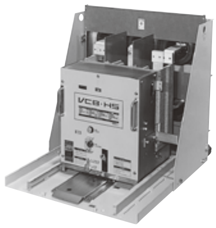
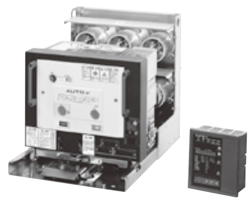
e-Front runners


Vacuum circuit breakers
HS series


Vacuum circuit breakers
Auto. V


Vacuum circuit breakers
New-Auto.V


Vacuum circuit breakers
Multi VCB

■ VACUUM CIRCUIT BREAKERS

■ VACUUM MAGNETIC CONTACTORS


Vacuum Magnetic Contactors
HN series

■ PROTECTIVE RELAYS


Protective relays
QH series

HIGH
VOLTAGE
EQUIPMENT
Up to 36kV

INDIVIDUAL CATALOG 12

from D&C CATALOG 20th Edition

01 02 03 04 05 06 07 08 09 10 11 **12**

Fuji Electric FA Components & Systems Co., Ltd.

12 H.V. Vacuum circuit breakers
Vacuum magnetic contactors
Protective relays

Page

Vacuum Circuit Breakers

General information 12/1
Advantages 12/2
HS series
- General information 12/4
- Specifications 12/5
- Types and ratings 12/11
- Installation and accessories 12/14
- Dimensions 12/15
- Wiring diagrams 12/24
- Application guide 12/25

Auto. V
- Specifications 12/26
- Design features 12/27
- Types and ratings 12/29
- New-Auto. V 12/30
- Installation and accessories 12/35
- Dimensions 12/38
- Wiring diagrams 12/42

Multi VCB
- Specifications 12/45
- Types and ratings 12/47
- Installation and accessories 12/48
- Dimensions 12/50
- Wiring diagrams 12/54

Vacuum Magnetic Contactors

HN series 12/57

Protective Relays

QH series
- General information 12/66
- Dimensions 12/69
- Wiring diagrams 12/70

MINIMUM ORDERS

Orders amounting to **less than ¥10,000** net per order will be charged as ¥10,000 net per order plus freight and other charges.

WEIGHTS AND DIMENSIONS

Weights and dimensions appearing in this catalog are the best information available at the time of going to press. FUJI ELECTRIC FA has a policy of continuous product improvement, and design changes may make this information out of date.
Please confirm such details before planning actual construction.

INFORMATION IN THIS CATALOG IS SUBJECT TO CHANGE WITHOUT NOTICE.

■ FUJI vacuum circuit breakers

Vacuum circuit breakers are compact circuit breakers designed for safe operation, high reliability and easy maintenance, and are widely used for various types of high voltage circuits. FUJI V-circuit breakers (VCB) have been developed through the use of our many years of successful experience and advanced technology. They are compact and light-weight, and are available in a number of current ratings.

AF92-31 KK03-058

HS series **Auto. V** **Multi VCB**

● HS series

These types are available in all ratings from 3.6 to 36kV, and can be applied to a variety of H.V. switchgear. The motor-spring stored-energy types feature auto-reclosing. The HS types are comparatively high in breaking current with ratings of over 7.2kV, 20kA.

- Breaking currents: 12.5kA to 50kA
- Rated voltage: 3.6kV to 36kV
- Standards: JEC, IEC

See page 12/4.

● Auto. V

Auto. Vs are provided with a built-in electronic overcurrent relay and toroidal-type CT.
They require little space for installation and also facilitate the system wide protective coordination.
The inverse-time operating and instantaneous trip currents can be set by means of the dial.

- Breaking currents: 8kA, 12.5kA
- Rated voltage: 3.6/7.2kV
- Standards: JIS C4603

See page 12/26.

● Multi VCB

The Multi VCBs are general purpose VCBs which are small in size and simple in construction thus allowing them to be applied to many types of switchgear.

- Breaking currents: 8kA, 12.5kA
- Rated voltage: 3.6/7.2kV
- Standards: JIS C4603

See page 12/45.

■ Quick selection table

Breaking current (kA)	Rated current JIS, JEC (A)	Rated voltage (kV)	Closing system	Type □ : Installation
20	600 1200 2000	3.6/7.2	Motor-spring	**HS2006□-06Mf-E** **HS2006□-12Mf-E** **HS2006□-20Mf-E**
25	600 1200 2000	3.6/7.2		**HS2506□-06Mf-E** **HS2506□-12Mf-E** **HS2506□-20Mf-E**
31.5	1200 2000 3000	3.6/7.2	Discontinued Mar.2007	**HS3106□-12Mf-E** **HS3106□-20Mf-E** **HS3106□-30Mf-N**
40	1200 2000 3000 4000	3.6/7.2	Discontinued Mar.2007	**HS4006□-12Mf-E** **HS4006□-20Mf-E** **HS4006□-30Mf-N** **HS4006□-40Mf-N**
50	1200 2000 3000	3.6/7.2		**HS5006□-12Mf-NA** **HS5006□-20Mf-NA** **HS5006□-30Mf-N**
12.5	600 1200 2000	12		**HS1210□-06Mf-E** **HS1210□-12Mf-E** **HS1210□-20Mf-E**
16	600 1200 2000	12		**HS1610□-06Mf-E** **HS1610□-12Mf-E** **HS1610□-20Mf-E**
20	600 1200 2000	12		**HS2010□-06Mf-E** **HS2010□-12Mf-E** **HS2010□-20Mf-E**
25	600 1200 2000	12		**HS2510□-06Mf-E** **HS2510□-12Mf-E** **HS2510□-20Mf-E**
31.5	1200 2000 3000	12		**HS3110□-12Mf-E** **HS3110□-20Mf-E** **HS3110□-30Mf-N**
40	1200 2000 3000 4000	12	Motor-spring	**HS4010□-12Mf-NA** **HS4010□-20Mf-NA** **HS4010□-30Mf-N** **HS4010□-40Mf-N**
50	1200 2000 3000	12		**HS5010□-12Mf-NA** **HS5010□-20Mf-NA** **HS5010□-30Mf-N**
12.5	600 1200	24		**HS1220□-06Mf-K** **HS1220□-12Mf-K**
16	600 1200	24		**HS1620□-06Mf-E** **HS1620□-12Mf-E**
25	600 1200 2000	24		**HS2520□-06Mf-E** **HS2520□-12Mf-E** **HS2520□-20Mf-E**
40	1200 2000 3000	24		**HS4020□-12Mf-N** **HS4020□-20Mf-N** **HS4020□-30Mf-N**
25	600 1200 2000	36		**HS2530□-06Mf-N** **HS2530□-12Mf-N** **HS2530□-20Mf-N**
8.0 12.5	400 600	3.6/7.2	Manual-spring	**HA08□-H□** **HA12□-H□**
8.0 12.5	400 600	3.6/7.2	Motor-spring Fixed	**HA08□-A□** **HA12□-A□**
8.0 12.5	400 600	3.6/7.2	Motor-spring Draw-out	**HA08A□-A8** **HA12A□-A8**
8.0 12.5	400 600	3.6/7.2	Motor-spring Fixed	**HA08□-A□** **HA12□-A□**
8.0 12.5	400 600	3.6/7.2	Motor-spring Draw-out	**HA08A□-A□** **HA12A□-A□**

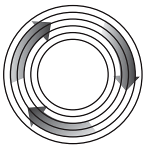
Note: □ Installation : *See pages 12/4 for HS series, 12/26 for Auto. V and 12/45 for Multi VCB.*

H.V. Distribution Equipment
Vacuum circuit breakers
Advantages

■ Description
3.6kV to 36kV, 600 to 4000A, 12.5 to 50kA

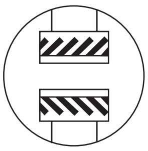
The revolutionary arc extinguishing system

● Rotary



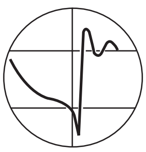
FUJI VCBs have employed a unique design principle in which the contacts are provided with a succession of slits having toroidal-type CrCu contacts mounted on them.
The arc is driven round the circular contact surface as it is being extinguished. Since the arc is not localized at one point there is no fear of overheating.
This results in much improved inter-electrode dielectric strength so ensuring excellent breaking capability. Moreover, uneven contact wear is minimized.

● Getter



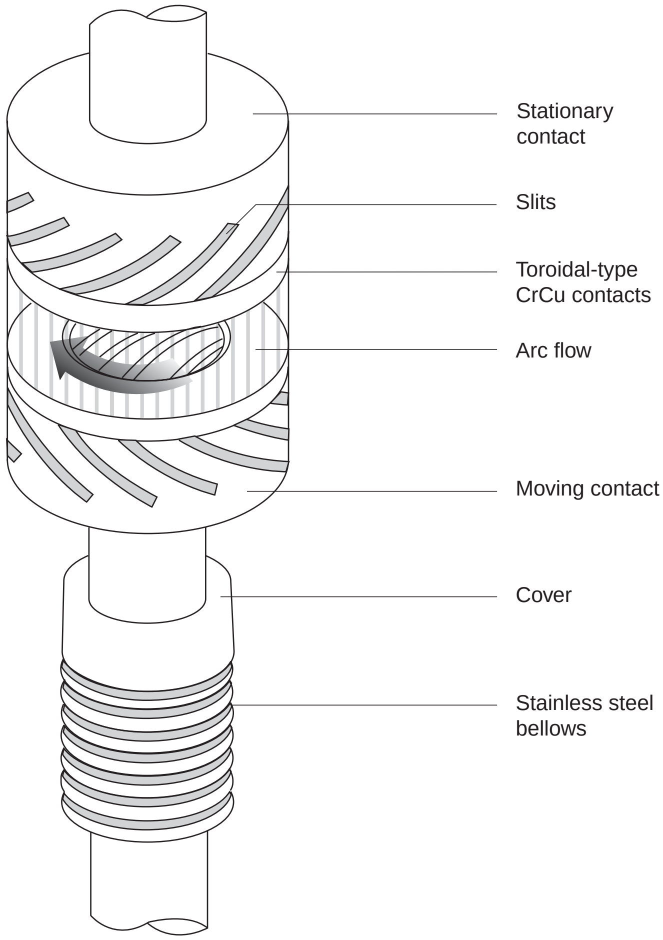
FUJI vacuum interrupters make use of the gettering effect. The toroidal-type contacts are made of a special chromium-copper (CrCu) alloy specially developed by FUJI so as to ensure a large “getter” quality.
The metallic gases thus produced at interruption and left in the vacuum are quickly absorbed by the getter. The gases are neutralized so maintaining the high degree of vacuum.
The interrupters require a minimum of attention over their long service life.

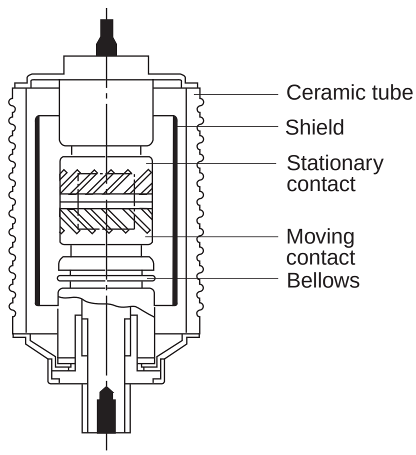
● Surge



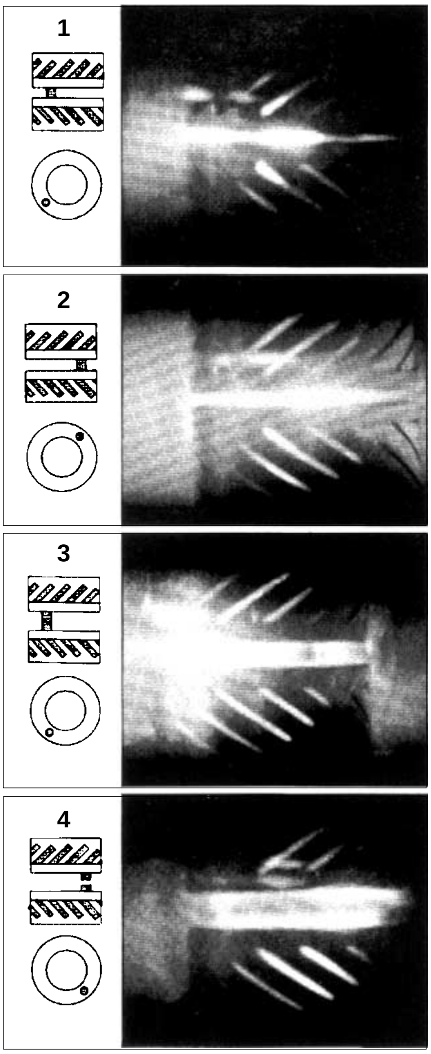
Switching surges can be generated at small current breaking due to the VCB inherent chopping current.
FUJI has paid much attention to this problem, and after much effort on design and materials research it has been possible to reduce the chopping current to 3.5 Amps. This very small chopping current means that the corresponding surge voltage will be reduced and cost efficient surge protection can be carried out for motors, transformers and other load equipment.

The revolutionary arc extinguishing system





● Progress of arc extinction
Arcs generated by VCBs have inherent characteristics that change when approximately 10kA is reached. Less than 10kA a dispersed arc occurs, over this value the arc is concentrated. The photos were taken consecutively and illustrate an interruption in the 25kA range (concentrated arc). About 4 1/2 rotations occurred (10ms at 50Hz). This time is typical, but varies according to breaking current and arcing times.



Explanation
1. The contacts begin to open and the arc moves from the center to the left hand side.
2. 3. The arc is driven round the toroidal-type contact surface.
4. The contacts are in the full open position just before interruption is completed.

■ Definitions

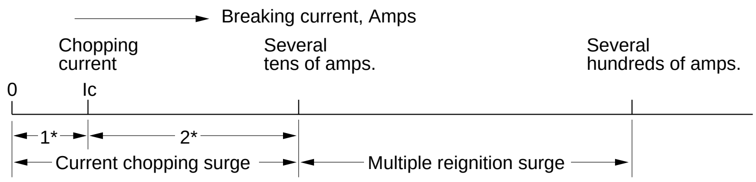
● What is the action of the "getter"?
Sometimes called a "degasser" the "getter" uses a special material such as zirconium alloy that has the property of absorbing metallic gases in a vacuum. This allows the high degree of vacuum to be maintained.

● Switching surges and VCBs?
Switching surges can be generated when breaking currents within several hundreds range.
VCB inherent switching surges are generated under certain specific conditions which mainly comprise current chopping surges and multiple current reignition surges. No problem is posed by switching surges when breaking current exceeds several hundred amperes.

Surge voltages
The value of the surge voltage due to switching surges varies according to the load circuit conditions.
This can be expressed in the following simple formula:
Surge voltage = Surge impedance × Chopping current
Therefore, it is necessary to keep the chopping current low in order to reduce the surge voltage to the minimum. The peak transient voltage is obtained by adding to the above calculation the voltage on the load side at the time of current chopping.

Chopping surge
The chopping surge occurs when a low current is interrupted, the arc is unstable before current becomes zero and the current is forcedly chopped. At this time a surge is generated by the energy remaining in the load inductance.
Example:
When the no-load interruption of a transformer is carried out the exciting current only is interrupted.

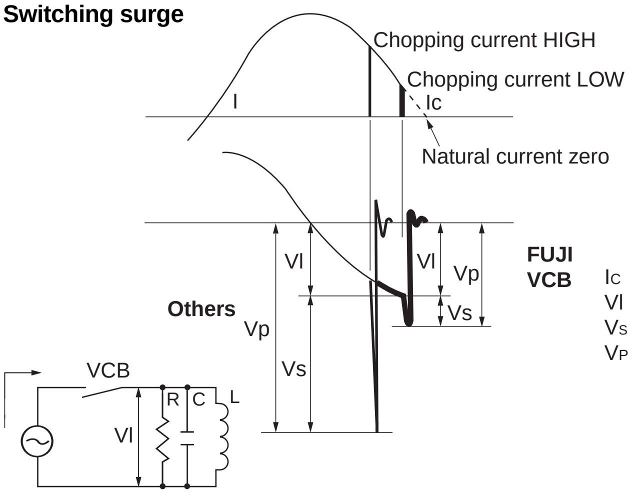
Chopping surge



1* Chopping surge suppresed by reignition
2* Chopping surge not accompanied with reignition

Multiple reignition surge
The multiple reignition surges can occur when breaking currents range from tens to hundreds of amperes. Although no problem is normally posed even when breaking these currents, a high surge voltage can be generated when breaking an inrush current on starting the motors.

Switching surge



I_C : Chopping current
Vl : Voltage at load side
V_S : Surge transient voltage
V_P : Peak transient voltage
$V_P = Vl + V_S$
$V_S =$ Surge impedance $\times I_C$
Surge impedance:
$Z = \sqrt{\frac{L}{C}}$

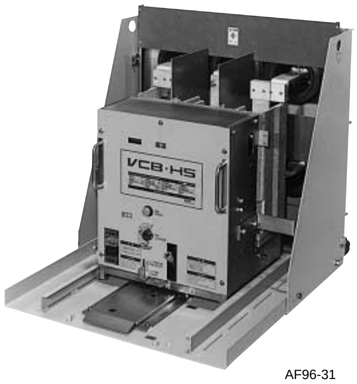
Vacuum circuit breakers
HS series/General information

■ Description

HS type 3.6kV to 36kV up to 63kA. FUJI HS series vacuum circuit breakers are designed to meet the many special needs of industry. The vacuum interrupter system employed reflects the latest technology. The circuit breaker has a very stable and constant breaking performance over a wide range of currents up to the rated short circuit current value.
The motor spring type (M) closing system can perform high speed reclosing.
The contacts are made of a special alloy and require no maintenance over their long life time.
The interrupter is provided with a contact-wear indicator which gives notice when replacement is required.
The open and close positioning indicator, operating counter, pushbutton for manual interruption and manual closing device are conveniently installed on the control section of the dead-front operating panel, and are isolated from the high-voltage breaking section for safety reasons and to facilitate operation and inspection. FUJI VCBs comprise the fixed mounted (P) type and cradle (X and Y) types. Since the cradle version is provided with a draw-out system switchgear assembly is easily carried out.

■ Ordering information

Specify the following:
1. Type number
2. Rated voltage, current and frequency
3. Rated breaking capacity
4. Installation system
5. Operating voltage and frequency (M) of closing system
6. Voltage and current of tripping system
7. Optional accessories, if required



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Series of FUJI VCB

Breaking current \ Rated voltage	3.6kV	7.2kV	12kV	15kV	24kV	36kV
12.5kA	–		HS1210: 600A 1200A, 2000A	–	HS1220: 600A 1200A	–
16kA	–		HS1610: 600A 1200A, 2000A	HS1615: 600A, 1200A, 2000A	HS1620: 600A 1200A	–
20kA	HS2006: 600A 1200A, 2000A		HS2010: 600A 1200A, 2000A	HS2015: 600A, 1200A, 2000A	–	–
25kA	HS2506: 600A 1200A, 2000A		HS2510: 600A 1200A, 2000A	HS2515: 600A, 1200A, 2000A	HS2520: 600A 1200A, 2000A	HS2530: 600A 1200A, 2000A
31.5kA	HS3106: 1200A 2000A, 3000A		HS3110: 1200A 2000A, 3000A	HS3115: 600A, 1200A, 2000A	–	–
40kA	HS4006: 1200A 2000A, 3000A, 4000A4000A		HS4010: 1200A 2000A, 3000A	HS4015: 600A, 1200A, 2000A	HS4020: 1200A 2000A, 3000A	–
50kA	HS5006: 1200A, 2000A, 3000A		HS5010: 1200A 2000A, 3000A	–	–	–
63kA	HS6306: 1200A, 2000A		–	–	–	–

■ Type number nomenclature

HS 20 06 M- 06 M f

Basic type
HS: 7.2kV 12.5kA and over

Rated breaking current
12: 12.5kA 31: 31.5kA
16: 16kA 40: 40kA
20: 20kA 50: 50kA
25: 25kA 63: 63kA

Rated voltage
06: 3.6/7.2kV 20: 24kV
10: 12kV 30: 36kV

Installation
P : Fixed type
X : Draw-out type with cradle for JEM1425 Class CW
U : Draw-out type with cradle for JEM1425 Class CW
Y : Draw-out type with cradle and shutter for JEM1425 MW, PW
M: Draw-out type for HS2530

Rated current
06: 600, 630A 20: 2000A
12: 1200, 1250A 30: 3000A
40: 4000A

Closing system
M: Motor-spring stored energy (High speed reclosing)
Specify the frequency and voltage (AC or DC)

Tripping system
f : Shunt trip
Specify the frequency and voltage (AC or DC)

■ Specifications

Type		**HS2006□ -■Mf-E**		**HS2506□ -■Mf-E**		**HS3106□ -■Mf-E**	
Rated voltage [kV]		3.6	7.2	3.6	7.2	3.6	7.2
Rated current [A] ■ :06, 12, 20, 30	JEC	600, 1200 2000		600, 1200 2000		1200, 2000, 3000	
	IEC	630, 1250 2000		630, 1250 2000		1250, 2000, 3000	
Rated breaking capacity	[kA]	20		25		31.5	
	[MVA] Ref. value	125	250	160	310	200	390
Rated short-circuit making current [kA]		50		63		80	
Rated short-time withstand current [kA]	JEC: 2 sec. IEC: 1 sec. *1	20 20		25 25		31.5 31.5	
Rated breaking time [cycle]		3		3		3	
Rated withstand voltage — Power frequency (1 min.)	JEC [kV] IEC [kV]	22 20		22 20		22 20	
Rated withstand voltage — Impulse (1.2×50μs) [kV]		60		60		60	
Closing time at no load [sec]		0.04		0.04		0.04 (3000A: 0.05)	
Rated operating sequence	JEC IEC	O-1min-CO-3min-CO, CO-15s-CO or O-0.35s-CO-1min-CO O-3min-CO-3min-CO, CO-15s-CO or O-0.3s-CO-3min-CO					
Opening time [sec.]	JEC	0.03		0.03		0.03	
	IEC	0.03		0.03		0.03	
Closing system		Motor-spring stored energy (High speed reclosing) (M)					
Operating voltage and current for closing		100V AC/DC, 1.7A*3 200V AC/DC, 1A		100V AC/DC, 2A 200V AC/DC, 1A		100V AC/DC, 2.5A 200V AC/DC, 1.7A	
Control voltage and current for closing		100V AC/DC, 4A 200V AC/DC, 2A		100V AC/DC, 4A 200V AC/DC, 2A		100V AC/DC, 5A 200V AC/DC, 2.5A	
Tripping system*2		Shunt trip (f)					
Operating voltage and current for tripping		100V DC, 4A 200V DC, 2A				100V DC, 4A 200V DC, 2A	
Auxiliary contact		4NO+4NC, Rating 100/200V AC: 20/10A, 100/200V DC: 5/3A					
Durability	Mechanical [operations] Electrical [operations]	10000 10000					
Installation □		P, Y X, U (600, 1200A only)		P, Y X, U (600, 1200A only)		P, Y X (1200, 2000A only)	
Mass (draw-out type without cradle)[kg]		62 (X, U, Y: 600A) 66 (Y: 1200A) 117 (Y: 2000A)		66 (X, U, Y: 600A) 70 (Y: 1200A) 117 (Y: 2000A)		122 (X, Y: 1200A) 130 (X, Y: 2000A) 220 (Y: 3000A)	

Notes: *1 Contact FUJI for the information concerning the 3 sec. rating of IEC.
*2 If capacitor tripping system is required, connect a capacitor trip device VCB-T1A or VCB-T2A (optional accessory) to AC power supply.
*3 2A for 2000A rating.

■ Specifications

Type		**HS4006□ -■Mf-E**		**HS4006□ -40Mf-N**		**HS5006□ -■Mf-NA**		**HS5006□ -30Mf-N**		**HS6306□ -■Mf-NB**	
Rated voltage [kV]		3.6	7.2	3.6	7.2	3.6	7.2	3.6	7.2	3.6	7.2
Rated current [A] ■: 12, 20, 30	JEC	1200, 2000, 3000		4000		1200, 2000		3000		1200, 2000	
	IEC	1250, 2000, 3000		4000		1250, 2000		3000		1250, 2000	
Rated breaking capacity	[kA]	40		40		50		50		63	
	[MVA] Ref. value	250	500	250	500	310	620	310	620	390	780
Rated short-circuit making current [kA]		100		100		125		125		160	
Rated short-time withstand current [kA]	JEC: 2 sec. IEC: 1 sec. *1	40 40		40 40		50 50		50 50		63 63	
Rated breaking time [cycle]		5		5		5		5		5	
Rated withstand voltage — Power frequency (1 min.)	JEC [kV] IEC [kV]	22 20		22 20		22 20		22 20		22 20	
Rated withstand voltage — Impulse (1.2×50μs) [kV]		60		60		60		60		60	
Closing time at no load [sec]		0.04(3000A: 0.05)		0.1		0.1		0.1		0.1	
Rated operating sequence	JEC IEC	O-1min-CO-3min-CO, O-3min-CO-3min-CO,		CO-15s-CO or O-0.35s-CO-1min-CO CO-15s-CO or O-0.3s-CO-3min-CO							
Opening time [sec.]	JEC	0.03		0.07		0.07		0.07		0.07	
	IEC	0.04		0.07		0.07		0.07		0.07	
Closing system		Motor-spring stored energy (High speed reclosing) (M)									
Operating voltage and current for closing		100V AC/DC, 2.5A 200V AC/DC, 1.7A		100V AC/DC, 6A 200V AC/DC, 3A		100V AC/DC, 6A 200V AC/DC, 3A		100V AC/DC, 6A 200V AC/DC, 3A		100V AC/DC, 6A 200V AC/DC, 3A	
Control voltage and current for closing		100V AC/DC, 5A 200V AC/DC, 2.5A		100V AC/DC, 4A 200V AC/DC, 2A		100V AC/DC, 4A 200V AC/DC, 2A		100V AC/DC, 4A 200V AC/DC, 2A		100V AC/DC, 4A 200V AC/DC, 2A	
Tripping system *2		Shunt trip (f)									
Operating voltage and current for tripping		100V DC, 4A: JEC 3A: IEC 200V DC, 2A: JEC 1.5A: IEC		100V DC, 4A 200V DC, 2A							
Auxiliary contact		4NO+4NC, Rating 100/200V AC: 20/10A, 100/200V DC: 5/3A									
Durability	Mechanical [operations] Electrical [operations]	10000 10000									
Installation □		P, Y X (1200, 2000A only)		P, X, Y		P, Y		P, Y		Y	
Mass (draw-out type without cradle) [kg]		122 (X, Y: 1200A) 130 (X, Y: 2000A) 220 (Y: 3000A)		400		240		320		350	

Notes: *1 Contact FUJI for the information concerning the 3 sec. rating of IEC.
*2 If capacitor tripping system is required, connect a capacitor trip device VCB-T1A or VCB-T2A (optional accessory) to AC power supply.

■ Specifications

Type		**HS1210□ -■Mf-E**	**HS1610□ -■Mf-E**	**HS2010□ -■Mf-E**	**HS2510□ -■Mf-E**	**HS3110□ -■Mf-E**
Rated voltage [kV]		12	12	12	12	12
Rated current [A] ■: 06, 12, 20	JEC	600, 1200 2000	600, 1200 2000	600, 1200 2000	600, 1200 2000	1200, 2000
	IEC	630, 1250 2000	630, 1250 2000	630, 1250 2000	630, 1250 2000	1250, 2000
Rated breaking capacity	[kA]	12.5	16	20	25	31.5
	[MVA] Ref. value	260	330	415	520	650
Rated short-circuit making current [kA]		31.5	40	50	63	80
Rated short-time withstand current [kA]	JEC: 2 sec. IEC: 1 sec. *1	12.5 12.5	16 16	20 20	25 25	31.5 31.5
Rated breaking time [cycle]		3	3	3	3	3
Rated withstand voltage: Power frequency (1 min.)	JEC [kV] IEC [kV]	28 28	28 28	28 28	28 28	28 28
Rated withstand voltage: Impulse (1.2×50μs) [kV]		75	75	75	75	75
Closing time at no load [sec.]		0.04	0.04	0.04	0.04	0.04
Rated operating sequence	JEC IEC	O-1min-CO-3min-CO, CO-15s-CO or O-0.35s-CO-1min-CO O-3min-CO-3min-CO, CO-15s-CO or O-0.3s-CO-3min-CO				
Opening time [sec.]	JEC	0.03	0.03	0.03	0.03	0.03
	IEC	0.03	0.03	0.03	0.03	0.03
Closing system		Motor-spring stored energy (High speed reclosing) (M)				
Operating voltage and current for closing		100V AC/DC, 1.7A (600, 1200A), 2.5A (2000A) 200V AC/DC, 1A (600, 1200A), 1.7A (2000A)				100V AC/DC, 2.5A 200V AC/DC, 1.7A
Control voltage and current for closing		100V AC/DC, 4A (600, 1200A), 5A (2000A) 200V AC/DC, 2A (600, 1200A), 2.5A (2000A)				100V AC/DC, 5A 200V AC/DC, 2.5A
Tripping system*2		Shunt trip (f)				
Operating voltage and current for tripping		100V DC, 4A 200V DC, 2A				100V DC, 4A 200V DC, 2A
Auxiliary contact		4NO+4NC, Rating 100/200V AC: 20/10A, 100/200V DC: 5/3A				
Durability	Mechanical [operations] Electrical [operations]	10000 10000				
Installation □		P, Y X (600, 1200A only)	P, Y X (600, 1200A only)	P, Y X (600, 1200A only)	P, Y X (600, 1200A only)	P, X, Y
Mass (draw-out type, without cradle) [kg]		71 (Y: 600A) 71 (Y: 1200A) 130 (X, Y: 2000A)	71 (Y: 600A) 71 (Y: 1200A) 130 (X, Y: 2000A)	71 (Y: 600A) 71 (Y: 1200A) 130 (X, Y: 2000A)	75 (Y: 600A) 75 (Y: 1200A) 130 (X, Y: 2000A)	122 (X, Y: 1200A) 130 (X, Y: 2000A)

Notes: *1 Contact FUJI for the information concening the 3 sec. rating of IEC.
*2 If capacitor tripping system is required, connect a capacitor trip device VCB-T1A or VCB-T2A (optional accessory) to an AC power supply.

■ Specifications

Type		**HS3110 -30Mf-N**	**HS4010 -■Mf-NA**	**HS4010 -■Mf-N**	**HS5010 -■Mf-NA**	**HS5010 -30Mf-N**
Rated voltage [kV]		12	12	12	12	12
Rated current [A] ■: 12, 20, 30, 40	JEC	3000	1200, 2000	3000, 4000	1200, 2000	3000
	IEC	3000	1250, 2000	3000, 4000	1250, 2000	3000
Rated breaking capacity	[kA]	31.5	40	40	50	50
	[MVA] Ref. value	650	830	830	1040	1040
Rated short-circuit making current [kA]		80	100	100	125	125
Rated short-time withstand current [kA]	JEC: 2 sec. IEC: 1 sec. *1	31.5 31.5	40 40	40 40	50 50	50 50
Rated breaking time [cycle]		3	5	5	5	5
Rated withstand voltage — Power frequency (1 min.)	JEC [kV] IEC [kV]	28 28	28 28	28 28	28 28	28 28
Rated withstand voltage — Impulse (1.2×50μs) [kV]		75	75	75	75	75
Closing time at no load [sec.]		0.1	0.1	0.1	0.1	0.1
Rated operating sequence	JEC IEC	O-1min-CO-3min-CO, CO-15s-CO or O-0.35s-CO-1min-CO O-3min-CO-3min-CO, CO-15s-CO or O-0.3s-CO-3min-CO				
Opening time [sec.]	JEC	0.04	0.04	0.04*3	0.07	0.07
	IEC	0.04	0.04	0.04*3	0.07	0.07
Closing system		Motor-spring stored energy (High speed reclosing) (M)				
Operating voltage and current for closing		100V AC/DC, 6A 200V AC/DC, 3A				
Control voltage and current for closing		100V AC/DC, 4A 200V AC/DC, 2A				
Tripping system*2		Shunt trip (f)				
Operating voltage and current for tripping		100V DC, 4A 200V DC, 2A				
Auxiliary contact		4NO+4NC, Rating 100/200V AC: 20/10A, 100/200V DC: 5/3A				
Durability	Mechanical [operations] Electrical [operations]	10000 10000				
Installation		P, Y	P, Y	P, Y(3000A) X(4000A)	P, Y	P, Y
Mass (draw-out type without cradle) [kg]		320	240	320 (3000A) 400 (4000A)	240	320

Notes: *1 Contact FUJI for the information concerning the 3 sec. rating of IEC.
*2 If capacitor tripping system is required, connect a capacitor trip device VCB-T1A or VCB-T2A (optional accessory) to AC power supply.
*3 0.07s for 4000A rating.

■ Specifications

Type		**HS1215□ -■Mf-N**	**HS1615□ -■Mf-N**	**HS2015□ -■Mf-N**	**HS2515□ -■Mf-N**	**HS3115□ -■Mf-N**	**HS4015□ -■Mf-N**
Rated voltage [kV]		15	15	15	15	15	15
Rated current [A] ■: 06, 12, 20, 30	JEC	600, 1200 2000	600, 1200 2000	600, 1200 2000	600, 1200 2000	1200 2000, 3000	1200 2000, 3000
	IEC	630, 1250 2000	630, 1250 2000	630, 1250 2000	630, 1250 2000	1250 2000, 3000	1250 2000, 3000
Rated breaking capacity	[kA]	12.5	16	20	25	31.5	40
	[MVA] Ref. value	325	415	520	650	820	1040
Rated short-circuit making current [kA]		31.5	40	50	63	80	100
Rated short-time withstand current [kA]	JEC: 2 sec. IEC: 1 sec. *1	12.5 12.5	16 16	20 20	25 25	31.5 31.5	40 40
Rated breaking time [cycle]		3	3	3	3	3	5
Rated withstand voltage — Power frequency (1 min.)	JEC [kV] IEC [kV]	– 36	– 36	– 36	– 36	– 36	– 36
Rated withstand voltage — Impulse (1.2×50μs) [kV]		95	95	95	95	95	95
Closing time at no load [sec.]		0.1	0.1	0.1	0.1	0.1	0.1
Rated operating sequence	JEC IEC	O-1min-CO-3min-CO, CO-15s-CO or O-0.35s-CO-1min-CO O-3min-CO-3min-CO, CO-15s-CO or O-0.3s-CO-3min-CO					
Opening time [sec.]	JEC	0.03	0.03	0.03	0.03	0.04	0.04
	IEC	0.03	0.03	0.03	0.03	0.04	0.04
Closing system		Motor-spring stored energy (High speed reclosing) (M)					
Operating voltage and current for closing		100V AC/DC, 1.3A 200V AC/DC, 0.8A				100V AC/DC, 6A 200V AC/DC, 3A	
Control voltage and current for closing		100V AC/DC, 5A 200V AC/DC, 3A				100V AC/DC, 4A 200V AC/DC, 2A	
Tripping system *2		Shunt trip (f)					
Operating voltage and current for tripping		100V DC, 4A 200V DC, 2A					
Auxiliary contact		4NO+4NC, Rating 100/200V AC: 20/10A, 100/200V DC: 20/10A					
Durability	Mechanical [operations] Electrical [operations]	10000 10000					
Installation □		P, X, Y	P, X, Y	P, X, Y	P, X, Y	P, Y	P, Y
Mass (draw-out type without cradle) [kg]		130 (600A) 130 (1200A) 140 (2000A)	130 (600A) 130 (1200A) 140 (2000A)	130 (600A) 130 (1200A) 140 (2000A)	130 (600A) 130 (1200A) 140 (2000A)	195 (1200A) 195 (2000A) 320 (3000A)	260 (1200A) 260 (2000A) 320 (3000A)

Notes: *1 Contact FUJI for the information concerning the 3 sec. rating of IEC.
*2 If capacitor tripping system is required, connect a capacitor trip device VCB-T1A or VCB-T2A (optional accessory) to AC power supply.

Vacuum circuit breakers
HS series

■ Specifications

Type		HS1220□ -■Mf-K	HS1620□ -■Mf-E	HS2520□ -■Mf-E	HS4020□ -■Mf-N	HS2530□ -■Mf-N
Rated voltage [kV]		24	24	24	24	36
Rated current [A] ■: 06, 12, 20, 30	JEC	600, 1200	600, 1200	600, 1200 2000	1200, 2000 3000	600, 1200 2000
	IEC	630, 1250	630, 1250	630, 1250 2000	1250, 2000 3000	630, 1250 2000
Rated breaking capacity	[kA]	12.5	16	25	40	25
	[MVA] Ref. value	520	665	1000	1660	1600
Rated short-circuit making current [kA]		31.5	40	63	100	63
Rated short-time withstand current [kA]	JEC: 2 sec. IEC: 1 sec. *[1]	12.5 12.5	16 16	25 25	40 40	25 25
Rated breaking time [cycle]		3	3	3	5	3
Rated withstand voltage — Power frequency (1 min.)	JEC [kV] IEC [kV]	50 50	50 50	50 50	50 50	70 70
Rated withstand voltage — Impulse (1.2×50μs) [kV]		125	125	125	125	170
Closing time at no load [sec.]		0.04	0.04	0.04	0.1	0.1
Rated operating sequence	JEC IEC	O-1min-CO-3min-CO, CO-15s-CO or O-0.35s-CO-1min-CO O-3min-CO-3min-CO, CO-15s-CO or O-0.3s-CO-3min-CO				
Opening time [sec.]	JEC	0.03	0.03	0.03	0.07	0.04
	IEC	0.03	0.03	0.03	0.07	0.04
Closing system		Motor-spring stored energy (High speed reclosing) (M)				
Operating voltage and current for closing		100V AC/DC, 2A 200V AC/DC, 1A		100V AC/DC, 2.5A 200V AC/DC, 1.7A	100V AC/DC, 6A 200V AC/DC, 3A	
Control voltage and current for closing		100V AC/DC, 4A 200V AC/DC, 2A		100V AC/DC, 5A 200V AC/DC, 2.5A	100V AC/DC, 4A 200V AC/DC, 2A	
Tripping system *[2]		Shunt trip (f)				
Operating voltage and current for tripping		100V DC, 4A 200V DC, 2A				
Auxiliary contact		4NO+4NC, Rating 100/200V AC: 20/10A, 100/200V DC: 20/10A				
Durability	Mechanical [operations] Electrical [operations]	10000 10000				
Installation □		P, X, Y	P, X, Y	P, X, Y	P, Y	P, M, X
Mass (draw-out type without cradle) [kg]		120 (P, X: 600A) 130 (P, X: 1200A) 150 (Y)	120 (P, X: 600A) 130 (P, X: 1200A) 150 (Y)	190 (Y: 600A) 190 (Y: 1200A) 200 (Y: 2000A)	280 (1200A) 280 (2000A) 350 (3000A)	280 (M, X: 600A) 280 (M, X: 1200A) 300 (M, X: 2000A)

Notes: *[1] Contact FUJI for the information concerning the 3 sec. rating of IEC.
*[2] If capacitor tripping system is required, connect a capacitor trip device VCB-T1A or VCB-T2A (optional accessory) to AC power supply.

■ Types and ratings, 3.6/7.2kV

Rating			Closing system		Tripping voltage	Type	Ordering code	□ : Avaiable installation system *1
Volts (kV)	Breaking current (kA)	Current (A)	Closing system *2	Operating voltage	Shunt-trip(f)			
3.6/7.2	20	600	M	100/110V DC	100/110V DC	**HS2006□-06Mf-E**		P, X, U, Y
		1200	M	100/110V DC	100/110V DC	**HS2006□-12Mf-E**		
		2000	M	100/110V DC	100/110V DC	**HS2006□-20Mf-E**		
	25	600	M	100/110V DC	100/110V DC	**HS2506□-06Mf-E**		P, X, U, Y
		1200	M	100/110V DC	100/110V DC	**HS2506□-12Mf-E**		
		2000	M	100/110V DC	100/110V DC	**HS2506□-20Mf-E**		
	31.5	1200	M	100/110V DC	100/110V DC	**HS3106□-12Mf-E**		P, X, Y
		2000	M	100/110V DC	100/110V DC	**HS3106□-20Mf-E**		
		3000	M	100/110V DC	100/110V DC	**HS3106□-30Mf-E**		
	40	1200	M	100/110V DC	100/110V DC	**HS4006□-12Mf-E**		P, X, Y
		2000	M	100/110V DC	100/110V DC	**HS4006□-20Mf-E**		
		3000	M	100/110V DC	100/110V DC	**HS4006□-30Mf-E**		
		4000	M	100/110V DC	100/110V DC	**HS4006□-40Mf-N**		P, X
	50	1200	M	100/110V DC	100/110V DC	**HS5006□-12Mf-NA**		P, Y
		2000	M	100/110V DC	100/110V DC	**HS5006□-20Mf-NA**		
		3000	M	100/110V DC	100/110V DC	**HS5006□-30Mf-N**		
	63	1200	M	100/110V DC	100/110V DC	**HS6306□-12Mf-NB**		Y
		2000	M	100/110V DC	100/110V DC	**HS6306□-20Mf-NB**		

Notes: *1 Installation system P: Fixed type
X: Draw-out type with cradle for JEM 1425 Class CW
U: Draw-out type with cradle for JEM 1425 Class CW
Y: Draw-out type with cradle and shutter for JEM 1425 Class MW, PW
*2 Closing system M: Motor-spring stored-energy (High speed reclosing)

■ Types and ratings, 12kV

Rating			Closing system		Tripping voltage	Type	Ordering code	□ : Avaiable installation system *1
Volts (kV)	Breaking current (kA)	Current (A)	Closing system *2	Operating voltage	Shunt-trip(f)			
12	12.5	600	M	100/110V DC	100/110V DC	**HS1210□-06Mf-E**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS1210□-12Mf-E**		
		2000	M	100/110V DC	100/110V DC	**HS1210□-20Mf-E**		
	16	600	M	100/110V DC	100/110V DC	**HS1610□-06Mf-E**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS1610□-12Mf-E**		
		2000	M	100/110V DC	100/110V DC	**HS1610□-20Mf-E**		
	20	600	M	100/110V DC	100/110V DC	**HS2010□-06Mf-E**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS2010□-12Mf-E**		
		2000	M	100/110V DC	100/110V DC	**HS2010□-20Mf-E**		

Notes: *1 Installation system P: Fixed type
X: Draw-out type with cradle for JEM 1425 Class CW
Y: Draw-out type with cradle and shutter for JEM 1425 Class MW, PW
*2 Closing system M: Motor-spring stored-energy (High speed reclosing)

■ Types and ratings, 12kV

Rating			Closing system		Tripping voltage	Type	Ordering code	□: Avaiable installation system *1
Volts (kV)	Breaking current (kA)	Current (A)	Closing system *2	Operating voltage	Shunt-trip(f)			
12	25	600	M	100/110V DC	100/110V DC	**HS2510□-06Mf-E**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS2510□-12Mf-E**		
		2000	M	100/110V DC	100/110V DC	**HS2510□-20Mf-E**		
	31.5	1200	M	100/110V DC	100/110V DC	**HS3110□-12Mf-E**		P, X, Y
		2000	M	100/110V DC	100/110V DC	**HS3110□-20Mf-E**		
		3000	M	100/110V DC	100/110V DC	**HS3110□-30Mf-N**		P, Y
	40	1200	M	100/110V DC	100/110V DC	**HS4010□-12Mf-NA**		P, Y
		2000	M	100/110V DC	100/110V DC	**HS4010□-20Mf-NA**		
		3000	M	100/110V DC	100/110V DC	**HS4010□-30Mf-N**		P, Y
		4000	M	100/110V DC	100/110V DC	**HS4010□-40Mf-N**		X
	50	1200	M	100/110V DC	100/110V DC	**HS5010□-12Mf-NA**		P, Y
		2000	M	100/110V DC	100/110V DC	**HS5010□-20Mf-NA**		
		3000	M	100/110V DC	100/110V DC	**HS5010□-30Mf-N**		

Notes: *1 Installation system P: Fixed type
X: Draw-out type with cradle for JEM 1425 Class CW
Y: Draw-out type with cradle and shutter for JEM 1425 Class MW, PW
*2 Closing system M: Motor-spring stored-energy (High speed reclosing)

■ Types and ratings, 15kV

Rating			Closing system		Tripping voltage	Type	Ordering code	□: Avaiable installation system *1
Volts (kV)	Breaking current (kA)	Current (A)	Closing system *2	Operating voltage	Shunt-trip(f)			
15	12.5	600	M	100/110V DC	100/110V DC	**HS1215□-06Mf-N**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS1215□-12Mf-N**		
		2000	M	100/110V DC	100/110V DC	**HS1215□-20Mf-N**		
	16	600	M	100/110V DC	100/110V DC	**HS1615□-06Mf-N**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS1615□-12Mf-N**		
		2000	M	100/110V DC	100/110V DC	**HS1615□-20Mf-N**		
	20	600	M	100/110V DC	100/110V DC	**HS2015□-06Mf-N**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS2015□-12Mf-N**		
		2000	M	100/110V DC	100/110V DC	**HS2015□-20Mf-N**		
	25	600	M	100/110V DC	100/110V DC	**HS2515□-06Mf-N**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS2515□-12Mf-N**		
		2000	M	100/110V DC	100/110V DC	**HS2515□-20Mf-N**		
	31.5	1200	M	100/110V DC	100/110V DC	**HS3115□-12Mf-N**		P, Y
		2000	M	100/110V DC	100/110V DC	**HS3115□-20Mf-N**		
		3000	M	100/110V DC	100/110V DC	**HS3115□-30Mf-N**		
	40	1200	M	100/110V DC	100/110V DC	**HS4015□-12Mf-N**		P, Y
		2000	M	100/110V DC	100/110V DC	**HS4015□-20Mf-N**		
		3000	M	100/110V DC	100/110V DC	**HS4015□-30Mf-N**		

Notes: *1 Installation system P: Fixed type
X: Draw-out type with cradle for JEM 1425 Class CW
Y: Draw-out type with cradle and shutter for JEM 1425 Class MW, PW
*2 Closing system M: Motor-spring stored-energy (High speed reclosing)

■ Types and ratings, 24kV and 36kV

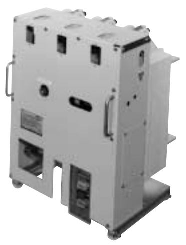
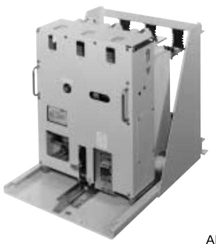
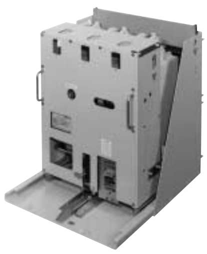
Rating			Closing system		Tripping voltage	Type	Ordering code	□: Avaiable installation system *1
Volts (kV)	Breaking current (kA)	Current (A)	Closing system *2	Operating voltage	Shunt-trip(f)			
24	12.5	600	M	100/110V DC	100/110V DC	**HS1220□-06Mf-K**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS1220□-12Mf-K**		
	16	600	M	100/110V DC	100/110V DC	**HS1620□-06Mf-E**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS1620□-12Mf-E**		
	25	600	M	100/110V DC	100/110V DC	**HS2520□-06Mf-E**		P, X, Y
		1200	M	100/110V DC	100/110V DC	**HS2520□-12Mf-E**		
		2000	M	100/110V DC	100/110V DC	**HS2520□-20Mf-E**		
	40	1200	M	100/110V DC	100/110V DC	**HS4020□-12Mf-N**		P, Y
		2000	M	100/110V DC	100/110V DC	**HS4020□-20Mf-N**		
		3000	M	100/110V DC	100/110V DC	**HS4020□-30Mf-N**		
36	25	600	M	100/110V DC	100/110V DC	**HS2530□-06Mf-N**		P, M, X
		1200	M	100/110V DC	100/110V DC	**HS2530□-12Mf-N**		
		2000	M	100/110V DC	100/110V DC	**HS2530□-20Mf-N**		

Notes: *1 Installation system
P: Fixed type
X: Draw-out type with cradle for JEM 1425 Class CW
Y: Draw-out type with cradle and shutter for JEM 1425 Class MW, PW
M: Draw-out type for HS2530

*2 Closing system
M: Motor-spring stored-energy (High speed reclosing)

12

■ Installation and supplied accessories

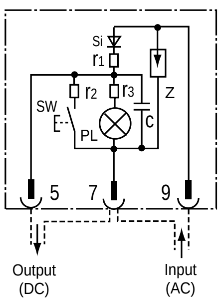
Vacuum circuit breaker	Cradle	Construction	Accessories
P-fixed mounting type  AF93-314		The VCB shall be fixed to the switchgear by means of 4 bolts. No draw-out system is provided. Wheels are provided to facilitate movement or transport. Open type cubicle	• Clamp bolts (4 ea. for one unit) • Closing handle • Plug-in connector for control circuit • On-off counter
X-draw-out type  AF93-312	 SF-877	A cradle is provided with a draw-out system. This cradle makes unnecessary the provision of rails or main circuit connector for the switchgear. No mechanical adjustment is required. JEM 1425 Class CW type metal enclosure	• On-off counter • Cradle with draw-out system (Main circuit connector, earthing shoe, rail, etc.) • Plug-in connector • Closing handle • Draw-out handle
Y-draw-out type  AF93-313	 SF-1055	A cradle is provided with a draw-out system to accept the metal-clad switchgear, which is provided with a shutter. All the necessary parts are provided for this type of breaker. The switchgear is very easy to assemble. JEM 1425 Class PW or MW type metal-clad switchgear	• On-off counter • Cradle with draw-out system (Main circuit connector, earthing shoe, rail, shutter, etc.) • Plug-in connector • Closing handle • Draw-out handle

■ Optional accessories

Capacitor trip device/VCB-T1A, T2A


KK04-064

This is used when the trip circuit is connected to an AC power supply, and as well as the capacitor, semiconductors are also built in. It provides a DC output and the trip coil is DC rated.



Vacuum condition tester/VC-1A
See page 12/25.

Lifting dolly
L-2HS, L-4HS


FA215

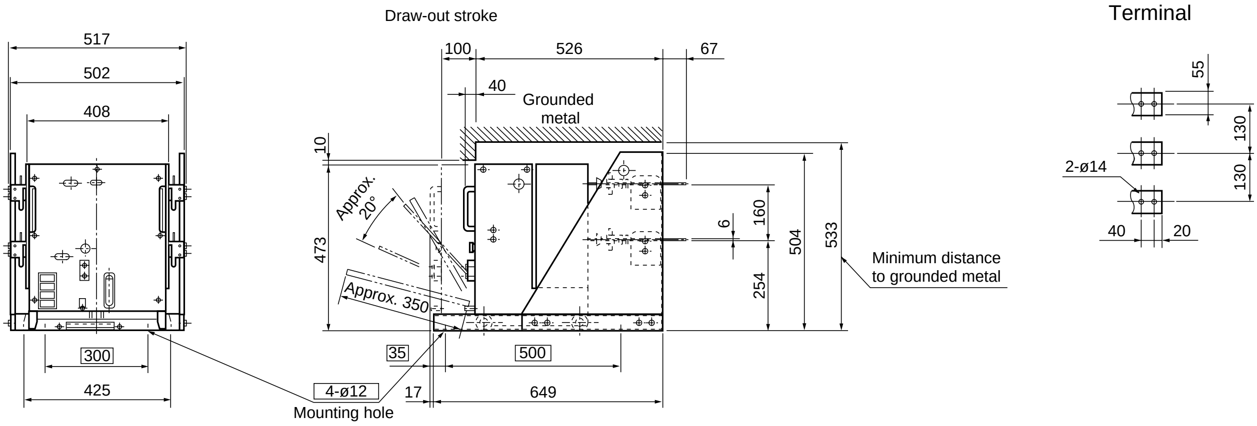
Type	Description
VCB-T1A	Capacitor trip device 100/110V AC
VCB-T2A	Capacitor trip device 200/220V AC
AF3320R3TXG0542	C-R surge absorber for 3.3kV
AF6620R3TXG0543	C-R surge absorber for 6.6kV
VC-1A	Vacuum condition tester 100V AC 50/60Hz

Lifting dolly

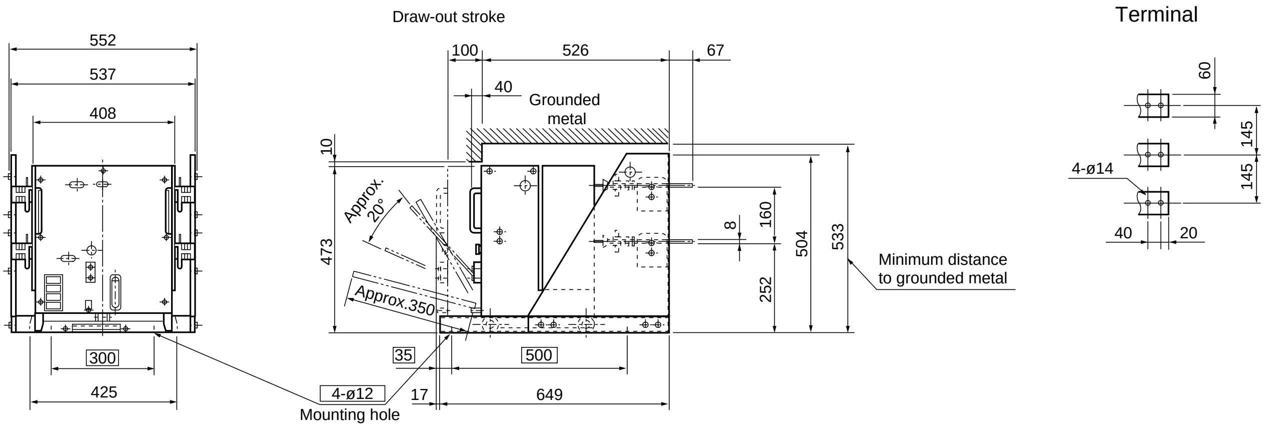
Type	Description	
L-2HNB	7.2kV: 20/25kA 12kV: 20/25kA	 600, 1200A
L-2HS40E	7.2kV: 31.5/40kA 12kV: 12.5/16/20/25kA	1200, 2000A 2000A
L-4HS43N	7.2kV: 31/40kA 12kV: 40/50kA 24kV: 40kA	3000A 1200, 2000A 1200, 2000A

■ Dimensions, mm
Draw-out/X type

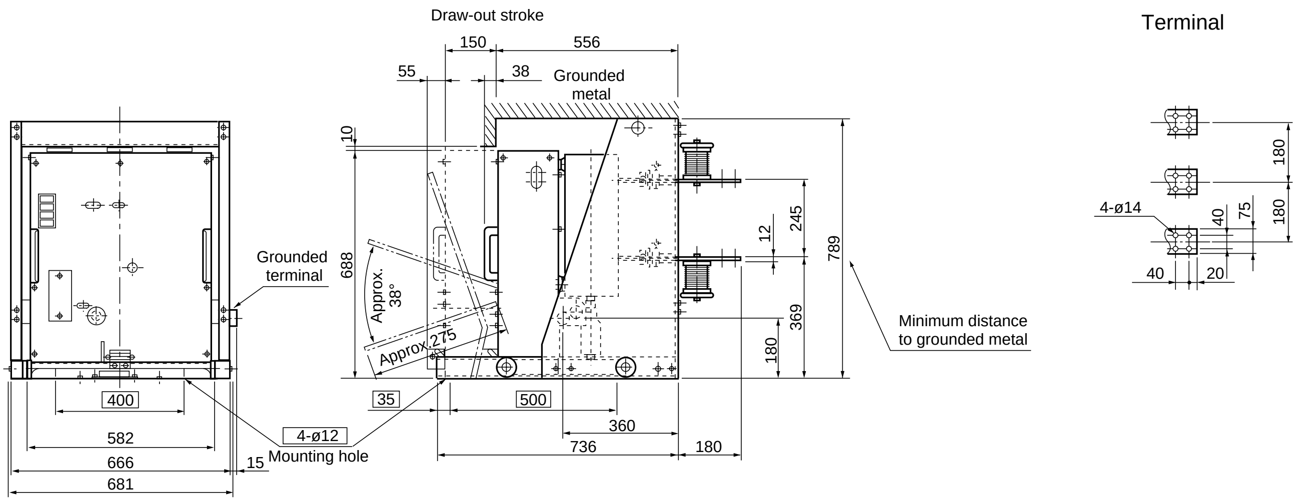
HS2006X-06Mf-E, HS2506X-06Mf-E



HS2006X-12Mf-E, HS2506X-12Mf-E

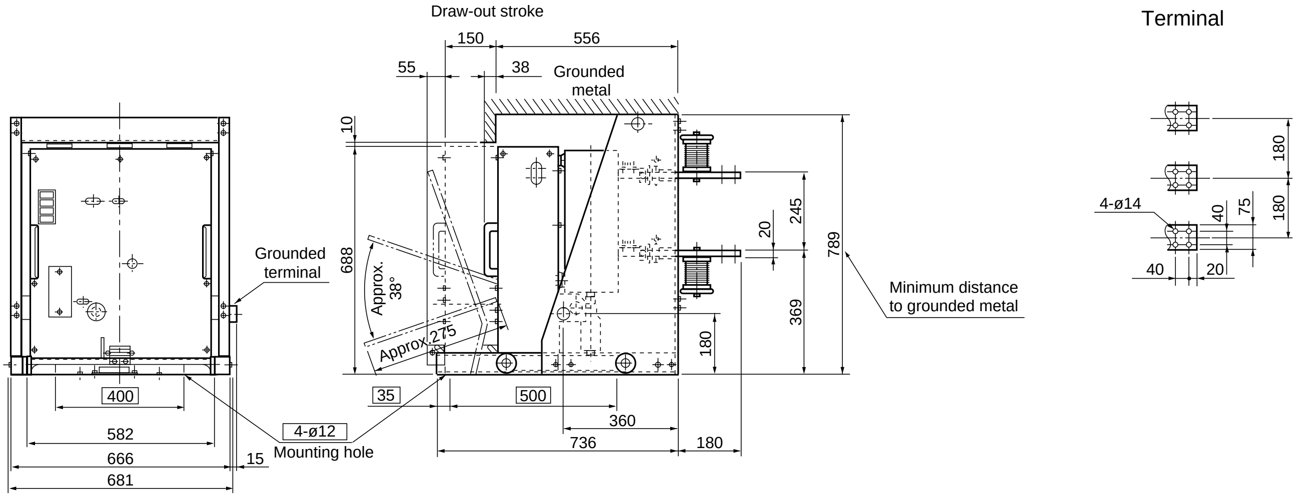


HS3106X-12Mf-E, HS4006X-12Mf-E

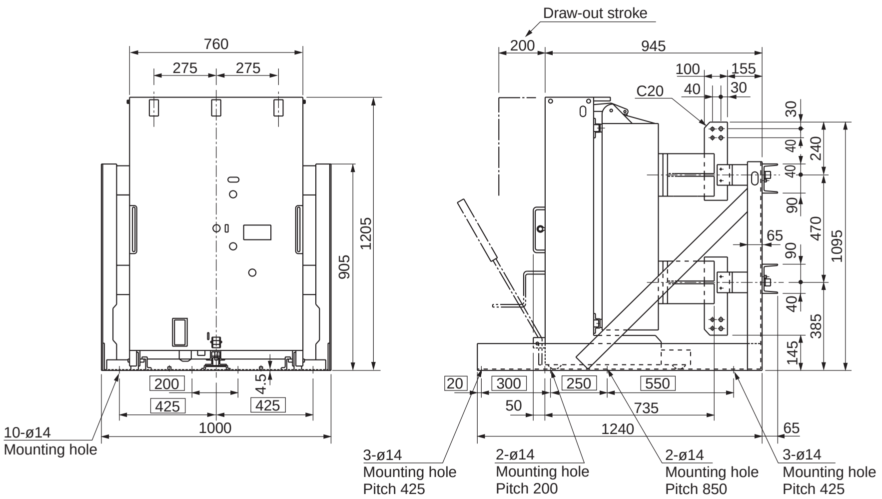


■ Dimensions, mm
Draw-out/X type

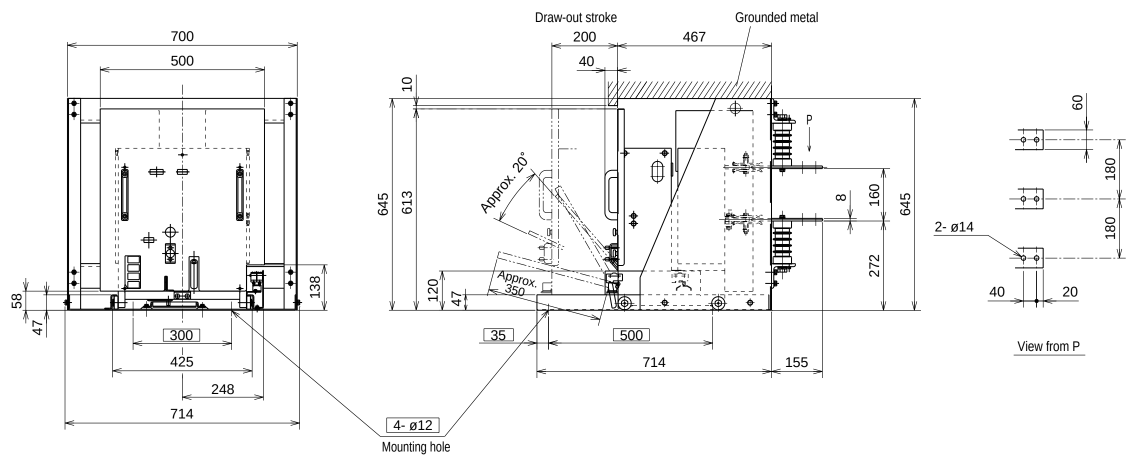
HS3106X-20Mf-E, HS4006X-20Mf-E



HS4006X-40Mf-N, HS4010X-40Mf-N

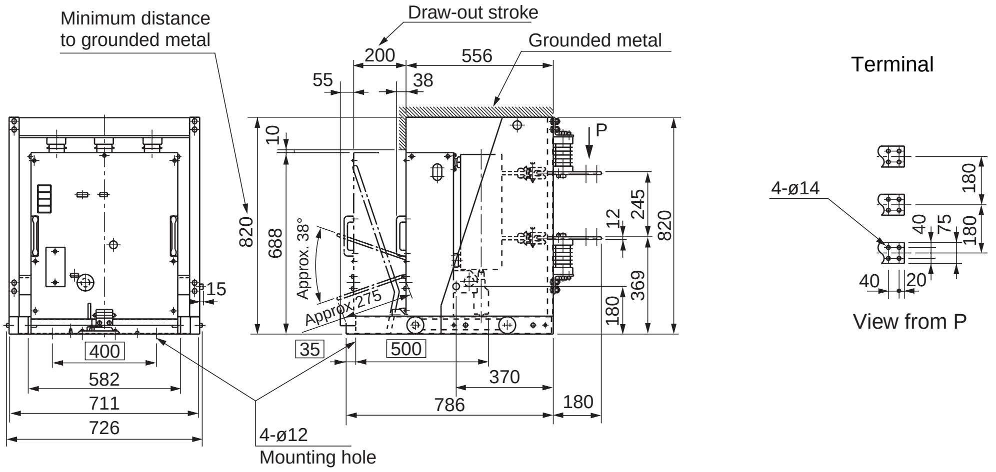


HS1210X-06Mf-E, 12Mf-E, HS1610X-06Mf-E, 12Mf-E, HS2010X-06Mf-E, 12Mf-E, HS2510X-06Mf-E, 12Mf-E

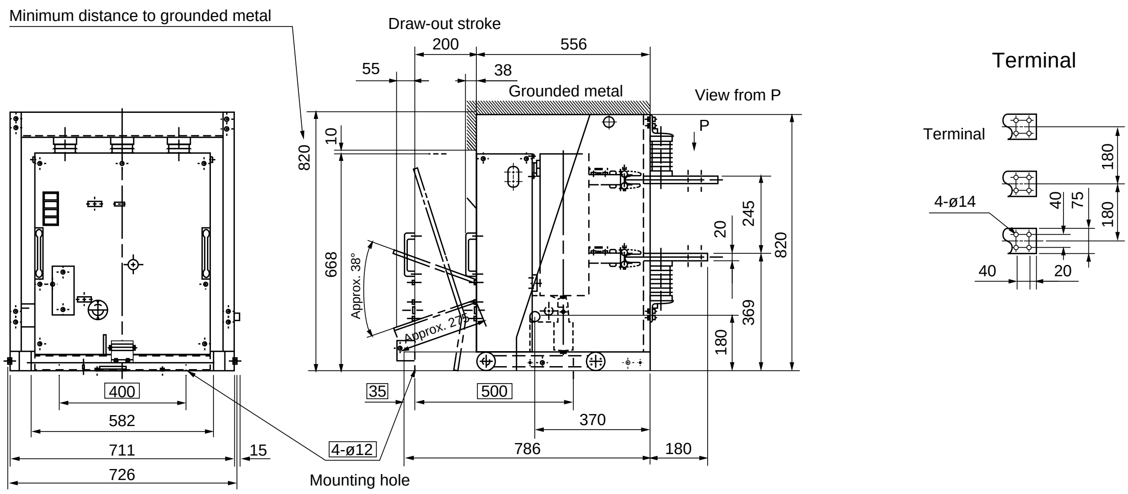


■ Dimensions, mm
Draw-out/X type

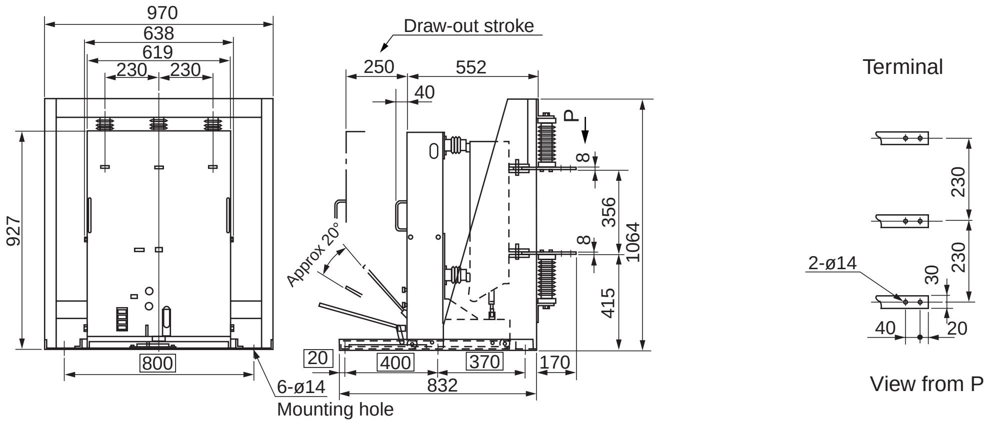
HS3110X-12Mf-E



HS1210X-20Mf-E, HS1610X-20Mf-E, HS2010X-20Mf-E, HS2510X-20Mf-E, HS3110X-20Mf-E



HS1220X-06Mf-K, HS1620X-06Mf-E



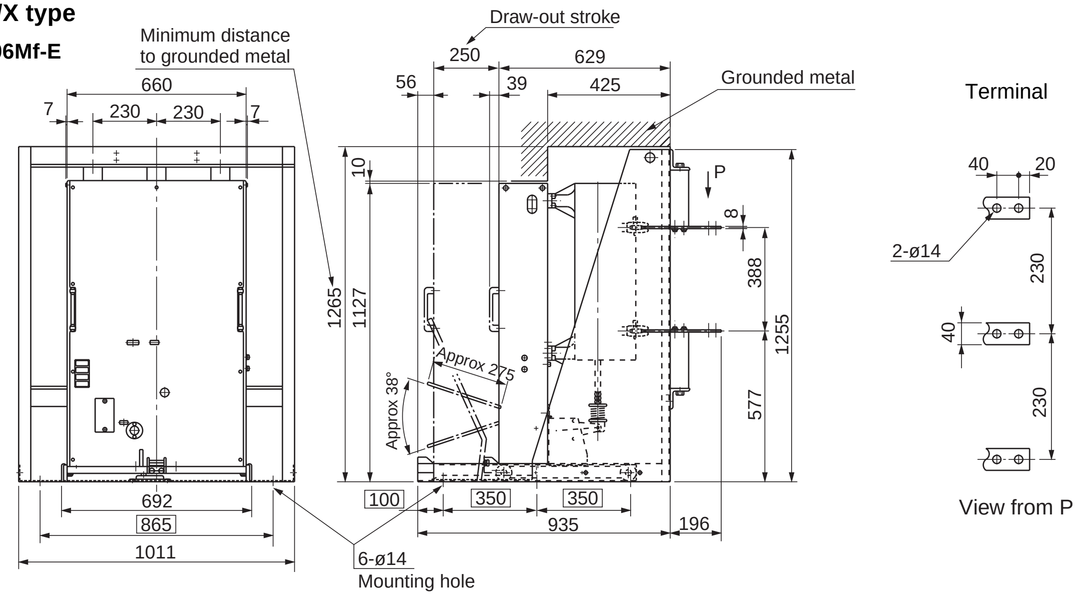
12

Vacuum circuit breakers
HS series

■ **Dimensions, mm**

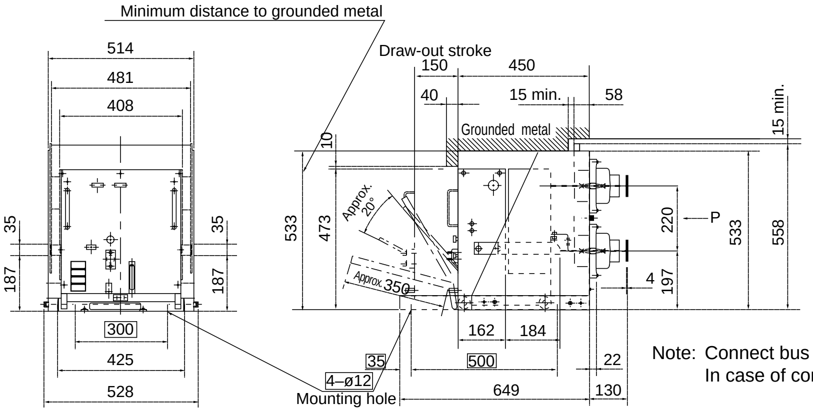
Draw-out/X type

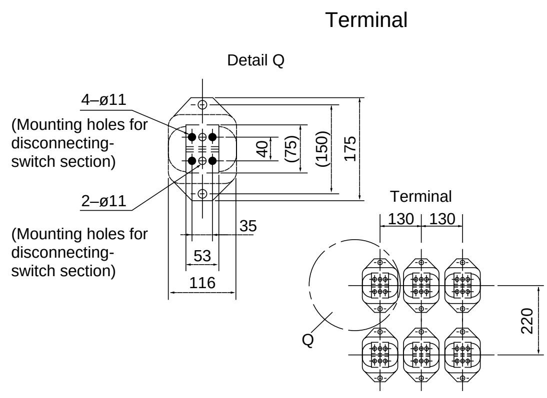
HS2520X-06Mf-E



Draw-out/Y type

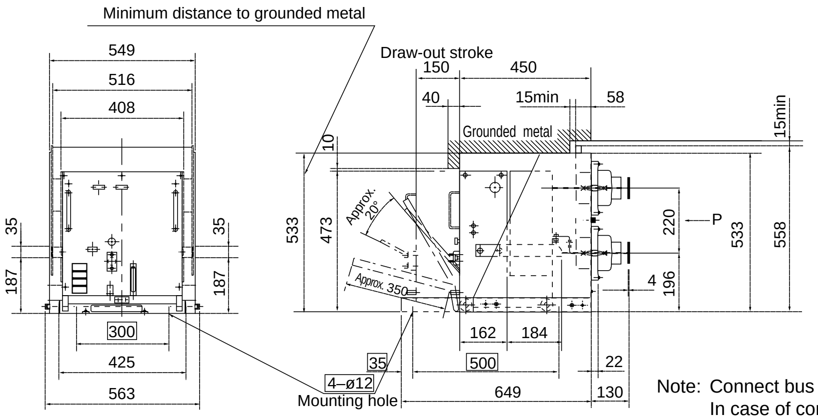
HS2006Y-06Mf-E, HS2506Y-06Mf-E

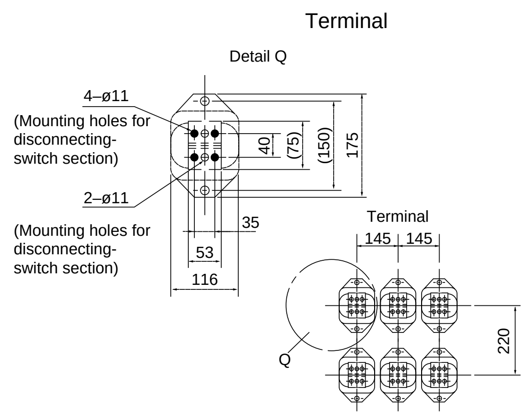




Note: Connect bus bars by using 4-ø11 marked ●.
In case of connecting by 2 positions, use 2-ø11 marked ○.

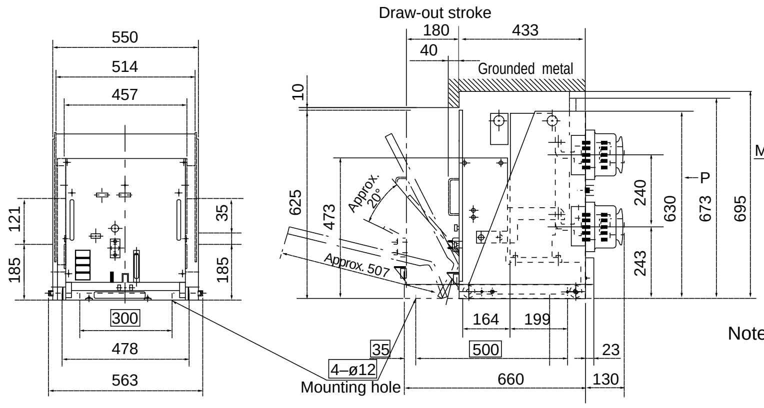
HS2006Y-12Mf-E, HS2506Y-12Mf-E

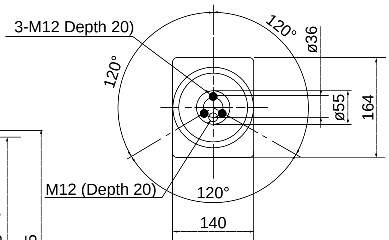


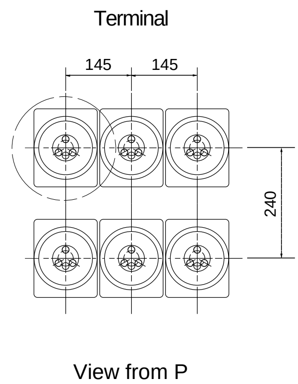


Note: Connect bus bars by using 4-ø11 marked ●.
In case of connecting by 2 positions, use 2-ø11 marked ○.

HS2006Y-20Mf-E, HS2506Y-20Mf-E

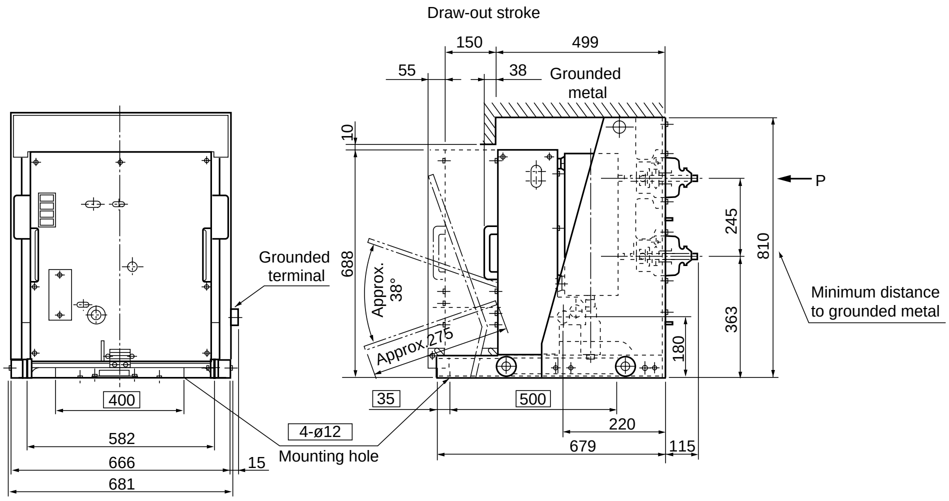


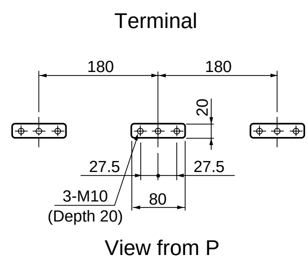




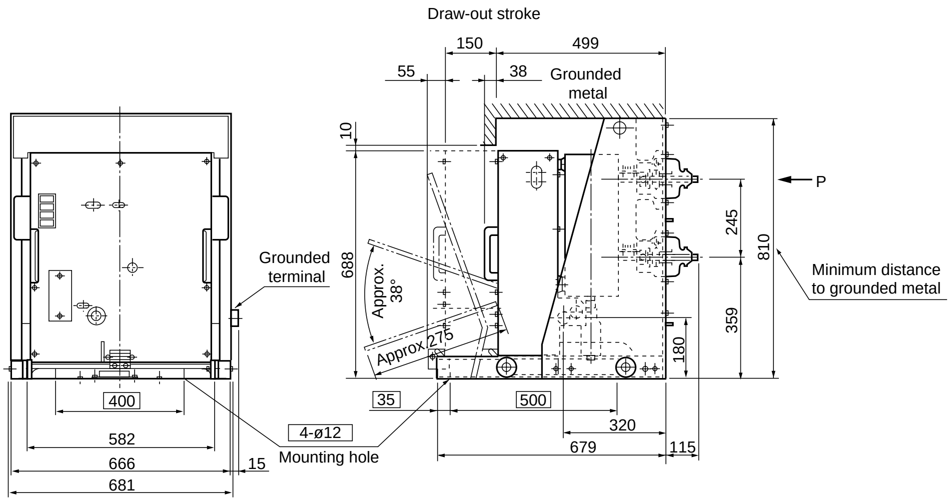
Note: Connect bus bars by using 3-M12 marked ●.
The case of connecting by 2-M12 use upper and lower positions.

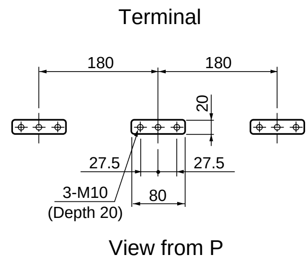
HS3106Y-12Mf-E, HS4006Y-12Mf-E





HS3106Y-20Mf-E, HS4006Y-20Mf-E

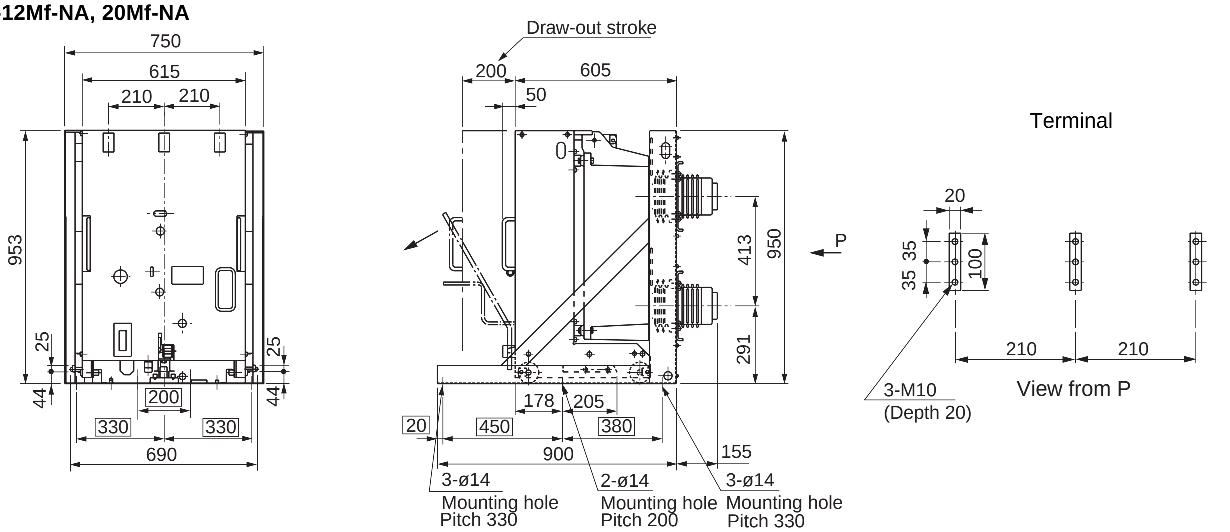




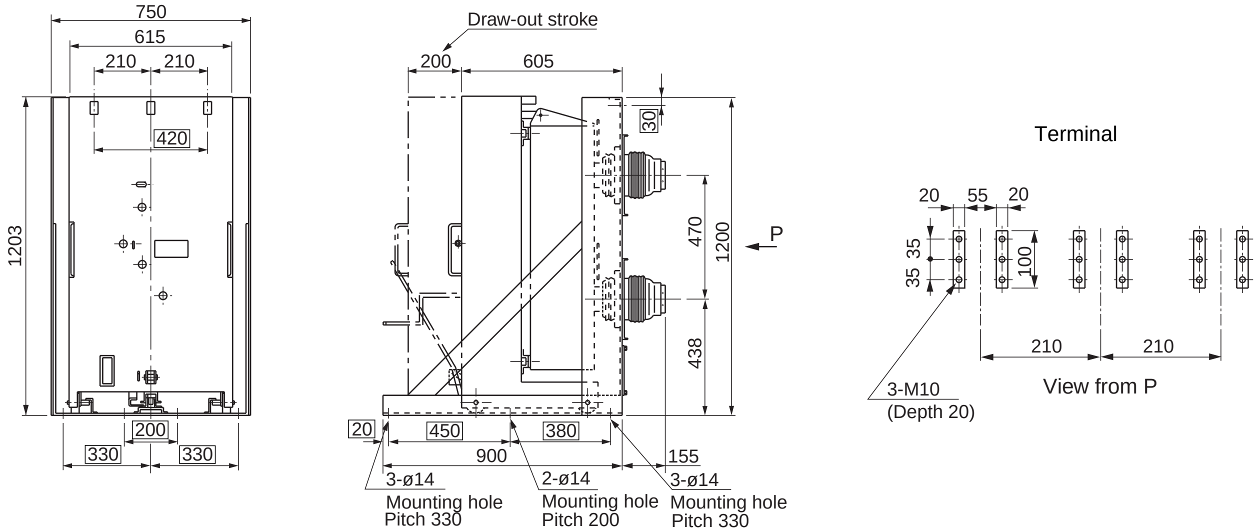
12

■ Dimensions, mm
Draw-out/Y type

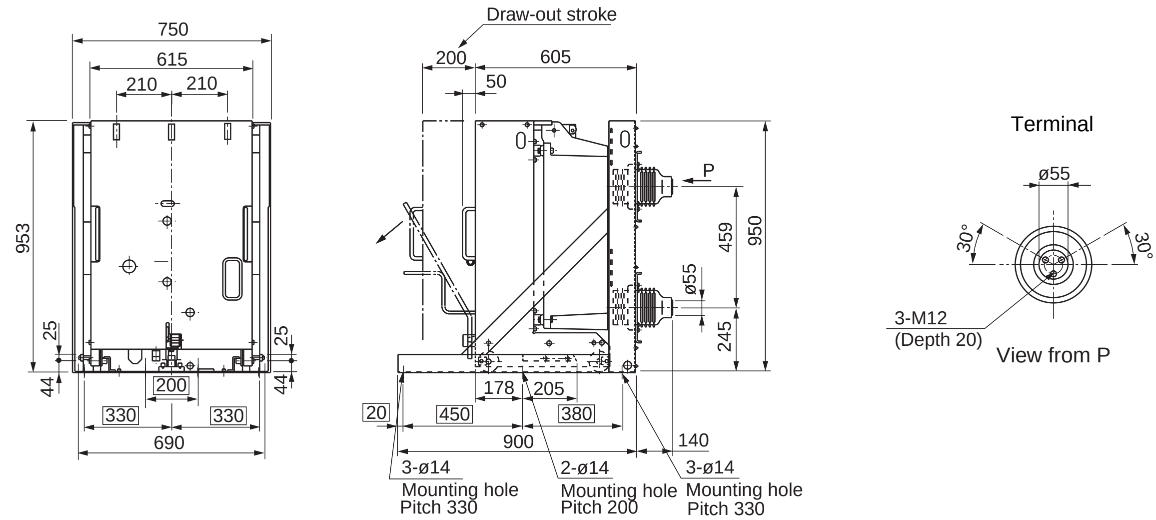
HS4010Y-12Mf-NA, 20Mf-NA



HS3106Y-30Mf-E, HS4006Y-30Mf-E, HS3110Y-30Mf-N

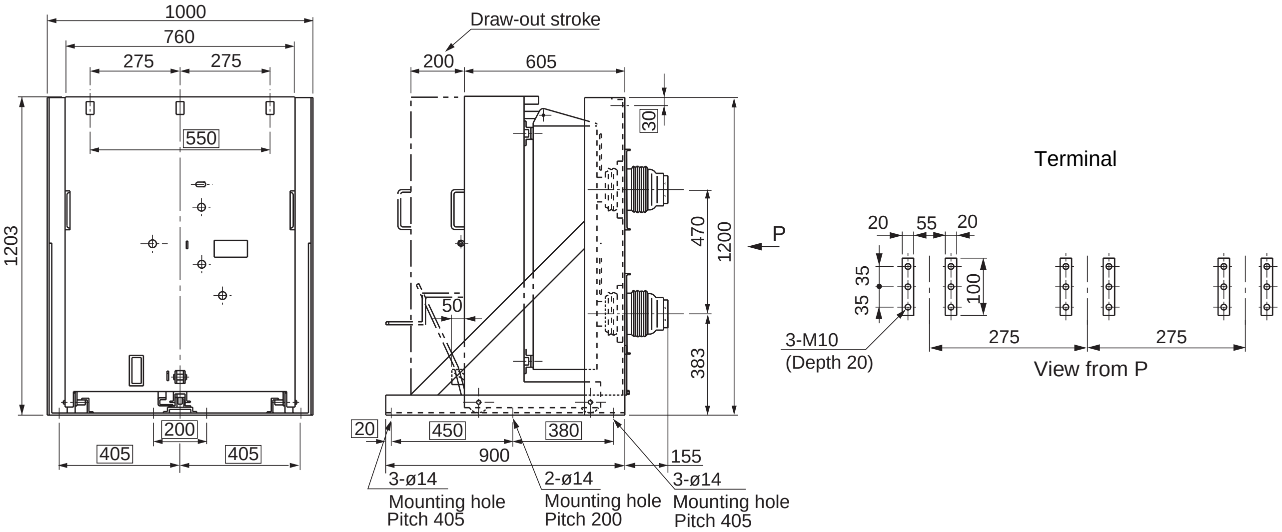


HS5006Y-12Mf-NA, 20Mf-NA, HS5010Y-12Mf-NA, 20Mf-NA

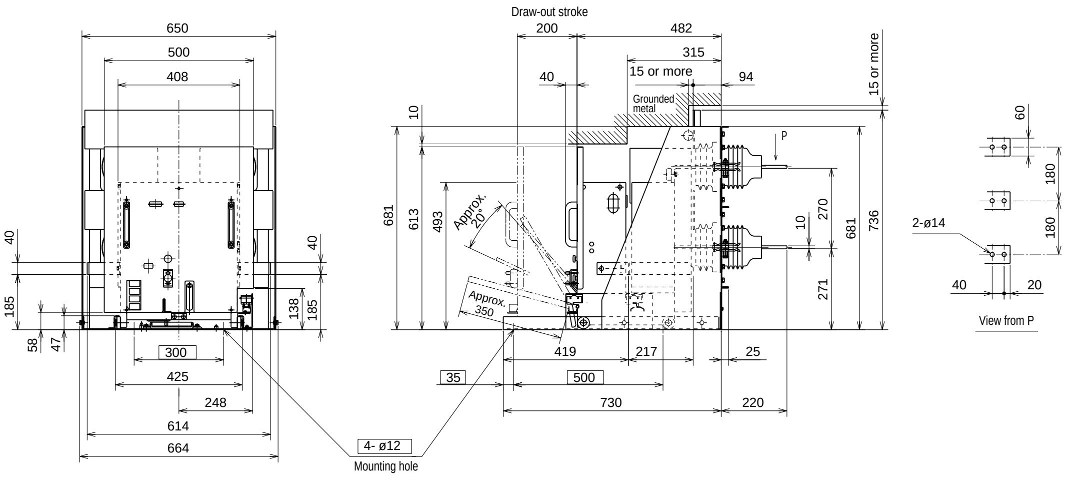


■ Dimensions, mm
Draw-out/Y type

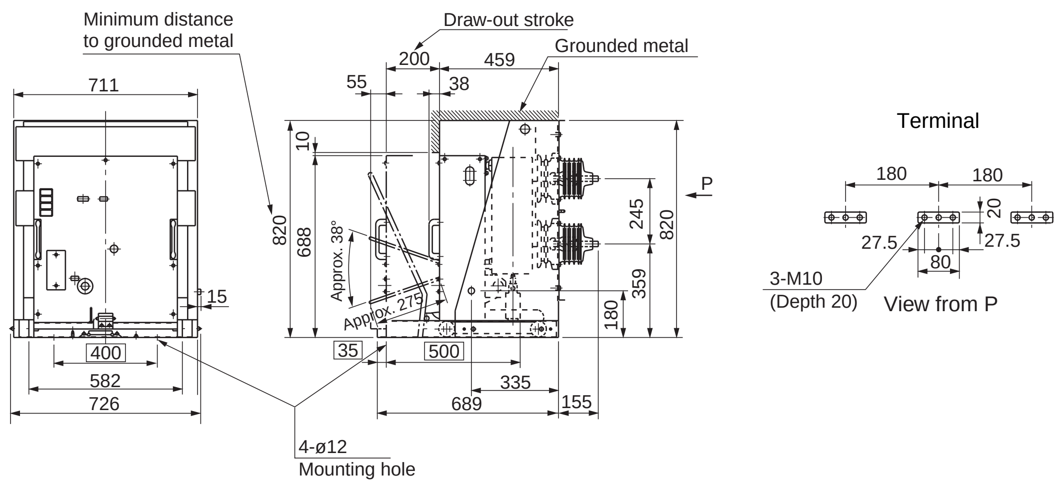
HS5006Y-30Mf-N, HS5010Y-30Mf-N



HS1210Y-06Mf-E, 12Mf-E, HS1610Y-06Mf-E, 12Mf-E, HS2010Y-06Mf-E, 12Mf-E
HS2510Y-06Mf-E, 12Mf-E



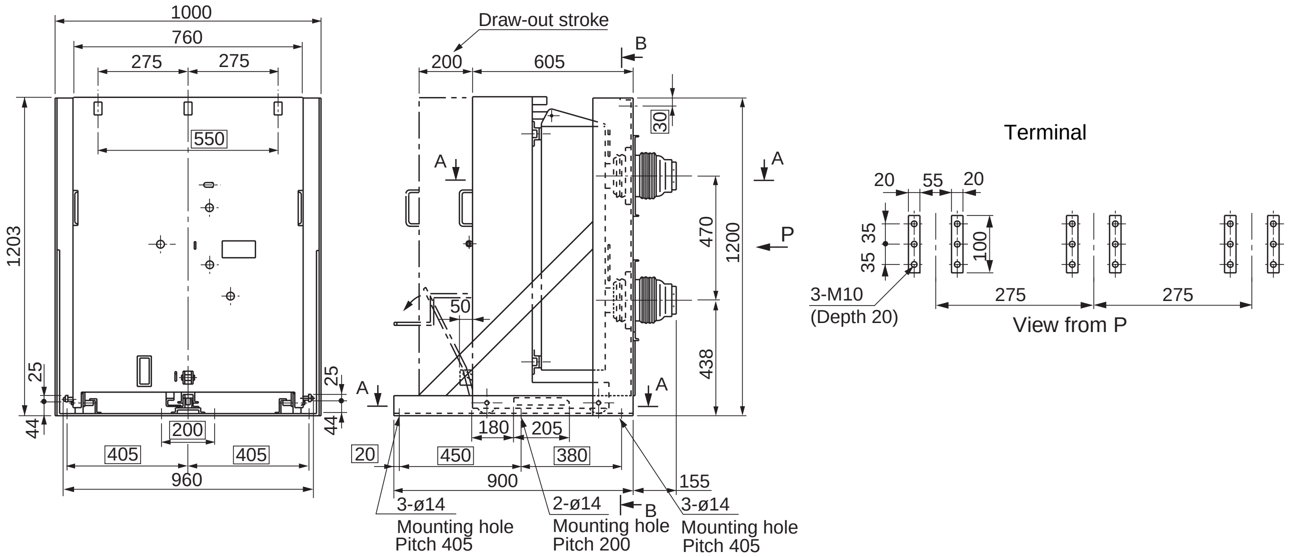
HS1210Y-20Mf-E, HS1610Y-20Mf-E, HS2010Y-20Mf-E, HS2510Y-20Mf-E, HS3110Y-12Mf-E, 20Mf-E



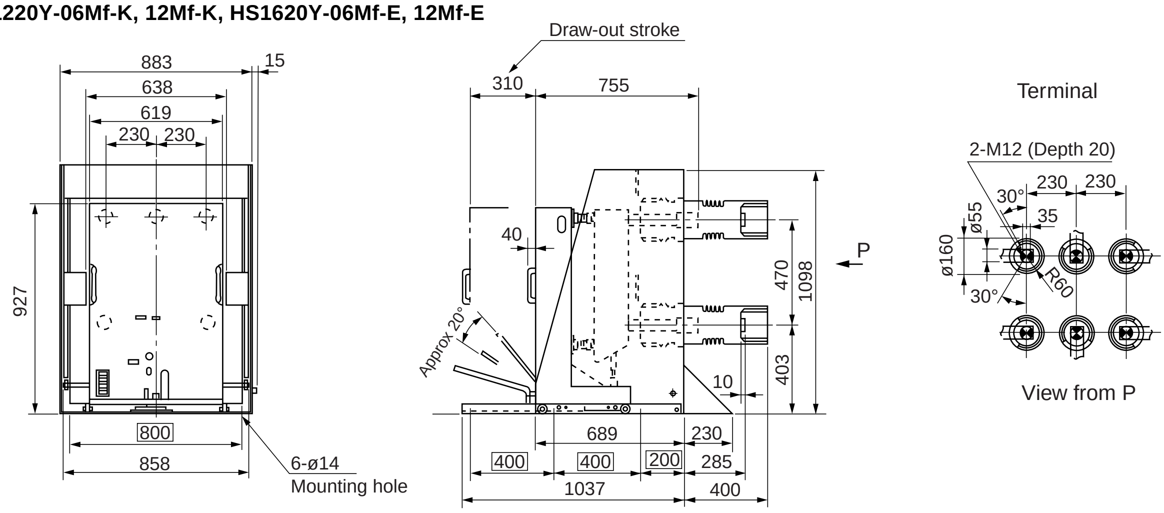
Vacuum circuit breakers
HS series

■ Dimensions, mm
Draw-out/Y type

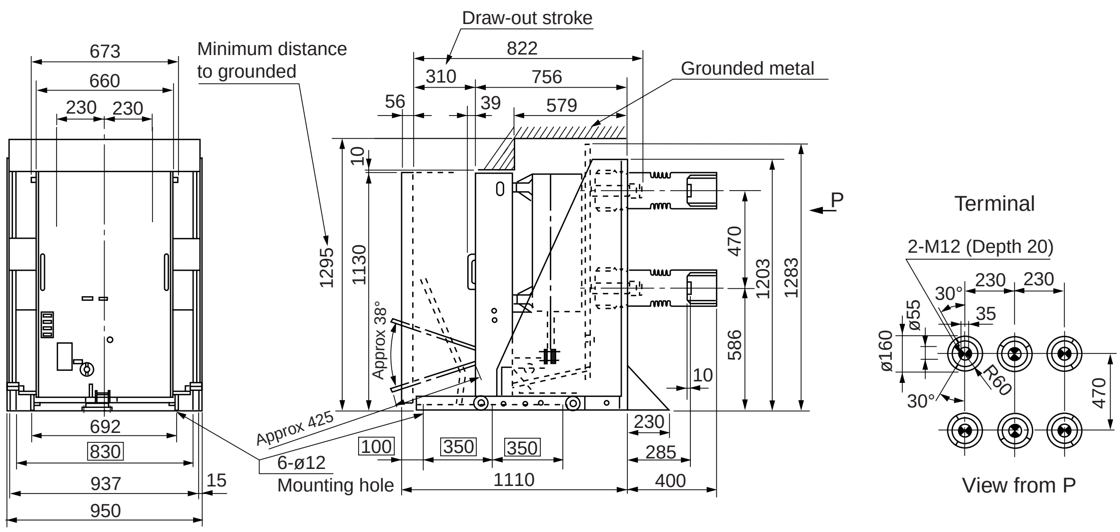
HS4010Y-30Mf-N



HS1220Y-06Mf-K, 12Mf-K, HS1620Y-06Mf-E, 12Mf-E

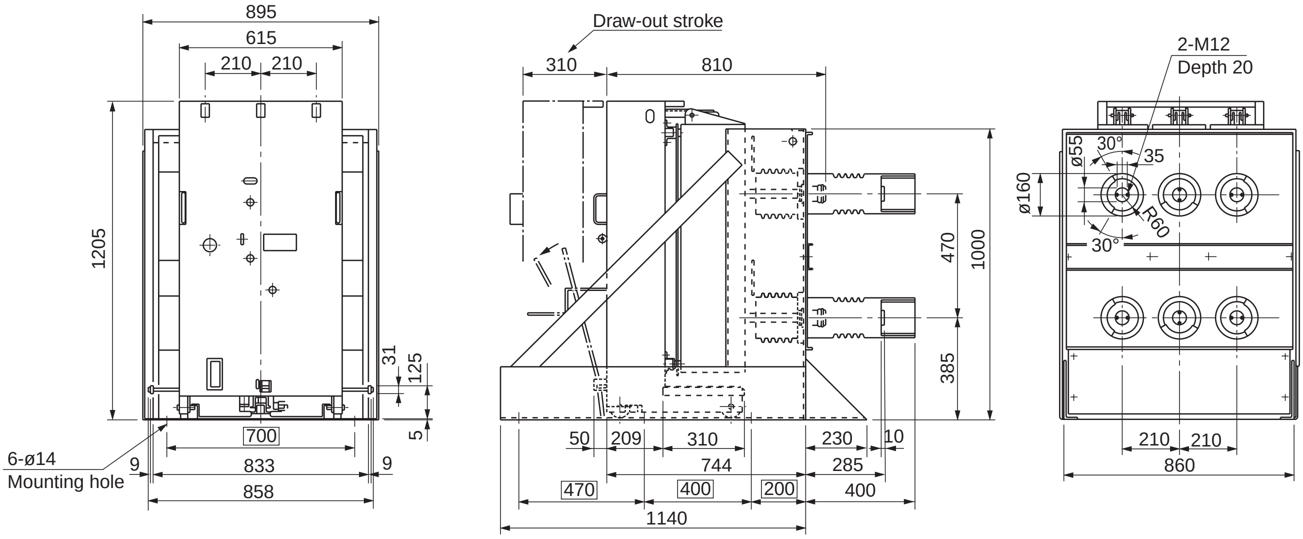


HS2520Y-06Mf-E, 12Mf-E, 20Mf-E

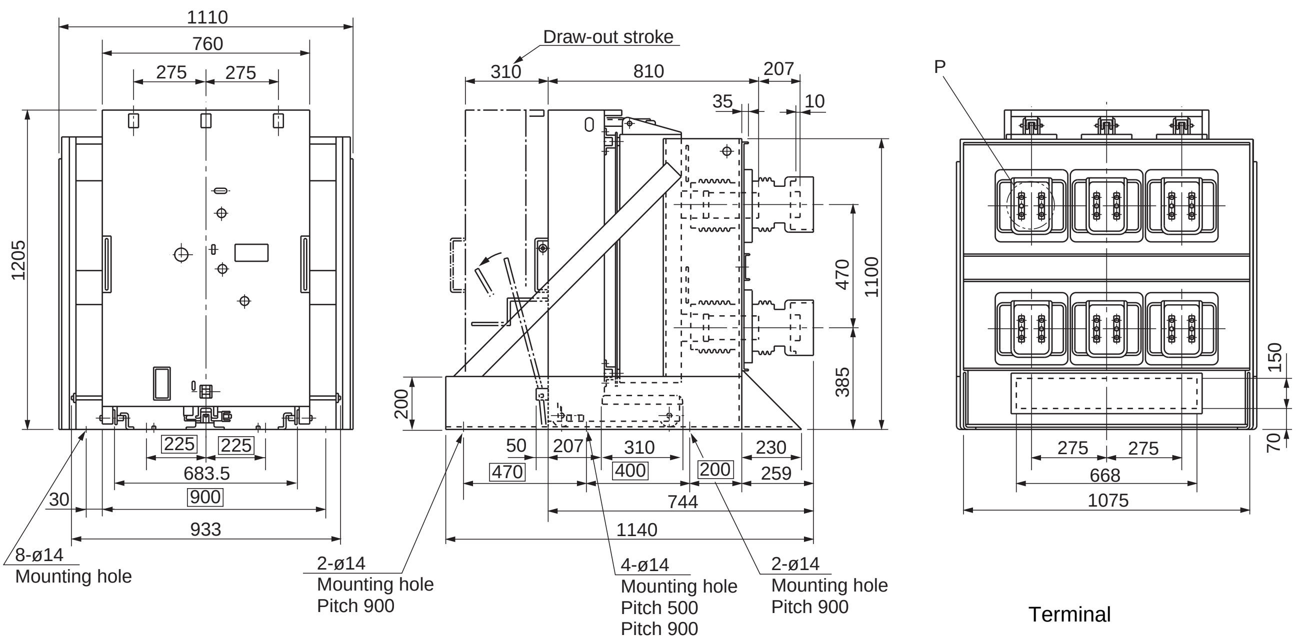


■ Dimensions, mm
Draw-out/Y type

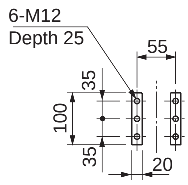
HS4020Y-12Mf-N, 20Mf-N



HS4020Y-30Mf-N



Terminal

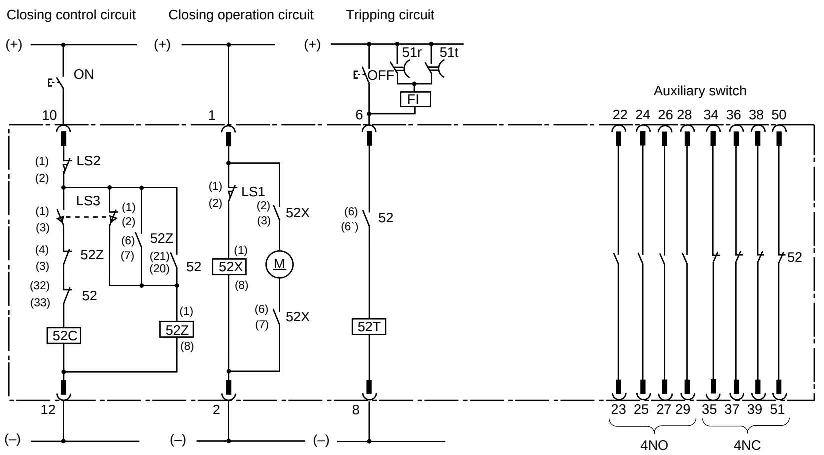


Detail of P

■ **Dimensions of other types:** Contact Fuji.

■ Wiring diagrams

● HS2006, HS2506, HS1210, HS1610, HS2010, HS2510, HS1215, HS1615, HS2015, HS2515, HS1220, HS1620



Terminal arrangement of control circuit receptacle
(A front view of CB mounted receptacles)

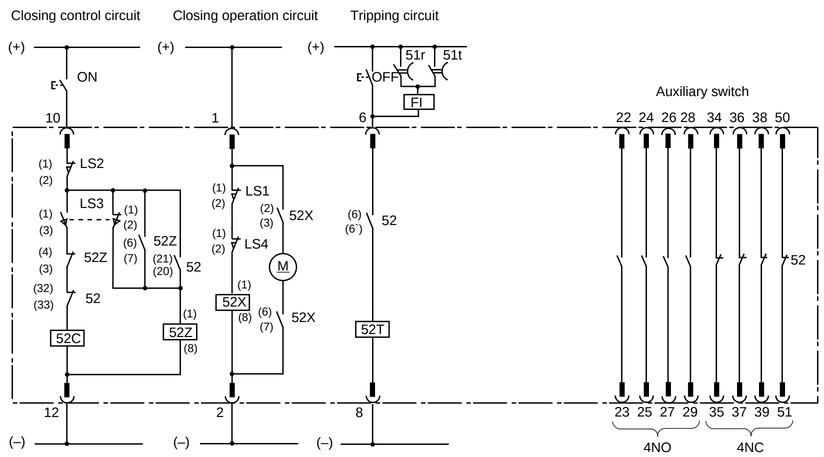
HS2006, HS2506, HS1210, HS1610, HS2010, HS2510, HS1220, HS1620

1	2	10	RED
12	6	8	
		22	YELLOW
23	24	25	
26	27	28	BLUE
29	34	35	
36	37	38	GREEN
39	50	51	

HS1215, HS1615, HS2015, HS2515

2	1
12	10
8	6
23	22
25	24
27	26
29	28
35	34
37	36
39	38
51	50

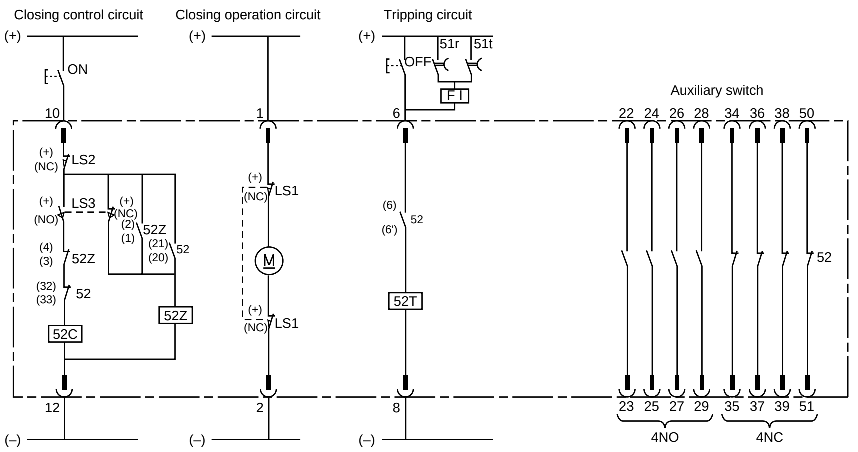
● HS3106-E, HS4006-E, HS3110-E



Terminal arrangement of control circuit receptacle
(A front view of CB mounted receptacles)

1	2	10	RED
12	6	8	
		22	YELLOW
23	24	25	
26	27	28	BLUE
29	34	35	
36	37	38	GREEN
39	50	51	

●HS3106-N, HS4006-N, HS5006, HS6306, HS3110-N, HS4010, HS5010, HS3115, HS4015, HS2520, HS4020, HS2530



Terminal arrangement of control circuit receptacle
(A front view of CB mounted receptacles)

2	1
12	10
8	6
23	22
25	24
27	26
29	28
35	34
37	36
39	38
51	50

External terminal of VCB

52 : VCB
52a : NO contact of auxiliary switch
52b : NC contact of auxiliary switch
52X : Magnetic contactor
52Z : Anti-pumping relay
52C : Closing coil
52T : Shunt trip coil

M : Motor
LS_1 : Limit switch (Opens when the closing spring is in the stored condition)

LS_2 : Interlocking contact (Only draw-out type)
LS_3 : Limit switch (Closes when the closing spring is in the stored condition)
LS_4 : Limit switch (Opens when the closing pushbutton is operated)
51R, 51T : Overcurrent relay

■ Application guide of surge absorber

When VCBs are interrupted especially under specific overlapping conditions, chopping surges or surges due to multiple restrikes will cause an escalating effect.
It is therefore recommended that surge absorbers and arresters are fitted to protect motors or transformers.

Load \ Voltage	3.3kV	6.6kV	11kV	22kV
Motor	● C-R suppressor	● C-R suppressor	● C-R suppressor	Contact FUJI for further imformation
Molded transformer*1	–*2, *3 (BIL ≥ 45kV)	–*2, *3 (BIL ≥ 60kV)	● *3 Arrester (BIL ≥ 60kV)	● *3 Arrester (BIL ≥ 95kV)
Oil-immersed transformer*1	–*2, *3 (BIL ≥ 45kV)	–*2, *3 (BIL ≥ 60kV)	–*2, *3 (BIL ≥ 90kV)	● *3 (BIL ≥ 150kV)

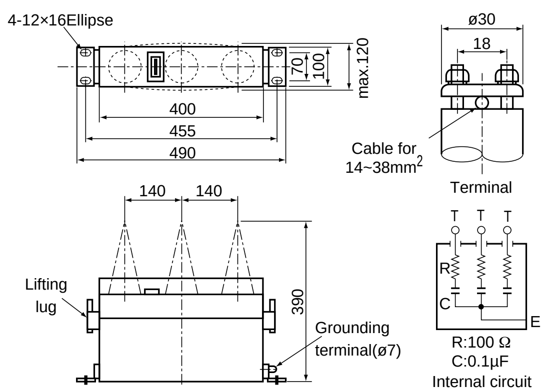
Notes: ● : Suppression device required – : Suppression device not required
*1 The withstand voltages (impulse) of transformer must exceed the values listed above.
*2 When breaking a magnetizing inrush current , it is recommended that a suppression device will be used.
*3 Semiconductor device must be provided with suitable suppression devices when a semiconductor is installed on the load side of transformer.

● C-R type surge absorber

Type	Rated voltage	Max. operating voltage	Frequency
AF3320R3TXG0542	$\frac{3.3kV}{\sqrt{3}}$	115% of rated voltage	50/60Hz
AF6620R3TXG0543	$\frac{6.6kV}{\sqrt{3}}$		50/60Hz

For 11kV : Contact FUJI.

Dimensions, mm/Surge absorber



● Arrester/GLI

Type	GLI-3G	GLI-6G
Rated voltage	4.2kV	8.4kV
Nominal discharge current	2.5kA	2.5kA
Max. clamping voltage	15kV or less	30kV or less
Discharge current withstand capacity	30kA, 2 times	30kA, 2 times

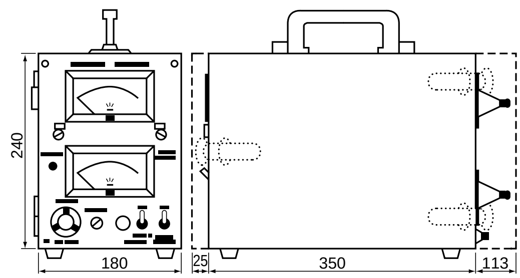
■ Vacuum condition tester/VC-1A

It is recommended that a withstand voltage tester (type VC-1A, sold separately) is used to check the state of the vacuum within the vacuum interrupter. The method of testing is very simple. First, withdraw the VCB from its enclosure set at the OFF position and switch the control circuit to the isolation position. Then earth the VCB together with the VC-1A tester and apply a test voltage. In this case apply 22kV (if the VCB's rated voltage is 7.2kV) between the poles of the vacuum interrupter for one minute. Under these conditions if the vacuum is normal a continuous buzzer signal will be given during the period the test voltage is applied.
On the other hand an intermittent buzzer sound will be given if the vacuum is unserviceable. Replace with a new interrupter if necessary.

Type	**VC-1A (Portable type)**
Input voltage	100V 50/60Hz
Output voltage	22/11kV AC
Operation	Continuous (or 10 min. if the output is short-circuited)
Detecting current	When 1.0A current flows in the L.V. input circuit the detector relay operates and interrupts.
Timer	1-minute timer is built into the tester.
Accessories	Input cord: 3 meters. Cord for test use (with clips): 1.5 meters (2 leads)
Mass	20kg


SH-27
Vacuum condition tester VC-1A

Dimensions, mm



Vacuum circuit breakers
Auto. V

Auto.V

■ Description

7.2/3.6kV, 400A, 600A, 8kA, 12.5kA FUJI Auto. Vs are vacuum circuit breakers which incorporate a built-in solid-state OCR and CT.
As they do not require to have a CT installed inside the switchgear cubicle or an OCR fixed to the front panel, space is saved in the cubicle and wiring and installation are simplified.
A system protection is easily arranged using Auto. Vs with primary circuit breaker and also a protective coordination with low voltage MCCBs.
The CT is a compactly built toroidal type and it is fitted to the upper part of the VCB. Its overcurrent withstanding value is as large as 12.5kA, 1 sec.

■ Features

- Built-in solid-state OCR and CT are provided
- System protective coordination is easily arranged using the VCBs.
- Compactly assembled, so saving space
- The built-in CT has a large overcurrent withstand value of 12.5kA.
- The setting range of the rated current is 24A to 320A.
- Applicable to the receiving and distribution facilities of 6kV, 170 to 2000kVA.

AF92-35

■ Specifications

Type		HA08□–H6 HA08□–H7	HA12□–H6 HA12□–H7	HA08□–A6 HA08□–A7	HA12□–A6 HA12□–A7
Closing system		Manual-spring		Motor-spring	
Installation □		Fixed: B, C, P		Fixed: B, C, P	
Rated voltage	(kV)	3.6/7.2		3.6/7.2	
Rated current	(A)	400	600	400	600
Rated frequency	(Hz)	50/60		50/60	
Rated breaking capacity	(kA)	8 50MVA at 3.6kV 100MVA at 7.2kV	12.5 80MVA at 3.6kV 160MVA at 7.2kV	8 50MVA at 3.6kV 100MVA at 7.2kV	12.5 80MVA at 3.6kV 160MVA at 7.2kV
Rated making current, peak value	(kA)	20	31.5	20	31.5
Rated closing time	(s)	—		0.03	
Rated short-time current, 1 second	(kA)	8	12.5	8	12.5
Insulation level		Dielectric: 22kV, 1 minute Impulse (1.2 × 50μs): 60kV			
Rated breaking time		3-cycle		3-cycle	
Opening time	(s)	0.03		0.03	
Operating duty		0 — 1 min. — CO — 3 min. — CO or CO — 15 sec. — CO			
OCR: Rated operating current setting value *1	(A)	24—30—36—42—48—60—75—90—105—120—160—200—240—280—320			
OCR: Instantaneous trip current		5, 7.5, 10, 12.5, 15 times the rated operating current			
OCR: Operating current: Inverse time element Instantaneous element		Within ± 10% of each setting current Within ± 15% of each setting current			
OCR: Operating time: Inverse time element Instantaneous element		Time setting 10: Input 300% 10 sec. Input 700% 1.6 sec. Time setting 6 : Input 300% 6 sec.±17% Input 700% 1 sec.±12% Less than 0.05 sec. at 200% of setting current			
OCR: Inertia characteristic		90% of the operating time obtained when 1,000% of the setting value input at minimum current setting value and time setting 10.			
Durability: Mechanical (operations) Electrical (operations)		10,000 10,000			
No. of operations (operations/hour)		60			
Applicable capacitor capacity *2	(kVA)	3,000	5,000	3,000	5,000
Auxiliary contact		2NO + 2NC (5NO + 5NC available on request)			
Alarm contact		1NO 100/110V AC 2.0A, 200/220V AC 1.0A, 100/110V DC 0.3A			
Mass (kg) Fixed		25	28	27	30
Standard		H.V. circuit breaker: JIS C 4603 (1990) AC circuit breaker: JEC2300 (1998) Overcurrent relays for H. V. power receiving: JIS C 4602 (1986)			

Note: *1 Operating current setting value 8 to 80A is also available.
*2 Maximum values when the VCB is used with a 6% reactor connected in a 6.6kV AC circuit. Halve these values for a 3.3kV AC circuit.

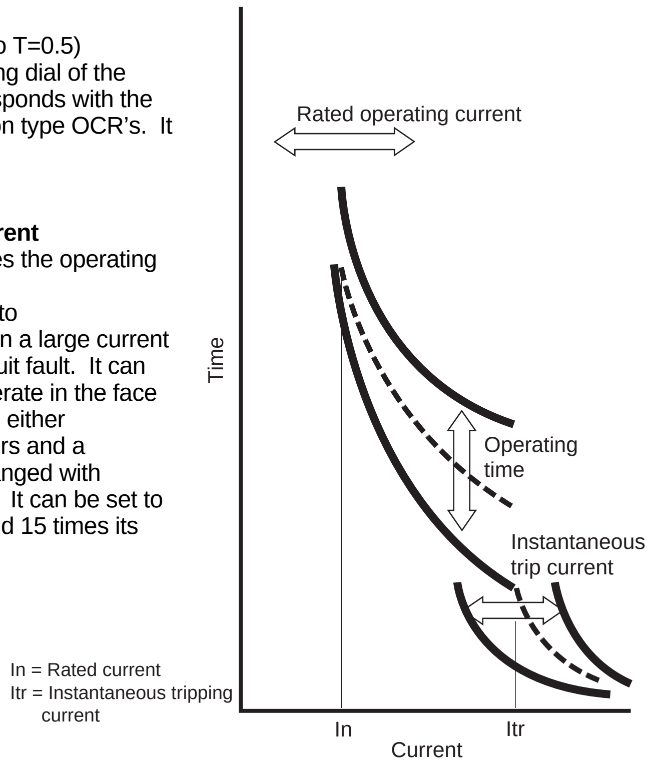
■ **Design features**
The four dials facilitate the setting of the overcurrent protection as followed:

- **Rated operating current**
Rated current range: 24 to 320A
(8 to 80A)
No. of steps: 15
Steps from 24A to 320A can be set by the two dials—CT's primary current dial and multiplying factor dial of primary current. These breakers are most suitable for receiving and distributing facilities with capacities from 6kV, 170 to 2000kVA. Since the rating for the primary current can be freely changed expenses for changing the CT ratio can be saved when expanding electrical facilities.

- **Operating time**
No. of steps: 16 (T=50 to T=0.5)
The operating time setting dial of the solid-state OCR's corresponds with the time lever of the induction type OCR's. It has 16 steps, from
T = 50 to T = 0.5.

- **Instantaneous trip current**
Trip current: 5 to 15 times the operating current.
This device is designed to instantaneously trip when a large current flows due to a short-circuit fault. It can be set so it does not operate in the face of inrush currents due to either transformers or capacitors and a coordination can be arranged with primary circuit breakers. It can be set to operate at between 5 and 15 times its operating current.

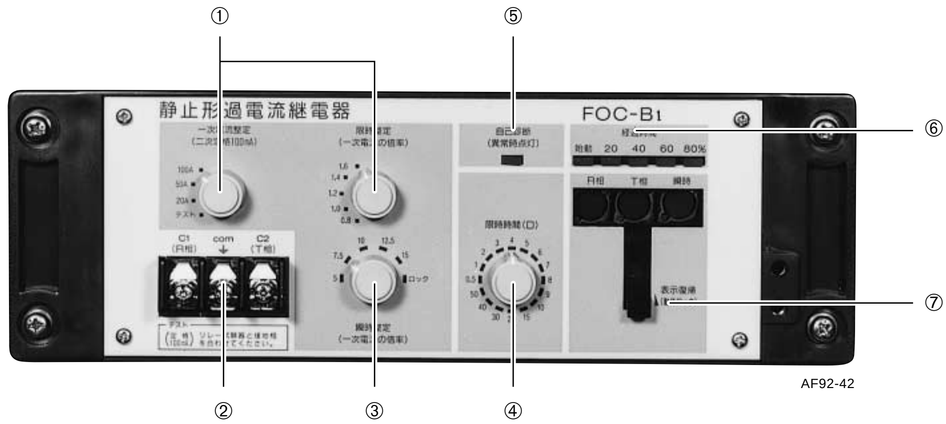
Operating current and time setting range for Auto. V



Rated operating current setting dials
The combination of these two dials permits the setting of 15 possible combinations.

① **Rated operating current value (A)**

Primary current setting dial		Multiplying factor dial				
		0.8	1.0	1.2	1.4	1.6
Standard	30A	24	30	36	42	48
	75A	60	75	90	105	120
	200A	160	200	240	280	320
	TEST	Set at this point when carrying out the operating test of OCR's				



② **Terminals for operating tests**
When carrying out the operating test, set the rated operating current setting dial at the TEST position and apply the test current between the C1-com and C2-com terminals.

③ **Instantaneous tripping current setting dial**
This can be set to 5 to 15 times the rated operating current value. When set at the LOCK position the instantaneous function stops.

④ **Operating time setting dial**
This corresponds to the time dial for the induction type relay and can be set at 16 steps, from T = 50 to T = 0.5.

⑤ **Self diagnostic function**
Continuously monitors operation of the internal microcomputer and lights alarm LEDs on detection of abnormal conditions.

⑥ **Elapsed operating time indicators (LEDs)**
- Start: This LED lights whenever main circuit current exceeds the operating current setting for overcurrent interruption.
- Elapsed operating time: These four LEDs indicate the breaker's overcurrent activation status in 20, 40, 60, or 80% of the maximum overcurrent duration before interruption occurs.

⑦ **Reset lever**
Resets the OCR and its operation indicators.

■ Design features

● Auto. V improves system dependability

FUJI solid-state type OCR's are provided with the ideal inverse time characteristics instead of the conventional electronic type linear characteristics.
In the case of the conventional induction type OCR's their long inverse time zone in characteristic curves do not extend smoothly, and so they do not meet the requirements of the operating characteristics of L. V. breakers thus making it difficult to arrange a coordination. The operating time of Auto. V's at 300% current has been greatly improved to 10 sec. as against 2 to 3 sec. for conventional OCR's. The function to extend the operating time by five times, an option of the previous Auto. V is included in the new Auto. V as a standard feature.

● Inertia characteristics exceed 90%

The inertia characteristics correspond with the "non-operating characteristics (permissible)".
When carrying out the coordination with the low voltage MCCB's, it is necessary to consider the "non-operating characteristics" and "coordination" in which the inertia characteristics are taken into consideration.
In the case of the induction type OCR's the inertia characteristics normaly exceed 60%, thus make it difficult to establish coordination with low voltage MCCB's.
On the other hand in the electronic type OCR's their inertia characteristics exceed 90%, giving them ideal operating characteristics.

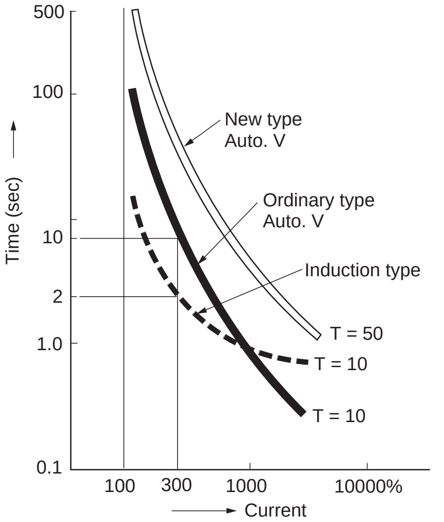
● The overcurrent withstanding value of the CT is 12.5kA

The CT built in the Auto. V is extremely small in size but its toroidal design permits it to withstand overcurrents having values as large as 12.5kA for
1 sec.

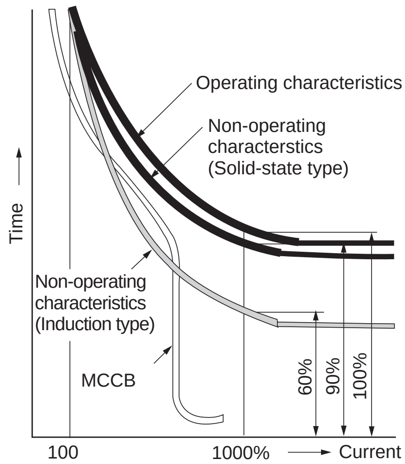
CT with large overcurrent constant

The internal CT's overcurrent constant of 20 or more was achieved by combining a CT with a very low activation power OCR. When using a CT in combination with a protective relay, the CT's overcurrent constant must be large enough for the overcurrent. To determine compatibility, overall OCR operation must be checked from the combined CT and OCR characteristics as shown in the figure at right.

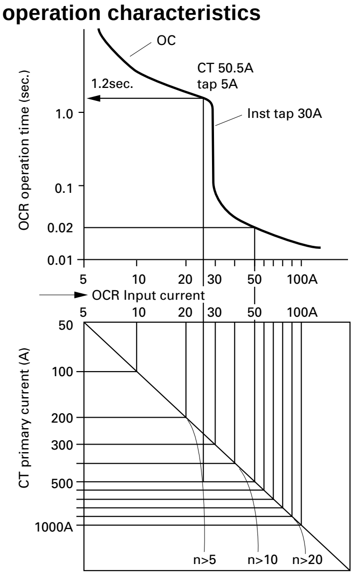
The operating characteristics of Auto. V and induction type OCR (FUJI CH1-53 type)



The inertia characteristics of Auto. V and induction type OCR



CT overcurrent constant and OCR operation characteristics



■ Operating characteristics of overcurrent relays

The curves indicate the time-current characteristics of OCR's. These characteristics meet the requirements of JIS C4602 "Overcurrent Relays for H. V. Power Receiving"

Note: For practical dial setting method or the test method of solid state OCR's please contact FUJI.

Note:
* Overcurrent constant
In CT the secondary current increases proportionally to the increase of the primary current.
When the value exceeds a certain value a saturation takes place due to magnetic saturation. The overcurrent constant(n) indicates the value obtained by dividing, the current value at the point where the error reaches 10%, by the rated current.

$$n = \frac{\text{Current at the point where the error reach 10\%}}{\text{Rated current}}$$

JEC190 (1977) instrument transformer for protective relay is stipulated as "n>5, n>10 and n>20". It is necessary that they have an adequately large overcurrent constant when incorporated with protective relays.

■ **Types and ratings**

Ratings	Installation	Closing system		Shunt trip			
		System type	Operating voltage	100/110V AC Type	Ordering code	100/110V DC Type	Ordering code
Voltage 3.6/7.2kV	Fixed: B Switchboard use	Manual-spring		**HA08B-H6F**	HA31BH6-400F	**HA08B-H7F**	HA31BH7-400F
		Motor-spring Instantaneous	100/110V AC/DC 200/220V AC/DC 48V DC 21/24V DC	**HA08B-A6F** **HA08B-B6F** **HA08B-C6F** **HA08B-D6F**	HA31BA6-400F HA31BB6-400F HA31BC6-400F HA31BD6-400F	**HA08B-A7F** **HA08B-B7F** **HA08B-C7F** **HA08B-D7F**	HA31BA7-400F HA31BB7-400F HA31BC7-400F HA31BD7-400F
Breaking current 8.0kA	Fixed: C Cubicle use	Manual-spring		**HA08C-H6F**	HA31CH6-400F	**HA08C-H7F**	HA31CH7-400F
		Motor-spring Instantaneous	100/110V AC/DC 200/220V AC/DC 48V DC 21/24V DC	**HA08C-A6F** **HA08C-B6F** **HA08C-C6F** **HA08C-D6F**	HA31CA6-400F HA31CB6-400F HA31CC6-400F HA31CD6-400F	**HA08C-A7F** **HA08C-B7F** **HA08C-C7F** **HA08C-D7F**	HA31CA7-400F HA31CB7-400F HA31CC7-400F HA31CD7-400F
Rated current 400A	Fixed: P Portable type	Manual-spring		**HA08P-H6F**	HA31PH6-400F	**HA08P-H7F**	HA31PH7-400F
		Motor-spring Instantaneous	100/110V AC/DC 200/220V AC/DC 48V DC 21/24V DC	**HA08P-A6F** **HA08P-B6F** **HA08P-C6F** **HA08P-D6F**	HA31PA6-400F HA31PB6-400F HA31PC6-400F HA31PD6-400F	**HA08P-A7F** **HA08P-B7F** **HA08P-C7F** **HA08P-D7F**	HA31PA7-400F HA31PB7-400F HA31PC7-400F HA31PD7-400F
Voltage 3.6/7.2kV	Fixed: B Switchboard use	Manual-spring		**HA12B-H6F**	HA32BH6-600F	**HA12B-H7F**	HA32BH7-600F
		Motor-spring Instantaneous	100/110V AC/DC 200/220V AC/DC 48V DC 21/24V DC	**HA12B-A6F** **HA12B-B6F** **HA12B-C6F** **HA12B-D6F**	HA32BA6-600F HA32BB6-600F HA32BC6-600F HA32BD6-600F	**HA12B-A7F** **HA12B-B7F** **HA12B-C7F** **HA12B-D7F**	HA32BA7-600F HA32BB7-600F HA32BC7-600F HA32BD7-600F
Breaking current 12.5kA	Fixed: C Cubicle use	Manual-spring		**HA12C-H6F**	HA32CH6-600F	**HA12C-H7F**	HA32CH7-600F
		Motor-spring Instantaneous	100/110V AC/DC 200/220V AC/DC 48V DC 21/24V DC	**HA12C-A6F** **HA12C-B6F** **HA12C-C6F** **HA12C-D6F**	HA32CA6-600F HA32CB6-600F HA32CC6-600F HA32CD6-600F	**HA12C-A7F** **HA12C-B7F** **HA12C-C7F** **HA12C-D7F**	HA32CA7-600F HA32CB7-600F HA32CC7-600F HA32CD7-600F
Rated current 600A	Fixed: P Portable type	Manual-spring		**HA12P-H6F**	HA32PH6-600F	**HA12P-H7F**	HA32PH7-600F
		Motor-spring Instantaneous	100/110V AC/DC 200/220V AC/DC 48V DC 21/24V DC	**HA12P-A6F** **HA12P-B6F** **HA12P-C6F** **HA12P-D6F**	HA32PA6-600F HA32PB6-600F HA32PC6-600F HA32PD6-600F	**HA12P-A7F** **HA12P-B7F** **HA12P-C7F** **HA12P-D7F**	HA32PA7-600F HA32PB7-600F HA32PC7-600F HA32PD7-600F

New-Auto.V

■ Description

The New-Auto.V is a circuit breaker that consists of a standard MULTI.VCB provided with a CT (current transformer), and incorporates a multiple function protectors and controllers to prevent equipment from overcurrent and other factors, thus saving energy and reducing installation man-hour.

- Multiple function protectors and controllers offers versatile features such as ground-fault directional, ground-fault overvoltage, undervoltage, and overvoltage protective functions in addition to overcurrent protection. It also includes measurement functions for a variety of items, such as current, voltage, power, power-factor, frequency, and zero-phase voltage values.

KK03-052

Draw-out type MW or PW (Y type)

Multiple function protectors and controllers

■ Highly reliable overcurrent protection

- Withstand overcurrent of CT: 12.5kA
- Overcurrent constant of CT: n>20

■ Specifications

Type		**HA08A□–A8**	**HA12A□–A8**
Closing system		Motor-spring	
Installation □		Draw-out: X, Y, U	
Rated voltage	(kV)	3.6/7.2	
Rated current	(A)	400	600
Rated frequency	(Hz)	50/60	
Rated breaking capacity	(kA)	8 50MVA at 3.6kV 100MVA at 7.2kV	12.5 80MVA at 3.6kV 160MVA at 7.2kV
Rated making current, peak value	(kA)	20	31.5
Rated closing time	(s)	0.03	
Rated short-time current, 1 second	(kA)	8	12.5
Insulation level		Dielectric: 22kV, 1 minute Impulse (1.2 × 50µs): 60kV	
Rated breaking time		3-cycle	
Opening time	(s)	0.03	
Operating duty		0 — 1 min. — CO — 3 min. — CO or CO — 15 sec. — CO	
Life expectancy	Mechanical (operations) Electrical (operations)	10,000 10,000	
No. of operations (operations/hour)		60	
Applicable capacitor capacity *1	(kVA)	3,000	5,000
Auxiliary contact		5NO + 5NC	
Mass (kg)	Draw-out (X type) Cradle for X type	34 11	35 11
Standard		H.V. circuit breaker: JIS C 4603 (1990), AC circuit breaker: JEC 2300 (1998)	

Note: * 1 Maximum values when the VCB is used with a 6% reactor connected in a 6.6kV AC circuit.
Halve these values for a 3.3kV AC circuit.

■**Specifications (Multiple function protectors and controllers)**

Item				Specification
General specification	Control power supply [V]			100/110DC (80 to 143DC) or 100AC (85 to 132AC)
	Power consumption (main unit) [W]			15W max.
	Rated frequency [Hz]			50/60 (settings selectable)
	Rated current		CT primary side [A]	30/100/300 AC (selectable)
			CT secondary side [A]	0.1 AC
	Rated zero-phase current		ZCT [mA]	200/0.2 AC *1
	Insulation resistance			10MΩ between all electric circuits and ground
	Vibration resistance			1.96m/s^2, 16.7Hz, 0.4mm double amplitude in three directions for 10 minutes each
	Shock resistance			300m/s^2 three times each in three directions
	Dielectric strength			2kV AC between all charged parts and ground excluding MN signal line, RS-485 signal line, and transducer output terminal.*2
	Noise immunity			Damped vibration waveform at 1 to 1.5MHz with peak voltage of 2.5 to 3kV continuously applied for 2 seconds Impulse noise in rectangular waveform (1ns/1µs) at peak voltage of 1.5kV applied for 10 minutes Radiowave freguency band: 10V/m on 140MHz, 430MHz, and 900MHz bands Cellular phone (800MHz/1.5GHz at 0.8W) or PHS (1.9GHz 10mW) in close contact
	Static electric noise			In contact with metal part: ±6kV Panel surface (not in contact with no metal parts): ±8kV
	Lightning impulse			Between all electric circuits and ground (excluding MN signal line, RS-485 signal line, and transducer output terminal) 4.5kV, 1.2x50µs, three times each on positive and negative sides
	Ambient humidity			10˚C to 60˚C (with no condensation or icing)
	Storage temperature			-20˚C to +70˚C (with no condensation or icing)
	Humidity			20% to 90% (on daily average with no condensation)
	Operating atmosphere			Free from corrosive gas and excessive dust
	Grounding			Ground at a resistance of 100Ω or less
	Mass			1.4kg
	Permissible momentary power interruption time			20ms (continuous operation) with display turned off The protective relay is, however, operable for 200ms after the power is interrupted.*3 (Display turns off, communication stops, and fault output turns on)
Protective function	Overcurrent protection	Rated operation current (51) setting range		15 to 390A
	Instantaneous overcurrent protection 50 (INST)	Rated trip current	Setting range	(1 to 20) × rated current (in 0.2 increments), LOCK
			Operating value	±15% max. of each setting current
		Operating time	Operating value	0.05s max. at 200% of setting current
	Short-time overcurrent protection 51DT	Rated trip current	Setting range	(1 to 20) × rated current (in 0.2 increments), LOCK
			Operating value	±10% max. of each setting current
		Operating time	Setting range	0 to 5s (at 0.05 increments)
			Operating value	±17% max. of 300% of setting value, ±12% max. of 700% of setting value (Lower limit: ±50ms)
	Time-lag overcurrent protection 51	Rated trip current	Setting range	50 to 130% of rated current (at 10% increments), LOCK
			Operating value	±10% max. of each setting current
		Operating time	Time-magnification (lever) setting range	(0.5 to 20) × (in 0.1 increments), (20 to 100) × (in 1 increments)
			Operating value	±17% max. of 300% of setting value, ±12% max. of 700% of setting value (Lower limit: ±100ms)
	Ground fault protection 67DG and 51G	Zero-phase current	Setting range	0.1 to 1.0A (at 0.05A increments), LOCK
			Operating value	±10% max. of setting value
		Zero-phase voltage	Setting range	2.5% to 15% of rated voltage (at 2.5% increments)
			Operating value	±25% max. of setting value
		Phase	Max. sensitivity	30, 45, 60˚
			Operating angle range	Max. sensitivity phase: ±80˚
			Operating angle tolerance	±15%
		Operating time	Setting range	0.1 to 3s (at 0.05s increments), 3 to 120s (at 1s increments)
			Operating value	±5% max. of setting value (Lower limit: ±50ms)

12

Protective function	Overvoltage protection 59(OV)	Voltage	Setting range	110 to 150V (at 5V increments), LOCK	
			Operating value	±5% max. of setting value	
		Operating time	Setting range	0.1, 0.2 to 2s (at 0.2s increments), 2 to 10s (at 1s increments)	
			Operating value	±5% max. of setting value (Lower limit: ±50ms)	
	Undervoltage protection 27 (UV)	Voltage	Setting range	20 to 100V (at 5V increments), LOCK	
			Operating value	Setting value of 90V min.: ±5% Setting value of 85V max.: ±[{2.3 +(110V/voltage setting value)x 0.16}x 2]%	
		Operating time	Setting range	0.1, 0.2 to 2s (at 0.2s increments), 2 to 10s (at 1s increments)	
			Operating value	±5% max. of setting value (Lower limit: ±50ms)	
Prealarm	Overcurrent OCA	Voltage	Setting range	10% to 100% of rated current (at 5% increments), LOCK	
			Operating value	±10% max. of setting value	
		Operating time	Setting range	10 to 200s (at 10s increments)	
			Operating value	±5% max. of setting value	
	Leakage current OCGA	Voltage	Setting range	50%, 60%, 70%, and 80% of 67DG or 51G operating current setting value, Lock	
			Operating value	±10% max. of setting value (Lower limit: ±20mA)	
		Operating time	Setting range	10 to 200s (at 10s intervals)	
			Operating value	±5% max. of setting value	
External I/O specifications	Input circuit	Fixed, 5 points		CT primary rated current (30A/100A/300A): 3 points, CT test position: 1 point, trip output lock: 1 point	100V DC (143V max.)/100V AC (132V max.) common use DC ON voltage: 40V min, 70V max. AC ON voltage: 40V min, 70V max.
		General-purpose, 3 points		External making, external breaking and external reset of each one point is default.	
		Others, 2 points		Trip coil (TC) disconnection monitoring, 52a contact: each one contact	
	Output circuit	Input, 1 point		Making earrent: 15 A (110V DC) Permissible continuous current: 4A	
		Off and trip, 1 point			
		Alarm output, 8 points		Current made or broken: 0.2 A (110V DC inductive load, L/R=15ms) Permissible continuous current: 1A	
		Device failure, 1 point			
Metering and display specifications	Current, demand current and demand max. current			0, 0.4% to CT rating and to CT rating x 1.3 Fault current of 2000% max. can be displayed	
	Zero-phase current and zero-phase current history max. value		200/0.2mA	ZCT primary current: 0.05 to 1.0A *1 Fault current of 4A max. can be displayed	
	Zero-phase voltage and zero-phase voltage history max. value			1.5% to 50% *4	
	Voltage			5 to 150V on VT secondary side	
	Frequency			45 to 55Hz (50Hz) and 55 to 65Hz (60Hz)	
	Power-factor			Lead 0 to 1.0 to Lag 0	
	Active power, reactive power, demand power and max. demand power			0, 0.4% to ($\sqrt{3}$ x rated voltage x 1.3In x power-factor 1.0) % (In: CT primary rated current)	
	Active energy and reactive energy			JIS C 1216 (meter with transformer), equivalent to table 4 normal class	
	History data			Number of protective operation times: 0 to 9999 Operating hours: 0 to 9999 x 100 hr Number of switching times: 0 to 9999 x 10 times	

Notes *1 When using ZCT, FUJI's dedicated product ZCT-□ is recommended. For details, please contact FUJI.
*2 Do not apply 2kV between lines.
*3 When you use AC power as control power supply, and 27 (UV) function, and you require that the operating time setting at power failure be operated more than 2s, the use of a UPS or AC power supply UM2P-A1 is recommended (sold separately).
*4 When you use zero-phase potential input device, use FUJI's dedicated ZPD-1.

■ **Multiple function protectors and controllers offers versatile features.**

● **A host of protective functions**
- Provided with ground-fault directional, ground-fault overvoltage, undervoltage, and overvoltage protective functions in addition to overcurrent protection.
- Allows precise settings for relay operation characteristics, to ensure easy protective coordination.

● **Additional measurement functions**
- Includes measurement functions for a variety of items, such as current, voltage, power, power-factor, frequency, and zero-phase voltage values.

● **Equipped with transducer and communications functions.**
- The transducer function (4 channels) enables the use of analog meters.
- The communications function (RS-485) enables status and other monitoring items.

■ **Wide-range CT supports equipment across a wide capacity range**
- Range of operating current settings for overcurrent protection: 15 to 390A
- Covers an equipment capacity range of 170 to 4,400kVA.

Rated operating current (A)

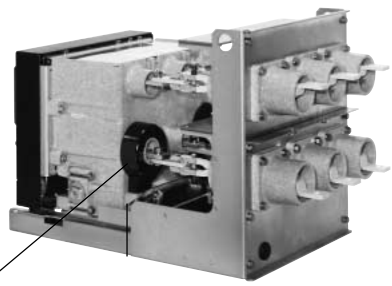
CT rating	50%	60%	70%	80%	90%	100%	110%	120%	130%
30A	15A	18A	21A	24A	27A	30A	33A	36A	39A
100A	50A	60A	70A	80A	90A	100A	110A	120A	130A
300A	150A	180A	210A	240A	270A	300A	330A	360A	390A

- Instantaneous operating current: 1x to 20x CT rated current (at 0.2x increments)
- Time-lag time-magnification: Setting between 0.5 and 100

■ **Greatly simplifies main circuit connections**
- The compact, built-in CT eliminates the need for CT space or CT installation work on distribution boards.

Draw-out type MW or PW (Y type)

Multiple function protectors and controllers KK03-061


Toroidal wide-range CT KK03-051

■ **Types and ratings**

Ratings	Installation	Closing system Closing system	Operating voltage	Trip system	Type
Voltage 3.6/7.2kV Breaking current 8.0kA Rated current 400A	Draw-out with cradle: X Draw-out with cradle and shutter: Y Draw-out with cradle: U	Motor-spring Instantaneous	100/110V AC/DC	Shunt trip (Operated by signal communication with multiple function protections and controllers) 100/110V DC	**HA08AX-A8** **HA08AY-A8** **AH08AU-A8**
Voltage 3.6/7.2kV Breaking current 12.5kA Rated current 600A	Draw-out with cradle: X Draw-out with cradle and shutter: Y Draw-out with cradle: U	Motor-spring Instantaneous	100/110V AC/DC	Shunt trip (Operated by signal communication with multiple function protections and controllers) 100/110V DC	**HA12AX-A8** **HA12AY-A8** **AH12AU-A8**

■ Closing system

System		Specification			Remarks
		Voltage	Motor current	Coil current	
Motor-spring	A	100/110V AC/DC	0.6A	4A	• Use a VT with a capacity of at least 50VA.
	B	200/220V AC/DC	0.5A	2.5A	• Use a 3A fuse to protect the control circuit
	C	48V DC	1.5A	5.5A	• Spring charging time is 5 seconds.
	D	21/24V DC	1.5A	13A	

Note: The New-Auto.V comes only with motor-spring A.

■ Tripping system

	System		Specification
Auto.V *1,*2	Shunt trip	6 7	100/110V AC, 1.5VA 100/110V DC, 3.4A
New-Auto.V *2	Shunt trip	8	100/110V DC, 3.4A Operated by signal communication with multiple function protectors and controller

■ Auxiliary contact

Contact arrangement	Specification	Remark
2NO + 2NC standard provided (Fixed type) 5NO + 5NC standard provided (Draw-out type)	100/200V AC, 10A 100/200V DC, 5/3A	5NO + 5NC contacts are available on request (Fixed type)

Note: *1 To use AC to trip the Auto. V, use a capacitor trip device in combination with the trip system.
*2 In the case of shunt tripping with AC power supply, use the capacitor shunt trip power supply in combination. For details, refer to the information on the accessories sold separately.

■ Alarm contact

Contact arrangement	Specification
1NO standard provided (Auto.V)	100/110V AC, 2.0A 200/220V AC, 1.0A 100/110V DC, 0.3A (time constant: 7ms)

■ Type number nomenclature

● Auto.V

HA 08 B - A 6 S L

Basic type — HA

Breaking current — 08
08: 8kA (Rated current 400A)
12: 12.5kA (Rated current 600A)

Installation — B
B: Fixed, switchboard use
C: Fixed, cubicle use
P: Fixed, portable type

Vacuum interrupter used — L
Blank: Standard level vacuum interrupter
L: Low-level-surge vacuum interrupter

Rated operating current — S
F: 24 to 320A (standard)
S: 8 to 80A

Tripping system — 6
6: Shunt trip 100/110V AC
7: Shunt trip 100/110V DC

Closing system — A
H: Manual-spring
A: Motor-spring, Instantaneous closing 100/110V AC/DC
B: Motor-spring, Instantaneous closing 200/220V AC/DC
C: Motor-spring, Instantaneous closing 48V DC
D: Motor-spring, Instantaneous closing 21/24V DC

● New-Auto.V

HA 08 A X - A 8 L S1 K

Basic type — HA, A

Breaking current — 08
08: 8kA(Rated current 400A)
12: 12.5kA(Rated current 600A)

Installation — X
X: Draw-out, with cradle for JEM 1425 class CW
Y: Draw-out, with cradle and shutter for JEM 1425 class MW and PW
U: For use in small depth switchboard, JEM1425 class CW

Panel lead wire — K
Blank: With panel lead wire
K: Plug only

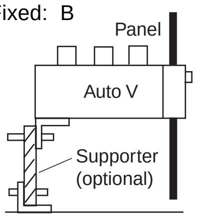
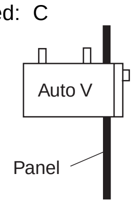
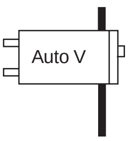
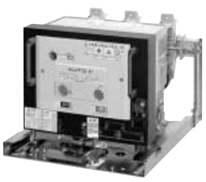
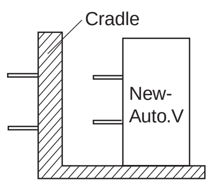
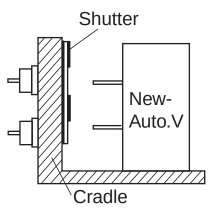
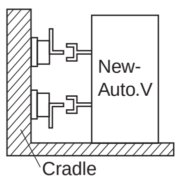
Position switch — S1
Blank: With no position switch
S1: With run position and test position, both with SPDT contacts

Vacuum interrupter used — L
Blank: Standard level vacuum interrupter
L: Low-level-surge vacuum interrupter

Tripping system — 8
8: Multiple function protectors and controllers provided with built-in CT
Shunt trip 100/110V DC

Closing system — A
A: Motor-spring, Instantaneous closing 100/110V AC/DC

■ Installation and accessories

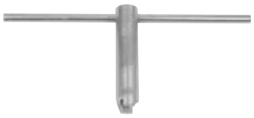
	Photo	Installation system	Description	Supplied accessories	Optional accessories
Auto.V	 AF92-35	Fixed: B 	• Fixed type • Open-type switchboard, indoor use • Manual-spring handle or motor-spring • H.V. main terminals are positioned at the top of the VCB. This facilitates replacement of VCB	• Insulation tube for main terminal • Manual handle for motor-spring type	• Supporter • Capacitor trip device • Vacuum condition tester • Surge absorber
	 AF92-25	Fixed: C 	• Fixed type • Open-type cubicle use • Manual-spring handle or motor-spring • H.V. main terminals is located at the top of VCB. This facilitates replacement of VCB.	• Insulation tube for main terminal • Manual handle for motor-spring type	• Supporter • Capacitor trip device • Vacuum condition tester • Surge absorber
	 AF92-64	Fixed: P 	• Fixed type • Open-type, portable type • Manual-spring handle or motor-spring • H.V. main terminals is located at the back of VCB. This facilitates replacement of VCB.	• Manual handle for motor-spring type	• Capacitor trip device • Vacuum condition tester • Surge absorber
New-Auto.V	 KK03-055	Draw-out with cradle: X 	• Draw-out type • Class CW type metal enclosure/ indoor use • Motor-spring • Cradle is provided to facilitate assembly and adjustment of switchgear. • Interlock system and grounding device is provided.	• Manual handle for motor-spring type • Draw-out handle • Connector provided with external lead wire • Lead wire for digital multi-function relay • Test jumper wire for digital multi-function relay	• Draw-out extension rail • Position indicating switch • Capacitor trip device • Vacuum condition tester • Surge absorber • Lifter • Testing jumper • Connector with external lead wire
	 KK03-050	Draw-out with cradle and shutter: Y 	• Draw-out type • Class MW, PW type metal enclosure/indoor use • Motor-spring • Cradle with shutter is provided to facilitate assembly and adjustme nt of switchgear. • Interlock system and grounding device is provided.	• Manual handle for motor-spring type • Draw-out handle • Connector provided with external lead wire • Lead wire for digital multi-function relay • Test jumper wire for digital multi-function relay	• Draw-out extension rail • Position indicating switch • Capacitor trip device • Vacuum condition tester • Surge absorber • Lifter • Testing jumper • Connector with external lead wire
	 KK03-056	Draw-out with cradle: U 	• Draw-out type • Class CW type metal enclosure/ indoor use • Motor-spring • Cradle with shutter is provided to facilitate assembly and adjustme nt of switchgear. • Interlock system and grounding device is provided.	• Manual handle for motor-spring type • Draw-out handle • Connector provided with external lead wire • Lead wire for digital multi-function relay • Test jumper wire for digital multi-function relay	• Draw-out extension rail • Position indicating switch • Capacitor trip device • Vacuum condition tester • Surge absorber • Lifter • Testing jumper • Connector with external ead wire

■ Supplied accessories

● Insulation tube for main terminal
Installation types: B and C

AF88-1108

● Manual handle for motor-spring type
All types



KK03-073

● Draw-out handle
Installation types: X, Y, and U

KK03-074

• Connector with external lead wire
Installation types: X, Y and U

KK03-075

• Lead wire for multiplefunction protectors and controllers
New-Auto.V type

KK03-076

• Jumper wire for digital multi-function relay test
New-Auto.V type

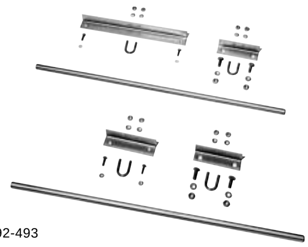
K03K-077

■ Optional accessories

● Supporter
Supporter kit for stabilizing the back of fixed type B, C Auto. V on the floor.

Type: C

Type: B



AF92-493

● Draw-out extension rail (HZ2AE)
Used with draw-out type (X, Y, U).
Use of an extension rail makes daily checking easier because the VCB can be pulled out of the panel.
Double stack types do not require lifters or chain blocks.

KK03-079

● Position indicating switch (HZ2AD)
Switch for indicating the service positions and test positions of draw-out (X, Y, U).
Used for interlocking to other devices attached to the cradle for draw-out type.

SG 1075

● Vacuum condition tester
VC-1A
For further information see page 12/25.

SH-27

● C-R type surge absorber
AF3320R3TXG0542
AF6620R3TXG0543
For further information see page 12/25.

● Testing jumper (HZ2AG)
Use to test remote ON/OFF operation of a VCB.

KK03-078

● Arrester
GLI-3G
GLI-6G

AF94-104

● Capacitor trip device
VCB-T1A, T2A, VCB-T1PA, T2PA
These are used when the trip circuit is connected to AC power supply.

Type	VCB-T1A VCB-T1PA	VCB-T2A VCB-T2PA
Rated input voltage	100/110V AC	200/220V AC
Shunt trip coil volt	100/110V DC	200/220V DC

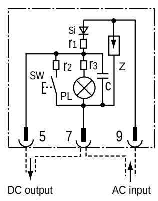
Surface mounting
VCB-T1A, T2A

KK04-064

Flush mounting
VCB-T1PA, T2PA

SH-307

Wiring diagram



Name
r1: Charging resistor
r2: Discharge resistor
r3: Series resistor
Si: Silicon rectifier diode
PL: Pilot lamp
C: Electrolytic capacitor
SW: Discharge switch
Z: Surge absorber

● Lifter
L-2HNB

KK03-080

■ Optional accessories

● AC power supply unit (for New-Auto.V)

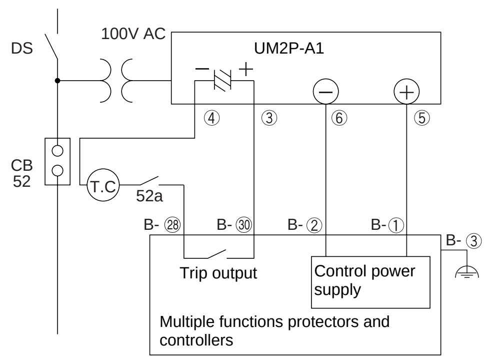
Type		**UM2P-A1**
Rated input voltage		100/110V AC (Allowable variation: 85 to 132V)
Rated output	Control power of multiple functions protectors and controllers	100/110V DC 0.15A
	Power supply of capacitor trip device	Rated charge voltage: 140V DC (C=1500 μ F)
Power failure compensation time	Control power of multiple functions protectors and controllers	1s
	Power supply of capacitor trip device	When power failure occurs at 60V AC, the charge voltage is 75DC or higher after the elapse of 30s.
Operating temperature range		-10 to +60˚C (no icing or no condensation)
Insulation resistance		Between all electrical circuits and ground: 10MΩ (500V DC megger)
Withstand voltage		Between all electrical circuits and ground: 2000V AC for 1min
Lightning impulse		Between all electrical circuits and ground: 4500V 1.2/50μs
Mass		1.5kg

Notes: The power failure compensation time of this AC power supply unit is 1s. If you use the UV (undervoltage) function with the operation time at 1.2s or longer, connect an external capacitor (not supplied) together between this unit's terminals 5 and 6, by referring to the table below.

Operating time of protection 27 (UV)	External capacitor capacitance	Example of capacitor
1.2 to 2s (at 0.2s increments)	1500 μ F (Withstand voltage: 200V DC min.)	Nichicon-made LNT2D152MSM
3 to 5s (at 1s increments)	6800 μ F (Withstand voltage: 200V DC min.)	Nichicon-made LNT2D682MSM
6 to 10s (at 1s increments)	1600 × t (μ F)	

t = Operating time (setting value) of protection 27 (UV)

Outline of devices used in combination



UM2P-A1 OWP101

● Specifications of AC meter (for Auto.V)

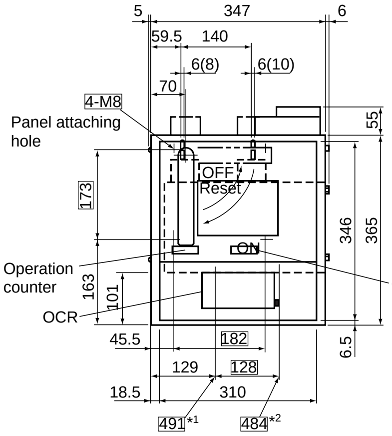
Product	AC meter *1
Type	**FR-80AS** (for Auto.V)
Operating principle	RMS rectifying type
Standard scale	Normal scale
Full scale [A]	Low ratings: 20, 40, and 100 Standard ratings: 60, 150, and 400 *2
Mass (g)	Approx. 150
Class	2.5 (JIS C 1102)
Dimensions [mm] (Front dimensions)	80 × 80

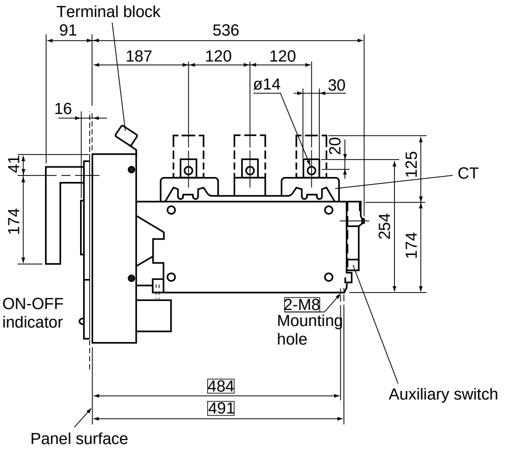
Note: *1. Specify that the meter is to be used for the Auto.V when ordering the meter alone.
*2. Set the full scale (A) to a value twice as large as the primary current setting (A) in the built-in OCR. For example, if the primary current of the OCR is 75A, read the full scale of the AC meter as 150A.

FR-80AS AF00-416

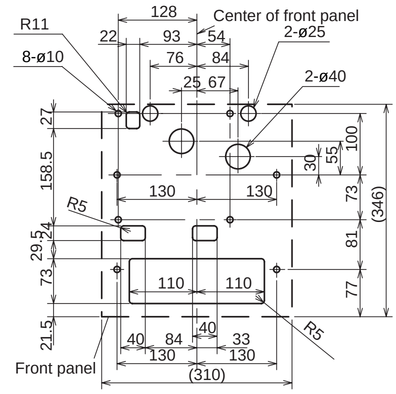
■ Dimensions, mm
Fixed/B type

HA08B-H6, H7
HA12B-H6, H7





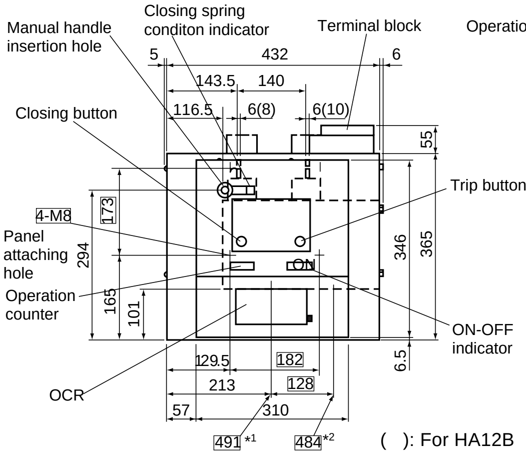
Panel cutting



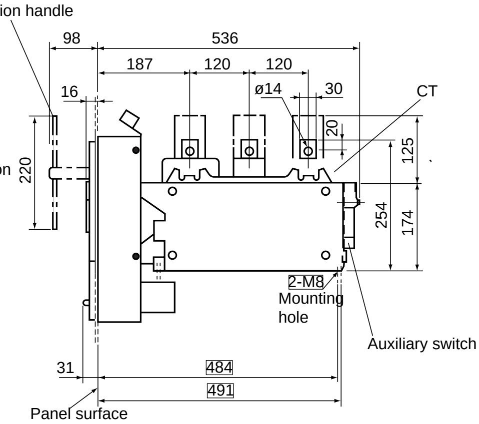
( ): For HA12B

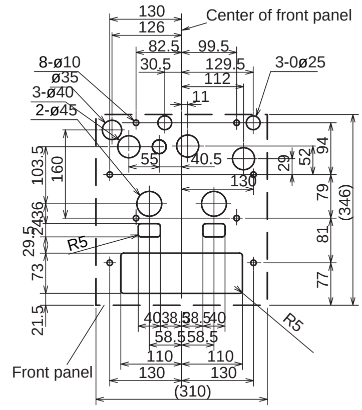
*1 Mounting-hole depth dimension pitch: 491mm side from panel surface
*2 Mounting-hole depth dimension pitch: 484mm side from panel surface

HA08B-A6, A7
HA12B-A6, A7



( ): For HA12B

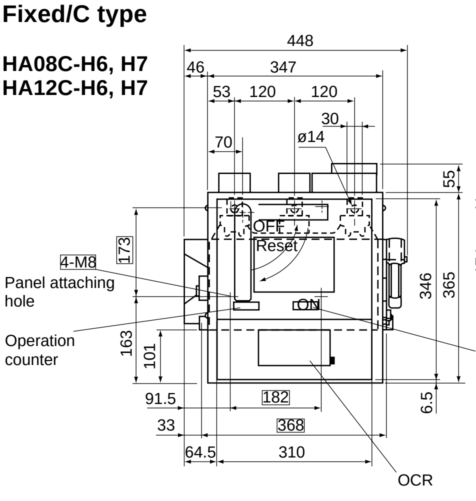


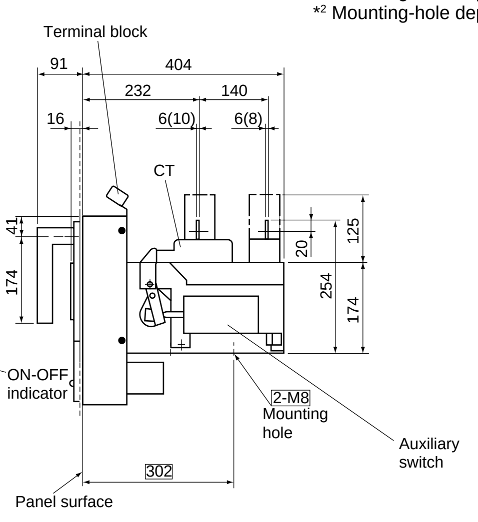


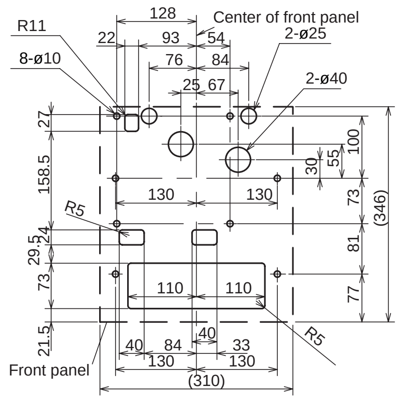
*1 Mounting-hole depth dimension pitch: 491mm side from panel surface
*2 Mounting-hole depth dimension pitch: 484mm side from panel surface

Fixed/C type

HA08C-H6, H7
HA12C-H6, H7



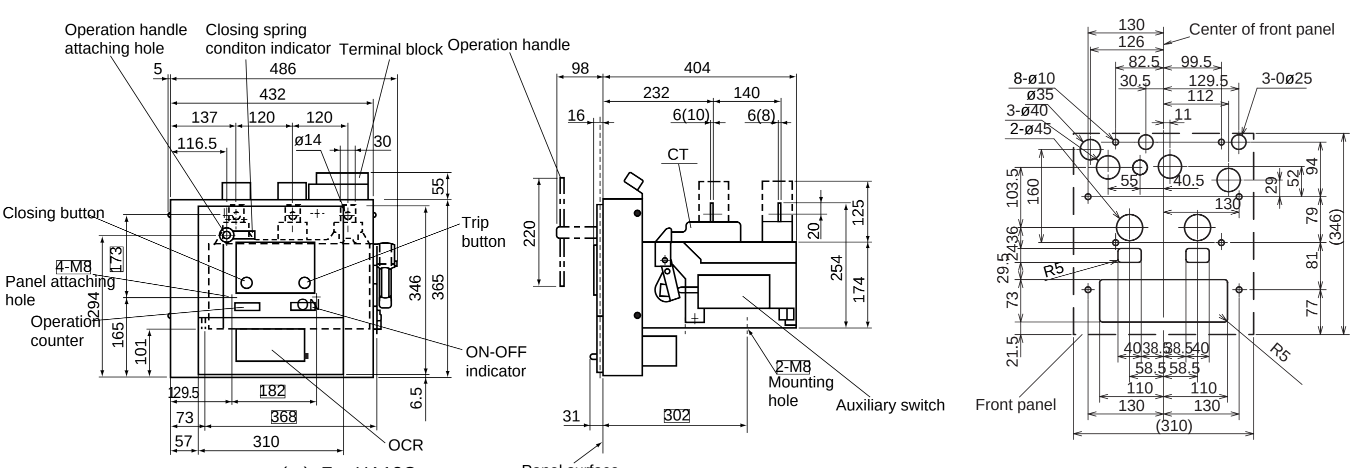




( ): For HA12C

■ Dimensions, mm
Fixed/C type

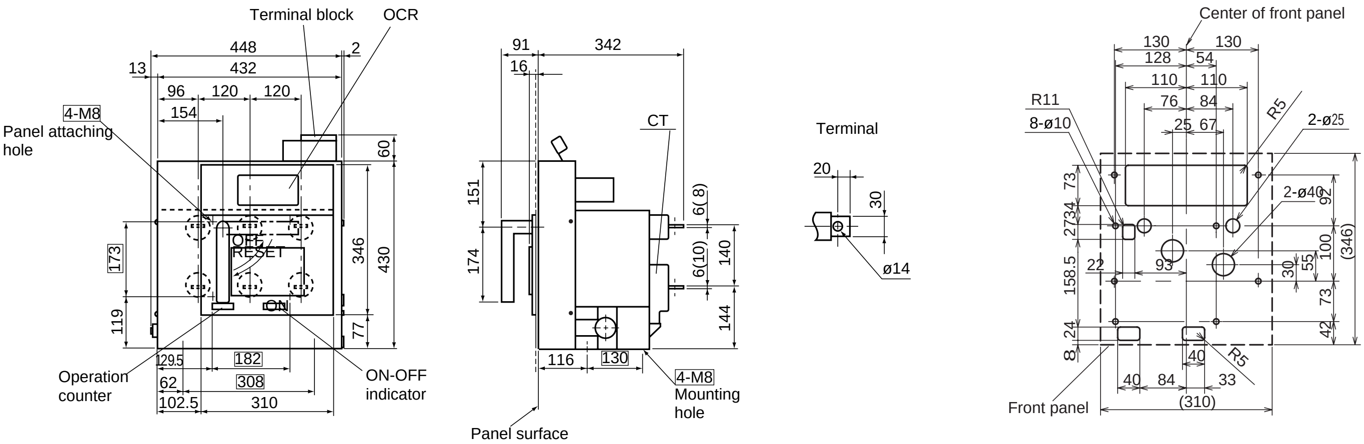
HA08C-A6, A7
HA12C-A6, A7



( ): For HA12C

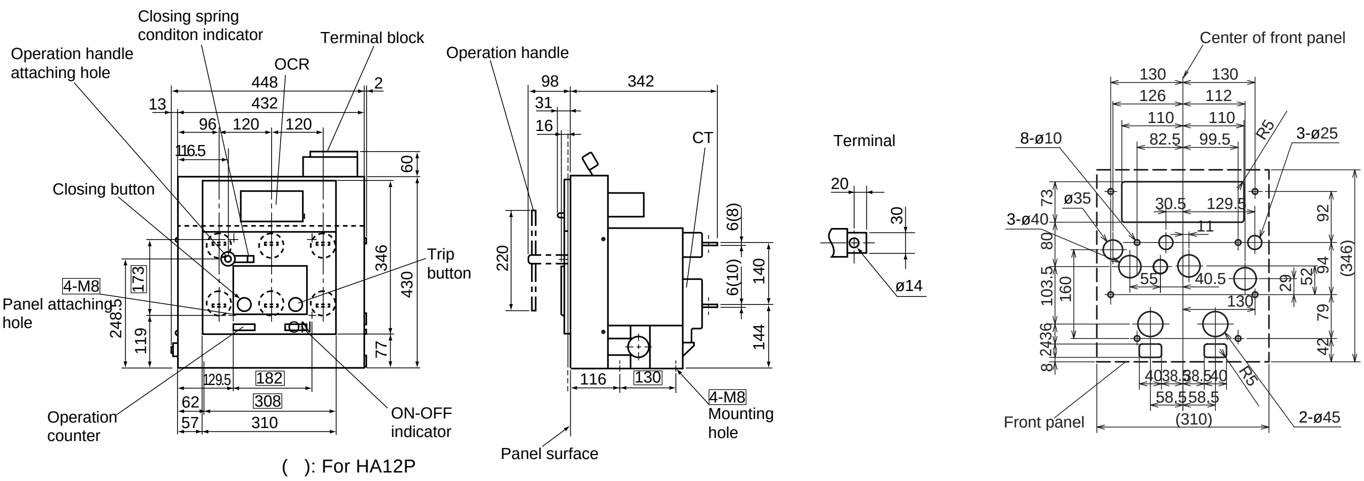
Fixed/P type

HA08P-H6, H7
HA12P-H6, H7



( ): For HA12P

HA08P-A6, A7
HA12P-A6, A7

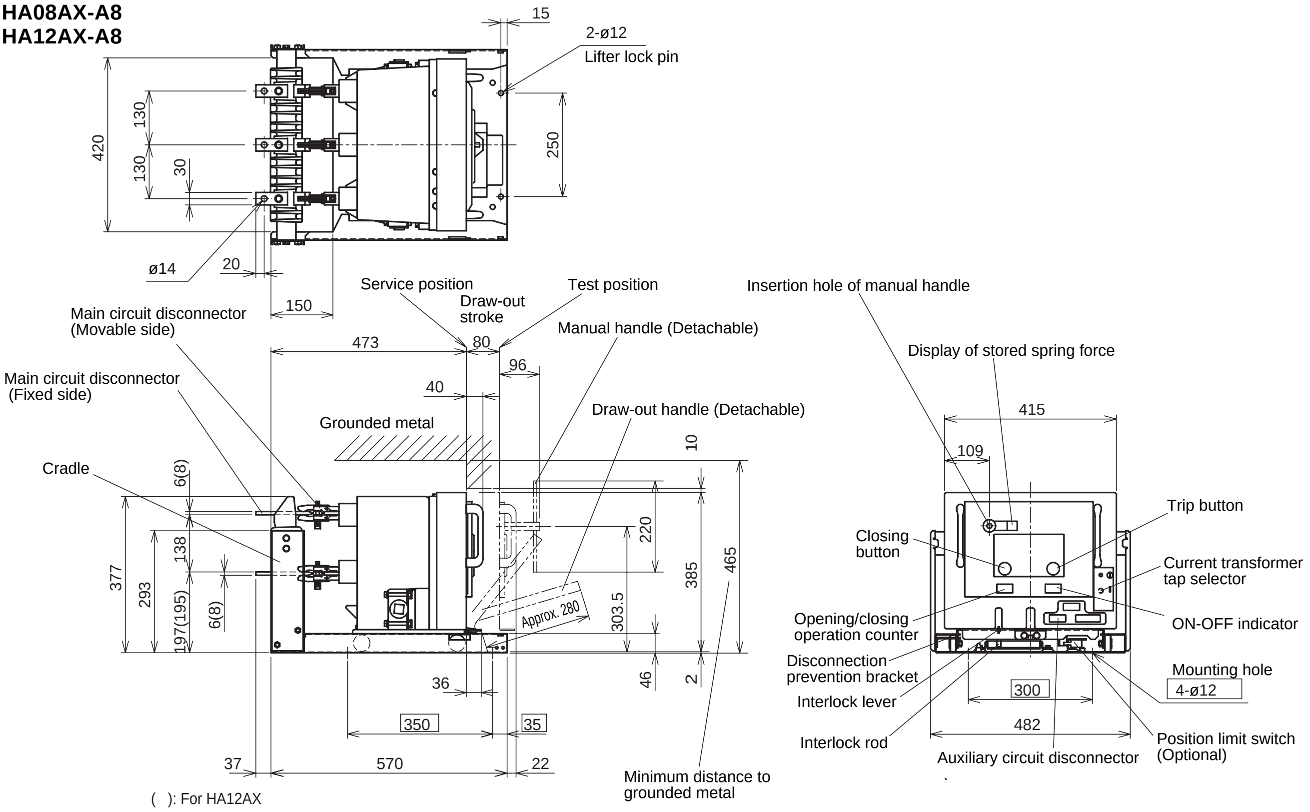


( ): For HA12P

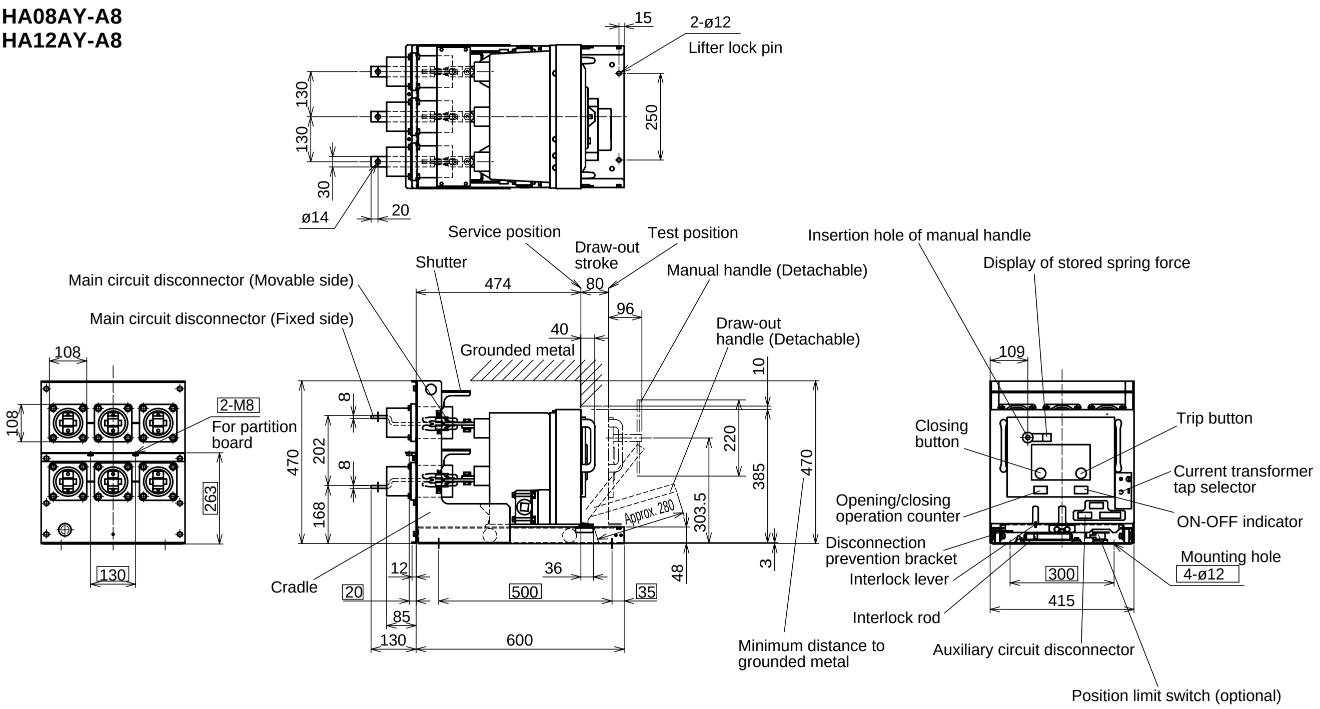
12

■ **Dimensions, mm**
Draw-out/X type

HA08AX-A8
HA12AX-A8

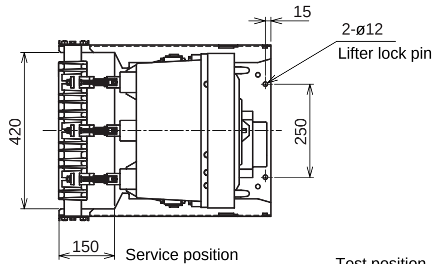


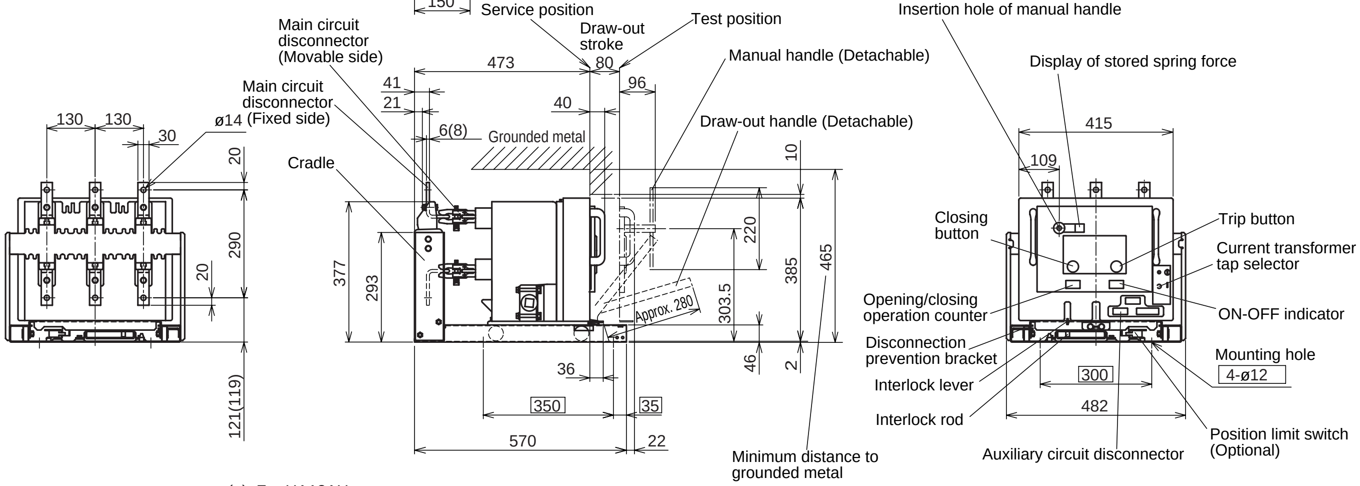
HA08AY-A8
HA12AY-A8



■ Dimensions, mm
Draw-out/Y type

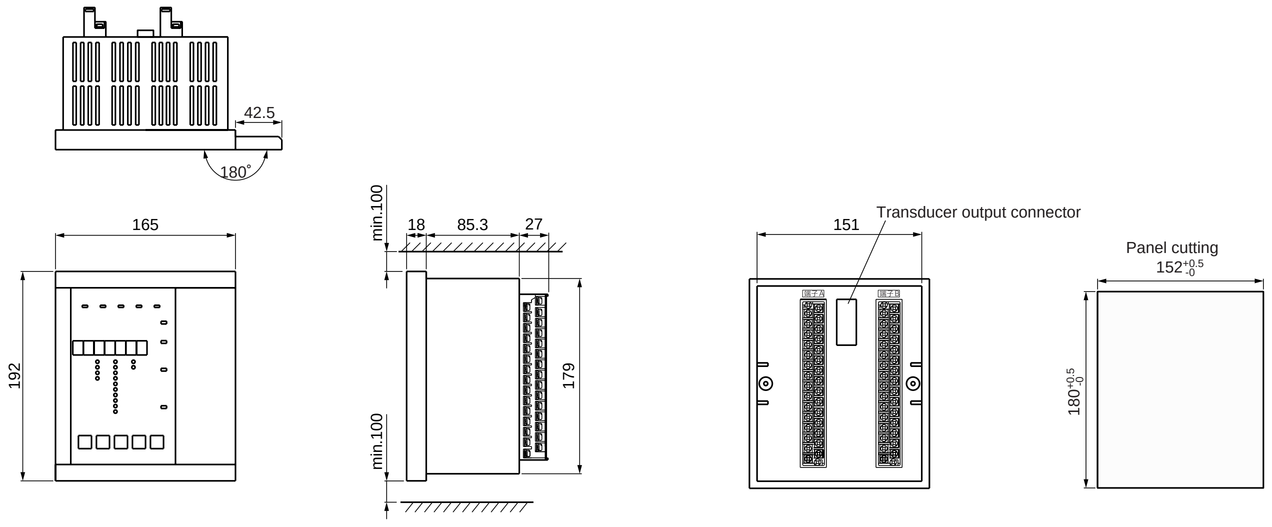
HA08AU-A8
HA12AU-A8





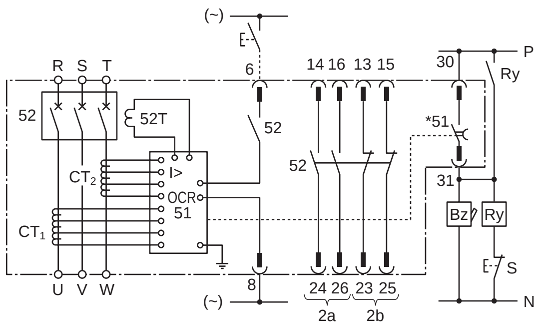
( ): For HA12AU

■ Multiple function protectors and controllers

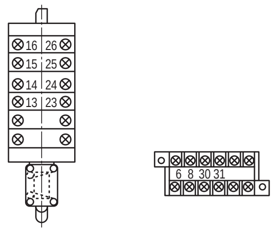


■ Wiring diagrams

HA08□-H6
HA12□-H6

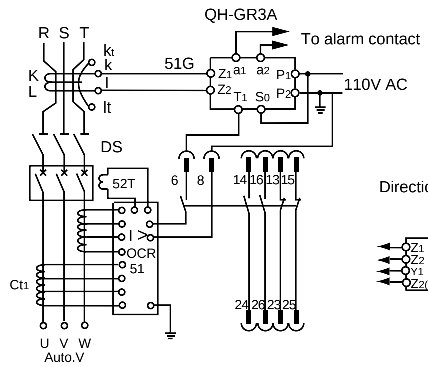


External terminal of VCB
Internal of VCB
*51 Instant (60ms)

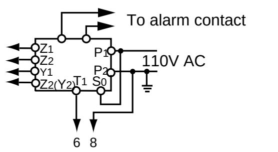


Auxiliary switch Control circuit terminal
(B, C, P types)

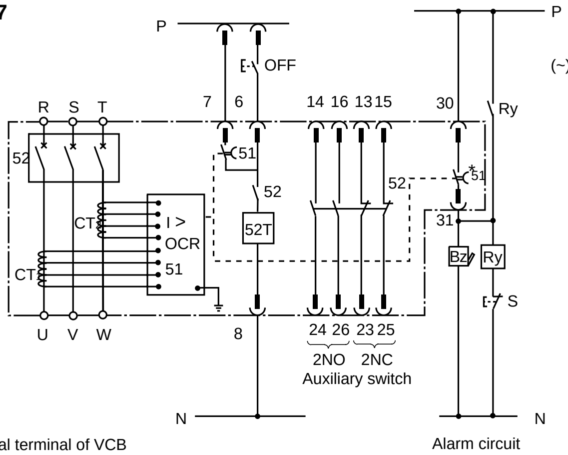
Connected with ground fault relay

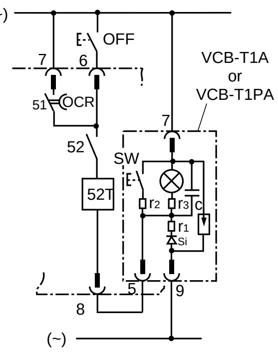


Directional ground fault relay QH-DG3

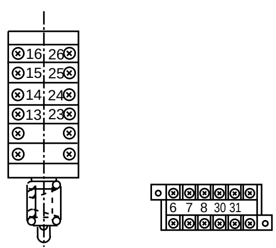


HA08□-H7
HA12□-H7





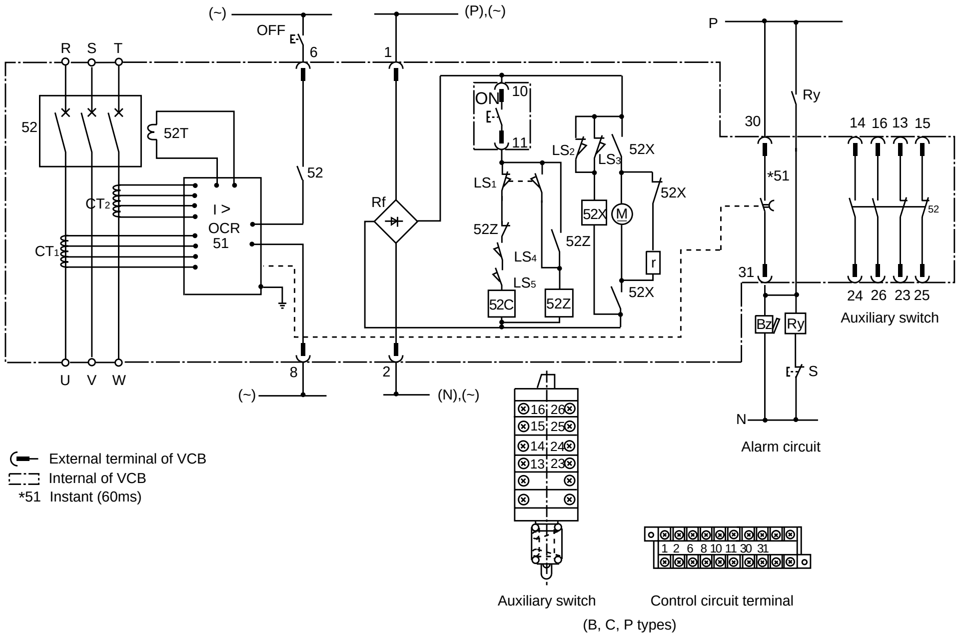
External terminal of VCB
Internal of VCB
*51 Instant (60ms)



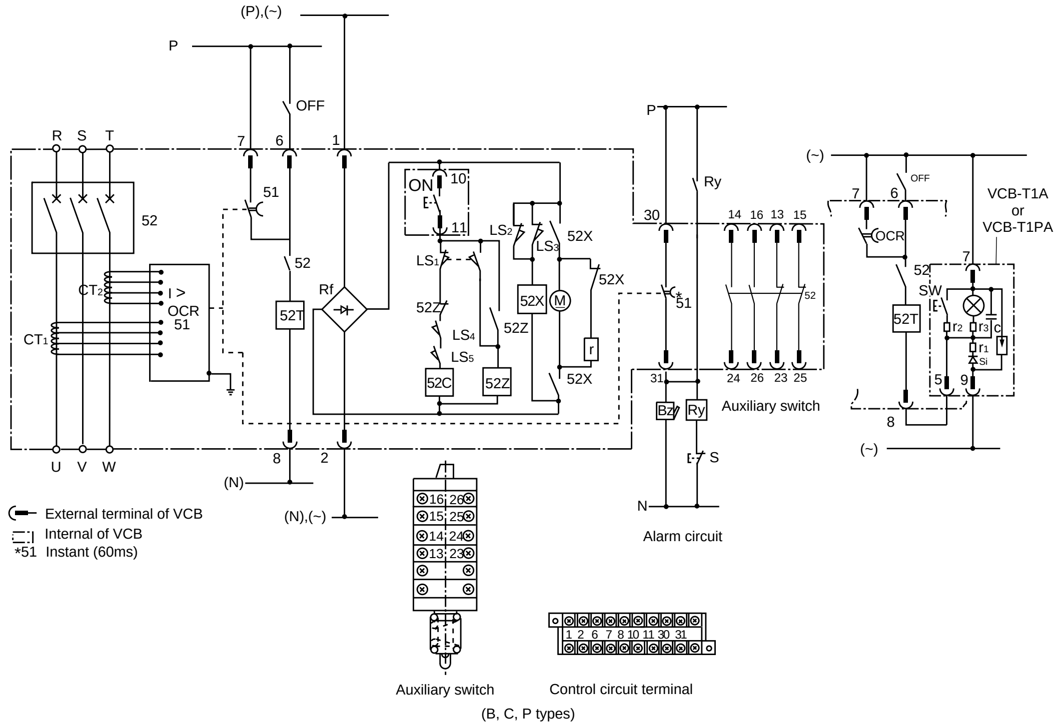
Auxiliary switch Control circuit terminal
(B, C, P types)

■ Wiring diagrams

HA08□-A6, B6, C6, D6
HA12□-A6, B6, C6, D6



HA08□-A7, B7, C7, D7
HA12□-A7, B7, C7, D7

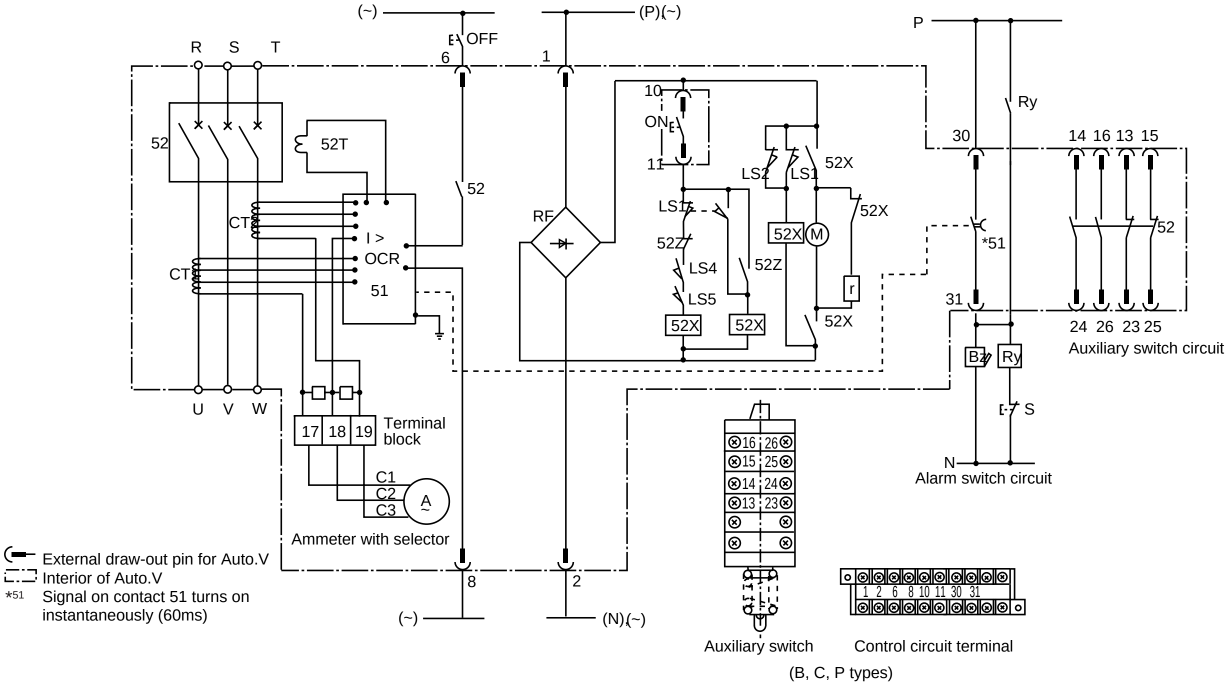


52X : Magnetic contactor
52Z : Anti-pumping relay
52T : Shunt trip coil
52C : Closing coil
M : Motor
Rf : Rectifier

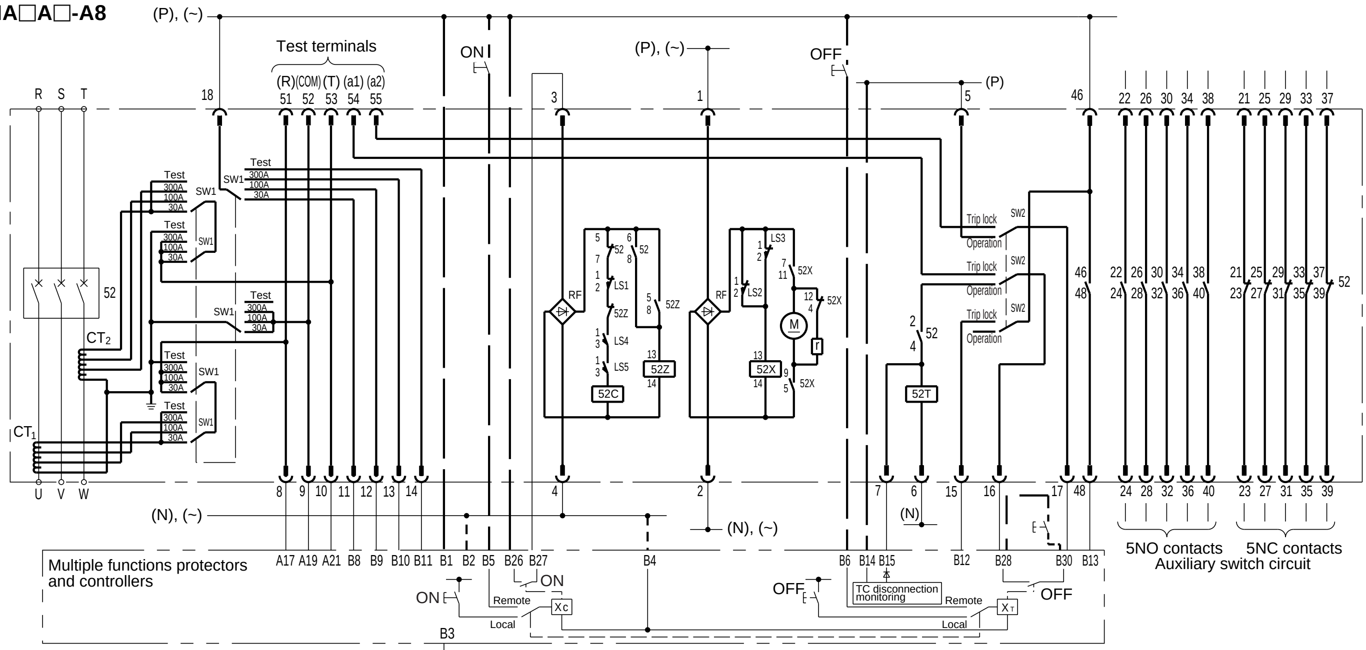
LS_1 : Limit switch
LS_2 : Limit switch (motor stop)
LS_3 : Limit switch (motor start)
LS_4 : Limit switch (closes when the closing spring is in the stored condition)
LS_5 : Limit switch (closes when the closing spring is in the stored condition)

VCB-T1A, T1PA : Capacitor trip device
OCR 51 : Overcurrent relay
CT_1, CT_2 : Current transformer
Bz : Fault indicating buzzer
S : Buzzer stop switch
Ry : Auxiliary relay (HH22 or HH23)
51G : Ground fault relay

HA12□-A6M1



HA□A□-A8



1. [dashed box]: Interior of VCB.
2. : External draw-out terminals of VCB.
3. [dashed box]: Interior of multiple functions protectors and controllers (Mounted separately)
4. — Control circuit lead wire (provided) – – Wiring on panel side
5. The wiring settings of the multiple functions protectors and controllers are initial ones with B5 turned on and B6 turned off.
6. The internal wiring of the multiple functions protectors and controllers is shown with function codes.
7. The external wiring of the muliple functions protectors and controllers is the wiring only used for overcurrent protective function.

51	52	53
54	55	

	8	10	12	14	
	9	11	13	18	

1	3	5	7	16	46	21	23	25	27	29	31	33	35	37	39
2	4	6	15	17	48	22	24	26	28	30	32	34	36	38	40

Auxiliary circuit plug (front view)

52C: Making coil
52T: Breaking coil
52X: Magnetic contactor for closing circuit
52Z: Pumping prevention relay
M: Control motor
RF: Rectifier
CT1 and CT2: Current transformers

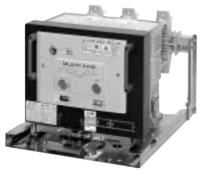
LS1: Limit switch (Draw-out interlock use)
LS2: Limit switch (Motor stopping use)
LS3: Limit switch (Motor startup use)
LS4: Limit switch
LS5: Limit switch (LS4 and LS5 are both turned on only when the circuit is ready to be turned on.)

SW1: Rotary switch (for CT tap or test selection)
SW2: Toggle switch (for operation and trip lock selection)
51 and OCR: Overcurrent relay
Ry: Control relay
Bx: Fault display buzzer
S: Buzzer stop switch

■ Description
7.2/3.6kV, 400A, 600A, 8kA, 12.5kA
The new Multi-VCB series of general-purpose vacuum circuit breakers are based on the conventional HA series and feature improved safety and ease of use. With 2300mm high switchgear cubicles they can be stacked up to four high with consequent saving of installation space. Multi VCBs are available in different mounting version such as the fixed type (B, C, P) and draw-out type (X, Y, U).


AF92-4
B-type


AF92-3
C-type


KK03-054
X-type


KK03-058
Y-type

■ Features
● Highly reliable and safety closing system
- Manual-spring stored energy closing system for improved operation safety, reliability, and constant closing speed.
- Half the torque formerly required for the manual operation and a new-turn-type handle improve operability.


AF92-7


AF92-8

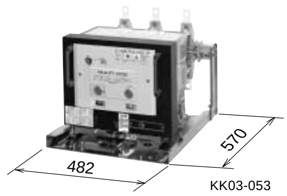
● Motor-spring stored energy type also improved
- Instantaneous closing system
  The new closing system ensures instantaneous closing time of 30ms. during switching to stand by circuit.
- AC/DC control circuit
  Common AC and DC control circuit eases application.

■ More compact
● Terminal blocks
- Terminal blocks are standard for the control circuits of motor-spring VCBs. Wire connect easily and quickly.

● Auxiliary switches
- Slide-action auxiliary switch contacts improve contact reliability.
- Auxiliary switches can have up to 5 NO contacts, and up to 5 NC contacts may be added as options for external circuits.

- The width of the draw-out type is compatible with a panel width of 500mm.
- The depth of the draw-out type is compatible with a panel depth of 700mm.

KK03-062
Draw-out MW and PW type



KK03-053
Draw-out type for small depth switchboard.

■ Specifications

Type		HA08□–H■	HA12□–H■	HA08□–A■	HA12□–A■	HA08A□–A■	HA12A□–A■
Closing system		Manual-spring		Motor-spring		Motor-spring	
Installation □		Fixed: B, C, P,		Fixed: B, C, P		Draw-out: X, Y, U	
Rated voltage	(kV)	3.6/7.2		3.6/7.2		3.6/7.2	
Rated current	(A)	400	600	400	600	400	600
Rated frequency	(Hz)	50/60		50/60		50/60	
Rated breaking capacity	(kA)	8 50MVA at 3.6kV 100MVA at 7.2kV	12.5 80MVA at 3.6kV 160MVA at 7.2kV	8 50MVA at 3.6kV 100MVA at 7.2kV	12.5 80MVA at 3.6kV 160MVA at 7.2kV	8 50MVA at 3.6kV 100MVA at 7.2kV	12.5 80MVA at 3.6kV 160MVA at 7.2kV
Rated making current, peak value	(kA)	20	31.5	20	31.5	20	31.5
Rated closing time		—		0.03		0.03	
Rated short-time current, 1 second	(kA)	8	12.5	8	12.5	8	12.5
Insulation level		Dielectric: 22kV, 1 minute Impulse (1.2 × 50μs): 60kV					
Rated breaking time		3-cycle		3-cycle		3-cycle	
Opening time	(s)	0.03		0.03		0.03	
Operating duty		0 — 1 min. — CO — 3 min. — CO or CO — 15 sec. — CO					
Life expectancy	Mechanical (operations) Electrical (operations)	10,000 10,000					
No. of operations (operations/hour)		60					
Applicable capacitor capacity *	(kVA)	3,000	5,000	3,000	5,000	3,000	5,000
Auxiliary contact		2NO + 2NC (5NO + 5NC available on request)				5NO + 5NC	
Mass (kg)	Fixed Draw-out (X type) Cradle for X type	23 — —	26 — —	25 — —	28 — —	— 34 11	— 35 11
Standard		H.V. circuit breaker: JIS C 4603 (1990), AC circuit breaker: JEC 2300 (1998)					

Note: * Maximum values when the VCB is used with a 6% reactor connected in a 6.6kV AC circuit.
Halve these values for a 3.3kV AC circuit.
■ Trip system

■ Closing system

System		Specification			Remarks
		Voltage	Motor current	Coil current	
Motor-spring	A	100/110V AC/DC	0.5A	4A	• Use a VT with a capacity of at least 50VA.
	B	200/220V AC/DC	0.5A	2.5A	• Use a 3A fuse to protect the control circuit
	C	48V DC	1.0A	5.5A	• Spring charging time is 5 seconds.
	D	21/24V DC	1.5A	13A	

■ Tripping system

System		Specification	Remarks
Shunt trip *1, *2	1	100/110V DC, 3.4A	For an AC-trip control circuit, use also a capacitor trip device VCB-T1A (for 100/110 AC) or VCB-T2A (for 200/220V AC), sold separately.
	2	200/220V DC, 3A	
	3	48V DC, 5.5A	
	4	21/24V DC, 13A	
Current trip	5	3A × 2 trip coil	Operating current: At least 3A The impedance of coil is less than 8Ω.

Note: *1 To use AC to trip the Multi VCB, use a capacitor trip device in combination with the trip system.
*2 Use the static-type OCR (overcurrent relay) in combination with Fuji Electric's QH-OC1 or QH-OC2, and fault display in combination with the JH11 type (shunt trip code 1, 2: DC1A coil, 3: DC3A coil, 4: DC3A coil, or 5: AC5A coil).

■ Auxiliary contact

Contact arrangement	Specification	Remarks
2NO + 2NC standard provided	100/200V AC, 10A 100/200V DC, 5/3A	5NO + 5NC contacts are available on request

■ Type number nomenclature

• Fixed type

HA 08 B - A 1 L

Basic type — HA

Breaking capacity — 08
08: 8kA (Rated current 400A)
12: 12.5kA (Rated current 600A)

Installation — B
B: Fixed, switchboard use
C: Fixed, cubicle use
P: Fixed, portable type

Vacuum interrupter used — L
Blank: Standard level interrupter
L: Low-level-surge interrupter

Tripping system — 1
1: Shunt trip 100/110V DC
2: Shunt trip 200/220V DC
3: Shunt trip 48V DC
4: Shunt trip 21/24V DC
5: Current trip 3A × 2-trip coil

Closing system — A
H: Manual-spring
A: Motor-spring, Instantaneous closing 100/110V AC/DC
B: Motor-spring, Instantaneous closing 200/220V AC/DC
C: Motor-spring, Instantaneous closing 48V DC
D: Motor-spring, Instantaneous closing 21/24V DC

• Draw-out type

HA 08 A X - A 1 L S1 K

Basic type — HA A

Breaking capacity — 08
08: 8kA (Rated current 400A)
12: 12.5kA (Rated current 600A)

Installation — X
X: Draw-out, with cradle for JEM 1425 class CW
Y: Draw-out, with cradle and shutter for JEM 1425 class MW and PW
U: For use in small depth switchboard, JEM 1425 class CW

Closing system — A
A: Motor-spring, Instantaneous closing 100/110V AC/DC
B: Motor-spring, Instantaneous closing 200/220V AC/DC
C: Motor-spring, Instantaneous closing 48V DC
D: Motor-spring, Instantaneous closing 21/24V DC

Panel lead wire — K
Blank: With panel lead wire
K: Plug only

Position switch — S1
Blank: With no position switch
S1: Run position and test position, both with SPDT contacts

Vacuum interrupter used — L
Blank: Standard level interrupter
L: Low-level-surge interrupter

Tripping system — 1
1: Shunt trip 100/110V DC
2: Shunt trip 200/220V DC
3: Shunt trip 48V DC
4: Shunt trip 21/24V DC

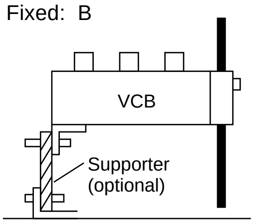
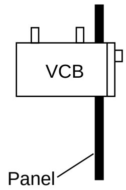
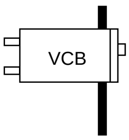
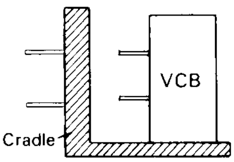
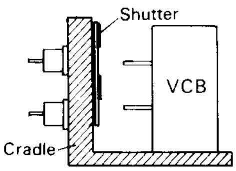
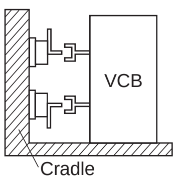
■ Types and ratings

Ratings	Installation	Closing system	Operating voltage	Type	Ordering code
Voltage 3.6/7.2kV Breaking current 8.0kA Rated current 400A	Fixed: B	Manual-spring		**HA08B-H□**	HA31BH□-400
		Motor-spring Instantaneous	100/110V AC/DC	**HA08B-A□**	HA31BA□-400
			200/220V AC/DC	**HA08B-B□**	HA31BB□-400
			48V DC	**HA08B-C□**	HA31BC□-400
			21/24V DC	**HA08B-D□**	HA31BD□-400
	Fixed: C	Manual-spring		**HA08C-H□**	HA31CH□-400
		Motor-spring Instantaneous	100/110V AC/DC	**HA08C-A□**	HA31CA□-400
			200/220V AC/DC	**HA08C-B□**	HA31CB□-400
			48V DC	**HA08C-C□**	HA31CC□-400
			21/24V DC	**HA08C-D□**	HA31CD□-400
	Fixed: P	Manual-spring		**HA08P-H□**	HA31PH□-400
		Motor-spring Instantaneous	100/110V AC/DC	**HA08P-A□**	HA31PA□-400
			200/220V AC/DC	**HA08P-B□**	HA31PB□-400
			48V DC	**HA08P-C□**	HA31PC□-400
			21/24V DC	**HA08P-D□**	HA31PD□-400
	Draw-out: X	Motor-spring Instantaneous	100/110V AC/DC	**HA08AX-A□**	HA08AX-A□
			200/220V AC/DC	**HA08AX-B□**	HA08AX-B□
			48V DC	**HA08AX-C□**	HA08AX-C□
			21/24V DC	**HA08AX-D□**	HA08AX-D□
	Draw-out: Y	Motor-spring Instantaneous	100/110V AC/DC	**HA08AY-A□**	HA08AY-A□
			200/220V AC/DC	**HA08AY-B□**	HA08AY-B□
			48V DC	**HA08AY-C□**	HA08AY-C□
			21/24V DC	**HA08AY-D□**	HA08AY-D□
	Draw-out: U	Motor-spring Instantaneous	100/110V AC/DC	**HA08AU-A□**	HA08AU-A□
			200/220V AC/DC	**HA08AU-B□**	HA08AU-B□
			48V DC	**HA08AU-C□**	HA08AU-C□
			21/24V DC	**HA08AU-D□**	HA08AU-D□
Voltage 3.6/7.2kV Breaking current 12.5kA Rated current 600A	Fixed: B	Manual-spring		**HA12B-H□**	HA32BH□-600
		Motor-spring Instantaneous	100/110V AC/DC	**HA12B-A□**	HA32BA□-600
			200/220V AC/DC	**HA12B-B□**	HA32BB□-600
			48V DC	**HA12B-C□**	HA32BC□-600
			21/24V DC	**HA12B-D□**	HA32BD□-600
	Fixed: C	Manual-spring		**HA12C-H□**	HA32CH□-600
		Motor-spring Instantaneous	100/110V AC/DC	**HA12C-A□**	HA32CA□-600
			200/220V AC/DC	**HA12C-B□**	HA32CB□-600
			48V DC	**HA12C-C□**	HA32CC□-600
			21/24V DC	**HA12C-D□**	HA32CD□-600
	Fixed: P	Manual-spring		**HA12P-H□**	HA32PH□-600
		Motor-spring Instantaneous	100/110V AC/DC	**HA12P-A□**	HA32PA□-600
			200/220V AC/DC	**HA12P-B□**	HA32PB□-600
			48V DC	**HA12P-C□**	HA32PC□-600
			21/24V DC	**HA12P-D□**	HA32PD□-600
	Draw-out: X	Motor-spring Instantaneous	100/110V AC/DC	**HA12AX-A□**	HA12AX-A□
			200/220V AC/DC	**HA12AX-B□**	HA12AX-B□
			48V DC	**HA12AX-C□**	HA12AX-C□
			21/24V DC	**HA12AX-D□**	HA12AX-D□
	Draw-out: Y	Motor-spring Instantaneous	100/110V AC/DC	**HA12AY-A□**	HA12AY-A□
			200/220V AC/DC	**HA12AY-B□**	HA12AY-B□
			48V DC	**HA12AY-C□**	HA12AY-C□
			21/24V DC	**HA12AY-D□**	HA12AY-D□
	Draw-out: U	Motor-spring Instantaneous	100/110V AC/DC	**HA12AU-A□**	HA12AU-A□
			200/220V AC/DC	**HA12AU-B□**	HA12AU-B□
			48V DC	**HA12AU-C□**	HA12AU-C□
			21/24V DC	**HA12AU-D□**	HA12AU-D□

Tripping system

□: 1: Shunt trip 100/110V DC
2: Shunt trip 200/220V DC
3: Shunt trip 48V DC
4: Shunt trip 21/24V DC
5: Current trip 3A × 2 -trip coil (Fixed type only)

■ Installation and accessories

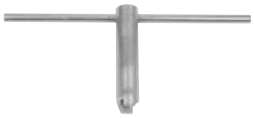
Photo	Installation system	Description	Supplied accessories	Optional accessories
 AF92-4	Fixed: B 	• Fixed type • Open-type switchboard, indoor use • Manual-spring handle or motor-spring • H.V. main terminals are positioned at the top of the VCB. This facilitates replacement of VCB.	• Insulation tube for main terminal • Manual handle for motor-spring type	• Supporter • Capacitor trip device • Vacuum condition tester • Surge absorber
 AF92-3	Fixed: C 	• Fixed type • Open-type cubicle use • Manual-spring handle or motor-spring • H.V. main terminals are located at the top of VCB. This facilitates replacement of VCB.	• Insulation tube for main terminal • Manual handle for motor-spring type	• Supporter • Capacitor trip device • Vacuum condition tester • Surge absorber
 AF92-5	Fixed: P 	• Fixed type • Open-type, portable type • Manual-spring handle or motor-spring • H.V. main terminals are located at the back of VCB. This facilitates replacement of VCB.	• Manual handle for motor-spring type	• Capacitor trip device • Vacuum condition tester • Surge absorber
 KK03-054	Draw-out: X With cradle 	• Draw-out type • JEM 1425 Class CW type metal enclosure/indoor use • Manual-spring handle or motor-spring • Cradle is provided to facilitate assembly and adjustment of switchgear. • Interlock system and grounding device are provided.	• Manual handle for motor-spring type • Draw-out handle	• Draw-out extension rail • Position indicating switch • Capacitor trip device • Vacuum condition tester • Surge absorber • Lifter • Testing jumper • Connector with external lead wire
 KK03-058	Draw-out: Y With cradle and shutter 	• Draw-out type • Class MW, PW type metal enclosure/indoor use • Manual-spring handle or motor-spring • Cradle with shutter is provided to facilitate assembly and adjustment of switchgear. • Interlock system and grounding device are provided.	• Manual handle for motor-spring type • Draw-out handle	• Draw-out extension rail • Position indicating switch • Capacitor trip device • Vacuum condition tester • Surge absorber • Lifter • Testing jumper • Connector with external lead wire
 KK03-053	Draw-out: U With cradle and shutter 	• Draw-out type • Class CW type metal enclosure/indoor use • Manual-spring handle or motor-spring • Cradle with shutter is provided to facilitate assembly and adjustment of switchgear. • Interlock system and grounding device are provided.	• Manual handle for motor-spring type • Draw-out handle	• Draw-out extension rail • Position indicating switch • Capacitor trip device • Vacuum condition tester • Surge absorber • Lifter • Testing jumper • Connector with external lead wire

■ Supplied accessories

● **Insulation tube for main terminal**
Installation types: B and C

AF88-1108

● **Manual handle for motor-spring type**



KK03-073

● **Draw-out handle**
Installation types: X, Y, and U

KK03-074

• Connector with external lead wire
Installation types: X, Y and U

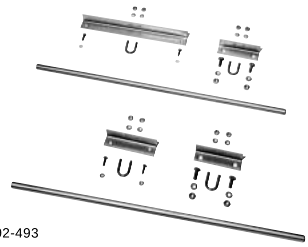
KK03-075

■ Optional accessories

● **Supporter**
Supporter kit for stabilizing the back of fixed type B, C VCB on the floor.

Type: C

Type: B

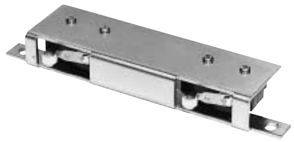


AF92-493

● **Draw-out extension rail** (HZ2AE)
Used with draw-out type (X, Y, U).
Use of an extension rail makes daily checking easier because the VCB can be pulled out of the panel.
Double stack types do not require lifters or chain blocks.

KK03-079

● **Position indicating switch** (HZ2AD)
Switch for indicating the service positions and test positions of draw-out (X, Y, U).
Used for interlocking to other devices attached to the cradle for draw-out type.



SG 1075

● **Vacuum condition tester**
VC-1A
For further information see page 12/25.

SH-27

● **C-R type surge absorber**
AF3320R3TXG0542
AF6620R3TXG0543
For further information see page 12/25.

● **Testing jumper** (HZ2AG)
Use to test remote ON/OFF operation of a VCB.

KK03-078

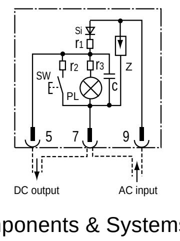
● **Arrester**
GLI-3G
GLI-6G

AF94-104

● **Capacitor trip device**
VCB-T1A, T2A, VCB-T1PA, T2PA
These are used when the trip circuit is connected to AC power supply.

Type	VCB-T1A VCB-T1PA	VCB-T2A VCB-T2PA
Rated input voltage	100/110V AC	200/220V AC
Shunt trip coil volt	100/110V DC	200/220V DC

Wiring diagram



Surface mounting
VCB-T1A, T2A

KK04-064

Flush mounting
VCB-T1PA, T2PA

SH-307

Name
r1: Charging resistor
r2: Discharge resistor
r3: Series resistor
Si: Silicon rectifier diode
PL: Pilot lamp
C: Electrolytic capacitor
SW: Discharge switch
Z: Surge absorber

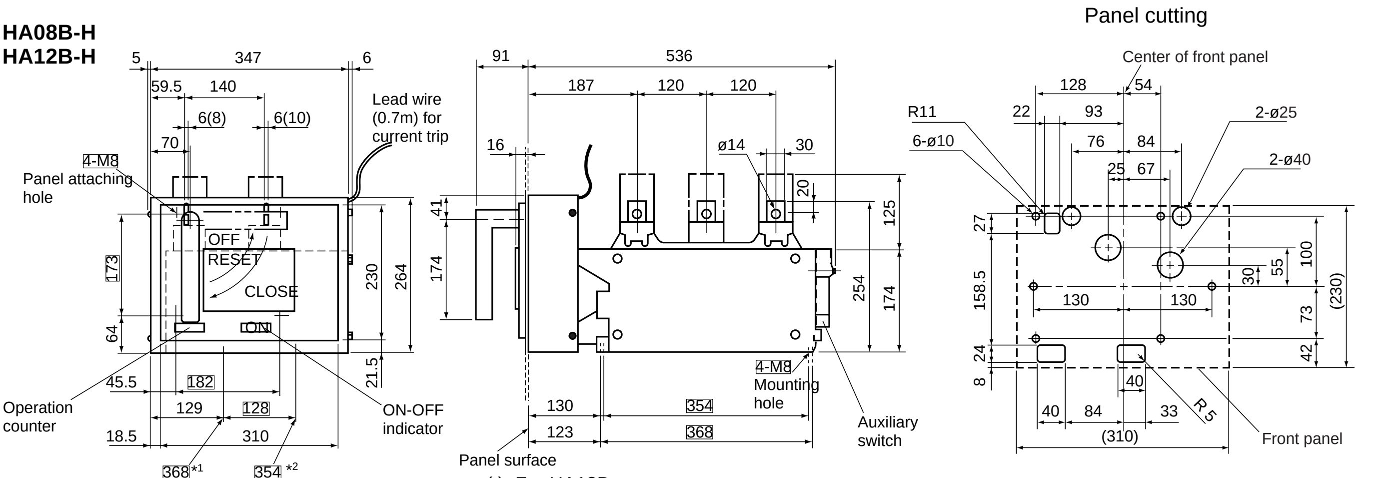
● **Lifter**
L-2HNB

KK03-080

12

■ Dimensions, mm
Fixed/B type

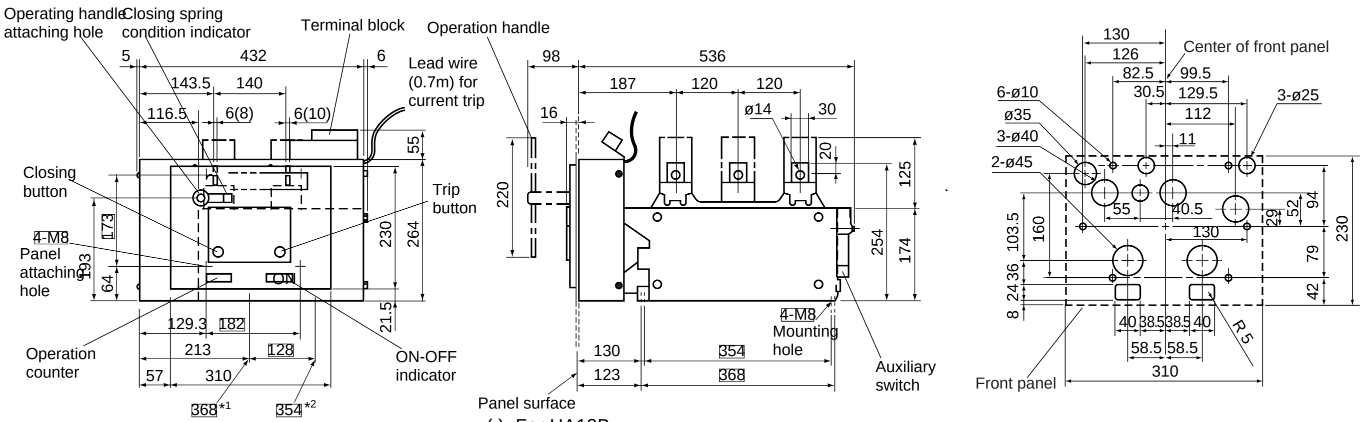
HA08B-H
HA12B-H



( ): For HA12B

*1 Mounting-hole depth dimension pitch: 368mm side from panel surface
*2 Mounting-hole depth dimension pitch: 354mm side from panel surface

HA08B-A
HA12B-A

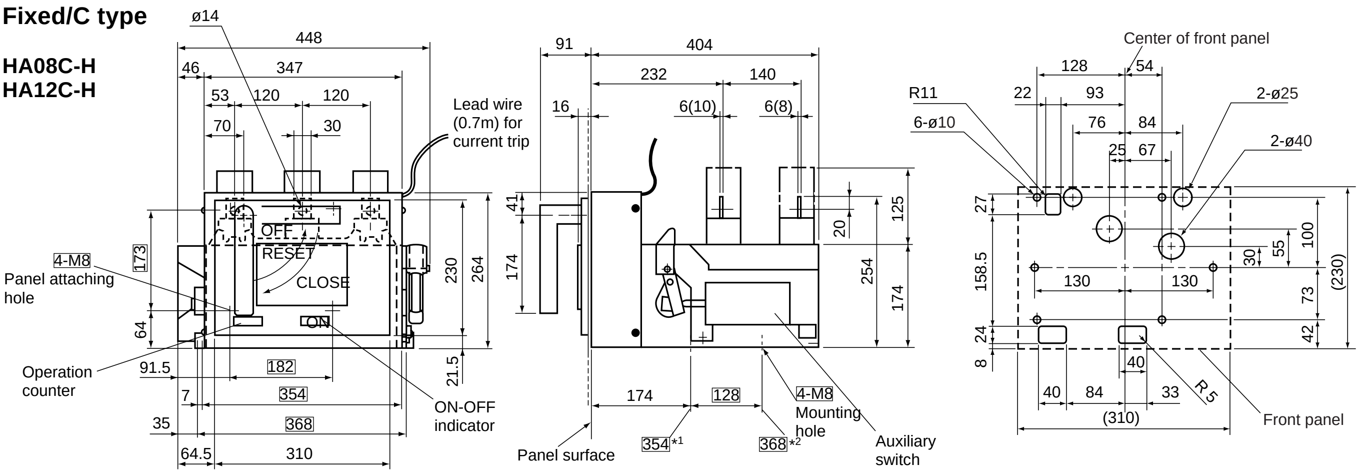


( ): For HA12B

*1 Mounting-hole depth dimension pitch: 368mm side from panel surface
*2 Mounting-hole depth dimension pitch: 354mm side from panel surface

Fixed/C type

HA08C-H
HA12C-H

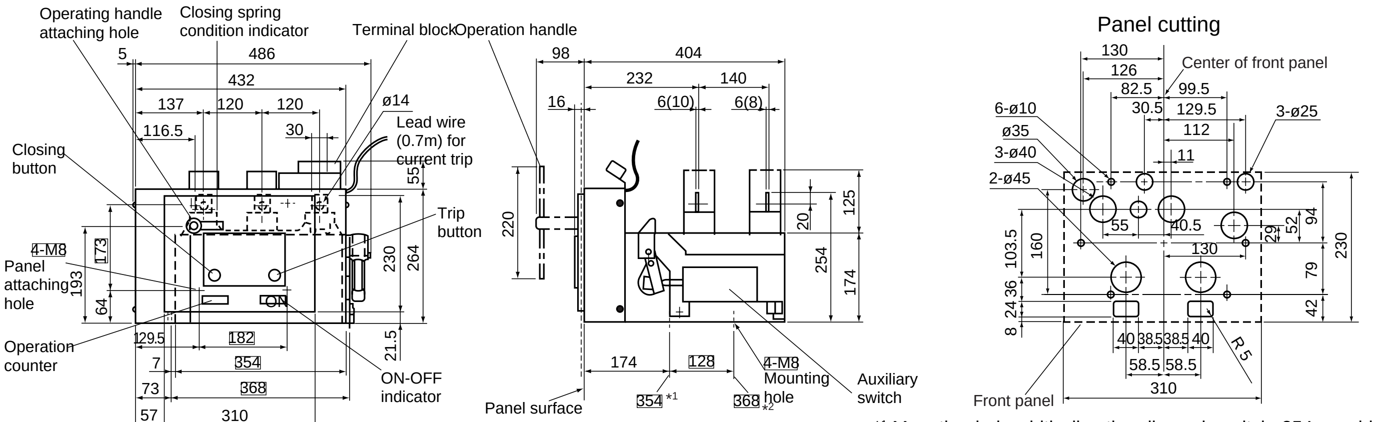


( ): For HA12C

*1 Mounting-hole width-direction dimension pitch: 354mm side
*2 Mounting-hole width-direction dimension pitch: 368mm side

■ Dimensions, mm
Fixed/C type

HA08C-A
HA12C-A

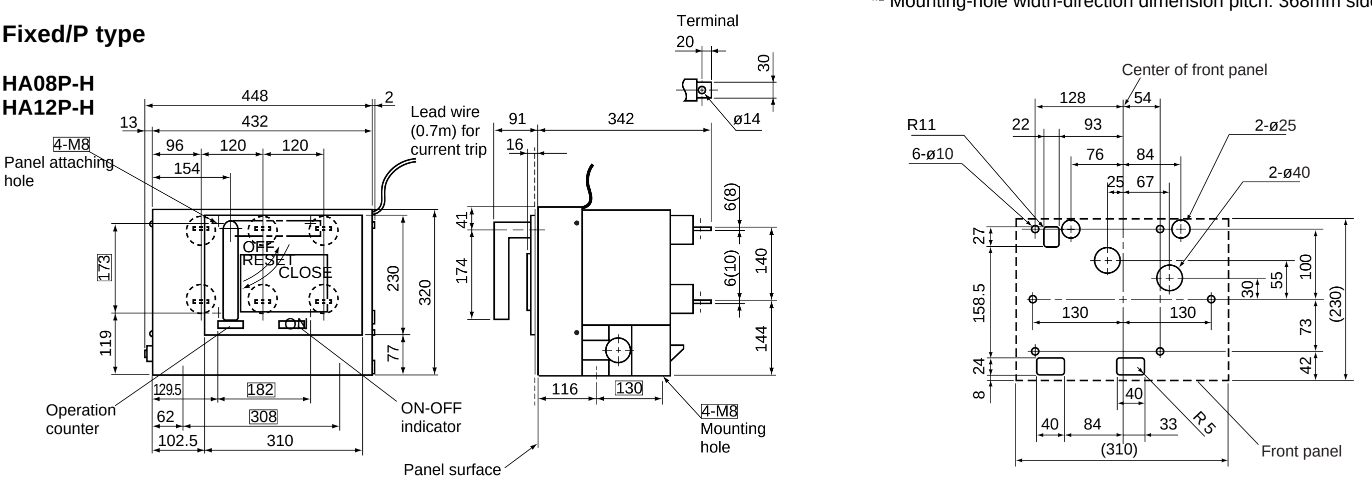


( ): For HA12C

*1 Mounting-hole width-direction dimension pitch: 354mm side
*2 Mounting-hole width-direction dimension pitch: 368mm side

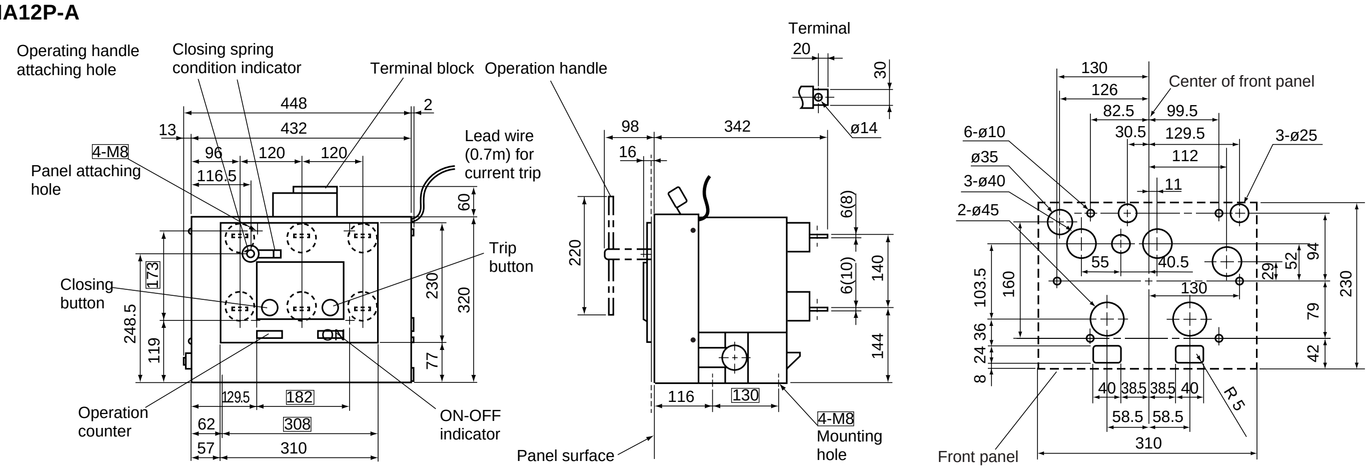
Fixed/P type

HA08P-H
HA12P-H



( ): For HA12P

HA08P-A
HA12P-A

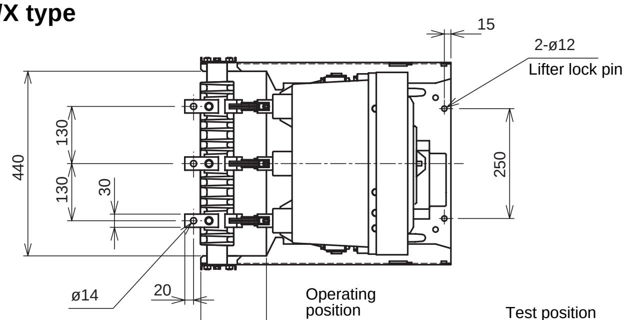


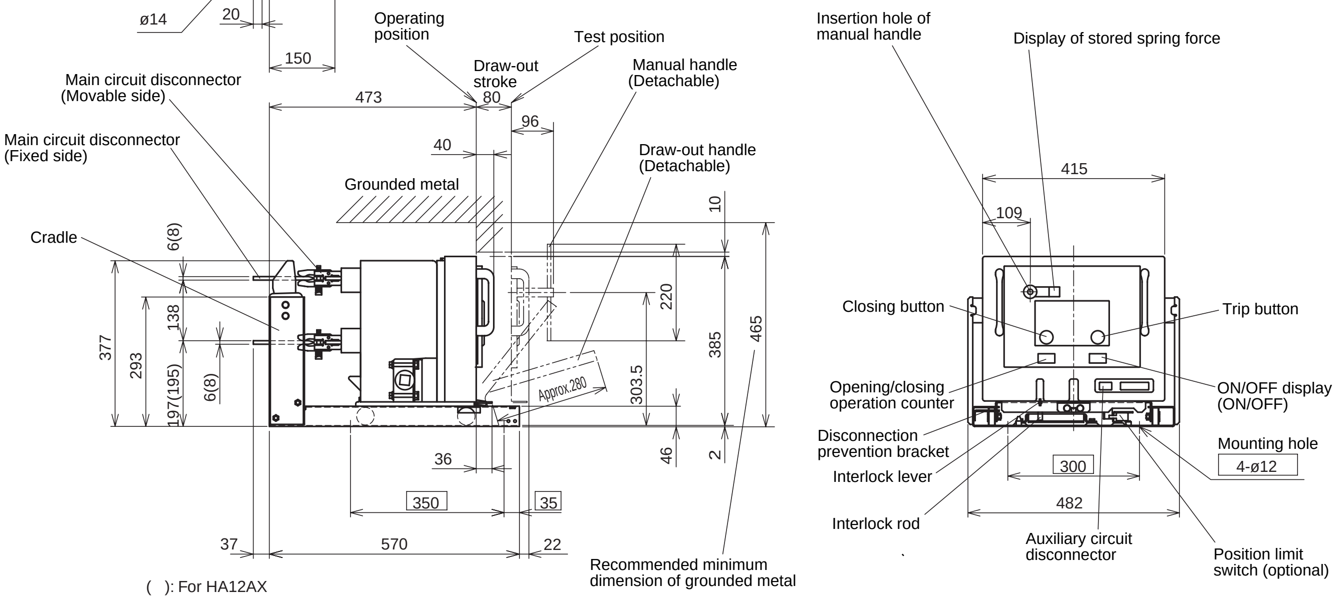
( ): For HA12P

12

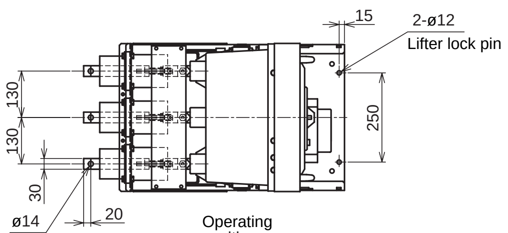
■ Dimensions, mm
Draw-out/X type

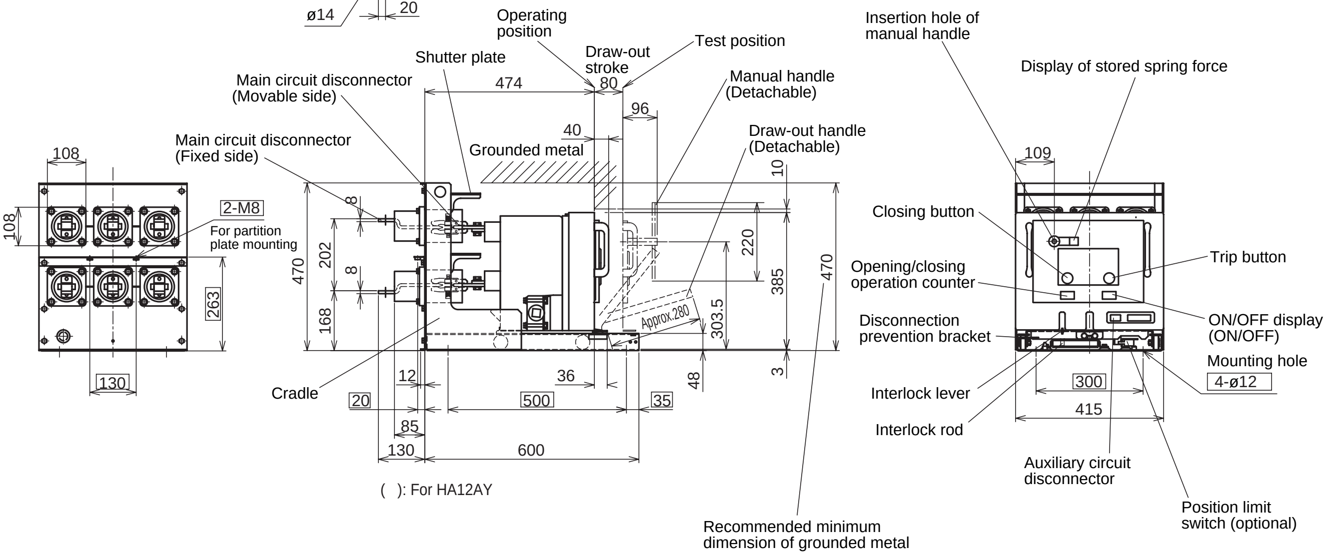
HA08AX-A
HA12AX-A



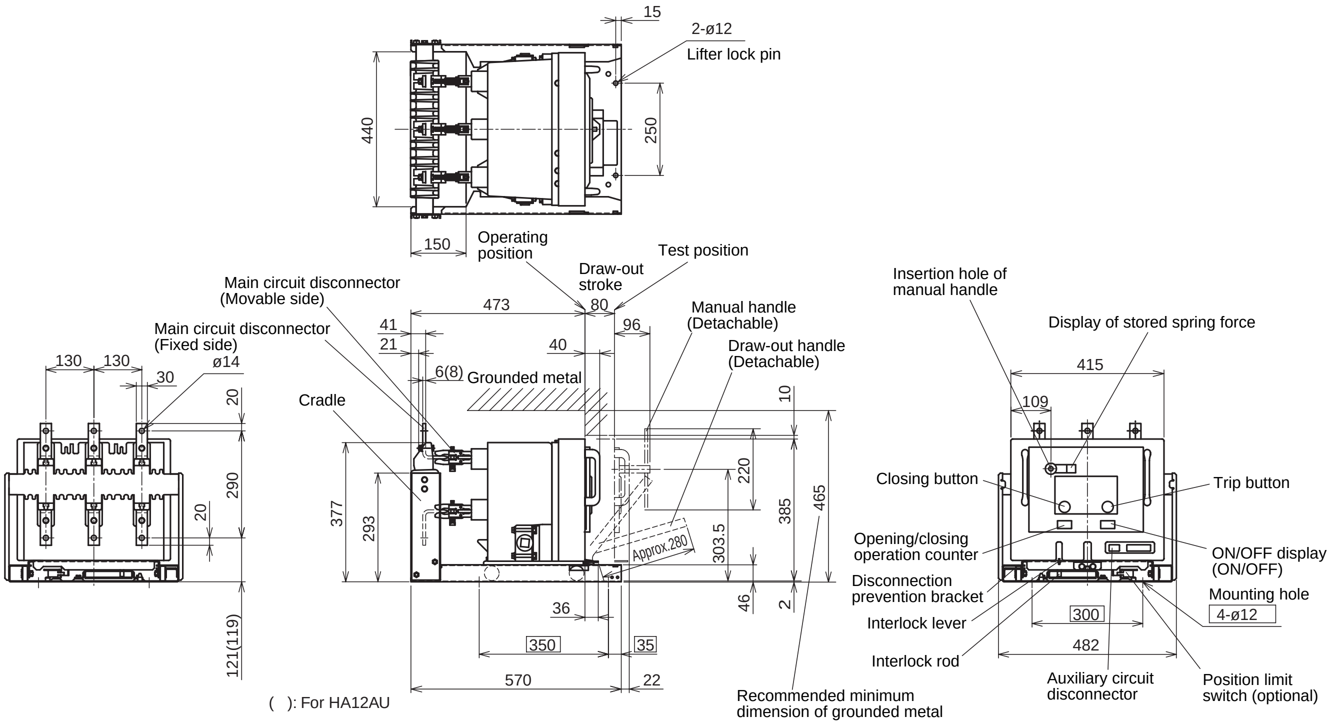


HA08AY-A
HA12AY-A





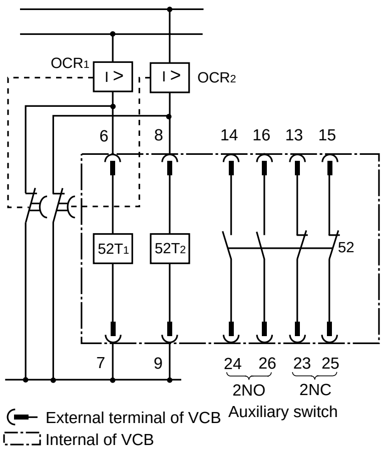
HA08AU-A
HA12AU-A

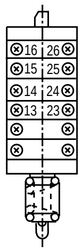


■ Wiring diagrams

● Fixed type

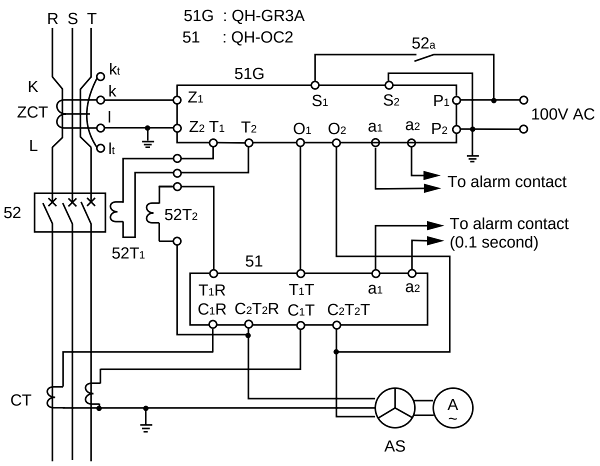
Manual-spring closing/current trip
HA08□-H5
HA12□-H5





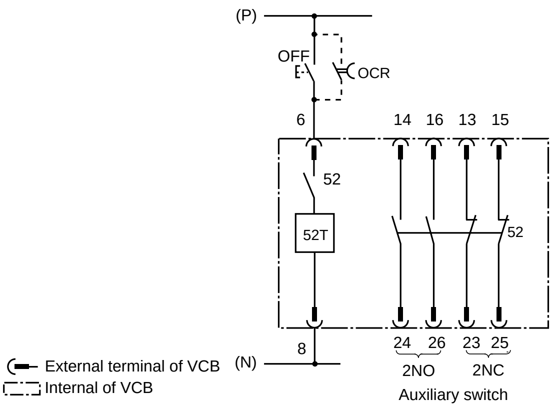
Auxiliary switch
(B, C, P types)

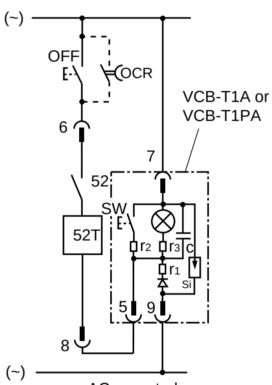
Connected with ground fault relay



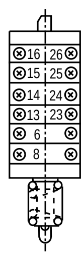
Manual-spring closing/shunt trip

HA08□-H1, HA08□-H2, HA08□-H3, HA08□-H4
HA12□-H1, HA12□-H2, HA12□-H3, HA12□-H4





AC operated



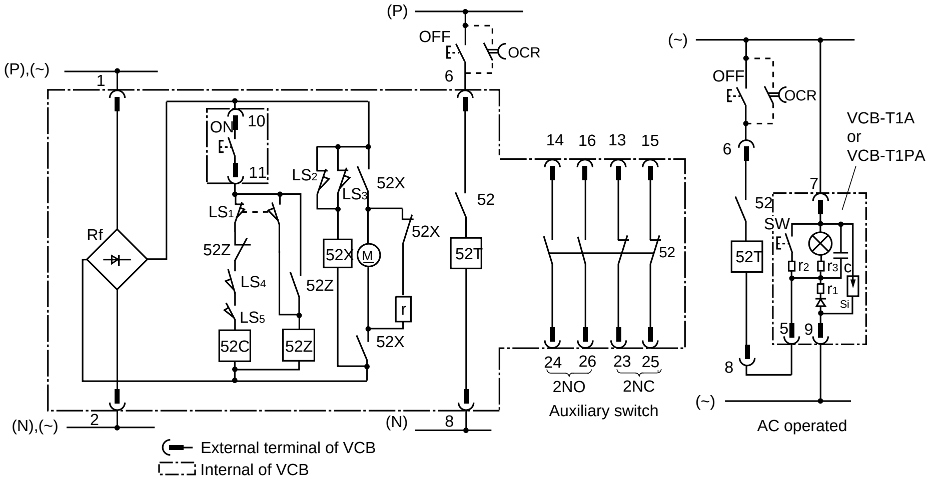
Auxiliary switch
(B, C, P types)

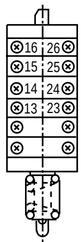
52T, $52T_1$, $52T_2$: Trip coil
VCB-T1A, T1PA : Capacitor trip device (sold separately)

OCR, OCR_1, OCR_2 : Overcurrent protective relay
51G : Ground fault relay

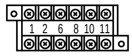
Motor-spring closing/shunt trip

HA08□-A*, HA08□-B*, HA08□-C*, HA08□-D*
HA12□-A*, HA12□-B*, HA12□-C*, HA12□-D*
(* : 1, 2, 3, 4)





Auxiliary switch



Control circuit terminal

(B, C, P types)

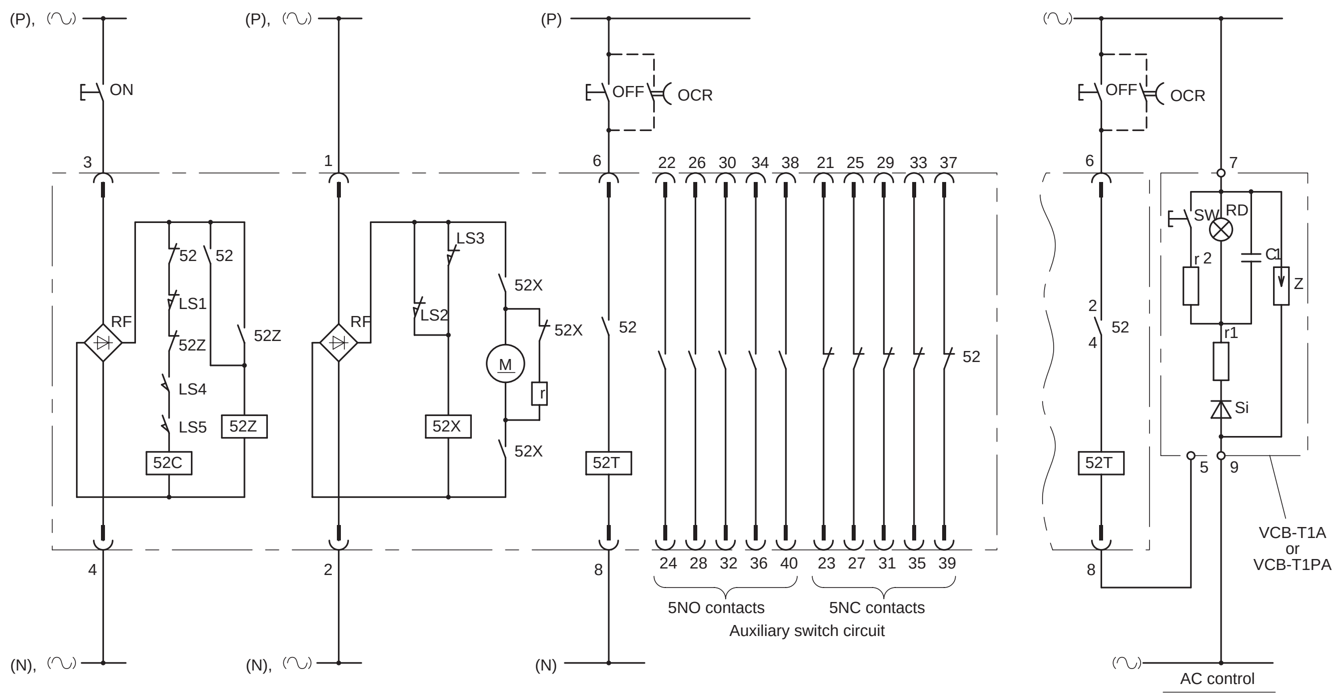
52X : Magnetic contactor
52Z : Anti-pumping relay
52T : Shunt trip coil
52C : Closing coil
M : Motor
Rf : Rectifier

LS_1: Limit switch
LS_2: Limit switch (motor stop)
LS_3: Limit switch (motor start)
LS_4: Limit switch (closes when the closing spring is in the stored condition)
LS_5: Limit switch (closes when the closing spring is in the stored condition)

VCB-T1A, T1PA : Capacitor trip device
OCR : Overcurrent relay

● Draw-out type

Motor-spring closing/shunt trip



1	3	6	21	23	25	27	29	31	33	35	37	39
2	4	8	22	24	26	28	30	32	34	36	38	40

X, Y, or U type
(Front view of VCB)

52C: Closing coil
52T: Breaking coil
52X: Magnetic contactor for closing circuit
52Z: Pumping prevention relay
M: Control motor
RF: Rectifier

LS1: Limit switch (Draw-out interlock use)
LS2: Limit switch (Motor stopping use)
LS3: Limit switch (Motor startup use)
LS4: Limit switch
LS5: Limit switch (LS4 and LS5 are both turned on only when the the circuit is ready to be turned on.)

VCB-T1A or VCB-T1PA: Capacitor shunt trip power supply (Sold separately)
OCR: Overcurrent relay

■ Description
3.3/6.6kV 200, 400 Amps

HN-type vacuum magnetic contactors incorporate a SUPER MAGNET that has a built-in IC. The IC minimizes the power consumption used in the closing circuit. HN types vacuum magnetic contactors operate on both AC and DC power supplies. A common insulating frame for units with a rated voltage of 3kV and 6kV simplifies switchgear design.

■ Features
The SUPER MAGNET
- Holding currents are minimized with an IC-controlled closing circuit. This is a cost-effective feature.
- Both AC and DC power supply operation possible.
- The SUPER MAGNET holds without chattering even when the line control voltage drops.
- The SUPER MAGNET's wide range of operating voltages allows it to be used in countries throughout the world.

Operating coil voltage

Rated voltage AC (50/60Hz)	DC	Operating voltage range
–	21–24V	85–110% of rated voltage
–	48V	
100–110V	100–110V	
200–220V	200–220V	

Shared insulating frame for 3kV and 6kV contactors
HN type vacuum magnetic contactors have a special insulating frame. The dimensions of the frame are the same for both 3kV and 6kV models, which facilitates switchgear design.

Advanced vacuum interrupter
A high performance interrupter minimizes surges due to closing and breaking, which makes special surge precautions unnecessary.


AF99-131
HN46AP


HN46AY
AF99-160

■ Specifications

Type		HN46A□*1-2	HN46A□*1-4
Rated voltage	(kV)	3.3/6.6	
Rated frequency	(Hz)	50/60	
Rated current	(A)	200	400
Rated breaking current	(kA)	4	
Rated short-time current	(kA)	4 (2 sec.)	
Insulation level			
Dielectric strength/1 min	(kV)	22 (16 between poles)	
Impulse 1.2X50µs	(kV)	60 (45 between poles)	
Making and breaking capacity	(kA)	1.6	3.2
Operating frequency	(sw/hour)		
Normal energized type		600	
Mechanically latched type		600	
Electrical durability	(Operations)	250,000	
Mechanical durability	(Operations)		
Normal energized type		2,500,000	
Mechanically latched type		250,000	
Average operating time			
Opening time	(ms)	140	
Closing time			
Normal energized type	(ms)	100	
Mechanically latched type	(ms)	20	
Auxiliary contact		3NO+3NC	
Max. applicable load (3.3/6.6kV)			
3-phase squirrel-cage type induction motor	(kW)	750/1500	1500/3000
3-phase transformer	(kVA)	1000/2000	2000/4000
Capacitor	(kVA)	1000/2000	2000/4000
Mass			
Fixed type (Normal energized)	(kg)	19	19
Draw-out type (Normal energized)	(kg)	34*2	34*2

□ *1: Installation system
P: Fixed type
X: Draw-out type
H: Draw-out type/Bushing type connector
Y: Draw-out type/Bushing type connector+shutter
(X, Y, H: With fuse holder)

*2: Without VT and cradle

12

■ Operating coil voltage and current

● Normal energized type

Type	Rated operating voltage (V) *	Current (A) Closing	Holding
HN46A□-2S1, 4S1	100–110 AC 100–110 DC	3 3	0.05 0.05
HN46A□-2S2, 4S2	200–220 AC 200–220 DC	1.5 1.5	0.03 0.03
HN46A□-2S4, 4S4	48 DC	8	0.1

● Mechanically-latched type

Type	Rated operating voltage (V) *	Current (A) Closing	Trip
HN46A□-2L1, 4L1	100–110 AC 100–110 DC	3 3	3.5 3
HN46A□-2L2, 4L2	200–220 AC 200–220 DC	1.5 1.5	2.2 2
HN46A□-2L3, 4L3	21–24 DC	16	8.5
HN46A□-2L4, 4L4	48 DC	8	4.5

■ Ratings of auxiliary switch (Built-in)

Contact arrangement	3NO+3NC	
Operating current	Res. Load	Ind. Load
100/110V AC	–	6A
200/220V AC	–	6A
48V DC	6A	6A
100/110V DC	2.5A	1.3A
200/220V DC	1A	0.45A

■ Types and ordering codes/Fixed types

Installation system	Operating system	Rated voltage (kV)	Rated current (A)	Appropriate fuse type	Operating coil voltage (V) AC	DC	Type and ordering code
Fixed type (P)	Normal energized	3.3/6.6	200	–	100–110 200–220 –	100–110 200–220 48	**HN46AP-2S1** **HN46AP-2S2** **HN46AP-2S4**
		3.3/6.6	400	–	100–110 200–220 –	100–110 200–220 48	**HN46AP-4S1** **HN46AP-4S2** **HN46AP-4S4**
	Mechanically latched	3.3/6.6	200	–	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AP-2L1** **HN46AP-2L2** **HN46AP-2L3** **HN46AP-2L4**
		3.3/6.6	400	–	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AP-4L1** **HN46AP-4L2** **HN46AP-4L3** **HN46AP-4L4**

■ Types and ordering codes/Draw-out types

Installation system	Operating system	Rated voltage (kV)	Rated current (A)	Appropriate fuse type	Operating coil voltage (V) AC	DC	Type and ordering code
Draw-out (X)	Normal energized	3.3/6.6	200	JC-6/5 JC-6/10 JC-6/30 JC-6/40 JC-6/50 JC-6/60 JC-6/75 JC-6/100*	100–110 200–220 –	100–110 200–220 48	**HN46AX-2S1J** **HN46AX-2S2J** **HN46AX-2S4J**
	Mechanically latched	3.3/6.6	200		100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AX-2L1J** **HN46AX-2L2J** **HN46AX-2L3J** **HN46AX-2L4J**

* Provided fuse holder: K. *See page 12/60* (Type number nomenclature)

■ Type and ordering code/Draw-out types

Installation system	Operating system	Rated voltage (kV)	Rated current (A)	Appropriate fuse type	Operating coil voltage (V)		Type and ordering code
					AC	DC	
Draw-out (X)	Normal energized	3.3/6.6	200	HF338E/3/20–100 HF338E/6/20, 30	100–110 200–220 –	100–110 200–220 48	**HN46AX-2S1A** **HN46AX-2S2A** **HN46AX-2S4A**
				HF338E/3/150, 200 HF338E/6/40–200	100–110 200–220 –	100–110 200–220 48	**HN46AX-2S1B** **HN46AX-2S2B** **HN46AX-2S4B**
				JB-3/50–200 JB-6/20, 50	100–110 200–220 –	100–110 200–220 48	**HN46AX-2S1C** **HN46AX-2S2C** **HN46AX-2S4C**
	Mechanically latched	3.3/6.6	200	HF338E/3/20–100 HF338E/6/20, 30	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AX-2L1A** **HN46AX-2L2A** **HN46AX-2L3A** **HN46AX-2L4A**
				HF338E/3/150, 200 HF338E/6/40–200	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AX-2L1B** **HN46AX-2L2B** **HN46AX-2L3B** **HN46AX-2L4B**
				JB-3/50–200 JB-6/20, 50	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AX-2L1C** **HN46AX-2L2C** **HN46AX-2L3C** **HN46AX-2L4C**
Draw-out/ bushing type connector (H)	Normal energized	3.3/6.6	200	HF338E/3/20–100 HF338E/6/20, 30	100–110 200–220 –	100–110 200–220 48	**HN46AH-2S1A** **HN46AH-2S2A** **HN46AH-2S4A**
				HF338E/3/150, 200 HF338E/6/40–200	100–110 200–220 –	100–110 200–220 48	**HN46AH-2S1B** **HN46AH-2S2B** **HN46AH-2S4B**
				JB-3/50–200 JB-6/20, 50	100–110 200–220 –	100–110 200–220 48	**HN46AH-2S1C** **HN46AH-2S2C** **HN46AH-2S4C**
	Mechanically latched	3.3/6.6	200	HF338E/3/20–100 HF338E/6/20, 30	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AH-2L1A** **HN46AH-2L2A** **HN46AH-2L3A** **HN46AH-2L4A**
				HF338E/3/150, 200 HF338E/6/40–200	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AH-2L1B** **HN46AH-2L2B** **HN46AH-2L3B** **HN46AH-2L4B**
				JB-3/50–200 JB-6/20, 50	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AH-2L1C** **HN46AH-2L2C** **HN46AH-2L3C** **HN46AH-2L4C**
Draw-out/ bushing type connector+ shutter (Y)	Normal energized	3.3/6.6	200	HF338E/3/20–100 HF338E/6/20, 30	100–110 200–220 –	100–110 200–220 48	**HN46AY-2S1A** **HN46AY-2S2A** **HN46AY-2S4A**
				HF338E/3/150, 200 HF338E/6/40–200	100–110 200–220 –	100–110 200–220 48	**HN46AY-2S1B** **HN46AY-2S2B** **HN46AY-2S4B**
				JB-3/50–200 JB-6/20, 50	100–110 200–220 –	100–110 200–220 48	**HN46AY-2S1C** **HN46AY-2S2C** **HN46AY-2S4C**
	Mechanically latched	3.3/6.6	200	HF338E/3/20–100 HF338E/6/20, 30	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AY-2L1A** **HN46AY-2L2A** **HN46AY-2L3A** **HN46AY-2L4A**
				HF338E/3/150, 200 HF338E/6/40–200	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AY-2L1B** **HN46AY-2L2B** **HN46AY-2L3B** **HN46AY-2L4B**
				JB-3/50–200 JB-6/20, 50	100–110 200–220 – –	100–110 200–220 21–24 48	**HN46AY-2L1C** **HN46AY-2L2C** **HN46AY-2L3C** **HN46AY-2L4C**

■ Type number nomenclature

HN 46A X – 2 S 2 A / □□□□□□

Basic type
Breaking capcity 4kA
Rated voltage 3.3/6.6kV

Installation system
P: Fixed type
X: Draw-out type
H: Draw-out type/Bushing type connector
Y: Draw-out type/Bushing type connector with shutter

Rated current
2: 200A
4: 400A

Operating system
S: Normal energized type
L: Mechanically latched type

Operating coil voltage (Closing/Trip)
1: 100–110V AC, 100–110V DC
2: 200–220V AC, 200–220V DC
3: 21–24V DC (Mechanically latched type only)
4: 48V DC
5: Closing 100-110V AC, 100–110V DC
Trip 200–220V AC, 200–220V DC
6: Closing 200–220V AC, 200–220V DC
Trip 100-110V AC, 100–110V DC
7: Other voltage
Specify operating voltage when ordering

Name plate
Blank : Japanese (JEM)
ZJ : English (JEM)
ZC : English (IEC)
ZA : English (AS)
ZB : English (BS)

Board-side lead wire
Blank : Board-side lead wire included
K : Plug only

Auxiliary circuit breaking part
Blank : Standard
T : Terminal block (fixed type only)
L : Auxiliary circuit plug interlock

Position switch
S1 : SPDT contacts for operating position and test position
S2 : 2PDT contacts for operating position and test position
Blank : No position switch

Bushing CT (BCT) (Optional accessories)*
For Y, H types
A to K *(Specify BCT code when ordering, see page 12/61 ②)*

VT (Optional accessories)*
For X, Y, H types
P1 to PA *(Specify VT code when ordering, see page 12/61 ①)*

Fuse holder type (For X, Y, H types)
A: For HF338E/3/20–100 or HF338E/6/20, 30 fuse
B: For HF338E/3/150, 200 or HF338E/6/40–200 fuse
C: For JB-3/50–200 or JB-6/20, 50 fuse
D: For JB-6/100–200 fuse
J: For JC-6/5–75 fuse
K: For JC-6/100 fuse

■ Supplied accessories for draw-out types

● Mechanical interlock

1. When the contactor is closed, it is impossible to shift it from the service position to the test position.
2. Under the condition where the contactor is closed, it is impossible to change it from the test position to the service position.
3. At both the test and the service positions, the interlock pin will engage and so lock the contactor in position. Thus the positions are always fixed correctly. Even if a closing operation is carried out at an intermediate position, the contactor cannot be closed.

● Electrical interlock

When the interlock pin is locked at both the service and test positions the limit switch will be closed, and the contactor can be operated.

● Shutter

Cradle with bushing type connectors can also be provided with a shutter.

● On-off counter (6-digit)

An on-off counter is standard with all VCB series.
This easily legible counter enables quick estimation of remaining service life.

Ratings of interlock contact

Contact arrangement	SPDT	
Operating current	Res. Load	Ind. Load
250V AC	16A	10A
125V AC	16A	10A
125V DC	0.6A	0.3A

Ratings of fuse blown indicator

Contact arrangement	1NO + 1NC	
Operating current	Res. Load	Ind. Load
250V AC	16A	10A
250V DC	0.3A	0.06A
125V DC	0.6A	0.3A
30V DC	6A	4A

■ Optional accessories

● Position switches

Type:Position switch N1 (Ordering code:HZ1AD)
SPDT position switches can be fitted to indicate the test position and the service position. (For X, Y, H)

Ratings of position switch

Contact arrangement	Service pos. SPDT, Test pos. SPDT Service pos. 2PDT, Test pos. 2PDT	
Operating current	Res. Load	Ind. Load
250V AC/DC	3A	NC: 2A, NO: 1.5A
125V AC/DC	10A	NC: 7.5A, NO: 6A
30V DC	15A	10A
14V DC	15A	NC: 15A, NO: 10A

● VT and bushing CT (BCT)

Draw-out types have room for fitting VTs in the space box.
It is possible to fit up to 2 VTs in the space. 3 BCTs can be fitted to the bushing type connector. The ratings are shown in the Table.

Ratings of VT

For VT	For control power supply *
3300V/110V, 220V 1.0 class 100VA	3300V/110V, 220V 400VA
6600V/110V, 220V 1.0 class 100VA	6600V/110V, 220V 400VA

* When used as control power supply, it becomes short-time rating.

Ratings of BCT

Max. voltage (kV)	Frequency (Hz)	Primary current(A)	Secondary current(A)	Burden (VA)	Overcurrent capacity
6.9	50/60	20, 30, 40, 50 75, 100, 150 200, 300, 400	5	25	40 times, 1 sec

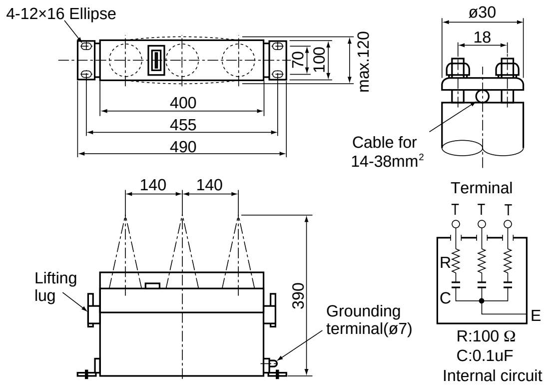
● Capacitor trip devices

Type	Ordering code	Tripping time after power failure:	Input voltage	Tripping coil voltage
VS-T1A	HZ1NI	30 sec.	100–110V AC	100–110V DC
VS-T2A	HZ1NJ		200–220V AC	200–220V DC

● C-R type surge absorber

Type	Ordering code	Max. operating voltage	Frequency	Rated voltage
AF3320R3 **TXG0542**	HZ1AK	115% rated voltage	50/60Hz	$\frac{3.3kV}{\sqrt{3}}$
AF6620R3 **TXG0543**	HZ1AL		50/60Hz	$\frac{6.6kV}{\sqrt{3}}$

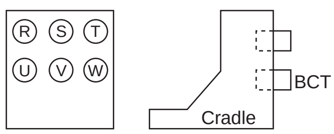
Dimensions,mm/Surge absorber



Codes of VTs and BCTs for draw-out types

① VT (For X, Y, H)			② BCT (For Y, H)					
Code	Voltage	No. of VTs	Code	Current	No. of BCTs	Code	Current	No. of BCTs
P1	3.3kV/110V	1	A2	20/5A	2	F2	100/5A	2
P2	3.3kV/110V	2	A3	20/5A	3	F3	100/5A	3
P3	6.6kV/110V	1	B2	30/5A	2	G2	150/5A	2
P4	6.6kV/110V	2	B3	30/5A	3	G3	150/5A	3
P5	3.3kV/220V	1	C2	40/5A	2	H2	200/5A	2
P6	3.3kV/220V	2	C3	40/5A	3	H3	200/5A	3
P7	6.6kV/220V	1	D2	50/5A	2	J2	300/5A	2
P8	6.6kV/220V	2	D3	50/5A	3	J3	300/5A	3
P9	3.3kV/110V	1	E2	75/5A	2	K2	400/5A	2
	3.3kV/220V	1	E3	75/5A	3	K3	400/5A	3
						Blank	Without BCT	
PA	6.6kV/110V	1						
	6.6kV/220V	1						
Blank	Without VT							

- Mounting position of CT
  2 CTs-Fit to U and W poles
  3 CTs- Fit to U, V and W poles



Example:
- Two 6.6kV/110V VTs and no BCT
  HN46A□–□□□□/P4
- No VT and two 50/5A BCTs
  HN46A□–□□□□/D2
- Two 6.6kV/110V VTs and two 50/5A BCTs
  HN46A□–□□□□/P4D2

12

■ Optional accessories

● Power fuses for draw-out types

The table indicates the appropriate current limiting fuses for use with HN vacuum magnetic contactors.

System voltage (kV)	Type Refer to the Table below	Ratings Voltage (kV)	Breaking capacity (kA)	Minimum breaking current(A)	Current (A)	Applicable load (max) 3ϕ Motor Squirrel-cage type(kW)	Wound-rotor type(kW)	3ϕ Transformer (kVA)	3ϕ Capacitor (kVA)
3.3	**HF338E/3/20**	3.6	40 (250MVA)	All excessive currents	20	–	55	50	30
	HF338E/3/30				30	–	90	100	75
	HF338E/3/40				40	37	132	150	100
	HF338E/3/50				50	55	160	200	150
	HF338E/3/75				75	90	250	300	250
	HF338E/3/100				100	132	355	400	400
	HF338E/3/150				150	200	450	500	500
	HF338E/3/200				200	355	630	750	750
	JB-3/50	3.6	40 (250MVA)	350	50	160	200	250	–
	JB-3/100			700	100	355	355	500	–
	JB-3/150			1050	150	560	560	750	–
	JB-3/200			1400	200	710	710	1000	–
	JC-6/5	3.6	40 (250MVA)	11	5	–	–	5	5
	JC-6/10			22	10	–	–	15	15
	JC-6/20			58	20	–	–	50	30
	JC-6/30			85	30	–	–	100	50
	JC-6/40			120	40	–	–	150	75
	JC-6/50			140	50	–	–	200	100
	JC-6/60			170	60	–	–	250	150
	JC-6/75			250	75	–	–	300	200
	JC-6/100			400	100	–	–	500	250
6.6	**HF338E/6/20**	7.2	40 (500MVA)	All excessive currents	20	–	110	75	75
	HF338E/6/30				30	37	160	150	150
	HF338E/6/40				40	75	315	250	200
	HF338E/6/50				50	90	375	300	300
	HF338E/6/75				75	160	530	500	500
	HF338E/6/100				100	250	750	750	750
	HF338E/6/150				150	375	1050	1000	1000
	HF338E/6/200	7.2	31.5 (390MVA)	1000	200	530	1500	1500	1500
	JB-6/20	7.2	40 (500MVA)	140	20	160	200	200	150
	JB-6/50			350	50	355	355	500	500
	JB-6/100			700	100	710	710	1000	750
	JB-6/150			1050	150	1000	1000	1500	1000
	JB-6/200			1400	200	1500	1500	2000	1500
	JC-6/5	7.2	40 (500MVA)	11	5	–	–	15	15
	JC-6/10			22	10	–	–	30	30
	JC-6/20			58	20	–	–	100	50
	JC-6/30			85	30	–	–	200	100
	JC-6/40			120	40	–	–	300	150
	JC-6/50			140	50	–	–	300	200
	JC-6/60			170	60	–	–	500	300
	JC-6/75			250	75	–	–	750	400
	JC-6/100			400	100	–	–	1000	500

Notes: JB fuse: The rated current value meets the requirements of JEC-2330 (1986) M (motor).
HF and JC fuses: The rated current value meets the requirements of JEC-2330 (1986)G (general).
Contact FUJI when the JC fuse will be used for a motor load application.

Fuse and fuse holder

Fuse holder: Type number 10th character	Fuse: Type	Ordering code
A	**HF338E/3/20**	HF1E-020
	HF338E/3/30	HF1E-030
	HF338E/3/40	HF1E-040
	HF338E/3/50	HF1E-050
	HF338E/3/75	HF1E-075
	HF338E/3/100	HF1E-100
	HF338E/6/20	HF2E-020
	HF338E/6/30	HF2E-030

Fuse holder: Type number 10th character	Fuse: Type	Ordering code
B	**HF338E/3/150**	HF1E-150
	HF338E/3/200	HF1E-200
	HF338E/6/40	HF2E-040
	HF338E/6/50	HF2E-050
	HF338E/6/75	HF2E-075
	HF338E/6/100	HF2E-100
	HF338E/6/150	HF2E-150
	HF338E/6/200	HF2E-200
C	**JB-3/50**	HF1B-050
	JB-3/100	HF1B-100
	JB-3/150	HF1B-150
	JB-3/200	HF1B-200
	JB-6/20	HF2B-020
	JB-6/50	HF2B-050

Fuse holder: Type number 10th character	Fuse: Type	Ordering code
D	**JB-6/100**	HF2B-100
	JB-6/150	HF2B-150
	JB-6/200	HF2B-200
J	**JC-6/5**	HF2C-005
	JC-6/10	HF2C-010
	JC-6/20	HF2C-020
	JC-6/30	HF2C-030
	JC-6/40	HF2C-040
	JC-6/50	HF2C-050
	JC-6/60	HF2C-060
	JC-6/75	HF2C-075
	JC-6/100	HF2C-100

(   ): Ordering code

■ Optional accessories

Connector with external lead wires (HZ1NH)

SH–27

Vacuum condition tester VC-1A (HZ1AM)

KK03-080

Lifting dolly L-2HNB (HZ2NB) (For X, Y, H)

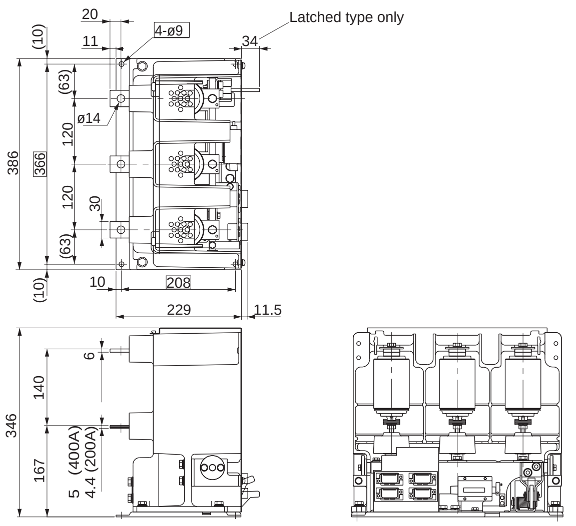
Testing jumper (HZ1NG)

SP–162

■ Dimensions,mm

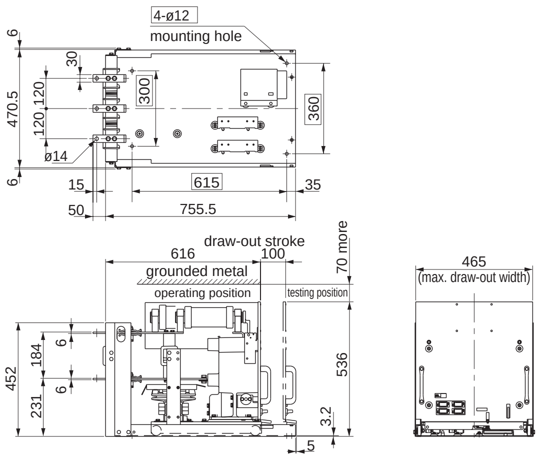
● Fixed type

• P type



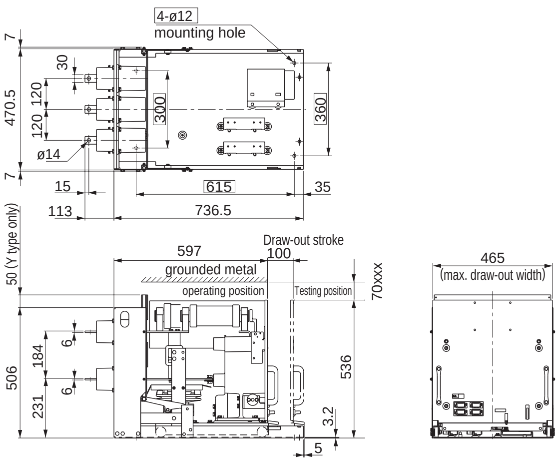
● Draw-out type

• X type



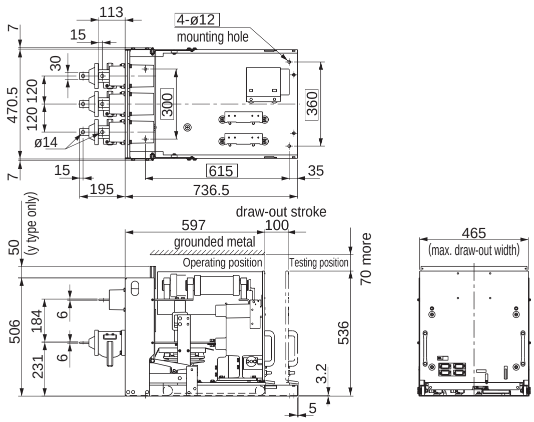
● Draw-out type

• Y and H types



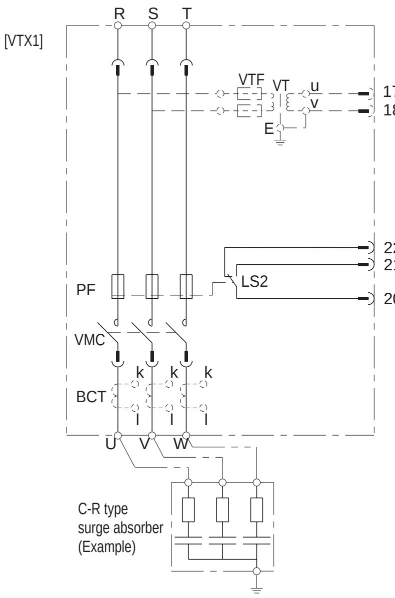
● Draw-out type (with BCT)

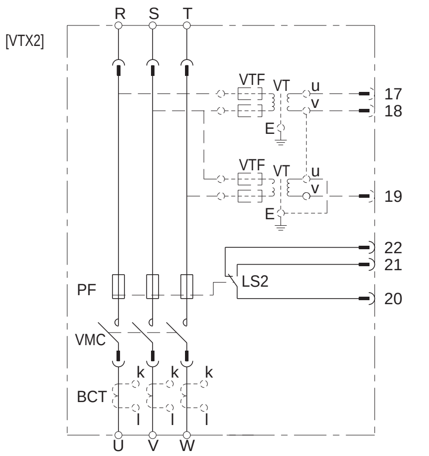
• Y and H types



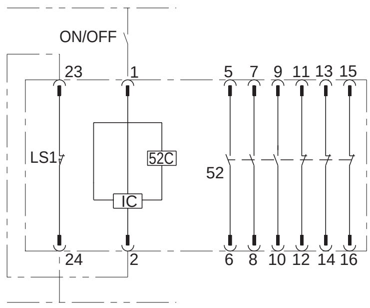
12

■ Wiring diagrams
Normal energized type

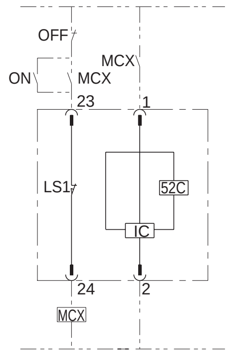




—— Internal circuit of contactor
– – – Wiring for optional accessories (VT, CT)
– · – External circuit



Wiring diagram for extenal relay cicuit (Example)

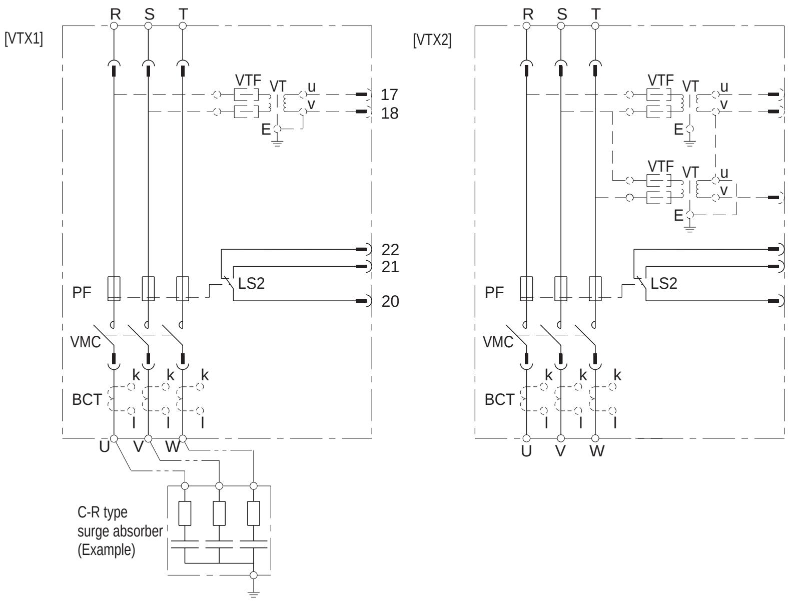


VS: Vacuum contactor
52: Auxiliary contact for vacuum contactor
52C: Closing coil
IC: IC-control device
LS1: Limit switch for interlock
MCX: Auxiliary relay for closing
PF: Power fuse (Optional accessories)
SW: Power fuse blown indicating contact
VT: VT
VTF: Fuse for VT
BCT: Bushing type CT

■ Terminal numbers

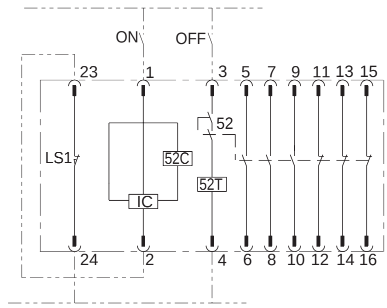
	Fixed type	Draw-out types Without VT	With one VT	With two VTs
Red	1, 2, –	1, 2, –	1, 2, –	1, 2, –
	–, –, –	–, 23, 24	–, 23, 24	–, 23, 24
Yellow	5, 6, 7	5, 6, 7	5, 6, 7	5, 6, 7
	8, 9, 10	8, 9, 10	8, 9, 10	8, 9, 10
Blue	11, 12, 13	11, 12, 13	11, 12, 13	11, 12, 13
	14, 15, 16	14, 15, 16	14, 15, 16	14, 15, 16
Green	–, –, –	–, –, –	17, 18, –	17, 18, 19
	–, –, –	20, 21, 22	20, 21, 22	20, 21, 22

■ Wiring diagrams
Mechanically-latched type

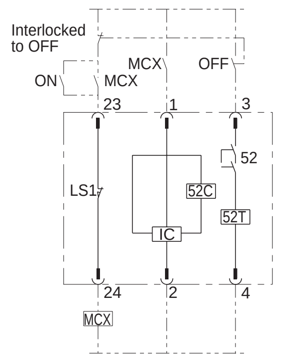


—— Internal circuit of contactor
– – – Wiring for optional accessories (VT, CT)
-·-·- External circuit

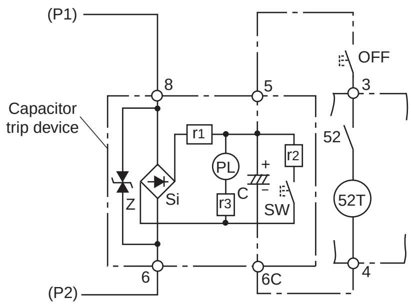
Note: IC control device is provided with protection circuit from an anti-pumping.



Wiring diagram for extenal relay circuit (Example)



Wiring diagram connected to capacitor trip device (Optional)



VS: Vacuum contactor
52: Auxiliary contact for vacuum contactor
52T: Tripping coil
52C: Closing coil
52Z: Anti-pumping relay
IC: IC-control device
LS1: Limit switch for interlock
MCX: Auxiliary relay for closing
PF: Power fuse (Optional accessories)
SW: Power fuse blown indication contact
VT: VT
VTF: Fuse for VT
BCT: Bushing type CT

■ Terminal numbers

	Fixed type	Draw-out types Without VT	With one VT	With two VTs
Red	1 2 3 / 4	1 2 3 / 4 23 24	1 2 3 / 4 23 24	1 2 3 / 4 23 24
Yellow	5 6 7 / 8	5 6 7 / 8	5 6 7 / 8	5 6 7 / 8
Blue	11 12 13 / 14	11 12 13 / 14	11 12 13 / 14	11 12 13 / 14
Green		/ 20 21 22	17 18 / 20 21 22	17 18 19 / 20 21 22

12

Protective Relays
QH series
General information

QH series protective relays

■ Description

FUJI overcurrent relays and voltage relays have inverse-time characteristics (induction and static types). The QH series is compact budget priced version and is easily installed on panels. It is drum-shaped and ideally suited for general industrial applications.
The directional ground-fault relay (DG) is used, combined with zero-phase current transformer (ZCT) and zero-phase potential input device (ZPD).
The ground-fault relay (GR) is used, combined with zero-phase current transformer (ZCT).

QH-OC AF90-78

QH-DG AF90-528

ZCT AF91-267

■ Specifications

● Overcurrent relays

Type		**QH-OC1**	**QH-OC2**
Trip system		Shunt trip	Current trip
Rated current		5A	
Rated frequency		50/60Hz	
Inverse time-lag element	Setting range	3-3.5-4-4.5-5-6A	
	Time-lag setting	0.5-1-2-3-4-5-6-7-8-9-10-15-20-30-40-50 (16 steps)	
	Operate time	300% overcurrent: 10s ± 17% or less, 700% overcurrent: 1.67s ± 12% or less at min. operating current and time-lag setting = 10	
	Operate characteristic	Extremely inverse time-lag	
Instantaneous element	Setting range	20-30-40-50-60-Lock	
	Operate time	200%, 0.05s or less	
Indication LED		Start, time-lag elapsed, operate, power, alarm	
Contact	For trip QH-OC1: 1NO QH-OC2: 2NC	Making capacity 10A at 100V DC, 220V DC (L/R=7ms) Breaking capacity 1A at 110V DC (L/R=7ms) 3.5A at 220V AC (cosø=0.4)	Breaking capacity 60A at 110V AC (depending on CT burden)
	For alarm, 1NO	2A at 24V DC (max. 30W at 125V DC) (L/R=7ms) 2A at 100V AC (max. 220VA at 250V AC) (cosø=0.4)	
Consumed VA		2VA (at 5A)	2VA (at 5A)
Mass		1.1kg	1.1kg

● Voltage relays

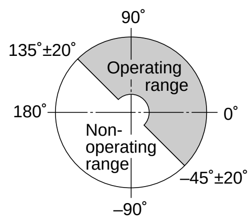
		Overvoltage relay	Undervoltage relay
Type		**QH-OV1**	**QH-UV1**
Trip system		Shunt trip	
Rate voltage		110V AC	110V AC
Setting range		115-120-125-130-135-140-150V	60-65-70-75-80-85-90-95-100V
Operate time setting		0.1-0.2-0.5-1-1.5-2-2.5-3-4-5-6-8-10s	0.1-0.2-0.5-1-1.5-2-2.5-3-4-5-6-8-10s
Indication		Start, operate, power	
Contact	For trip: 1NO	Making capacity 5A at 250V AC (cosø = 0.4)	
	For alarm: 1NO	Breaking capacity 2A at 250V AC (cosø = 0.4)	
Consumed VA		2VA	4VA
Mass		1kg	1.1kg

■ Specifications

● Directional ground-fault relays

Type		**QH-DG3** (for receiving circuit)	**QH-DG4** *(for branching circuit)
Trip system		Shunt trip, current trip	
Zero-phase voltage setting range		2.5-5-7.5-10-12.5% of zero-phase voltage 3810V at full ground-fault	-
Zero-phase current setting range		0.1-0.2-0.3-0.4-0.6A (ZCT primary side)	
Operating time setting		Insnt.-0.2-0.3-0.4-0.6s	
Operating characteristic	Operating time	±30ms at 130% current setting value -40ms to +0ms at 400% current setting value (when 150% of voltage setting value applied)	
	Zero-phase current	Within ±10% of current setting value (when 150% of voltage setting value applied)	
	Zero-phase voltage	Within ±25% of voltage setting value (when 150% of current setting value applied)	
Indication LED		Operate, zero-phase current/voltage, power	
Resetting method		Auto-manual (selectable by a switch)	
Test button		Provided	
Contact	For shunt trip: 1NO	Making capacity: 10A at 110V AC Breaking capacity: 7.5A at 110V AC (cosø= 0.4), 0.4A at 125V DC (L/R= 7ms)	
	For current trip: 2PDT	7.5A at 110V AC (cosø= 0.5)	
	For alarm: 1NO	Making capacity: 1.5A at 110V AC (cosø= 0.4), 0.1A at 125V DC (L/R= 7ms)	
Rated control voltage		110V AC 50/60Hz	
Frequency		50Hz-60Hz (changeable by a switch)	
Operate phase angle		Non grounded system: Lag 45°±20°, lead 135°±20° PC grounded system: Lag 70°±15°, lead 110°±15°	
Consumed VA		7VA (at operating)	6VA (at operating)
Mass		1.9kg	1.9kg

Operating phase angle
(non grounded system)



* The QH-DG4 will function as branching unit for power receiving use QH-DG3.
It cannot be used solely.

● Accessories, sold separately

Zero-phase current transformers

Description	Primary current (A)	Rated primary voltage (kV)	Dielectric strength	Over-current constant	Type	Mass (kg)
Round-hole through-type	100	3.3/6.6	22kV AC 1 min.	40	**ZCT-561A**	0.5
	200				**ZCT-562A**	0.5
	300	50/60Hz			**ZCT-653**	0.8
	400	common			**ZCT-654**	0.8
	600	use			**ZCT-906**	3.0
Split-toroidal type	100				**ZCT-451D**	0.9
	400				**ZCT-654D**	1.2

Zero-phase potential input device

Type	**ZPD-1**
Structure	Indoor use, epoxi-resin insulator
Rated voltage	7.2kV
Electrostatic capacitance	3 × 250pF
Dielectric strength	Class 6A, 22kV AC (1 minute)
Mass (kg)	3.6kg (1set = 3pcs)

● **Ground-fault relays**

Type		**QH-GR3A**
Trip system		Shunt trip, current trip
Operating current setting		0.1-0.2-0.4-0.6-0.8A
Operating time		0.1 to 0.3s at 130% current setting value 0.1 to 0.2s at 400% current setting value
Indication	Operation	Magnetic inversion (manual reset)
	Power	Green LED
Contact	For trips: 2PDT	Making capacity: 10A at 250V AC (cosø= 0.4), 10A at 125V DC (L/R= 7ms) Breaking capacity: 7.5A at 110V AC (max. 825VA at 250V AC) (cosø= 0.4) 1.2A at 100V DC (max. 120W at 125V DC) (L/R= 7ms)
	For alarm: 1NO	2A at 110V AC (max. 220VA at 250V AC) 2A at 24V DC (0.1A at 125V DC)
Consumed VA		5VA (at operating)
Test button		Providied
Mass		1.7kg

■ Type number nomenclature

• Protective relays

QH–OC 1

Basic type
QH: Static type

Relay type
OC1: Overcurrent relay (shunt trip)
OC2: Overcurrent relay (current trip)
OV1: Overvoltage relay
UV1: Undervoltage relay
DG3: Directional ground-fault relay (for receiving circuit)
DG4: Directional ground-fault relay (for branching circuit)
GR3A: Ground-fault relay

• Zero-phase potential input device

ZPD–1
Zero-phase potential input device

Zero-phase current transformers

ZCT–561A

Basic type

Type of transformer
(Hole-through diameter/Rated current)
561A: Hole-through type Ø56/100A
562A: Hole-through type Ø56/200A
653: Hole-through type Ø65/300A
654: Hole-through type Ø65/400A
906: Hole-through type Ø90/600A
451D: Split-toroidal type Ø45/100A
654D: Split-toroidal type Ø65/400A

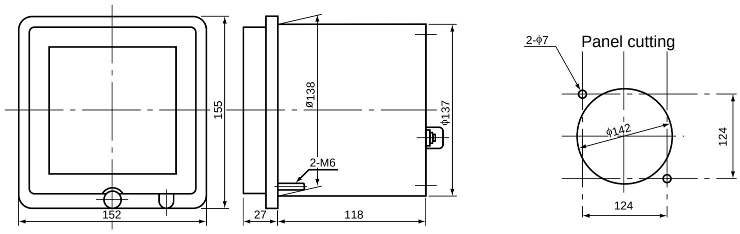
■ Ordering information

Specify the following:
1. Type number
2. Rated control voltage and frequency
3. Rated current and frequency (Overcurrent relay)
4. Setting range (Volts or Amperes)

■ Dimensions, mm

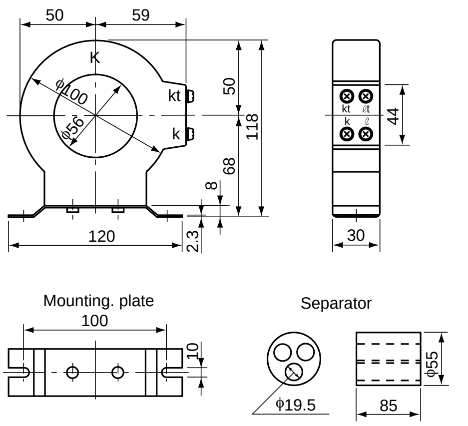
● Relays

QH-OC1, OC2, OV1, UV1, DG3, DG4, GR3A

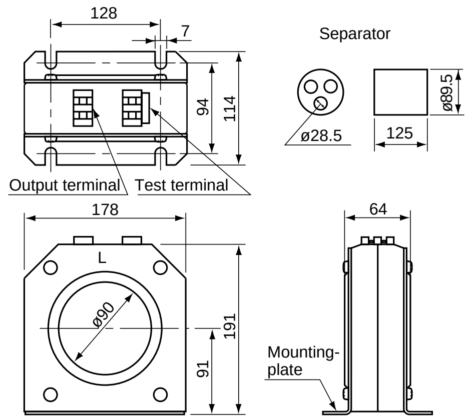


● Zero-phase current transformers

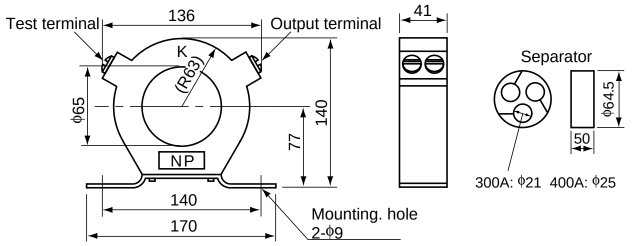
ZCT-561A, 562A



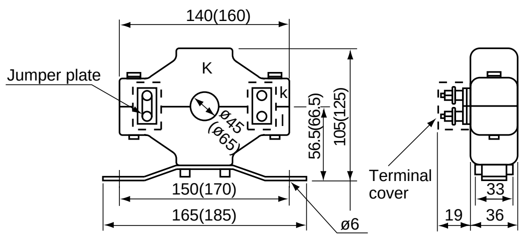
ZCT-906



ZCT-653, 654



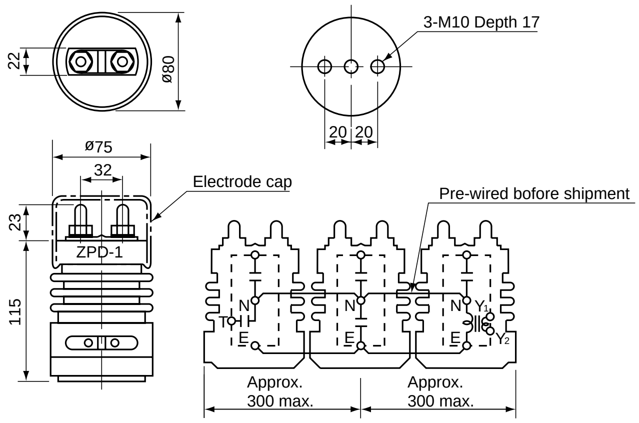
ZCT-451D, 654D



( ) : for ZCT-654D

● Zero-phase potential input device

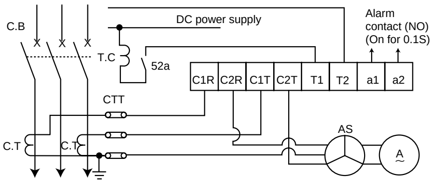
ZPD-1



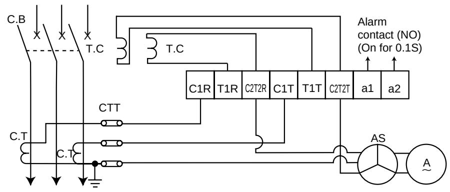
12

■ External wiring diagrams

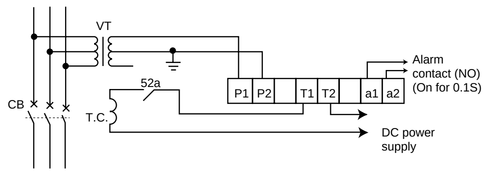
QH-OC1



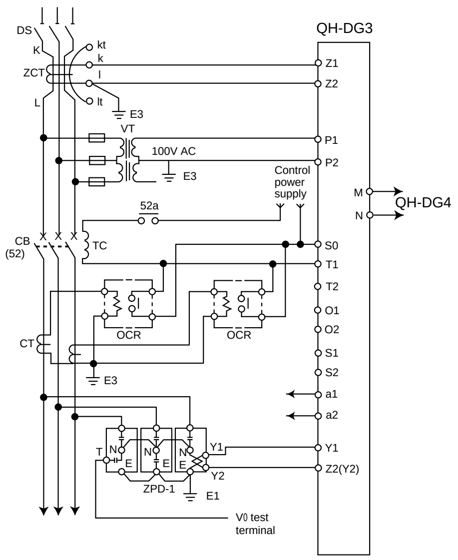
QH-OC2



QH-OV1, QH-UV1

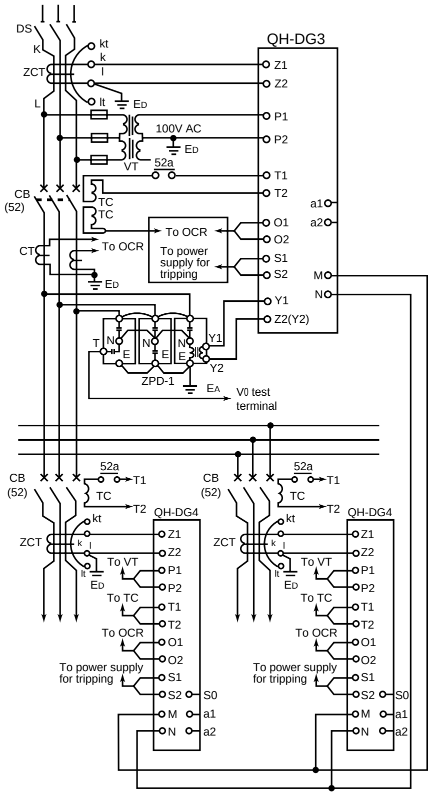


QH-DG3, shunt-trip

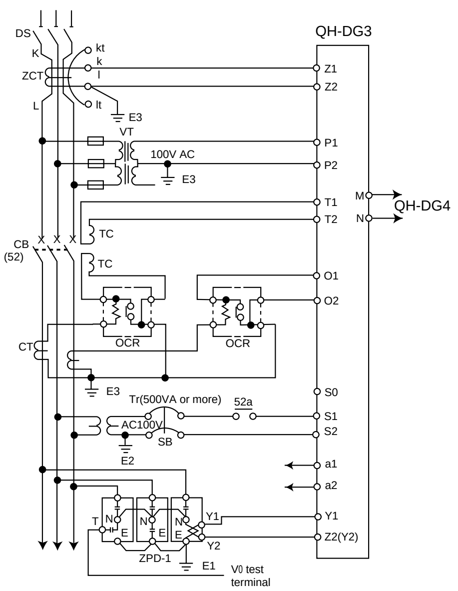


QH-DG3 with QH-DG4

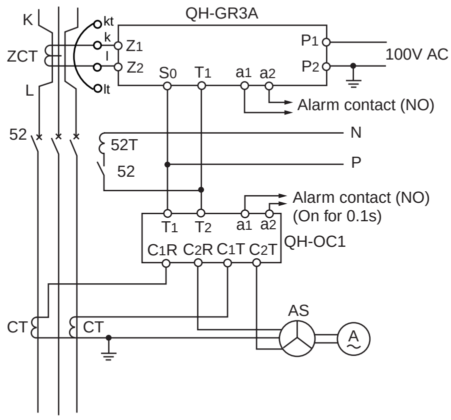
Installation at receiving point and branch point (QH-DG3 at receiving point, QH-DG4 at branch point)



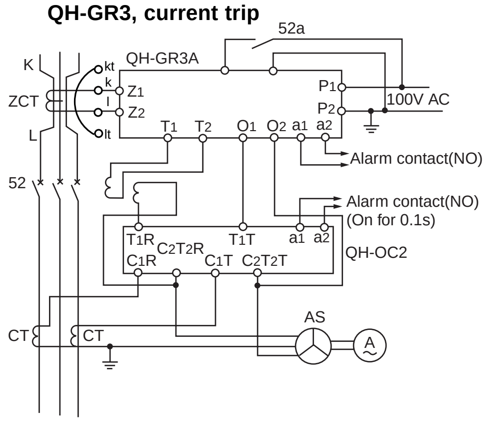
QH-DG3, current trip



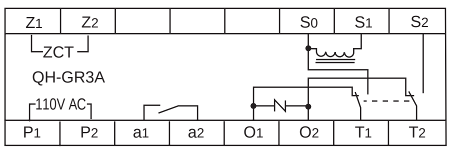
QH-GR3, shunt-trip



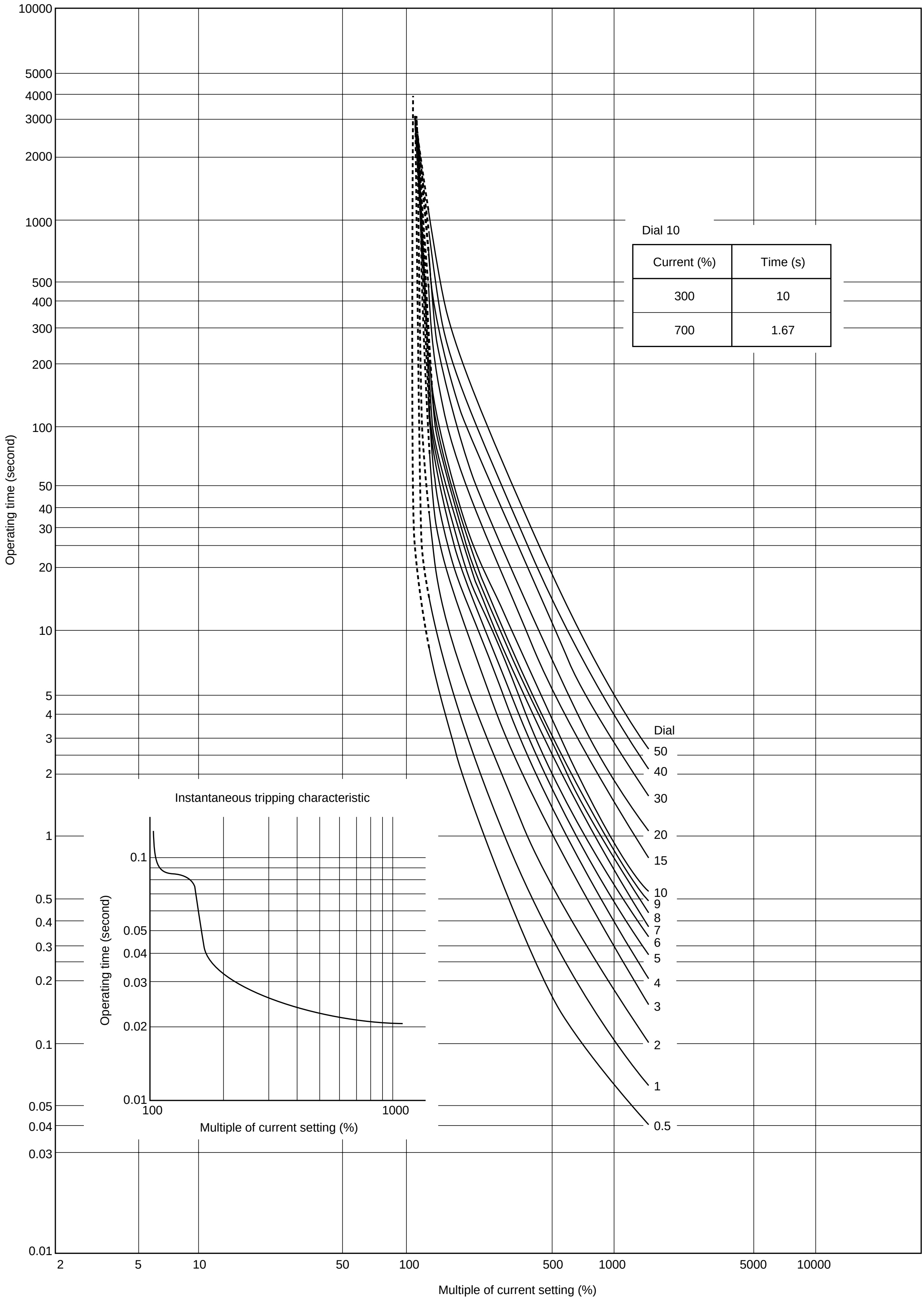
QH-GR3, current trip



■ Internal wiring diagram/QH-GR3



■ **Characteristic curves**
QH overcurrent relay



Current (%)	Time (s)
300	10
700	1.67

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- The products covered in this catalogs have not been designed or manufactured for use in equipment or systems which, in the event of failure, can lead to loss of human life.
- If you intend to use the products covered in this catalog for special applications, such as for nuclear energy control, aerospace, medical, or transportation, please consult our Fuji Electric FA agent.
- Be sure to provide protective measures when using the product covered in these catalogs in equipment which, in the event of failure, may lead to loss of human life or other grave results.
- Follow the directions of the operating instructions when mounting the product.

D&C CATALOG DIGEST INDEX

Individual catalog No.	LOW VOLTAGE PRODUCTS Up to 600 Volts
01	Magnetic Contactors and Starters Thermal Overload Relays, Solid-state Contactors
02	Manual Motor Starters and Contactors Combination Starters
03	Industrial Relays, Industrial Control Relays Annunciator Relay Unit, Time Delay Relays
04	Pushbuttons, Selector Switches, Pilot Lights Rotary Switches, Cam Type Selector Switches Panel Switches, Terminal Blocks, Testing Terminals
05	Limit Switches, Proximity Switches Photoelectric Switches
06	Molded Case Circuit Breakers Air Circuit Breakers
07	Earth Leakage Circuit Breakers Earth Leakage Protective Relays
08	Circuit Protectors Low Voltage Current-Limiting Fuses
09	Measuring Instruments, Arresters, Transducers Power Factor Controllers Power Monitoring Equipment (F-MPC)
10	AC Power Regulators Noise Suppression Filters Control Power Transformers
	HIGH VOLTAGE PRODUCTS Up to 36kV
11	Disconnecting Switches, Power Fuses Air Load Break Switches Instrument Transformers — VT, CT
12	Vacuum Circuit Breakers, Vacuum Magnetic Contactors Protective Relays

INDIVIDUAL CATALOG 12
from D&C CATALOG 20th Edition

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