inductive small current breaking.

It is possible to calculate the current chopping surge voltage by the following general equations.

Circuit conditions	Surge voltage equation
(1) Without reverse voltage (inching switching of transformer circuit/motor)	$Es = \sqrt{E^2 + (\eta \times \sqrt{Lm / Cm} \times Ic)^2}$
(2) With reverse voltage (motor switching of the constant - velocity drive)	$Es = E + \eta \times \sqrt{Lm / Cm} \times Ic$

Es : Surge voltage (peak value)

E : Power voltage to ground (peak value)

η : Attenuation coefficient (for transformer: approx. 0.65, for motor: 0.85)

$\sqrt{Lm / Cm}$: Surge impedance

Lm : Inductance of load circuit including a transformer or motor

Cm : Earth capacity of load circuit including a transformer or motor

Ic : Chopping current

Impact on Load Device

VCB load devices are generally considered to include transformers, rotators and capacitors. When the surge voltage is higher than the insulation level of a load device, one of the surge protection devices shown in Table 25 must be applied.

The withstand voltage of transformers, rotators and capacitors as listed in the IEC standards are shown in Table 26. Please confirm the overvoltage tolerance of each device with the relevant manufacturer.

Table 26 Withstand voltage test voltage value of load device (11kV system).

Type		Power frequency rated withstand voltage kV (rms value)	Rated lightning impulse withstand voltage kV (peak value)
Transformer	Oil IEC60076-3-2000	28	60
	Dry IEC726-3-1982		75
Rotator IEC-34-15-1995		23	49
Capacitor IEC60871-1		28	60
			75

Application for Reactor Circuit

A reactor circuit can be applied because the current chopping surge is not at a problematic level.

Application to the Capacitor Circuit

Although a capacitor circuit can be used, please exercise caution in regard to the following:

Before re-closing the capacitor, make sure the capacitor is fully discharged to prevent the risk of overvoltage being generated.

Application to the Different System Butt Welding Circuit

Application to different-system circuits

Application to different-system circuits is possible. In this case, it is necessary to shorten the maintenance, inspection and cleaning cycle because the voltage added between VCB poles will be higher than under normal conditions. A more frequent maintenance and inspection cycle is especially important in environments where there is pollution or high humidity.

Caution for Korndorfer Start Circuit

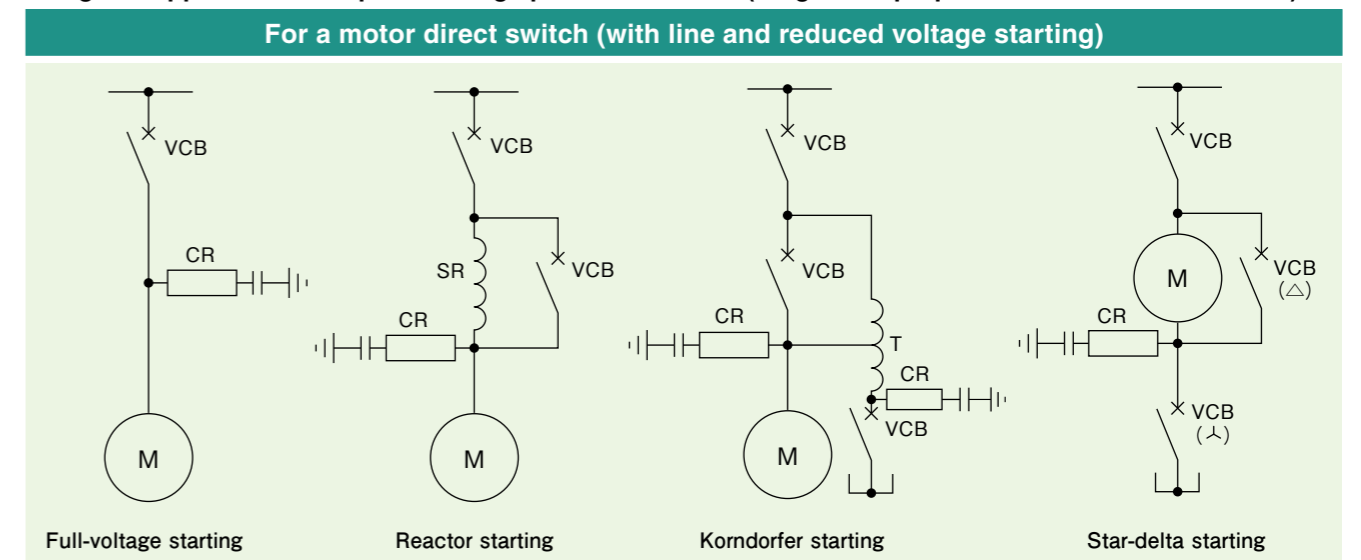
For a korndorfer start, a neutral point release of the auto-transformer should be conducted after the start current is completely diminished.

Alternatively, for an auto-transformer that is used as a starting compensator, please use a korndorfer system startup transformer specified in "power transformer (JEC-2201)."

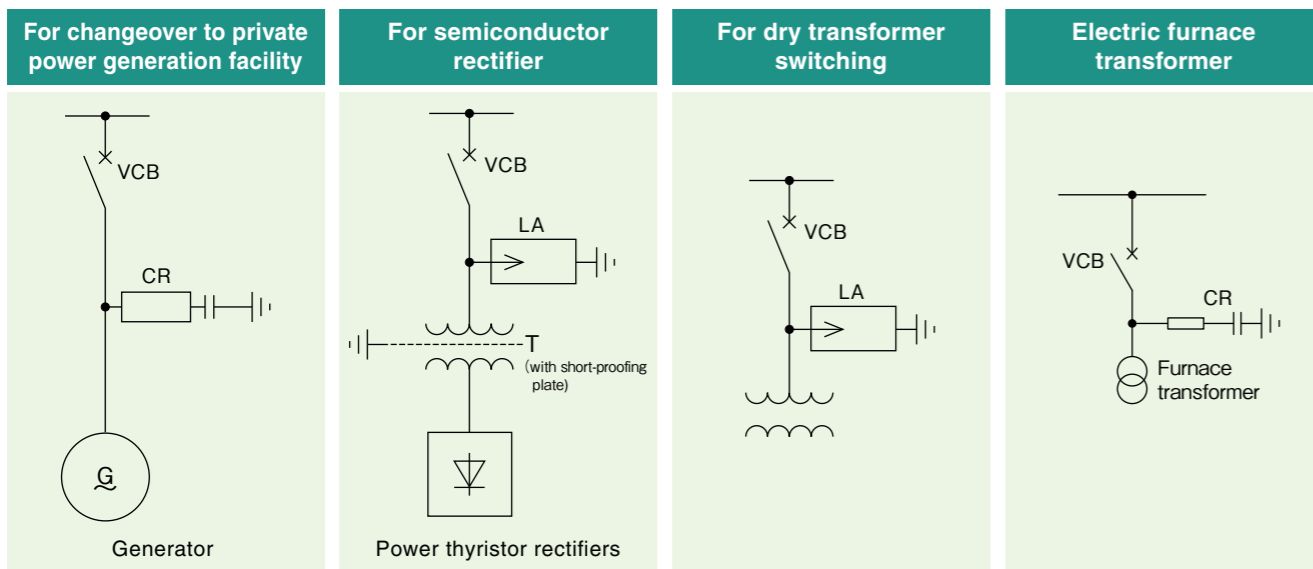
Application to Electric Furnace Circuit

High frequency switching of the circuit breaker for an electric furnace increases the possibility of generating a switching surge, and when a filter capacitor is connected there is a risk of generating high overvoltage. In addition to adopting a surge protection device, please use a circuit breaker with a high withholding voltage or select a circuit breaker with a rated voltage in one of the top classes.

Fig. 57 Application example of a surge protection device (for general-purpose vacuum circuit breakers).



11. Applicable Standards



Service Life and Applications

The service life of VCBs is specified in terms of the vacuum service life of VI, as well as the electrical and the mechanical service lives.

● Vacuum Service Life of VI

The high vacuum of the VI in the VCB ensures interrupting and insulation characteristics. It is very important that this vacuum be maintained.

Our VIs are manufactured on our advanced production line and provide safe, long term use guaranteed by our original method of service life testing and control. Vacuums can be inspected simply as part of regular inspections via the withstand voltage method or through use of portable vacuum checkers.

● Electrical Service Life of VI (see Table 27)

The electrical service life of a VI is determined by the electrode consumption and the number of switchings. For VPR-D, the service life can be determined by the number of load switchings, because the electrode consumption is extremely small. Therefore, it is not required to measure the electrode consumption (wipe) at the time of maintenance and inspection.

● Mechanical Service Life

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

● Replace When Service Life Expires

The estimated service life is 20 years when used under normal environmental conditions. When the VCB reaches the end of its mechanical service life or its specified operation count, it is necessary to replace the VCB.

Table 27 Switching service lives.

Type	Items	Load switching service life (times)	Mechanical switching service life (times)
3/6/10/15-VPR-D		10,000	10,000

*1: Values shown in the table above are based on the continuous switching test and apply to the short term; they are not guaranteed in the long term. To ensure optimum performance, please follow the maintenance and inspection procedures described in the instruction manual.

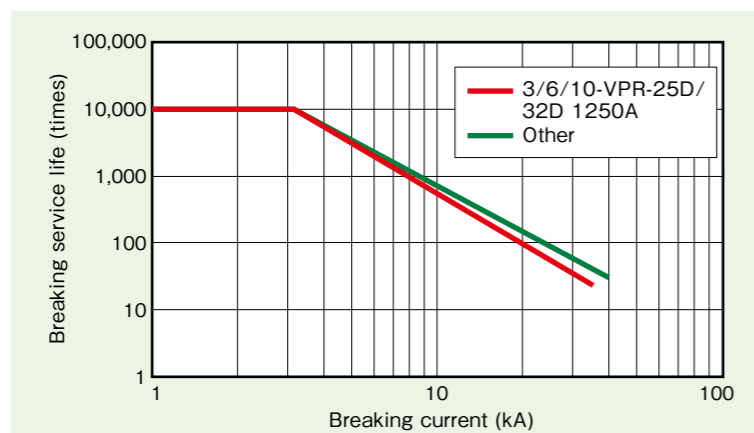


Fig. 58 Breaking service life criterion for breaking current.

Table 28 Capacitor load applicable capacities.

Type	Maximum switching capacity (kVar)	Multiple switching capacity (kVar)
3-VPR-D	2,500	1,500
6-VPR-D	5,000	3,000
10/15-VPR-D	7,000	4,000

*1: Electrical service life for the max. switching capacity is approx 2,000 times; multiple switching capacity is 10,000 times.

*2: Applicable capacities with 6-13% series-connected reactor.

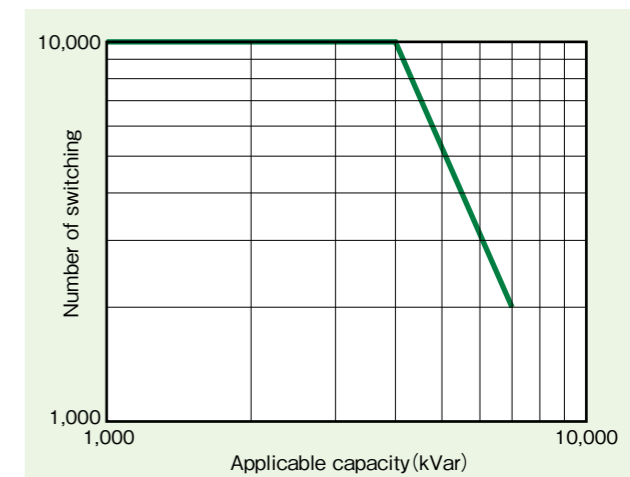


Fig. 59 Guidelines on the switching times for applicable capacity (for 12, 15kV).

Table 29 Maximum applicable capacity.

Type	Items	Three-phase induction motor								Distribution transformer (kVA)			
		Full-load current (A)*1				Motor output (kW)*2							
		3.6kV	7.2kV	12kV	15kV	3.6kV	7.2kV	12kV	15kV	3.6kV	7.2kV	12kV	15kV
3/6/10/15-VPR-D (1,250A)		1,250				4,900	9,800	16,100	20,300	7,000	14,000	23,000	29,000
3/6/10/15-VPR-D (2,000A)		2,000				7,700	15,400	26,600	32,900	11,000	22,000	38,000	47,000
3/6/10/15-VPR-D (3,150A)		3,150				12,600	25,200	42,000	52,500	18,000	36,000	60,000	75,000

*1: Maximum applicable full-load current (A) is for a single breaker.

*2: Motor output (kW) is: calculated by power factor × efficiency=0.7.

Polarity in Connecting to Main Circuit

It is unnecessary to classify the polarity in the power/load sides when connecting the main circuit of the VCB. (Electrical or mechanical performance is not changed regardless of whether it is connected to the power side of load side.)

■ Calorific Value

The contact resistance and calorific value of each rated current are shown. Use this as a reference when selecting models.

Table 30 Contact resistance and calorific value of each rated current.

Type	3/6/10-VPR-25D/32D	15-VPR-32D/3/6/10/15-VPR-40D	3/6/10/15-VPR-32D/40D	3/6/10-VPR-32D/40D
Rated current (A)	600/630 1,200/1,250	600/630 1,200/1,250	2,000	3,150
Contact resistance Rc(μΩ) between ① and ②*1	72	63	42	24
Calorific value (W) / three phases	338*2	296*2	504	715

*1: Measured value using the direct current voltage potential drop method.

*2: Value at the time of applying a 1,250A electrical current.

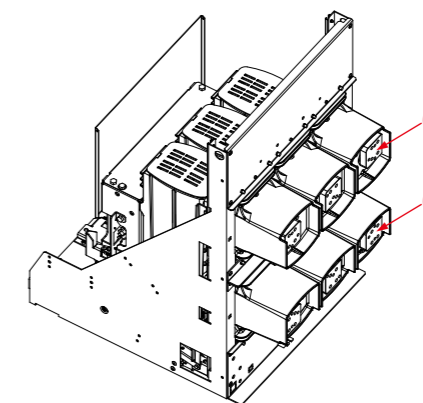
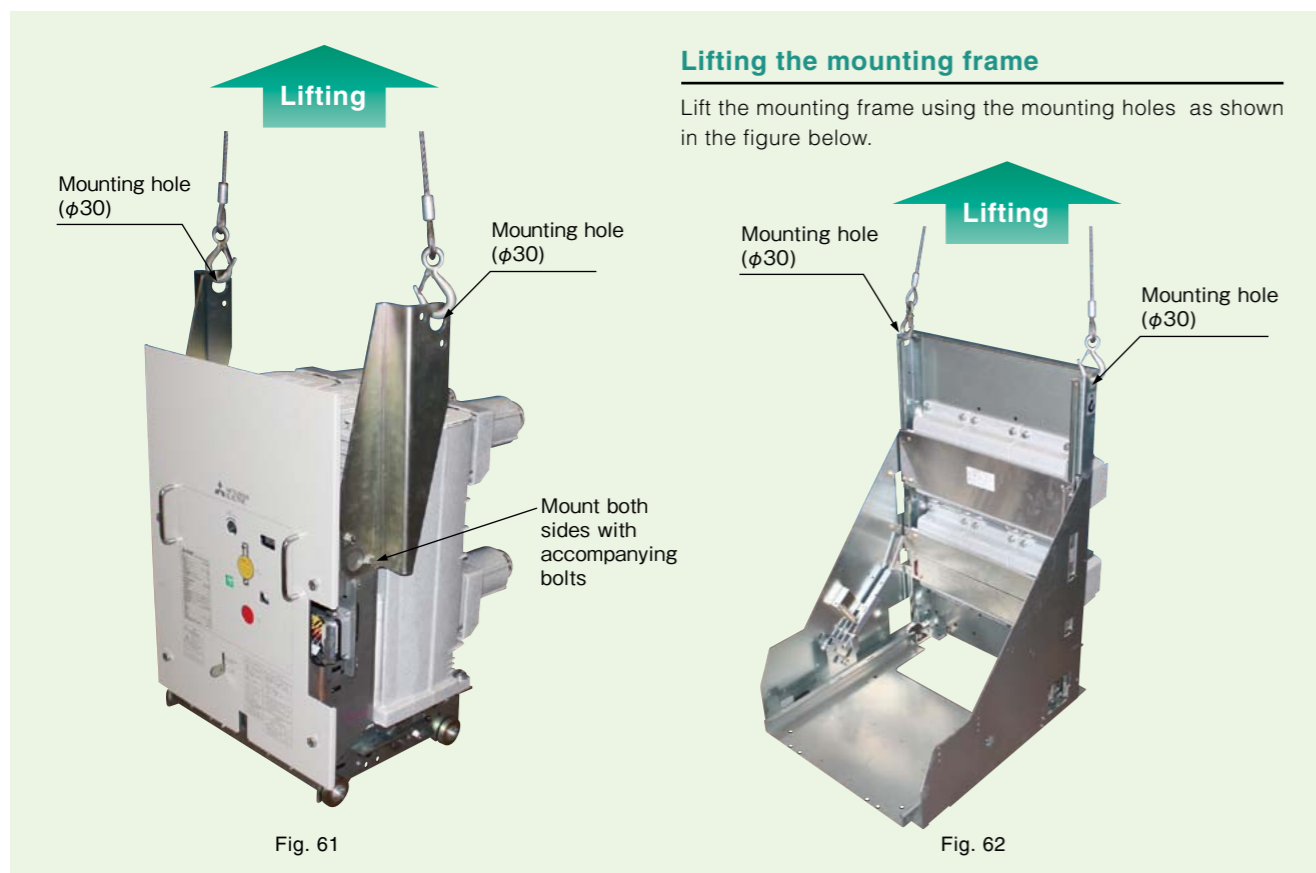


Fig. 60

11. Applicable Standards

Lifting the VCB

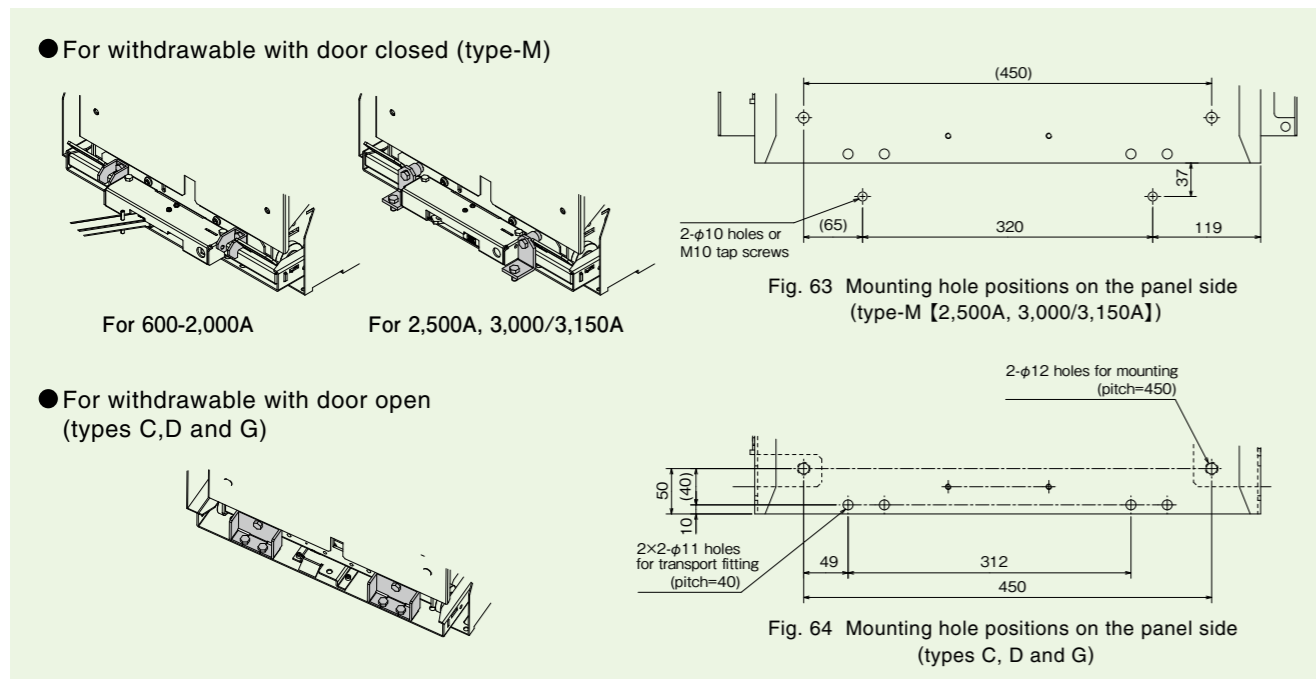
Lift the VCB using the mounting holes as shown below.



Do not lift VCBs while they are inserted in the mounting frame. When lifting the VCB or mounting frame, please refer to the instruction manual and follow the specific conditions provided.

Shipping Clamps

When a switchgear is supplied with the mounting frame and VCB (in test position), it is necessary to mount the frame and VCB on the switchgear. Follow the directions in the instruction manual and the accessories section of this catalog (page 20) to mount the devices using screws (M10) in the positions shown in the figure.



Altitude

When using the VCB in altitudes over 1,000m above sea level, the insulation withstand level is reduced due to differences from the standard ambient conditions.

To make corrections for altitude, please confirm and apply the insulation withstand levels for higher altitudes as listed in IEC 62271-1-2011.

For installations at an altitude 2,500 m, if VCB is required with BIL 75kV, VCB with BIL 95kV should be used in accordance with Figure 65. "75 multiplied by 1.2 is 90."

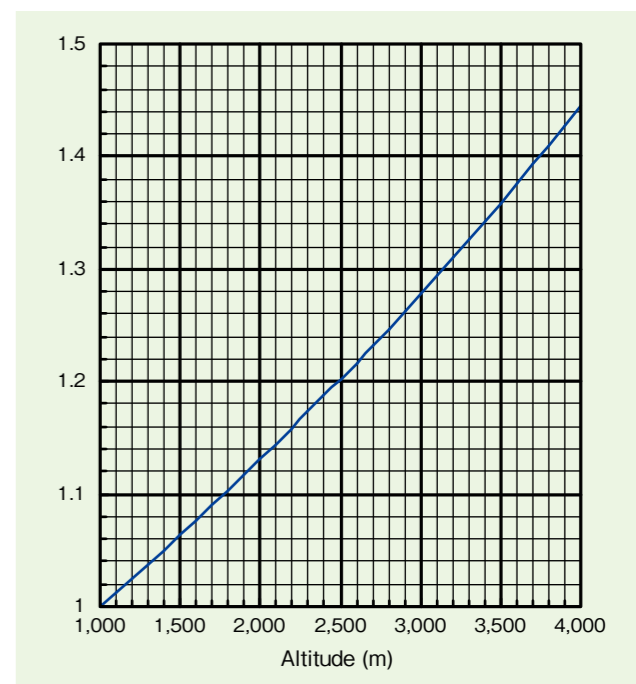


Fig. 65

Recommendations for VCB Maintenance

1. Standards for the replacement of parts

Replace parts according to the following schedule (applies to all types) to ensure reliable operation for the full term of the service life (20 years).

Table 31 Standards for the replacement of parts.

Part	Replacement standard		Reason for replacement
	Actuating cycle	Usage period	
Dumper	5,000	6 years	Degradation over time
Auxiliary switch	5,000	10-15 years	Preventive maintenance
Motor	5,000		
Limit switch	5,000		
VI	Switching service life of the rated short-circuit breaking current	30 times	Electrical service life
	Insulation performance	When defects occur in vacuum and withstand voltage	Degradation

2. Types of inspections

Table 32 Maintenance and inspection cycle.

Maintenance and inspection classification	Maintenance and inspection cycle	
	Normal environment	Substandard environment (especially dew condensation, salt and powder dust)
Patrol inspection	6 months	1 month
Periodic inspection	First time: 1-2 years Second time and later: 3 years	1-2 years
Detailed inspection	6 years	2-4 years
Special inspection	Maintenance and inspection cycle	

*1: Please replace a VCB when the number of switching operations reaches 10,000 times.

*2: Please consider replacing the product after 20 years of use under normal environmental conditions.

3. VCB Replacement Condition

VCBs are recommended for replacement when any of the following conditions are true:

- Twenty years have passed since manufacture.
- Switching service life has expired (see page 35).
- Abnormalities are identified in the inspection described in Table 32 and there is no chance of restoring the abnormalities through repair of parts.

*Make sure to refer to the instruction manual before inspection.

12. Ordering Information

Table 33 Code Description Chart (Standard Specifications)

Rated voltage	Type	Rated short-circuit breaking current	Series name	Classification	Standards	Mounting configuration	Rated current	Closing operation/control voltage	Tripping control voltage	Position switch	Secondary connector	Auxiliary switch	Closing spring charge indication switch	Mounting frame	Optional accessories
03 3.6kV	VPR	25 25kA	D	1 Class E1	J IEC 2300-2010	M Withdrawable with door closed (type-M) and class MW	06 600/630A	1 100-125 VAC/V DC	1 100-125 VDC	0 X	A Code A (Without interlock)	0 Standard (5a5b)	0 X	0 With mounting frame	0 X
06 7.2kV		32 31.5kA		2 Class E2	I IEC 62271-100-2012	C Withdrawable with door opened (type-C) and class CW	12 1,200/1,250A	2 200/220 VAC/V DC	2 200/220 VDC	1 1 unit (Connected position 2C+ (test position 2C))	B Code B (With interlock)	S For microcurrent (Standard 5a5b) microcurrent (2.2a2b contact)	1 With 1C	X Without mounting frame	A With Optional accessories
10 12kV		40 40kA		3 Class E1 BIL95kV (1.2kV)		D Withdrawable with door opened (type-D) and class PW	16 1,600A	7 24V DC	7 24V DC	2 2 units (Connected position 4C+ (test position 2C))					
15 15kV <small>(Except for the 3,000/3,150A rated current)</small>				4 Class E2 BIL95kV (1.2kV)		G Withdrawable with door opened (type-G) and class MW	20 2,000A	8 48V DC	8 48V DC						
						L Fixed (type-L)	25 2,500A	1 1 is standard. 2, 7 and 8 will be manufactured upon receipt of order							
							30 3,000A/3,150A (except for 15kV)								

Caution: • Refer to the catalog (JNEC-SL-0150) for the class E1 at 25kA, the standard draw-out operation (types C, D and G), and fixed (type-L) for items rated at 3.6kV/7.2kV (1,250A) and lower.

- Rated short-circuit breaking current of 40kA with E2 class cannot be manufactured.
- Withdrawable with door closed (type-M) is not compatible with mounting configuration class CW.
- Fixed (type-L) is not compatible with the rated voltage 15kV, BIL95kV, and code B.
- When selecting withdrawable (type-M), additional auxiliary switch and additional shunt tripping coil the control circuit plug configuration of code B should be applied.
- When selecting JEC 2300-2010 for standard, select class E1 for classification ⑨.

Table 34 Code description chart (special specifications)

Specifications	Codes and descriptions
Mechanical locking device (K)	
Tripping coil disconnection monitoring (T)	T
Additional shunt tripping coil (D)	D
Draw-out mechanism padlock device (P)	P
padlock device for close and trip button (B)	B
Capacitor tripping device (1), (2)	1 For 100/110V AC 2 For 200/220V AC
Earthing switch (Class E2) (E), (F)	E With electrical interlock F Without electrical interlock
Short-circuit capacity earthing (J)	J
Optional terminal (V: Vertical, H: Horizontal)	V H
Shutter padlock device (S)	S

- Caution:
- Mechanical locking device (K) and draw-out mechanism padlock device (P) should not be used together.
 - Earthing switches are not compatible with type-C in the mounting configuration.
 - When the tripping power is AC and the capacitor tripping device (CTD) is selected, select 100 - 125V for the tripping control voltage⑤.
 - When selecting an additional auxiliary switch and additional shunt tripping coil, it will be compatible only for control circuit plug: code B.
 - The tripping coil disconnection monitoring and the capacitor tripping device should not be used together.
 - The fixed (type-L) is not compatible with earthing switches, short-circuit capacity earthing, optional terminals or shutter padlock device.

Example for Order No.

10VPR40D1ID12110B0000 (without optional accessories)

10VPR40D1ID12110B000AKD (with mechanical locking device and additional shunt tripping coil)

To order any of the products below (sold separately), please contact a local service representative.
 Lifter CR suppressor Vacuum checker



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

MITSUBISHI ELECTRIC CORPORATION

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<http://Global.MitsubishiElectric.com>

Safety Warning

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