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Metasol *Meta Solution*

VCB

Vacuum Circuit Breakers (7.2/12/17.5kV)



LS *ELECTRIC*

Metasol VCB

Features

- Rating: 7.2/12/17.5kV 16/20/25/31.5kA 630/1000/1250
- Rated breaking time: 3 cycle
- Rated short-circuit withstand characteristics: 4sec
- Rated operating sequence: O-0.3s-CO-15s-CO
- Type test level(Electrical / Mechanical life): M2, E2(List3), C2
- CB Compartment type cradle: Implementation of all kinds
- Various cradle: E, F, H type
- Control voltage
 - DC 24~30V, DC 48~60V, DC 110V, DC 125V, DC 220V
 - AC 48V, AC 100~130V, AC 220~250V
- Various accessories
 - VCB part : UVT, Second coil, Position S/W, Keylock, Button padlock, Button cover, Padlock(H type), MOC, Locking magnet,

- Kelock, Mecha shaft interlock lever, Low energy trip device, CTC, Manual(rotatry) Charge geared ass'y
- Cradle part: Earthing S/W & accessory, Shutter padlock, TOC(Truck operating cell S/W), MOC(Mechanism operating cell S/W), Door interlock, Door emergency push button, Temperature sensor
- Others: Draw-in/out handle, Manual(rotatry) charging handle, UVT Time delay controller, CTD(Condensor trip device), TM
- Automatic Draw-in/out display

Standards and Test

- IEC 62271-100 [M2, C2, E2(List3)]
- KERI [M2, C2, E2(List3)]

Type		MVL-06□20,25□06,10,13			MVL-06□32□06,10,13		
Rated voltage	[kV]	7.2					
Rated current	[A]	630	1000	1250	630	1000	1250
Rated frequency	[Hz]	50 / 60					
Rated interrupting current	[kA]	20, 25			31.5		
Rated interrupting capacity	[MVA]	250, 312			393		
Rated short-time current	[kA]	20/4sec, 25/4sec			31.5/4sec		
Rated making current	[kA]	65			81.9		
Rated interrupting time	[cycle]	3					
Withstand voltage	Frequency [kV]	20					
	Impulse [kV/1.2x50μs]	60					
TRV increasing rate	[kV/μs]	0.24					
TRV MAX Value	[kV]	12.3					
Operating duty		O-0.3s-CO-15s-CO					
Control voltage	[V]	DC 24~30V	DC 48~60V, AC 48V	AC/DC 100~130V	AC/DC 200~250V		
Control current for closing	[A]	≤ 8	≤ 4	≤ 2	≤ 1		
Control current for opening	[A]	≤ 8	≤ 4	≤ 4	≤ 2		
Current of motor operation (steady current/Inrush current)	[A]	≤ 5 / ≤ 25	≤ 3 / ≤ 15	≤ 2 / ≤ 10	≤ 1 / ≤ 5		
Standard aux contacts		4a4b, 10a10b					
Rated opening time	[s]	≤ 0.04					
No-load closing time	[s]	≤ 0.06					
Motor charging time	[s]	≤ 5					
Pole distance	P, B, H [mm]	150			150		
	E, F [mm]	-					
Weight	E, F, H [kg]	83.5			91		
	Cradle (H-Type) [kg]	150					
	P, B [kg]	52			55		
Installation type		P, B, H					
Applicable standard		IEC 62271-100					



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MVL-12□16,20,25□06,10,13				MVL-12□32□06,10,13				MVL-17□16,20,25□06,10,13				MVL-17□32□06,10,13			
12				12				17.5				17.5			
630	1000	1250		630	1000	1250		630	1000	1250		630	1000	1250	
50 / 60				50 / 60				50 / 60				50 / 60			
16, 20, 25				31.5				16, 20, 25				31.5			
333, 416, 520				655				485, 607, 758				955			
16/4sec, 20/4sec, 25/4sec				31.5/4sec				16/4sec, 20/4sec, 25/4sec				31.5/4sec			
65				81.9				65				81.9			
3				3				3				3			
28				28				38				38			
75				75				95				95			
0.34				0.34				0.42				0.42			
20.6				20.6				30.0				30.0			
O-0.3s-CO-15s-CO				O-0.3s-CO-15s-CO				O-0.3s-CO-15s-CO				O-0.3s-CO-15s-CO			
DC 24-30V	DC 48-60V, AC 48V	AC/DC 100-130V	AC/DC 200-250V	DC 24-30V	DC 48-60V, AC 48V	AC/DC 100-130V	AC/DC 200-250V	DC 24-30V	DC 48-60V, AC 48V	AC/DC 100-130V	AC/DC 200-250V	DC 24-30V	DC 48-60V, AC 48V	AC/DC 100-130V	AC/DC 200-250V
≤ 8	≤ 4	≤ 2	≤ 1	≤ 8	≤ 4	≤ 2	≤ 1	≤ 8	≤ 4	≤ 2	≤ 1	≤ 8	≤ 4	≤ 2	≤ 1
≤ 8	≤ 4	≤ 4	≤ 2	≤ 8	≤ 4	≤ 4	≤ 2	≤ 8	≤ 4	≤ 4	≤ 2	≤ 8	≤ 4	≤ 4	≤ 2
≤ 5 / ≤ 25	≤ 3 / ≤ 15	≤ 2 / ≤ 10	≤ 1 / ≤ 5	≤ 5 / ≤ 25	≤ 3 / ≤ 15	≤ 2 / ≤ 10	≤ 1 / ≤ 5	≤ 5 / ≤ 25	≤ 3 / ≤ 15	≤ 2 / ≤ 10	≤ 1 / ≤ 5	≤ 5 / ≤ 25	≤ 3 / ≤ 15	≤ 2 / ≤ 10	≤ 1 / ≤ 5
4a4b, 10a10b				4a4b, 10a10b				4a4b, 10a10b				4a4b, 10a10b			
≤ 0.04				≤ 0.04				≤ 0.04				≤ 0.04			
≤ 0.06				≤ 0.06				≤ 0.06				≤ 0.06			
≤ 5				≤ 5				≤ 5				≤ 5			
150				150				150				150			
210				-				-				-			
83.5				91				83.5				91			
150				150				170				170			
52				55				52				55			
P, E, F, B, H				P, B, H				P, B, H				P, B, H			
IEC 62271-100				IEC 62271-100				IEC 62271-100				IEC 62271-100			

Ordering information

■ Breaker

MVL	12	H	20	A	06
Basic model name	Rated voltage (kV)	Version	Interrupting current (kA)	Phase distance/Compatibility	Rated current (A)
MVL VL Mecha.	06 7.2 12 12 17 17.5	P Fixed E E type drawout (for MESH) F F type drawout (for MESH) H H type drawout (for MESH) B Box type drawout	16 16 (7.2 kV is absent) 20 20 25 25 32 31.5	A 150 B 210 P 150 (Tulip contact) Q 210 (Tulip contact) T 150 (compatible with compact type)	06 630 10 1000 13 1250

Note) 1. P/H/B type is available for 150mm only, E/F type is available for 210mm only.
2. In case of E/F type, only 12kV, 20/25kA, 630/1250A are available.
3. In case of 7.2kV, only 630/1250A are available.
4. In case of 31.5kA, only 630/1250A, tulip type(P) are available.
5. In case of T type, only H type, 12kV, 20/25kA are available.

MVL-12H20A06	M1	C1	T1	SB2	U1	A12	Optional
	Motor control voltage		Trip coil voltage		UVT	Other accessories	
	M0 Motor none M1 DC 110V M2 DC 220V-250V M3 DC 125V M4 DC 24V-30V M5 DC 48V-60V M6 AC 48V M7 AC 100V-130V M8 AC 200V-250V		T0 T.C none T1 DC 110V T2 DC 220V-250V T3 DC 125V T4 DC 24V-30V T5 DC 48V-60V T6 AC 48V T7 AC 100V-130V T8 AC 200V-250V		U0 UVT none U1 DC 110V U2 DC 220V-250V U3 DC 125V U4 DC 24V-30V U5 DC 48V-60V U6 AC 48V U7 AC 100V-130V U8 AC 200V-250V	A1 Secondary trip coil A2 Secondary trip coil with TCS contact A3 Position S/W (Test : 1a1b, Service : 2b) A4 Position S/W (Test : 2a, Service : 2a) A5 Position S/W (Test : 1a1b, Service : 1a1b) A7 Keylock (Individual key) A8 Button padlock A9 Button cover AA Lead wire AB User type plug (Part) AC Plug interlock AD Padlock (H type) AE MOC AF Locking magnet AG Keylock (Same key) AI Mecha shaft interlock lever AO Lead wire special color (blue) AT Low energy trip device 25mJ AU Low energy trip device 100mJ AV CT operated coil 1A AW CT operated coil 5A AZ Manual(rotary) charge geared ass'y	
		Closing coil voltage		Connector and wire			
		C0 C.C none C1 DC 110V C2 DC 220V-250V C3 DC 125V C4 DC 24V-30V C5 DC 48V-60V C6 AC 48V C7 AC 100V-130V C8 AC 200V-250V		SA2 SA4 SB2 SB4 SA6 SA8 SB6	Standard Flame retardant	A type connector 4a4b A type connector 10a10b B type connector 4a4b B type connector 10a10b A type connector 4a4b A type connector 10a10b B type connector 4a4b	

Note) 1. Replace suffix "A12" with "A14" for A1, A4 and A7.

2. Unable to install A1 and U1-U8(UVT) simultaneously.

3. Unable to install A3, A4 and A5 simultaneously.

4. Unable to install A8 and A9 simultaneously.

5. When A1 is selected the maximum available auxiliary contacts are 9a9b.

6. When A2 is selected the maximum available auxiliary contacts are 4a3b and 9a8b.

7. AC, AD, AE and AF apply only to H type.

8. In case of B-type connector the flame retardant wire is applicable to auxiliary contacts 4a4b, not to 10a10b.

9. A/B-type connectors apply to P/E/F/G/K type and B-type connector only to H type.

10. Lead wire special color (blue) is for A-type connector only.

11. If a position switch is selected, A/B-type (P/E/F/G/K-type) or B-type(H-type) connector can be selected as an option for auxiliary contacts and wiring ass'y.

12. The control power of the locking magnet of H type breaker is the same as the motor control power.

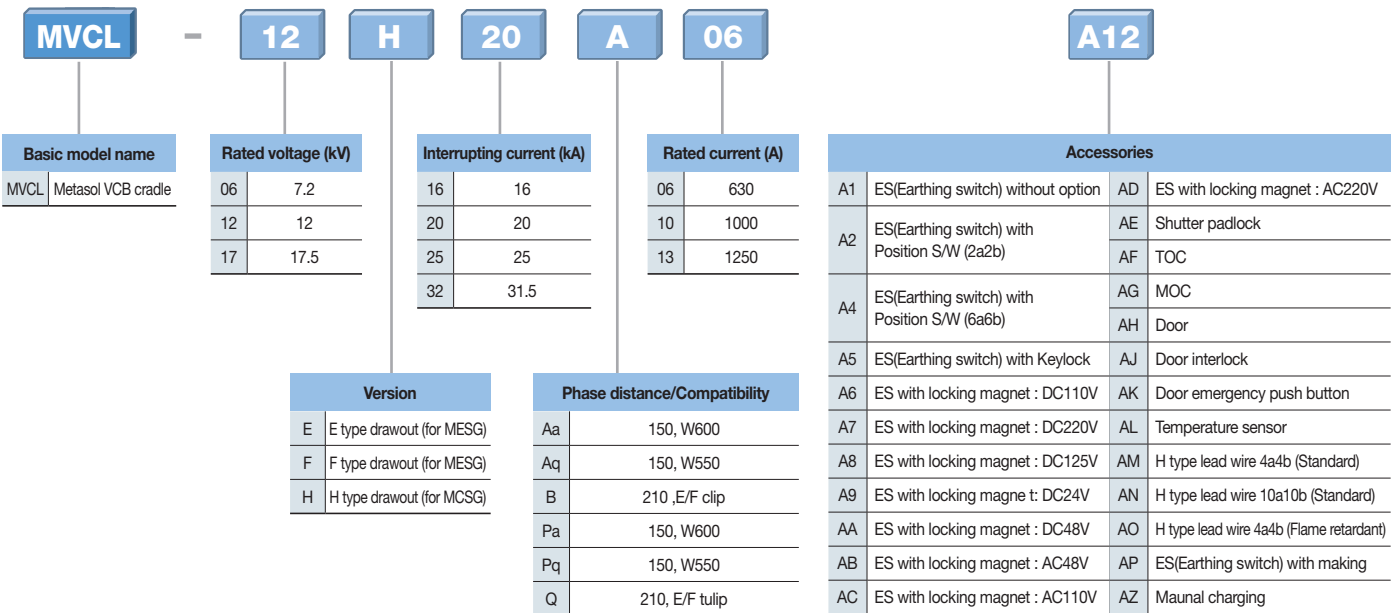
13. Flame retardant type blue wire is not available.

14. Unable to install A1 and U1-U8(UVT) simultaneously if AV and AW is installed. The maximum auxiliary contact is 4a4b with AV and AW.

15. A7[Keylock(Individual key)] and AG[Keylock(Same key)] an not be selected simultaneously.

Accessories	
CTD1	Condenser trip device (AC 110V)
CTD2	Condenser trip device (AC 220V)
UDC1	UVT time delay controller (ADC 110V)
UDC2	UVT time delay controller (ADC 220V)
UDC3	UVT time delay controller (ADC 48V)
CTU	Coil test unit

■ Cradle



Note) 1. In case of E/F type, only 12kV, 210mm(B,Q) are available.
 2. In case of H type,
 - Aa is for compartment W600.
 - Aq is for compartment W550.
 - Pa is for compartment W600, (Tulip type)
 - Pq is for compartment W550, (Tulip type)
 3. In case of Aq, Pq cradle, only 7.2/12kV are available

Note) 1. Accessories and TM for the cradle apply only to H type.
 2. AJ and AK apply only when the door (AH) is present.
 3. TM is for use with AL in H type cradle.
 4. H type lead wire - one of AM, AN or AO is required for cradle in case of H type breaker.
 5. Unable to install AK at the cradle if A8, A9 is present in the H type breaker
 6. A1 is selected, A5 is included as standard.

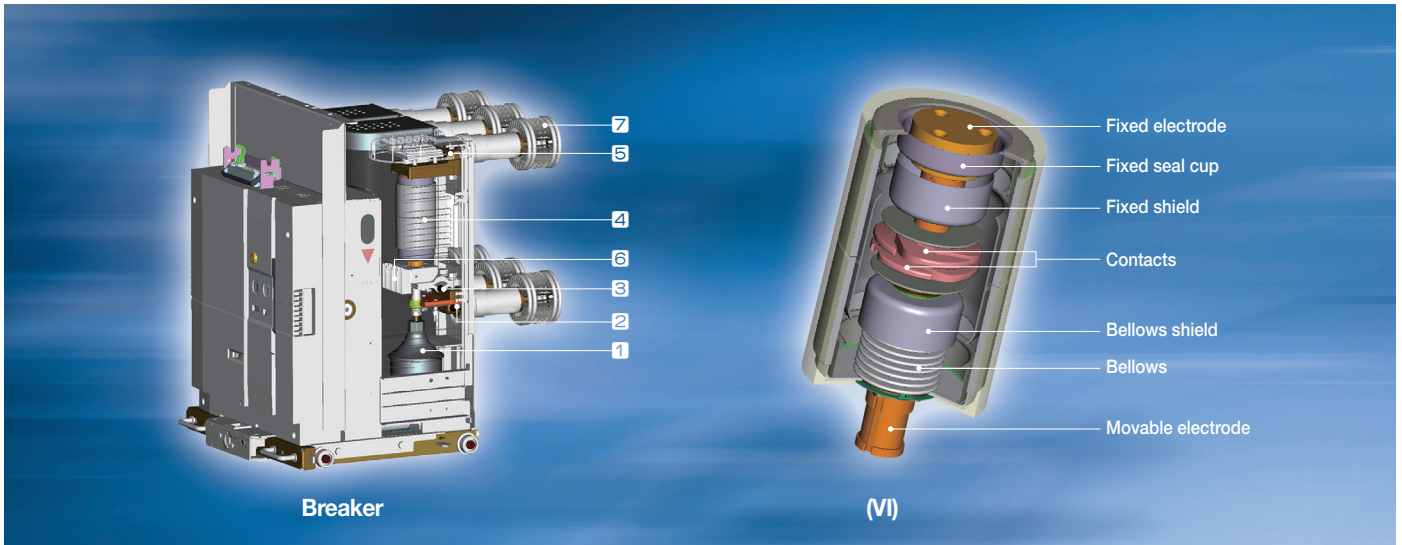


< E type cradle >



< F type cradle >

Structure



Breaker

- 1 Insulation rod
- 2 Lower terminal
- 3 Flexible shunt
- 4 Vacuum interrupter
- 5 Upper terminal
- 6 Heat sink, 2000A or more
- 7 Tulip contactor

Vacuum Interrupter, VI

The internal components of a typical Vacuum Interrupter are shown in the Fig. LS Vacuum Interrupter consists of a ceramic insulator, two end plates, arc shield, bellows, a movable and fixed electrode, and contact set. The ambient gas pressure within the evacuated tube is approximately 5×10^{-5} torr.

Accessories



Breaker

- 1 Motor(M), Charge switch
- 2 Closing coil(C)
- 3 Trip coil(TC)/Secondary Trip coil(TC1)
- 4 Counter
- 5 Auxiliary contact(SA)
- 6 UVT
- 7 Keylock
- 8 Button padlock
- 9 Button cover
- 10 Position switch
- 11 Handle for draw-in and out
- 12 UVT time delay controller
- 13 CTD
- 14 MOC
- 15 Padlock(H type door interlock)
- 16 Locking magnet
- 17 Plug interlock
- 18 Manual charging geared ass'y
- 19 Manual charging handle
- 20 CTC
- 21 LETD

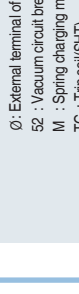
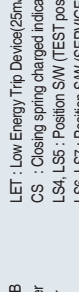
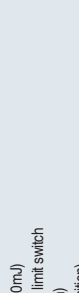
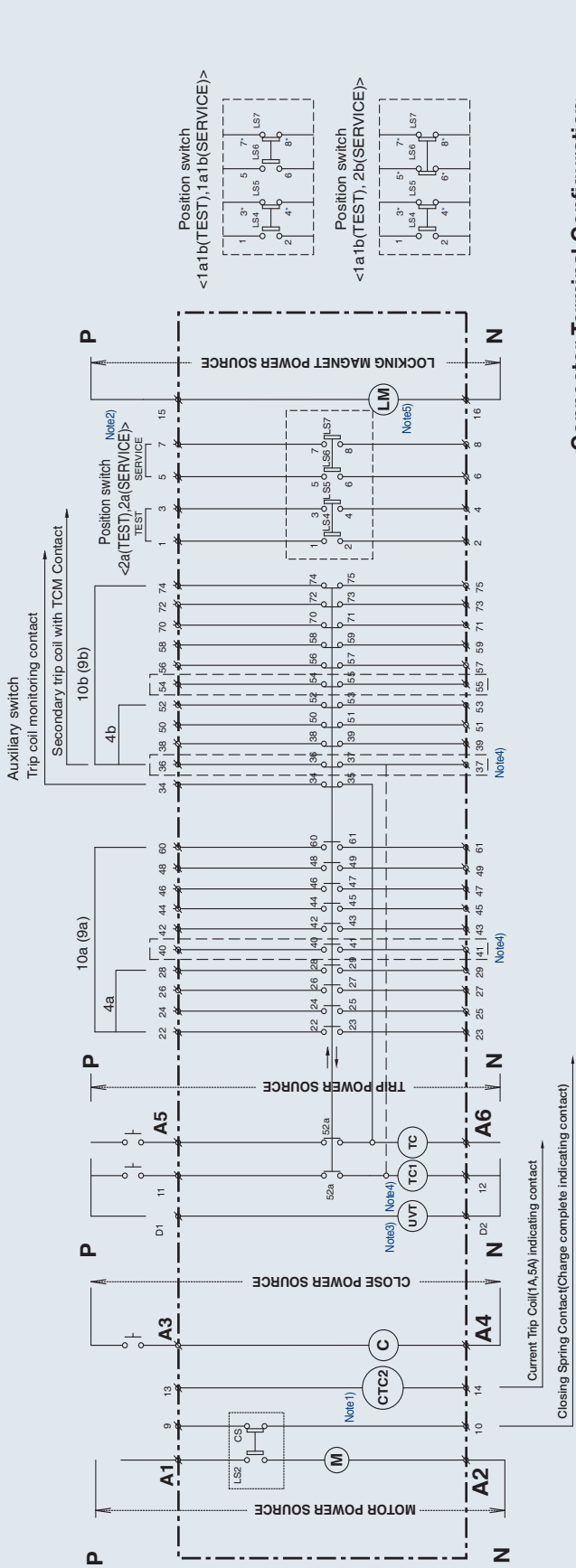
Cradle

- 1 TOC(Truck operating cell S/W)
- 2 MOC(Mechanism operating cell S/W)
- 3 Temperature sensor
- 4 Door
- 5 Door interlock
- 6 Shutter padlock
- 7 Emergency On/Off button
- 8 Earthing S/W & Accessory
- 8-1 Keylock-earthing S/W
- 8-2 Locking magnet-earthing S/W
- 8-3 Position S/W-earthing S/W
- 9 TM(Temperature monitoring unit)
- 10 Manual charging geared ass'y

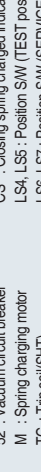
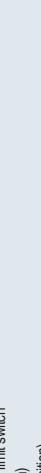
Accessories

No	Designation	Division	Shape	Division	Remarks	No	Designation	Division	Shape	Division	Remarks
1	Geared motor	Basic		VL common	Rating division: DC 24V, 48V, 110V 125V, 220V AC 48V, 110V, 220V	17	MOC	Option (Breaker)			
2	Closing coil	Basic		VL common	Rating division: DC 24V, 48V, 110V 125V, 220V AC 48V, 110V, 220V	18	TOC	Option (Cradle)		VL common	
3	Opening coil	Basic		VL common	Rating division: DC 24V, 48V, 110V 125V, 220V AC 48V, 110V, 220V	19	MOC	Option (Cradle)		New development	
4	Auxiliary contact	Basic		New development	4a4b, 10a10b	20	Temperature sensor	Option (Cradle)		VL common	
5	UVT	Option (Breaker)		VL common	Rating division: DC 24V, 48V, 110V 125V, 220V AC 48V, 110V, 220V	21	Earthing S/W & accessory	Option (Cradle)		New development	
6	Additional opening coil	Option (Breaker)		VL common	Rating division: DC 24V, 48V, 110V 125V, 220V AC 48V, 110V, 220V	22	Shutter padlock	Option (Cradle)		VL common	
7	Position S/W (H type)	Option (Breaker)		VL common	Test/Run: 2a2a, 2a2b	23	Door emergence push button	Option (Cradle)		New development	
8	Keylock	Option (Breaker)		ACB common		24	Door	Option (Cradle)		New development	
9	Button padlock	Option (Breaker)		VL common		25	Door interlock	Option (Cradle)		New development	
10	Button cover	Option (Breaker)		VL common		26	CTD	Others		VL common	
11	Plug interlock	Option (Breaker/Cradle)		VL common		27	UVT time delay controller	Others		VL common	
12	Padlock (H type door interlock)	Option (Breaker)		VL common		28	Drawout handle	Others		VL common	
13	Manual charging geared ass'y	Option (Breaker)		VL common	Rating division: DC 24V, 48V, 110V 125V, 220V AC 48V, 110V, 220V	29	Temperature monitoring unit (TM)	Others		New development	
14	CTC	Option (Breaker)		New development	1A, 5A	30	Lift	Others		New development	
15	LETD	Option (Breaker)		VL common	25mJ	31	Manual charging handle	Others		VL common	
16	Manual charging geared ass'y	Option (Cradle)		New development							

Control circuit diagram

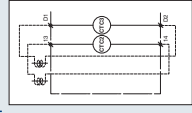


<Connector Terminal Configuration>



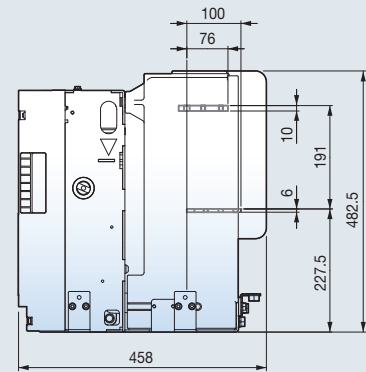
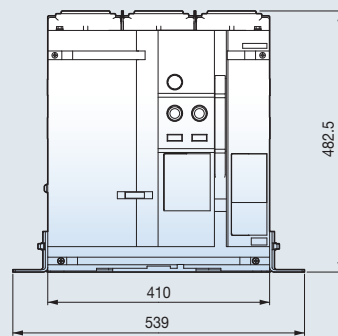
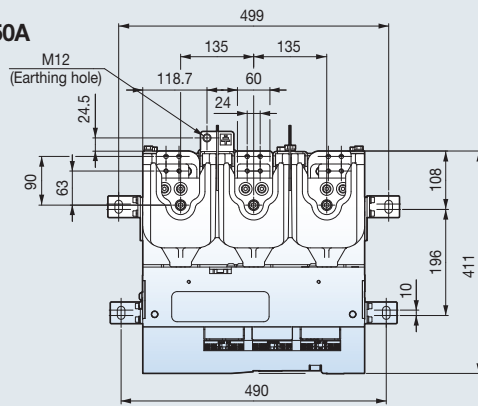
SW No.	TEST : 1a1b	TEST : 2a	TEST : 1a1b	TEST : 1a1b
	SERVICE : 2a	SERVICE : 2a	SERVICE : 1a1b	SERVICE : 1a1b
LS4	Close at TEST position	Close at TEST position	Close at TEST position	Close at TEST position
LS5	OPEN at TEST position	Close at TEST position	Close at TEST position	Close at TEST position
LS6	OPEN at SERVICE position	Close at SERVICE position	Close at SERVICE position	Close at SERVICE position
LS7	OPEN at SERVICE position	Close at SERVICE position	Close at SERVICE position	Close at SERVICE position

- Note 1: CTC2 : Current Trip Coil (Terminal No. : 13,14)
 2. Position SW - TEST 2a, SERVICE 2a (Terminal No. 1, 2, 3, 4, 5, 6, 7, 8)
 - TEST position 1a1b, SERVICE position 1a1b/2b are available.
 (* marked contact is b contact)
 3. UVT - Under Voltage Trip (Terminal No. D1, D2)
 4. TC1 - Secondary Trip Coil (Spare trip coil, terminal No. 11, 12)
 In case TC1 is selected and auxiliary switch is 10a10b, Some 'a' contact (Terminal No. : 40, 41) and 'b' contact (Terminal No. : 54, 55) are not available.
 5. LM - Locking Magnet (Terminal No. : 15, 16). In case of B type connector is available
 6. Secondary Trip Coil Monitoring Contact (Terminal No. : 36)
 In case Secondary Trip Coil TCM Contact is selected and auxiliary switch is 9a8b, Some 'a' contact (Terminal No. : 40, 41) and 'b' contact (terminal No. : 36, 37) are not available.
 7. CTC - Current Trip Coil (Terminal No. : A5, A6)
 CTC1 - Secondary Current Trip Coil (Terminal No. : 11, 12)
 CTC2 - Current Trip Coil (Terminal No. : 13, 14)
 CTC3 - Current Trip Coil (Terminal No. : D1, D2)
 8. LET - Low Energy Trip Device (Terminal No. : 13, 14)
 9. Close and Trip coil is One Pulse type, excluding Trip coil (DC110, 220V)
 10. In above optional accessories, UVT, CTC and TC1 can not be selected simultaneously.
 11. Above circuit diagram is based on "OFF" state of VCB and closing spring is charged.

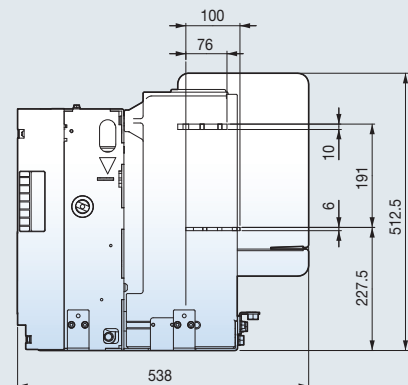
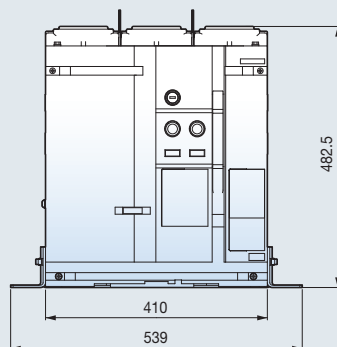
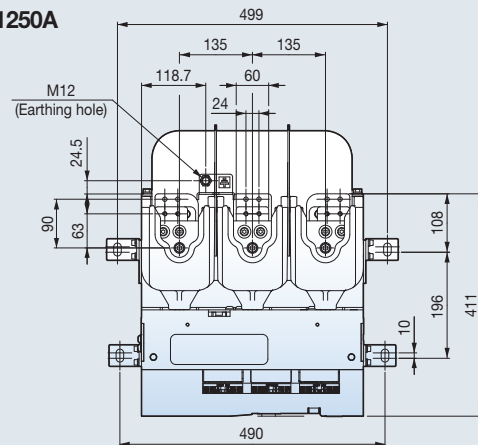


Dimensions

7.2kV 20, 25, 31.5kA 630, 1250A
 12kV 16, 20, 25kA 630, 1000, 1250A
 12kV 31.5kA 630, 1250A
 (P type, Phase: 150mm)

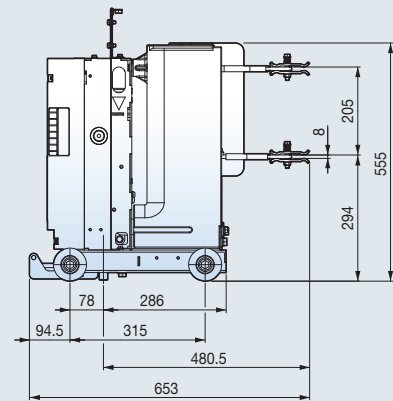
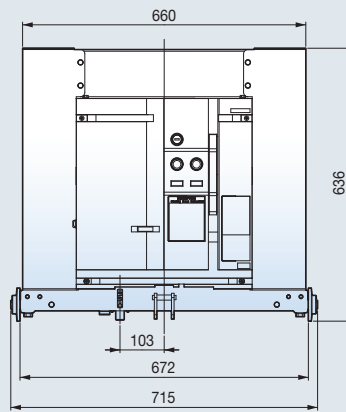
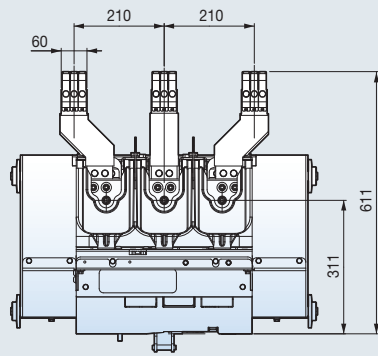


17.5kV 16, 20, 25kA 630, 1000, 1250A
 17.5kV 31.5kA 630, 1250A
 (P type, Phase: 150mm)

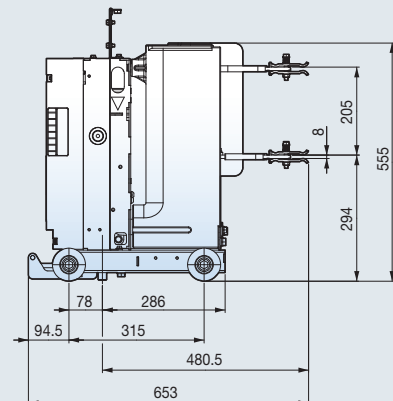
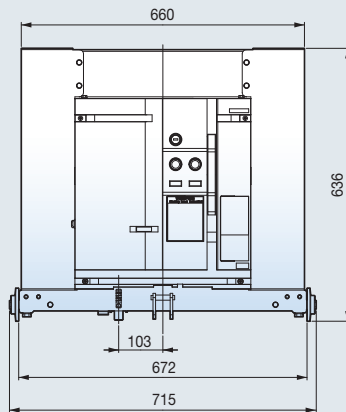
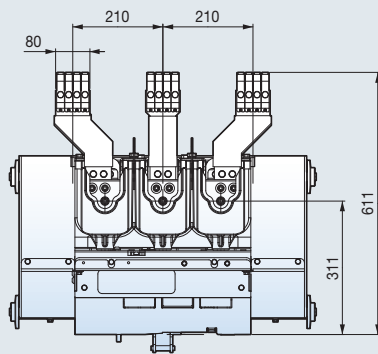


Dimensions

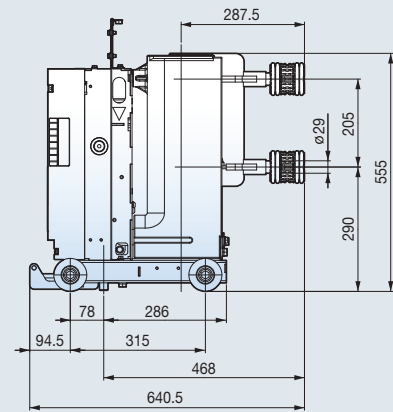
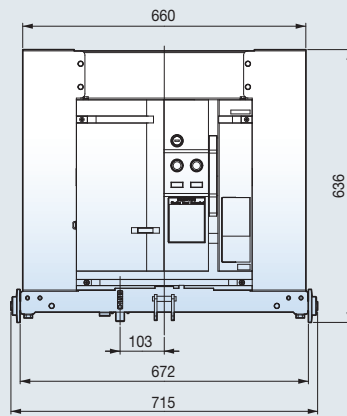
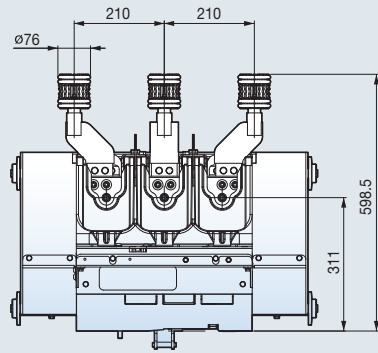
12kV 20, 25kA 630A
(E type, Clip, Phase: 210mm)



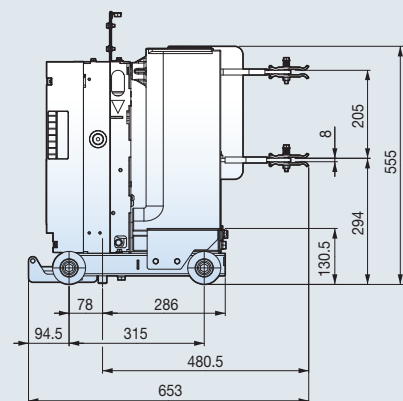
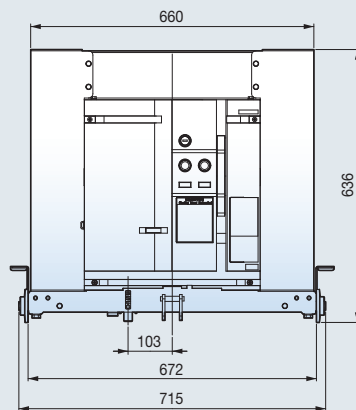
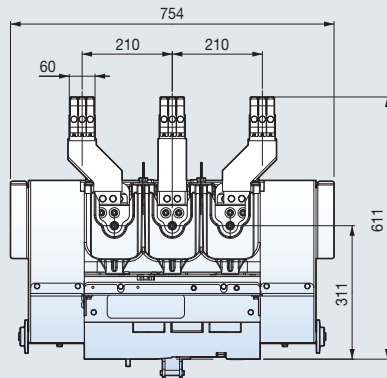
12kV 20, 25kA 1250A
(E type, Clip, Phase: 210mm)



12kV 20, 25kA 630, 1250A
(E type, Tulip, Phase: 210mm)

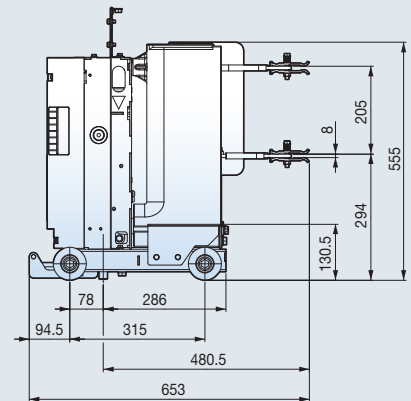
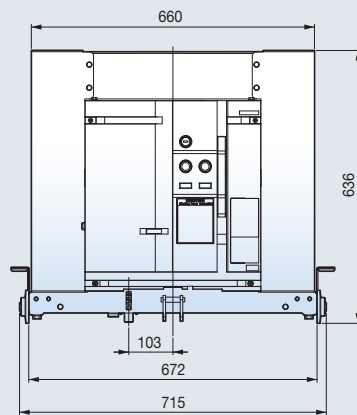
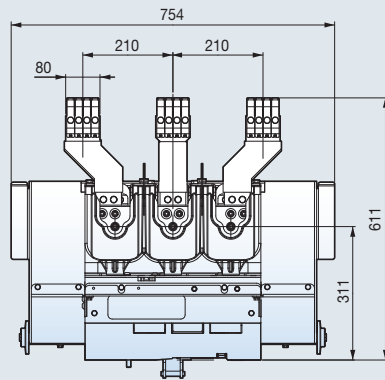


12kV 20, 25kA 630A
(F type, Clip, Phase: 210mm)

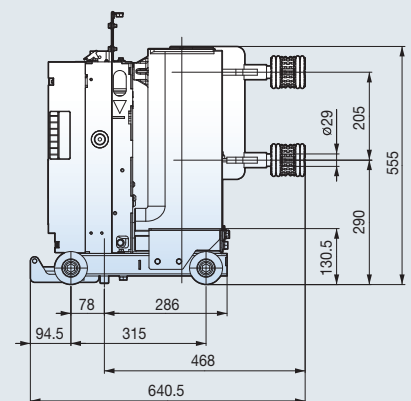
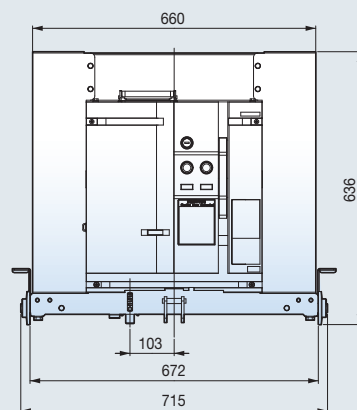
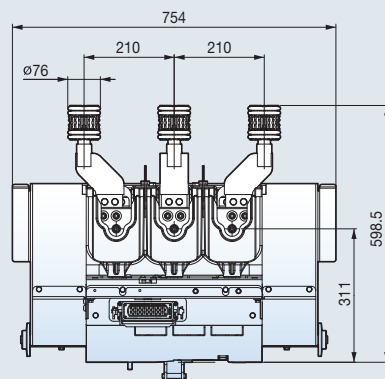


Dimensions

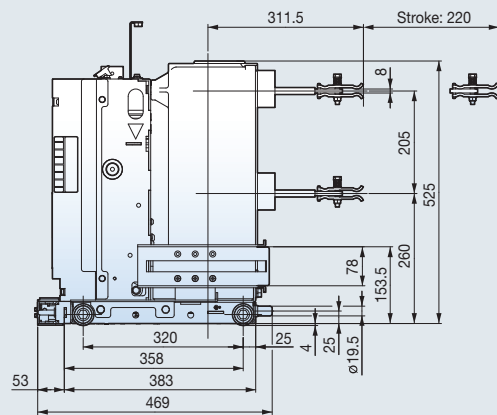
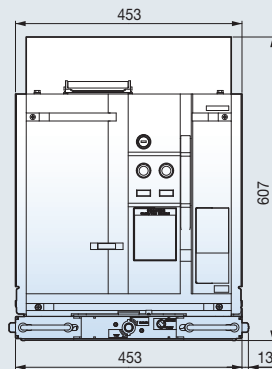
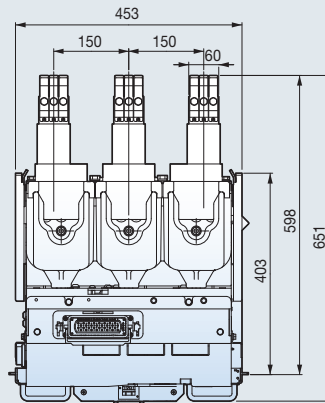
12kV 20, 25kA 1250A
(F type, Clip, Phase: 210mm)



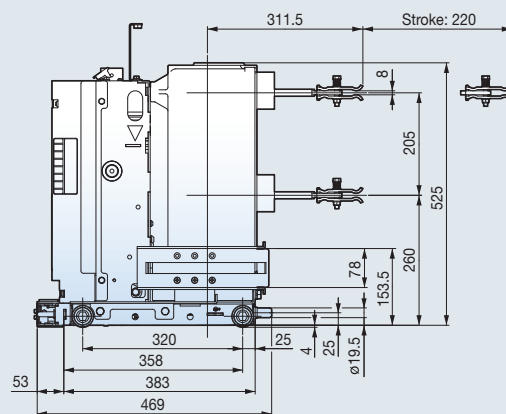
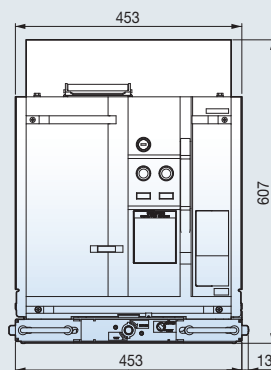
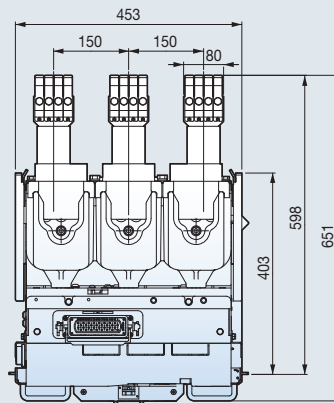
12kV 20, 25kA 630, 1250A
(F type, Tulip, Phase: 210mm)



7.2kV 20, 25kA 630A
 12, 17.5kV 16, 20, 25kA 630, 1000A
 (H type, Clip, Phase: 150mm)

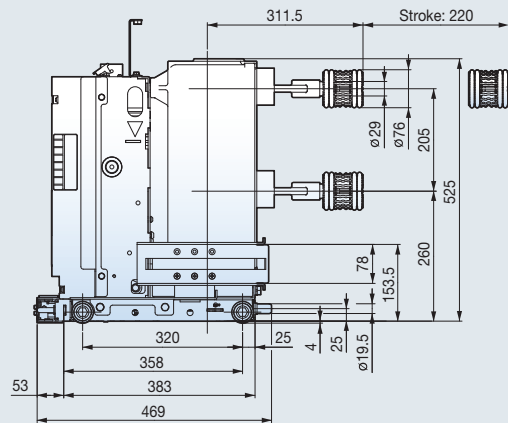
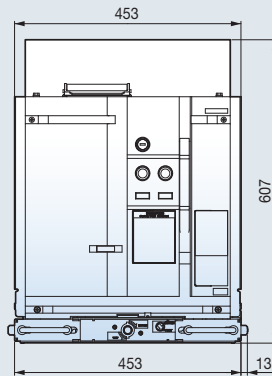
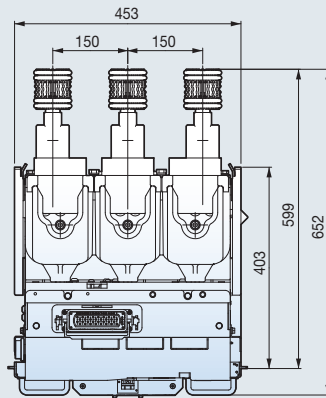


7.2kV 20, 25kA 1250A
 12, 17.5kV 16, 20, 25kA 1250A
 (H type, Clip, Phase: 150mm)

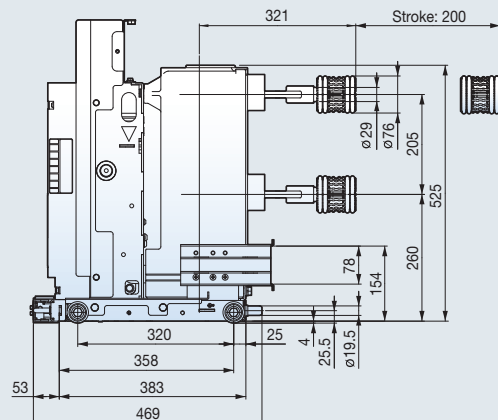
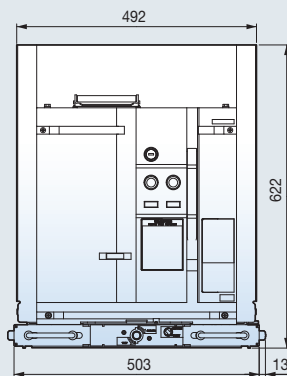
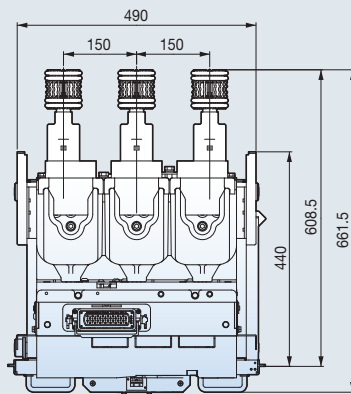


Dimensions (VCB)

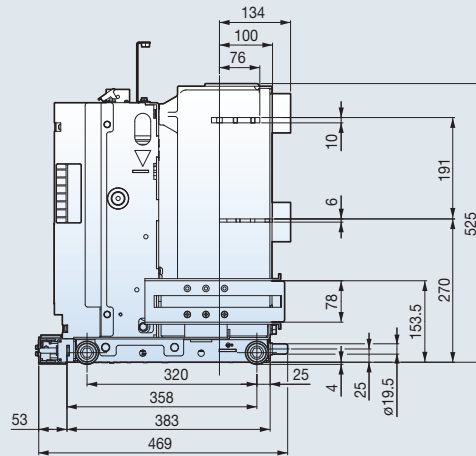
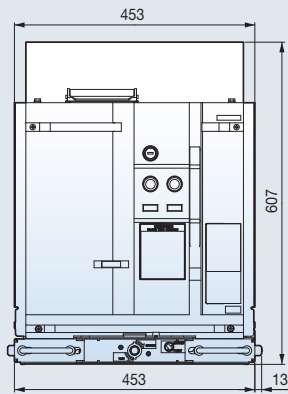
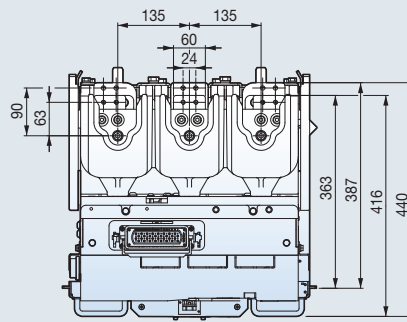
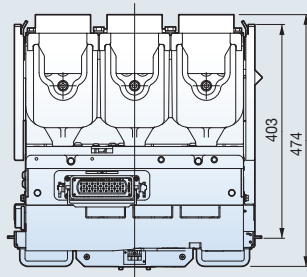
7.2kV 20, 25, 31.5kA 630, 1250A
 12, 17.5kV 16, 20, 25kA
 630, 1000, 1250A
 12, 17.5kV 31.5kA 630, 1250A
 (H type, Tulip, Phase: 150mm)



12kV 20, 25kA 630, 1000, 1250A
 (H compatible type, Phase: 150mm)

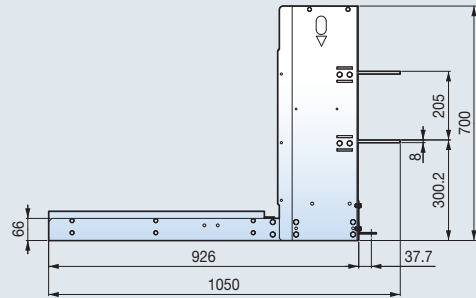
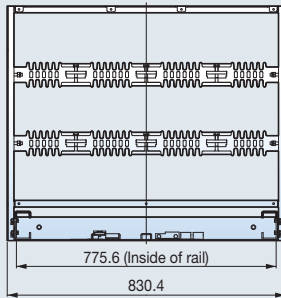
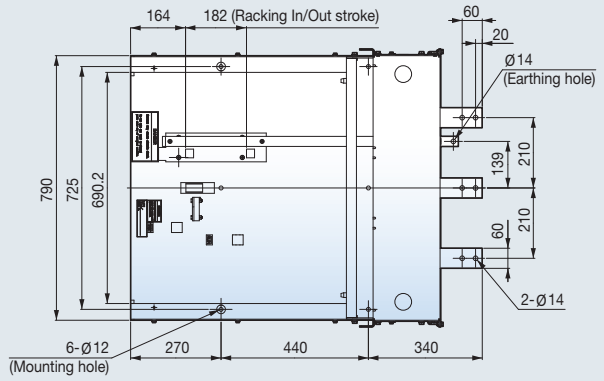


7.2kV 20, 25, 31.5kA 630, 1250A
 12, 17.5kV 16, 20, 25, 31.5kA
 630, 1000, 1250A
 (Box type, Phase: 150mm)

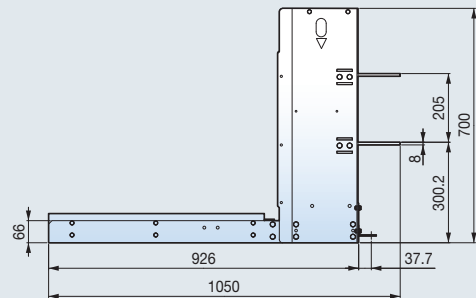
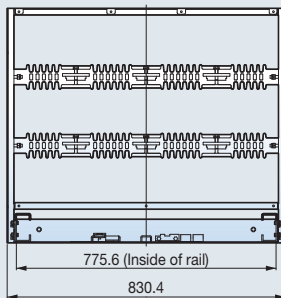
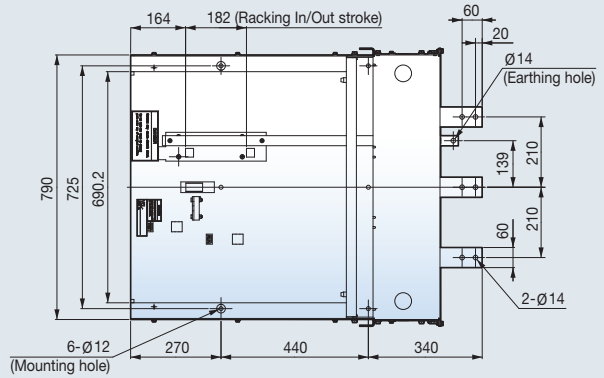


Dimensions (Cradle)

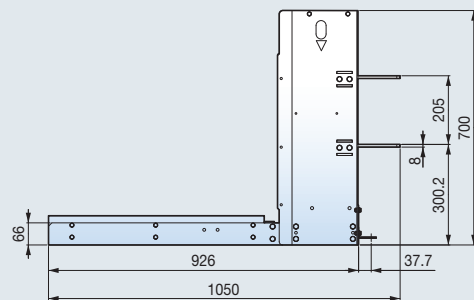
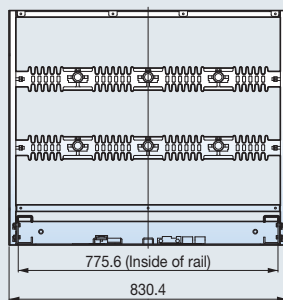
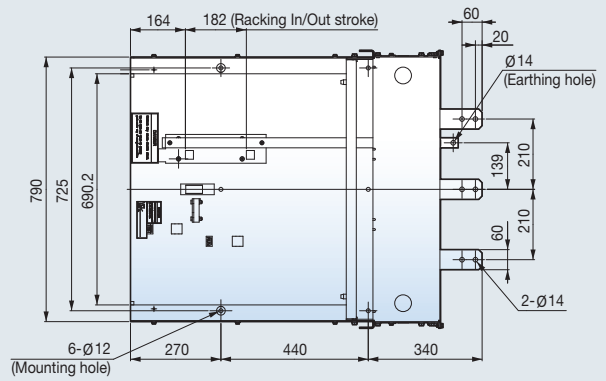
12kV 20, 25kA 630A
(E type cradle, Clip, Phase: 210mm)



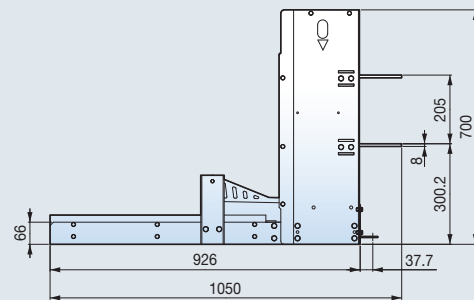
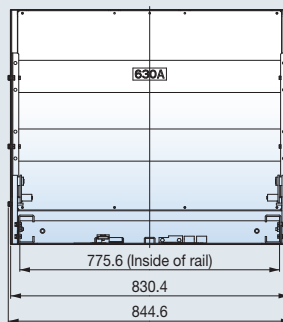
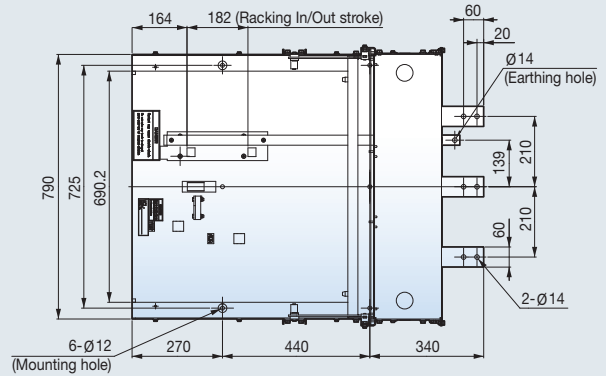
12kV 20, 25kA 1250A
(E type cradle, Clip, Phase: 210mm)



**12kV 20, 25kA 630, 1250A
(E type cradle, Tulip, Phase: 210mm)**

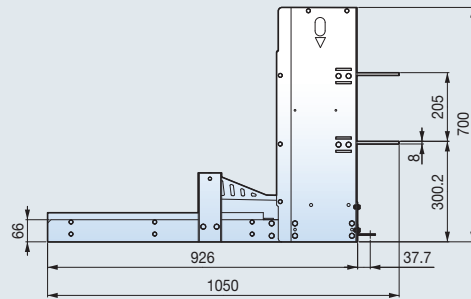
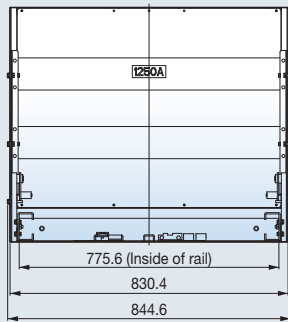
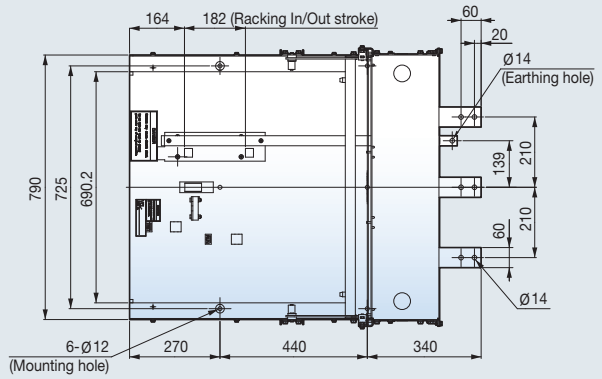


**12kV 20, 25kA 630A
(F type cradle, Clip, Phase: 210mm)**

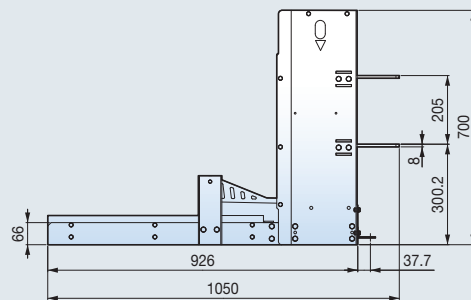
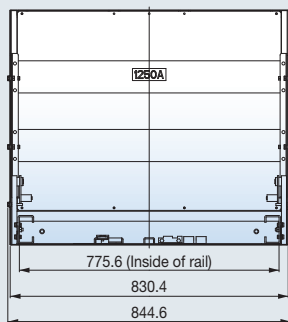
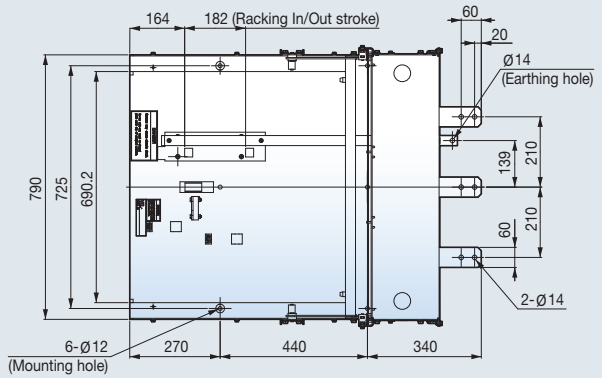


Dimensions (Cradle)

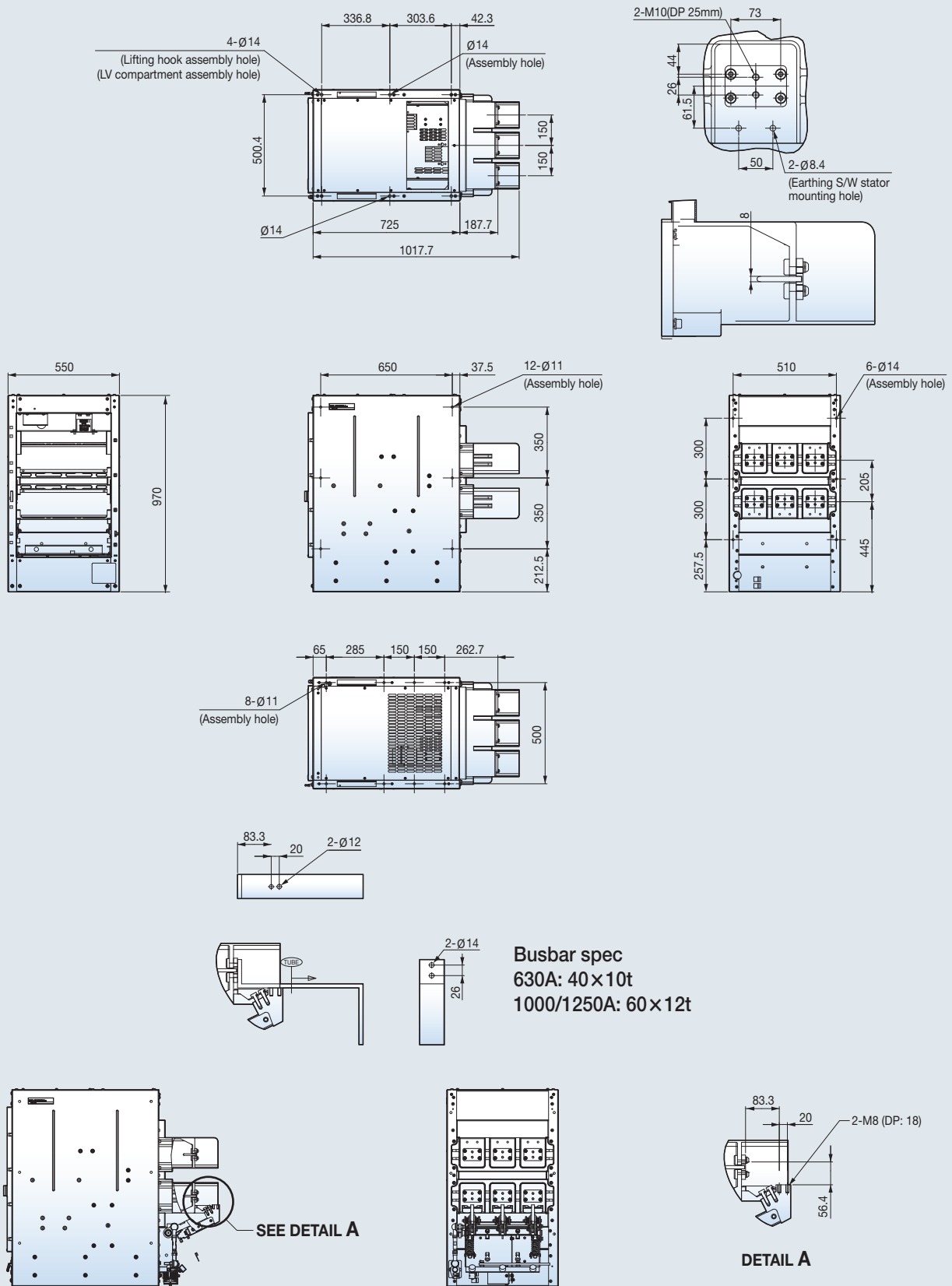
12kV 20, 25kA 1250A
(F type cradle, Clip, Phase: 210mm)



12kV 20, 25kA 630, 1250A
(F type cradle, Tulip, Phase: 210mm)

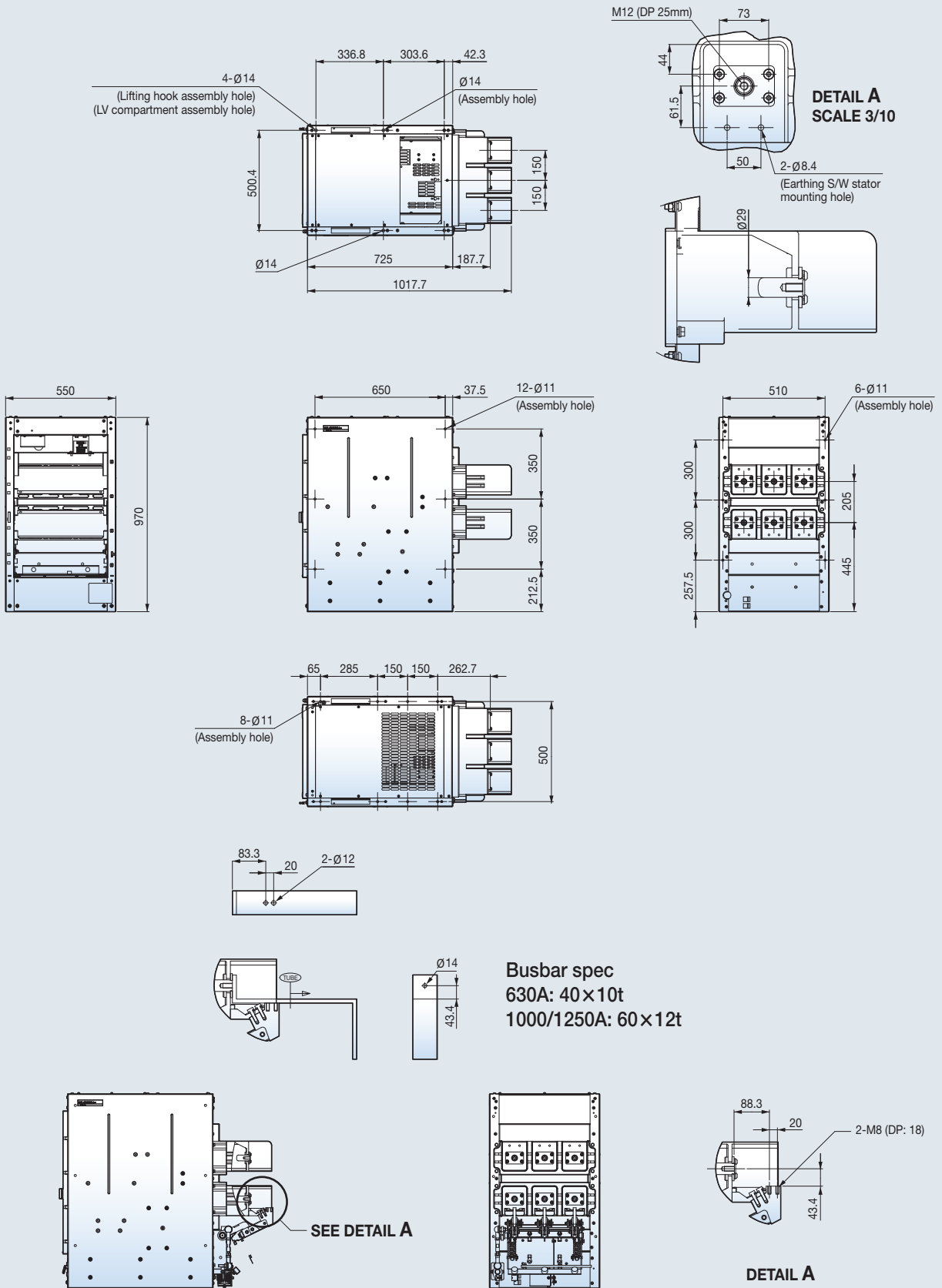


7.2, 12kV 16, 20, 25, 31.5kA 630, 1000, 1250A
(H type cradle, Clip, W: 550mm Phase: 150mm)

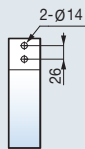
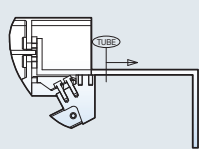
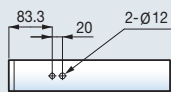
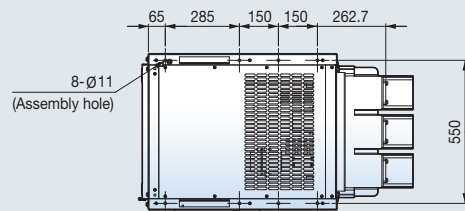
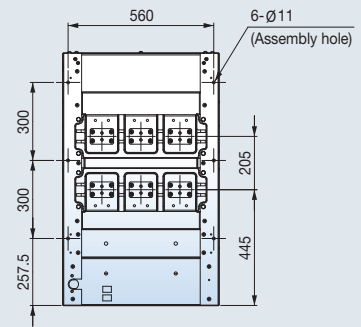
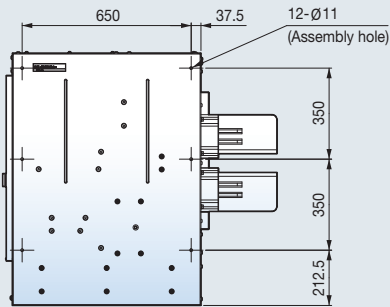
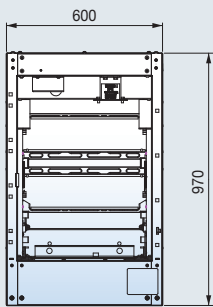
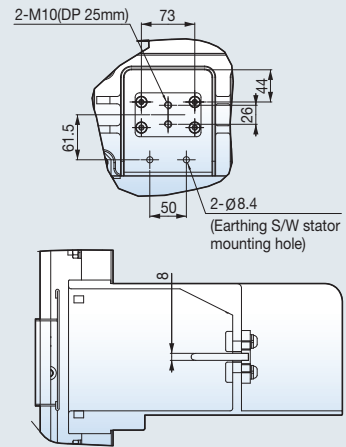
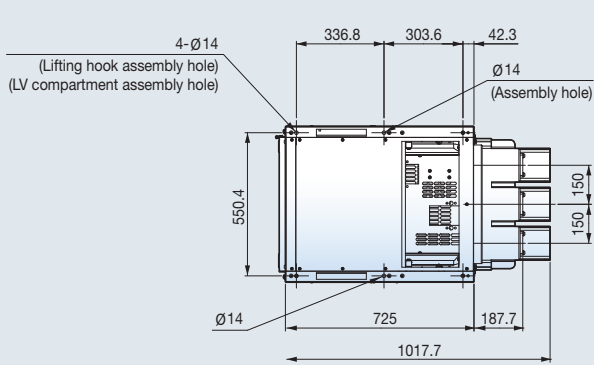


Dimensions (Cradle)

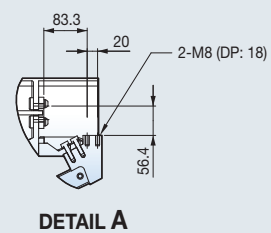
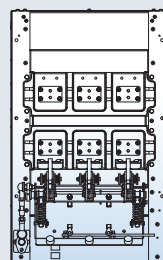
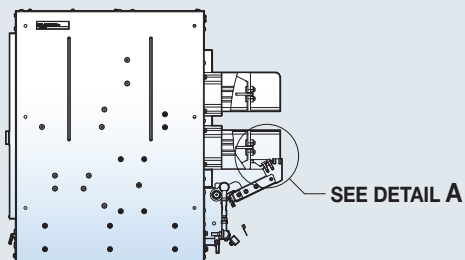
7.2, 12kV 16, 20, 25, 31.5kA 630, 1000, 1250A
 (H type cradle, Tulip, W: 550mm Phase: 150mm)



7.2, 12, 17.5kV 16, 20, 25, 31.5kA 630, 1000, 1250A
(H type cradle, Clip, W: 600mm Phase: 150mm)

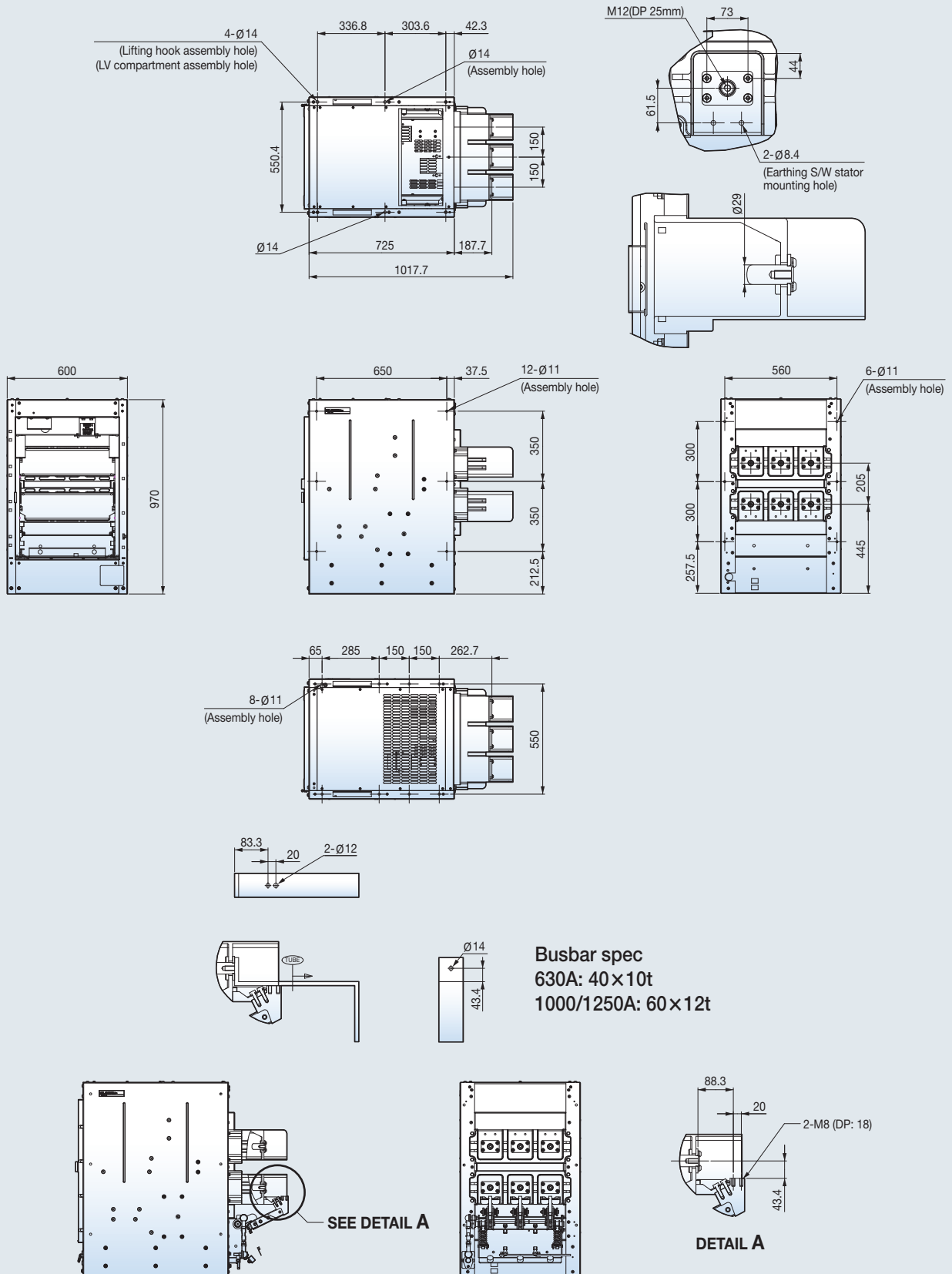


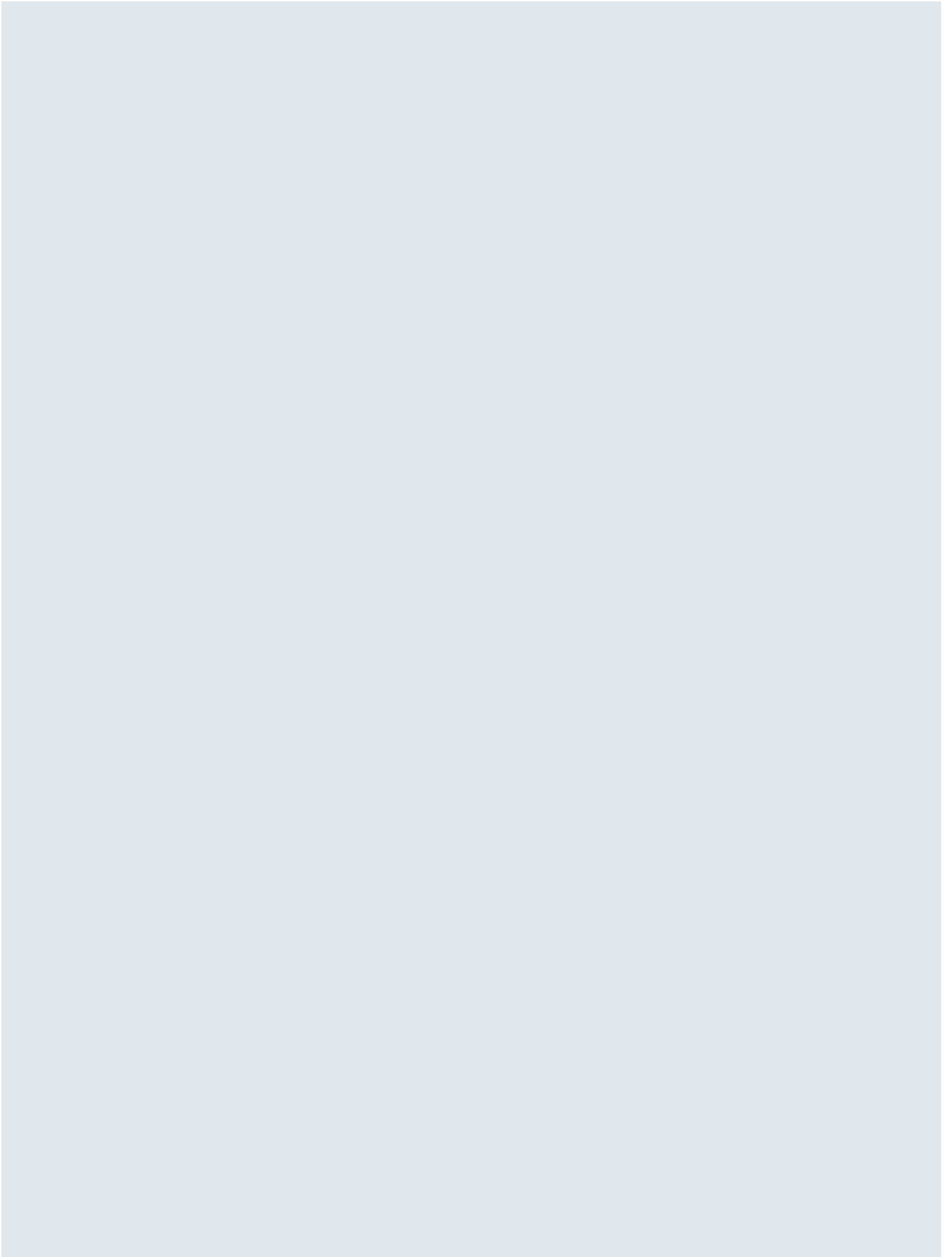
Busbar spec
630A: 40 × 10t
1000/1250A: 60 × 12t



Dimensions (Cradle)

7.2, 12, 17.5kV 16, 20, 25, 31.5kA 630, 1000, 1250A
 (H type cradle, Tulip, W: 600mm Phase: 150mm)







Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance. Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.



- According to The WEEE Directive, please do not discard the device with your household waste.



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