

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



Safety & Quality

TYPE VPR-C SERIES





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 circuit breakers are R size.

Rated current		600/630A	1200/1250A	1600A	2000A	2500A	3000/3150A	4000A
3.6kV	20kA	L size						
	25kA	L size						
	31.5kA	L size						
	40kA	L size						
7.2kV	20kA	L size		M size				
	25kA	L size		M size				
	31.5kA	L size		M size				
12kV	20kA	L size		M size				
	25kA	L size		M size				
	31.5kA	L size		M size				
24kV	20kA	L size		M size				
	16kA	L size		M size				
	25kA	L size		M size		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 <small>(see Notes 5)</small>	-	D
3	3.6kV	16		-	L Fixed (with wheels)
6	7.2kV	20		-	C Withdrawable (with Class CW mounting frame)
10	12kV	25		-	D Withdrawable (with Class PW mounting frame)
20	17.5kV, 24kV	32		-	G Withdrawable (with Class MW mounting frame)
		40		G	<small>(see Notes 3,4)</small>
				-	Standard
				G	Low surge

- Notes: 1. Different VSTs are installed on standard type and low surge type VCBs.
 2. Low surge types are only available for 600/630A and 1200/1250A range of 3-VPR VCBs and 6-VPR range of VCBs except 6-VPR-25C(S).
 3. Mounting configuration "L" is available for 600/630A to 2000A range of VCBs except for the 20-VPR range.
 4. For 20-VPR range of VCBs only mounting configurations "C" and "D" are available.
 5. Series code for 600/630A and 1200/1250A of 20-VPR-16CS and 20-VPR-25CS is CS. Refer to table 1 for details.

SELECTION CRITERIA

Table 1 IEC, JEC standard (Note 1)

Rated voltage	16kA	20kA	25kA	31.5kA	40kA
3.6kV	3-VPR-20C		3-VPR-25C	3-VPR-32C	3-VPR-40C
7.2kV	6-VPR-20C		6-VPR-25C 6-VPR-25C(S) (For 630,1250A)	6-VPR-32C	6-VPR-40C
12kV	10-VPR-25C 10-VPR-25C(F) (For 630,1250A)			10-VPR-32C	10-VPR-40C 10-VPR-40C(D) (For 4000A)
17.5kV	20-VPR-16CS		20-VPR-25CS		
24kV			20-VPR-25C (For 2000A)		

- Notes: 1. IEC : International standards, IEC 60056 (1987, Insulation level series I)
 JEC : Japanese standard, JEC-2300 (1998)
 2. Consult your dealer for information on the applicability of other foreign standards, including U.S. standard ANSI and Chinese standards GB, DL.
 3. Refer to the catalog (A-AL1-5-C1283-B) for VCBs of rated short-circuit breaking current 50kA or rated voltage 36kV.



RATINGS

FRAME SIZE

■ 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 (Note 2)	
	Low surge (Note 1)	3-VPR-20CG	3-VPR-25CG	3-VPR-32CG	3-VPR-40CG	6-VPR-20CG	-	
Closing operation mechanism								
Standards (Note 4)								
Rated voltage (kV)								
3.6								
Rated current (A)	600 / 630		600 / 630		1200 / 1250		1200 / 1250	
	1200 / 1250		1200 / 1250		1600		1600	
	1600		1600		2000		2000	
	2000		2000		2500		2500	
Rated frequency (Hz)								
3000 / 3150								
Rated short-circuit breaking current (kA)								
20		25		31.5		40		
Rated making current (kA)								
50		63		80		100		
Rated short-time withstand current (kA, 3sec.)								
20		25		31.5		40		
Rated opening time (sec.)								
Rated breaking time (cycles)								
3								
Rated withstand voltage (kV)	AC	16						
	Impulse	45						
Operating duty								
No-load closing time (sec.)								
Closing operation and control current (A) (Note 6)	Charging motor	1 (Charging time 8sec.) ... 600-1250A 1.2 (Charging time 6sec.) ... 1600, 2000A			1.2 (Charging time 6sec.)		1 (Charging time 8sec.) ... 600-1250A 1.2 (Charging time 6sec.) ... 1600, 2000A	
	Control current (CC coil)	2.4 ... 600-1250A 4 ... 1600, 2000A			4		2.4 ... 600-1250A 4 ... 1600, 2000A	
Tripping device								
Opening control current (A) (STC coil) (Note 6)	2 ... 600-1250A			4		2 ... 600-1250A		
	4 ... 1600, 2000A					4 ... 1600, 2000A		
External aux. contacts (Note 7,8)								
5a5b								
Operating counter (Mechanically)								
Mounting configuration								
Fixed (L)		Fixed (L) ... 1200-2000A			Fixed (L)			
Withdrawable (C,D,G)		Withdrawable (C,D,G) ... 1200-3150A			Withdrawable (C,D,G)			
Mass (kg) (Note 9)	55 (600/630A)		120 (1200/1250A)		55 (600/630A)			
	62 (1200/1250A)		140 (1600,2000A)		62 (1200/1250A)			
	140 (1600,2000A)		190 (3000/3150A)		140 (1600,2000A)			

- Notes: 1. Low surge types are only available for 600/630A and 1200/1250A range of 3-VPR VCBs and 6-VPR range of VCBs except 6-VPR-25C(S).
 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 1)
 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 range 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. For 2000A 20-VPR-25C, "S" is not added to the end of the type name.



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)

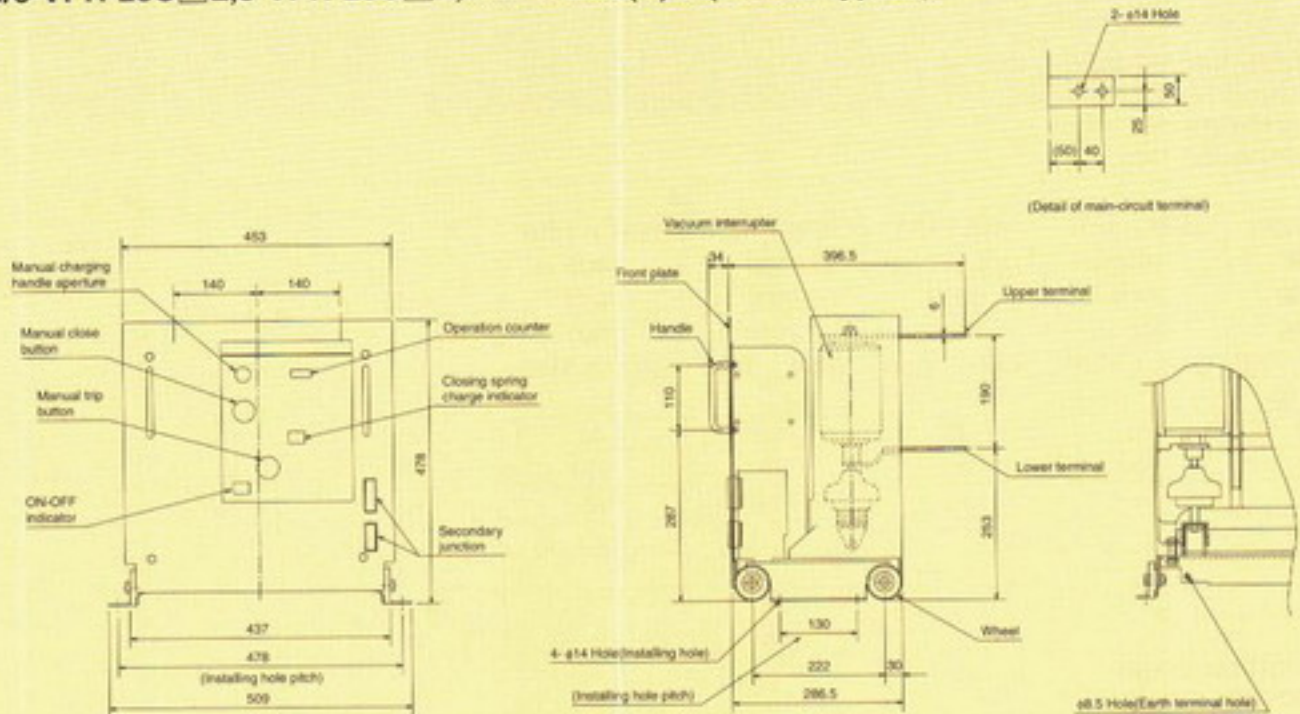


Fig. 1

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

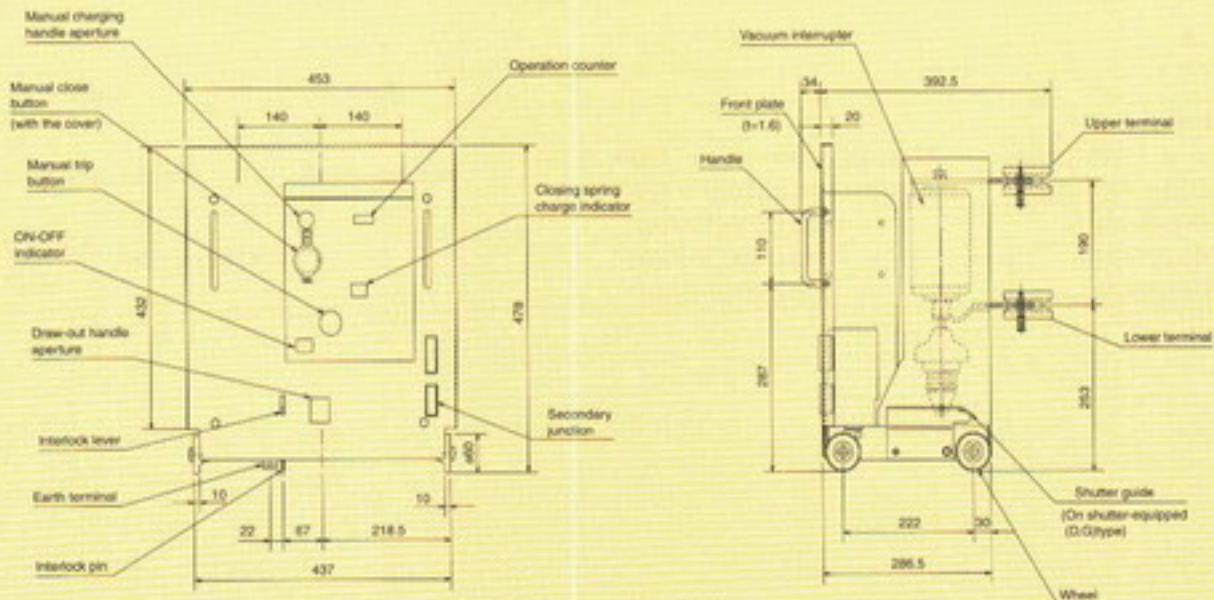


Fig. 2



Technical Information

■ Operation and control circuit

■ Electrical closing and tripping operation

Figure 43, 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.

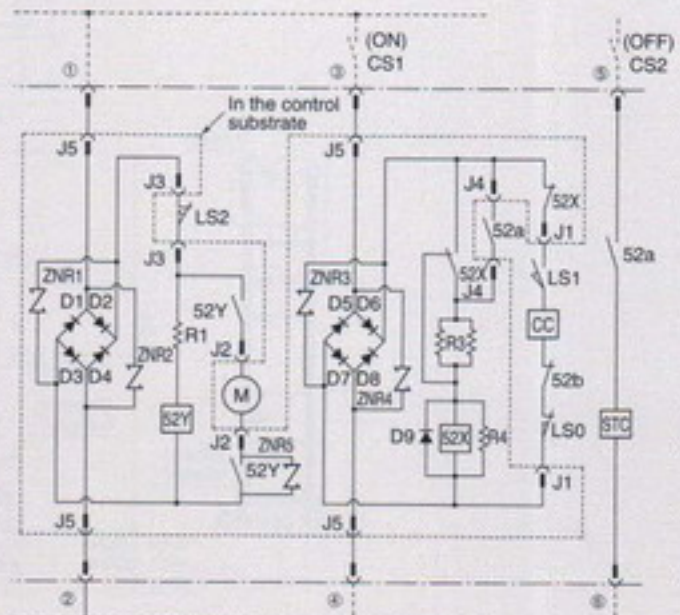
If the closing command and trip command are given simultaneously when the circuit breaker is in a closed state and the closing spring is in a charged state (closing preparation):

- 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. 46 Basic control circuit diagram

Notes: The right control circuit diagram indicates:

- VCB: Opened state
- Closing spring: Discharged state
- Motor circuit: No-voltage
- M: Motor (for charging the closing spring)
- CC: Closing coil
- STC: Voltage tripping coil
- LS0: Limit switch (for detection of position as to the mounting frame)
- LS1: Limit switch (closing spring charge detection contact)
- LS2: Limit switch (for motor start up/stop)
- 52a/b: Auxiliary contacts of circuit breaker
- 52Y: Auxiliary relay (for motor)
- 52X: Auxiliary relay (for anti-pumping prevention)
- R1/2/3/4: Resistance (R1,3 and 4 are equipped only for 200V)



■ Operation and control voltages (currents)

●Table 11 Operation and control voltage fluctuation range

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

●Table 12 Closing and tripping control current vs. current-flow time

VCB type name	Control voltage (V)	Current (A), Time (sec.)	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 1600, 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
20-VPR-16C/25C	Closing		3.4	0.05
	Tripping		3.4	0.03

●Table 13 Motor-operation control current vs. current-flow time

VCB type name	Control voltage (V)	Current (A), Time (sec.)	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 1600, 2000A 10-VPR-25C, 3/6/10-VPR-32C/40C 20-VPR-16C/25C			5	1.8	0.1	5
10-VPR-40C (D) 4000A			11.5	6	0.1	6

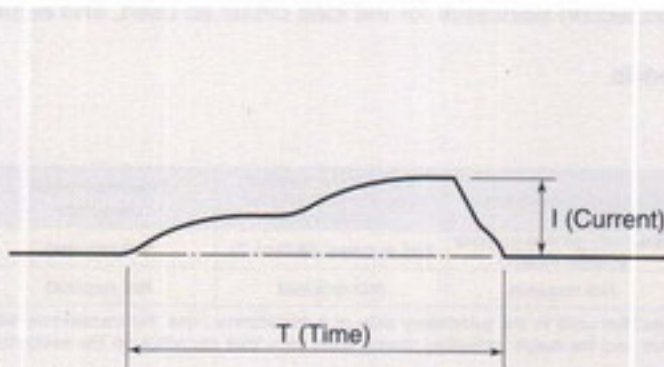


Fig. 47

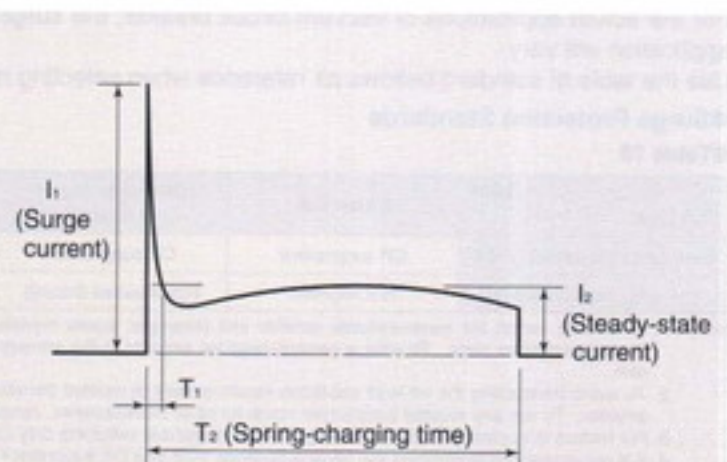


Fig. 48