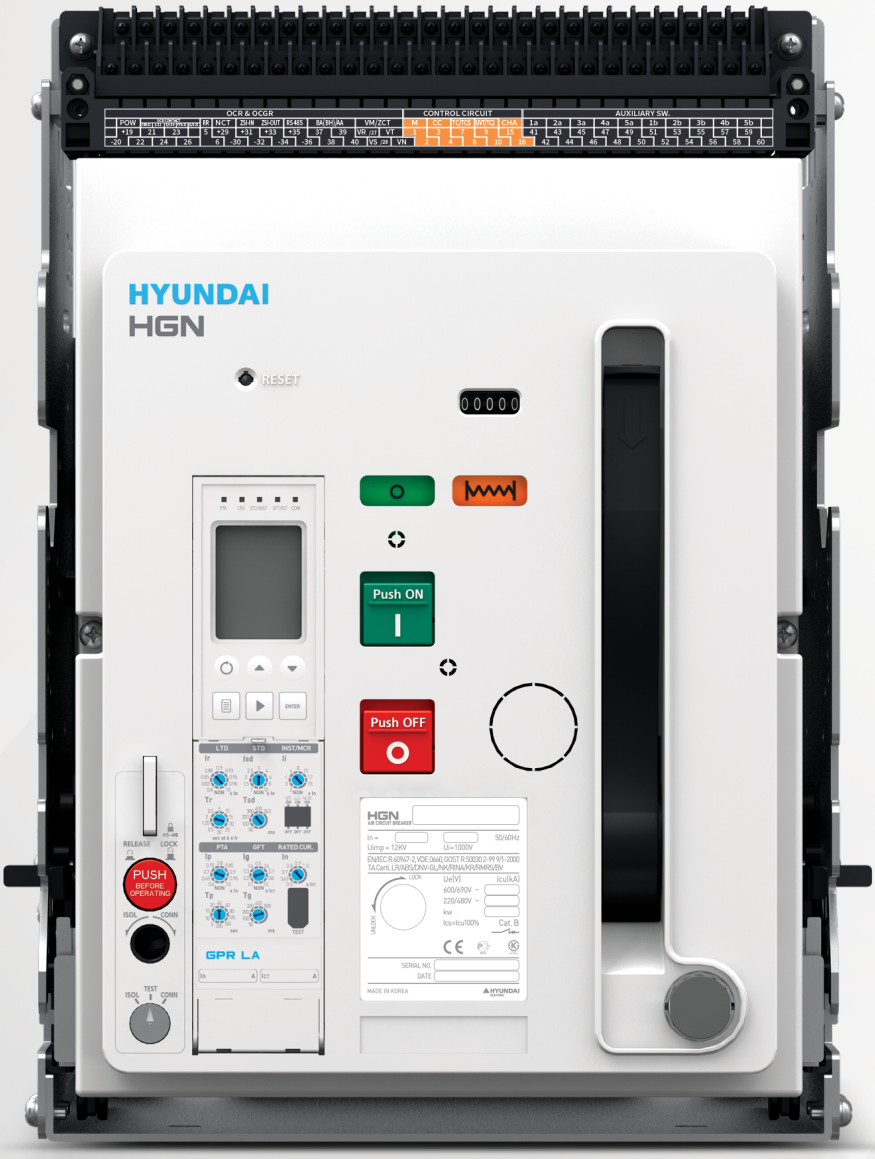
HG Series

Air Circuit Breakers

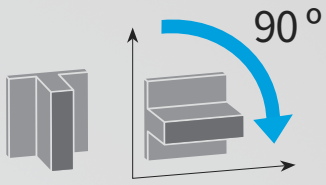
Maximized customer's range of selection and level of satisfaction with model dualization and compact size.



Characteristics

Multi

Bus bar terminal can be changed to horizontal/vertical



Retrofit

Customized Retrofit ACB can be Provided

New products can be developed to be compatible/installed according to the distance of cradle phase/pole/land and terminal size of the ACB that has been installed previously

Certifications

Maximum Breaking Capacity

150 kA (At 500 V, HGN D Frame)

Type per Rating

2 Frames, HGS 1,600/3,200 A

4 Frames, HGN 2,000/4,000/5,000/6,300 A

Rated Impulse Withstand Voltage (Uimp) : 12 kV

100 % N Phase Current Flow Capacity for all Types

A Frame [85 kA]

630 ~ 1,600 A (HGS) / 630 ~ 2,000 A (HGN)

B Frame [100 kA]

2,000 ~ 3,200 A (HGS) / 630 ~ 4,000 A (HGN)

C Frame [100 kA]

3,200 ~ 5,000 A (HGN)

D Frame [150 kA]

4,000 ~ 6,300 A (HGN)

Model Selection Table

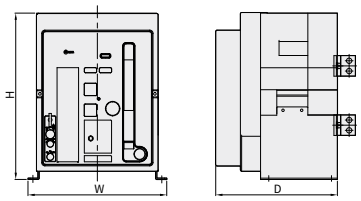
Rating and Specification

Model Name				HGS		HGN			
Item				**A Frame**	**B Frame**	**A Frame**	**B Frame**	**C Frame**	**D Frame**
Rated Current [In max]	Based on 40 °C		A	06 : 630	20 : 2,000	06 : 630	06 : 630	32 : 3,200	40 : 4,000
				08 : 800	25 : 2,500	08 : 800	08 : 800	40 : 4,000	50 : 5,000
				10 : 1,000	32 : 3,200	10 : 1,000	10 : 1,000	50 : 5,000	63 : 6,300
				12 : 1,250		12 : 1,250	12 : 1,250		
				16 : 1,600		16 : 1,600	16 : 1,600		
						20 : 2,000	20 : 2,000		
							25 : 2,500		
							32 : 3,200		
							40 : 4,000		
Rated Operational Voltage [Ue]			V	690		690			
Rated Insulation Voltage [Ui]			V	1,000		1,000			
Frequency			Hz	50/60		50/60			
No. of Poles			P	3, 4		3, 4			
Current Setting Range (…× In max)			A	0.4 ~ 1.0		0.4 ~ 1.0			
Rated Current of Neutral Pole (N) (··· %×In)			A	100 %	100 %	100 %	100 %	100 %	100 %
Rated Breaking Capacity [Icu] [Sym]									
IEC 60947-2 Category "B" KS C 4620	AC	690/600/550 V	kA	50	70 [1] (KS : 65)	65	85	85	100
		500/480/460 V		65	85	85	100	100	150
		415/380/230/220 V		65	85	85	100	100	150
Rated Service Short-Circuit Breaking Capacity [Ics] ···%×Icu			kA	100 %	100 %	100 %	100 %	100 %	100 %
Rated Closing Current [Icm] [Peak]									
IEC 60947-2 Category "B" KS C 4620	AC	690/600/550 V	kA	105	154	143	187	187	220
		500/480/460 V		143	187	187	220	220	330
		415/380/230/220 V		143	187	187	220	220	330
Rated Short-Time withstand Voltage [Icw] (Without Inst)									
1 Second			kA	50	70	65	85	85	100
2 Seconds				35	65	42	75	75	85
3 Seconds				28	50	35	65	65	75
Rated Impulse withstand Voltage [Uimp]			kV	12		12			
Total Breaking-Time			ms	40 [3]		40 [3]			
Closing Operational Time									
Motor Charging Time (sec) max.				10		10			
Closing Time (ms) max.				80		80			
Lifecycle (Cycles)									
Mechanical				20,000	15,000	20,000	15,000	10,000	10,000
Electrical				5,000	5,000	5,000	5,000	2,000	2,000
Weight									
3 Pole	Draw-Out Type		kg	63	87	63	87 (107) [2]	145	169
	Fixed Type			34	44	34	44 (61) [2]	76	108
4 Pole	Draw-Out Type			74	103	74	103 (140) [2]	173	214
	Fixed Type			44	55	44	55 (80) [2]	81	137
(W×H×D)									
3 Pole	Draw-Out Type		mm	328×460×368.4	399×460×368.4	328×460×368.4	399×460×368.4	624×460×368.4	766×460×368.4
	Fixed Type			337.4×404.4×295.8	408.4×404.4×295.8	337.4×404.4×295.8	408.4×404.4×295.8	633.4×404.4×295.8	775.4×404.4×295.8
4 Pole	Draw-Out Type			413×460×368.4	514×460×368.4	413×460×368.4	514×460×368.4	794×460×368.4	996×460×368.4
	Fixed Type			422.4×404.4×295.8	523.4×404.4×295.8	422.4×404.4×295.8	523.4×404.4×295.8	803.4×404.4×295.8	1,005×404.4×295.8

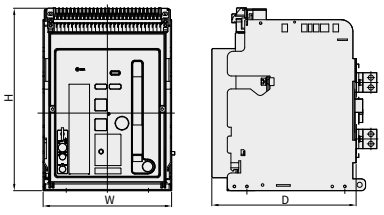
※ 1) 70 kA is DEKRA certified
2) 4,000 AF
3) In case of MCR and override setting, INST is 50 ms.

Life time is the limit lifespan and is not the guaranteed lifespan. In case of maintenance, it is charged. In the event of abnormalities in accessories during use, it can be replaced. Quality Assurance : Based on IEC 60947-2's number of opening/closing within the warranty period.

Fixed Type



Draw-Out Type

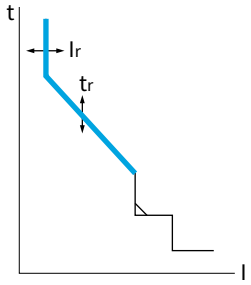


Accessories

Over Current Relay (OCR)

Operation Characteristics

Long Time Delay (LTD)



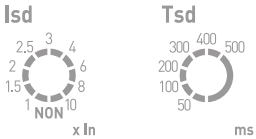
Standard Current Setting

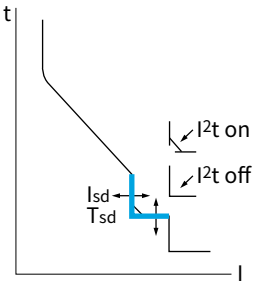
- **L Type**
  - The scale marks the magnification of [In].
  - The setting range of current is a 10-step method of Non, 0.8, 0.83, 0.85, 0.88, 0.9, 0.93, 0.95, 0.98 and 1.0×[In].
  - No protection in case the [Ir] is set as [Non].
  - The breaker does not trip below 105 % of [Ir] and trips at 120 % of [Ir] and above.
- **S Type**
  - The setting range of current is a 10-step method of Non, 0.7, 0.8, 0.9, 1.0, 1.05, 1.1, 1.15, 1.2, 1.25×[In].
  - The breaker trips at 100 % of [Ir] setting value and above.

Time Delay Setting

- **L Type**
  - The scale is the second of operating time based on 600 %×[Ir] with inverse time operation.
  - The setting range of current is a 10-step method of 0.5, 1.25, 2, 2.5, 5, 10, 15, 20, 25, 30 sec.
  - The breaker trips at ±15 % of setting time.
- **S Type**
  - The setting range is a 9-step method of 10, 15, 20, 25, 30, 35, 40, 50, 60 sec.
  - The scale is the second of operating time based on 120 %×[Ir] with inverse time operation.

Short Time Delay (STD)





Standard Current Setting

- **L Type**
  - The scale marks the magnification of [In].
  - The setting range of current is a 10-step method of Non, 1, 1.5, 2, 2.5, 3, 4, 6, 8, 10×[In].
- **S Type**
  - The scale marks the magnification of [In].
  - The setting range of current is a 10-step method of Non, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5×[In].

Time delay setting

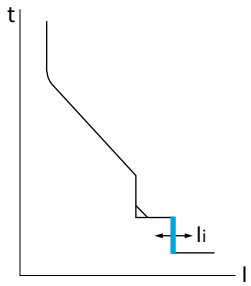
- **L Type**
  - The marking indicates the relay operation based on the time of 110 % of [Isd] in msec with definite time operation.
  - The setting range is a 6-step method of 50, 100, 200, 300, 400, 500 msec.
  - 1,000 % of inverse time curve is applied in case of I^2t on setting.
- **S Type**
  - The marking indicates the relay operation based on the time of 110 % of [Isd] in msec with definite time operation.
  - The setting range is a 6-step method of 50, 100, 200, 300, 400, 500 msec.
  - 500 % of inverse time curve is applied in case of I^2t on setting.

Accessories

Over Current Relay (OCR)

Operation Characteristics

Instantaneous (INST)



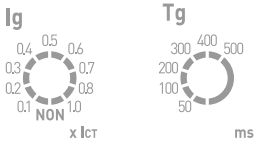
Standard Current Setting

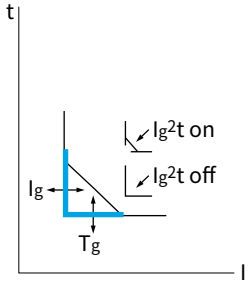
- The scale marks the magnification of [In].
- The setting range of current is a 9-step method of Non, 2, 3, 4, 6, 8, 10, 12, 15×[In].
- No protection in case [Ii] is set as [Non], the protection does not function.

Time Delay Setting

- Total breaking time is below 50 ms.

Ground Fault Trip (GFT)





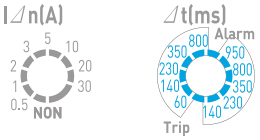
Standard Current Setting

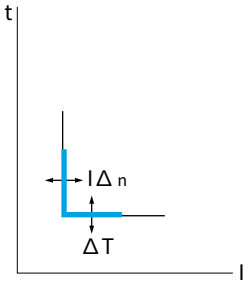
- **L Type**
  - The numbers indicate scale for the 1 st currnet of OCR [Ict].
  - The setting range of current is a 10-step method of Non, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 1.0×[Ict].

Time Delay Setting

- **L Type**
  - The marking indicates the relay operation based on the time of 120 % of [Ig] in msec with definite time operation.
  - The setting range is a 6-step method of 50, 100, 200, 300, 400, 500 msec.
  - It functions in case of 100 % Ict of inverse time in case of I_g^2t on setting.

Earth Leakege Trip (ELT)





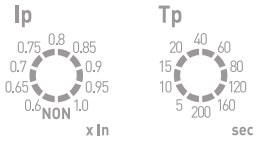
Standard Current Setting

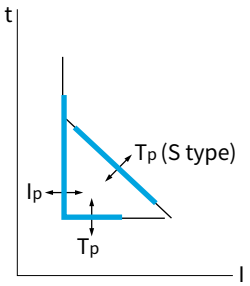
- **GPR LAZ**
  - The scale marks the magnification of UPR rated primary current [ZCT].
  - The setting range of current is a 9-step method of Non, 0.5, 1, 2, 3, 5, 10, 20, 30×[A].
- **GPR LAG**
  - The scale is based on 5 A ZCT at secondary.
  - The setting range of current is a 7-step method of Non, 0.5, 0.8, 1, 2, 3, 5.

Time Delay Setting

- **L Type**
  - Once the primary value that has been set flows as much as the delayed time, it is set as both alarm and trip mode.
  - The setting range of alarm is a 5-step method of 140, 230, 350, 800, 950 msec.
  - The setting range of trip is a 5-step method of 60, 140, 230, 350, 800 msec.

Pre-Trip Alram (PTA)





Standard Current Setting

- **L Type**
  - The scale marks the magnification of [In] with inverse time operation.
  - The setting range of current is a 10-step method of Non, 0.6, 0.65, 0.7, 0.75, 0.8, 0.85, 0.9, 0.95, 1.0 of [In].
- **S Type**
  - The scale marks the magnification with regards to [Io] with inverse time operation.
  - The setting range of current is a 10-step method of Non, 0.7, 0.75, 0.8, 0.85, 0.9, 0.95, 1.0, 1.05, 1.1×[Io].

Time Delay Setting

- **L Type**
  - The marking indicates the relay operation based on the time of 100 % of [Ip] in sec.
  - The setting range of current is a 10-step method of 5, 10, 15, 20, 40, 60, 80, 120, 160, 200 sec.
- **S Type**
  - 9-step of 1, 5, 10, 15, 20, 25, 30, 35, 40 sec can be selected in 120 % of [Ip] and has operation characteristics at inverse time operation.

Accessories

Over Current Relay (OCR)

Characteristic Curve

General Feeder

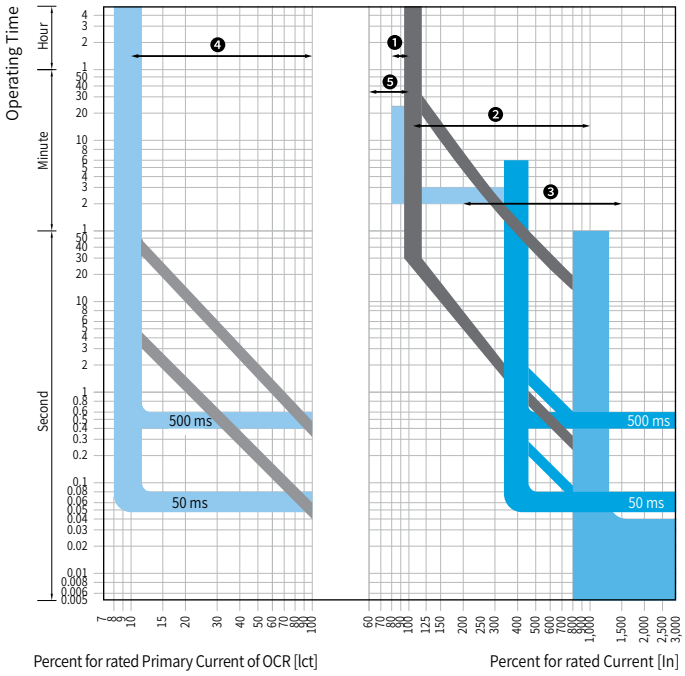
❶ Long Time Delay Current Setting Range

❷ Short Time Delay Current Setting Range

❸ Instantaneous Tripping Current Setting Range

❹ Ground Fault Trip Current Setting Range

❺ Pre-Trip Alarm Current Setting Range



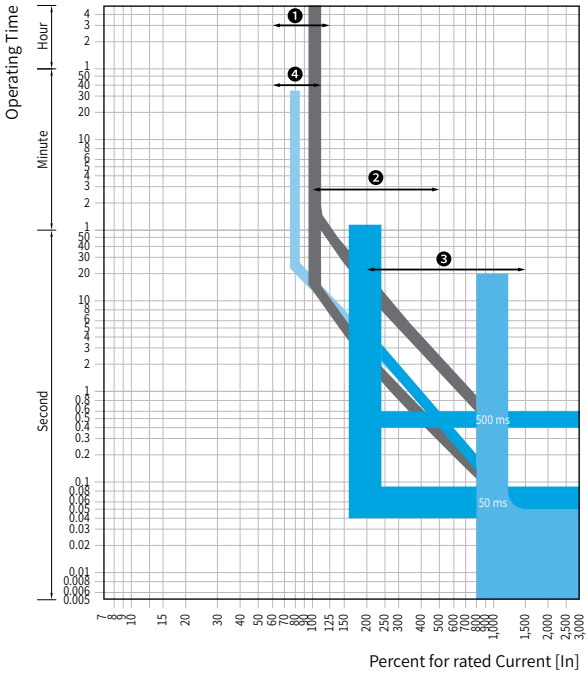
Generator

❶ Long Time Delay Current Setting Range

❷ Short Time Delay Current Setting Range

❸ Instantaneous Tripping Current Setting Range

❹ Pre-Trip Alarm Current Setting Range

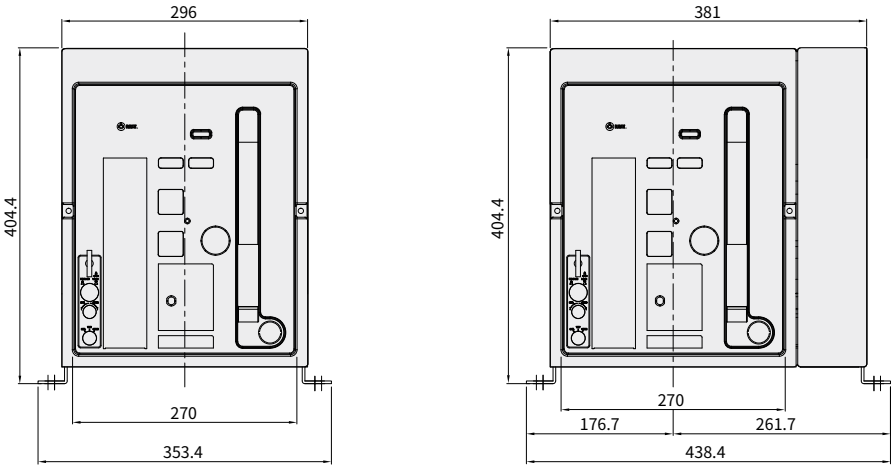


Dimensions

HGS/HGN Fixed Type 630 ~ 2,000 A (HGS06 ~ 16/HGN06 ~ 20 A Frame)

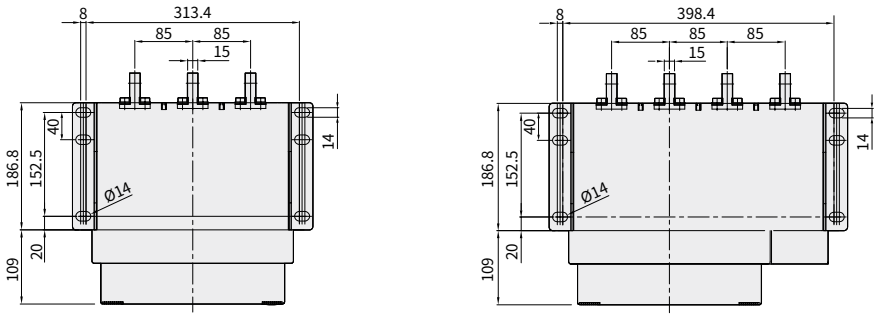
Unit : mm

Front

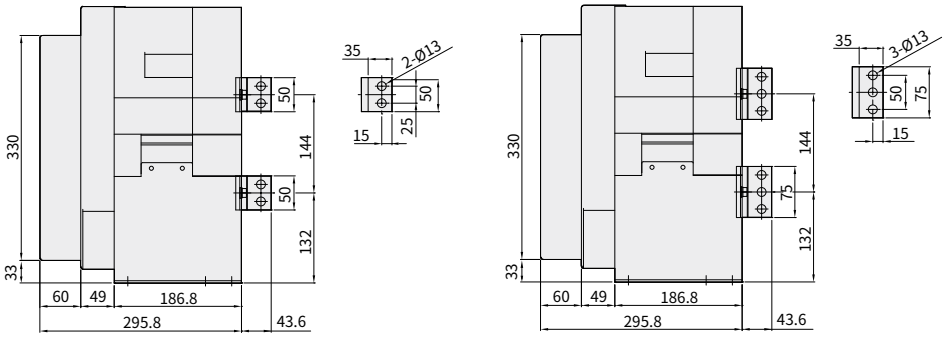


3P 4P

Vertical Type



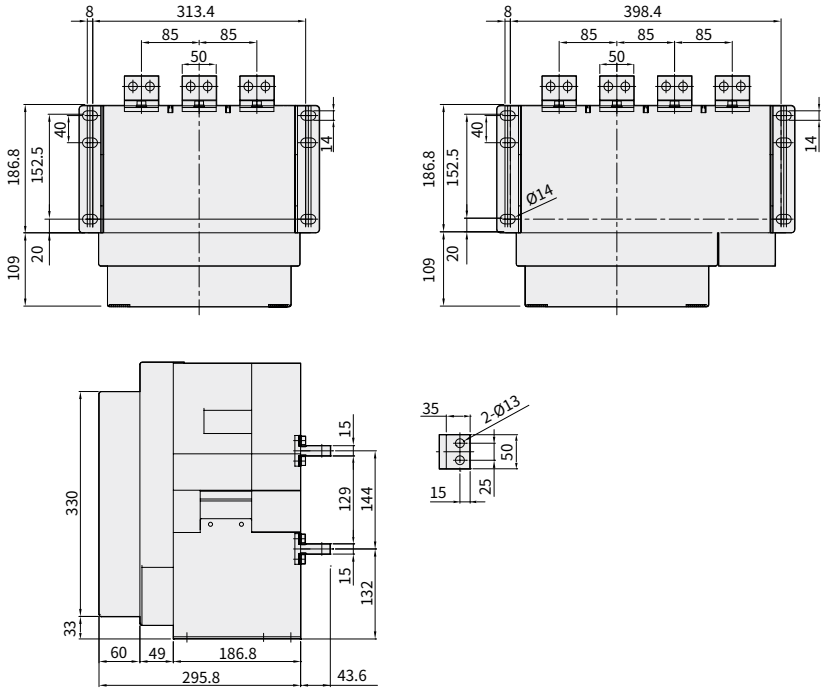
[HGS/HGN 630 ~ 1,600 A] [HGN 2,000 A]



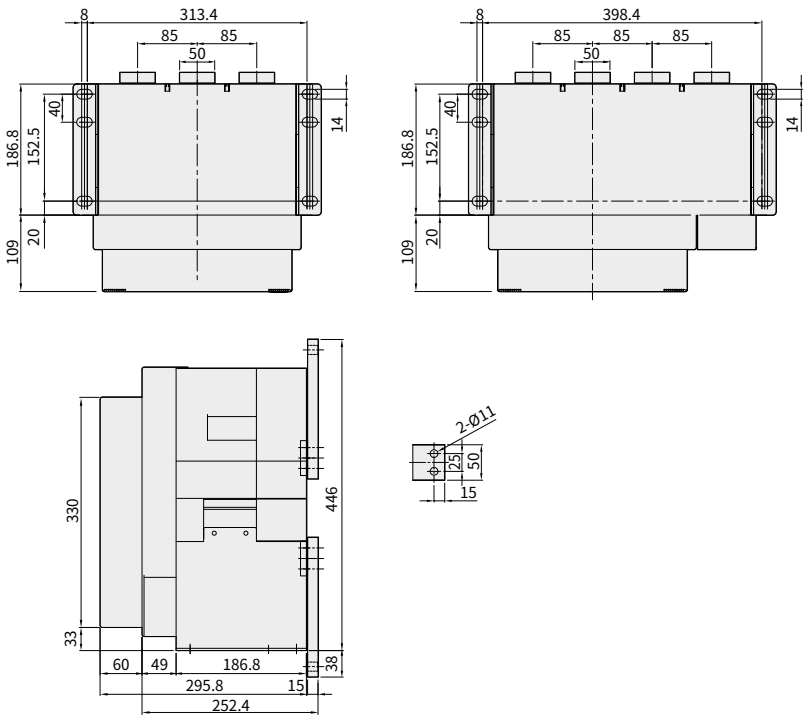
※ The drawing dimension of this page may be subject to change without prior notice.
As for the HGN fixed type A type 2,000 A, only the vertical terminal can be applicable.

Unit : mm

Horizontal Type (630 ~ 1,600 A)



Front Type (630 ~ 1,600 A)



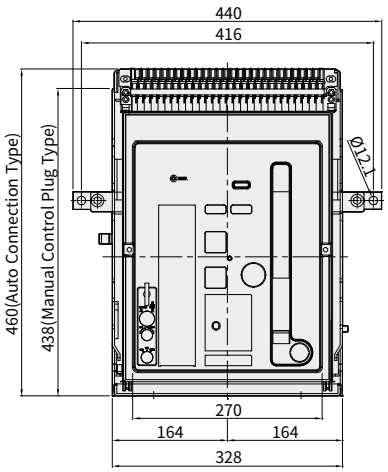
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

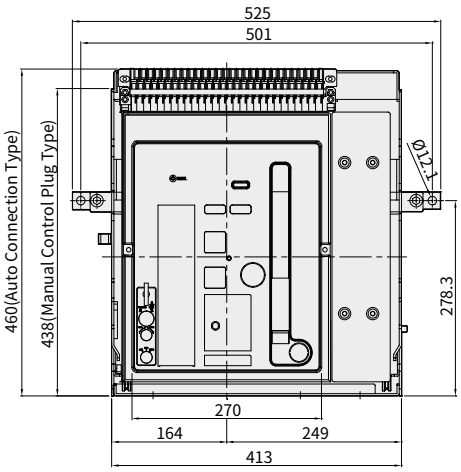
HGS/HGN Draw-Out Type 630 ~ 2,000 A (HGS06 ~ 16/HGN06 ~ 20 A Frame)

Unit : mm

Front

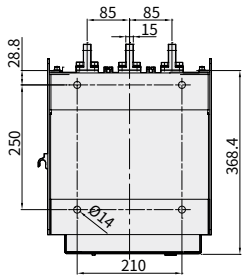


3P

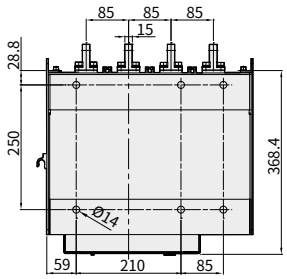


4P

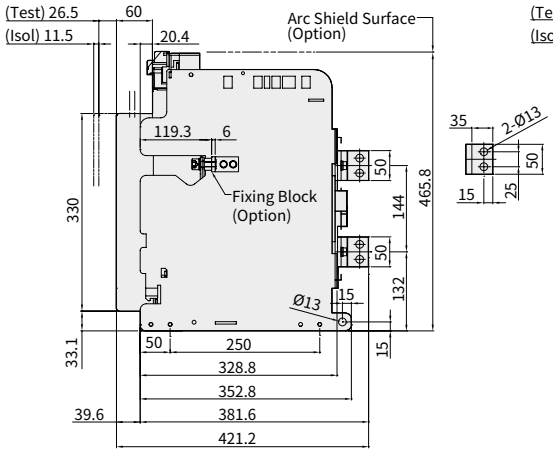
Vertical Type

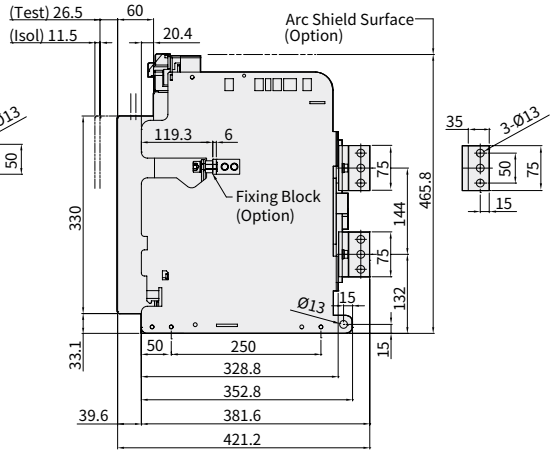


[HGS/HGN 630 ~ 1,600 A]



[HGN 2,000 A]

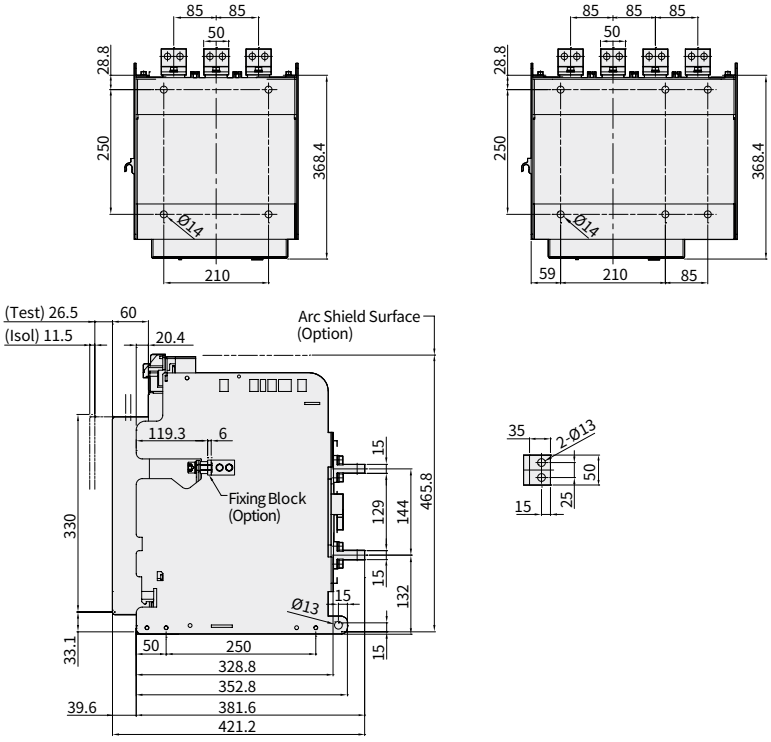




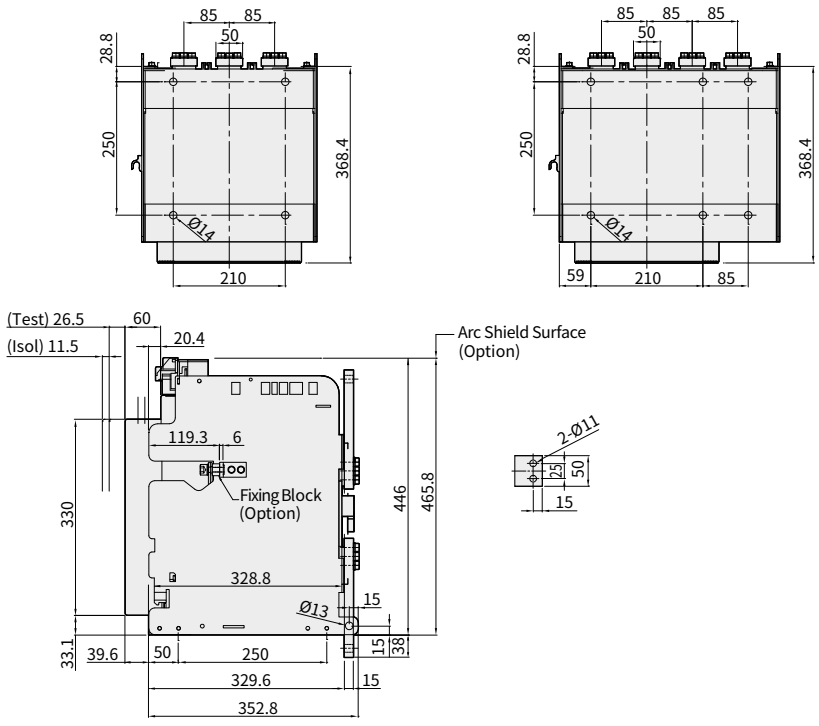
※ The drawing dimension of this page may be subject to change without prior notice.
As for the HGN draw-out type A type 2,000 A, only the vertical terminal can be applicable.

Unit : mm

Horizontal Type (630 ~ 1,600 A)



Front Type (630 ~ 1,600 A)



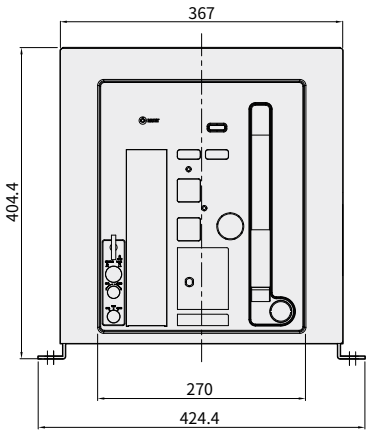
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

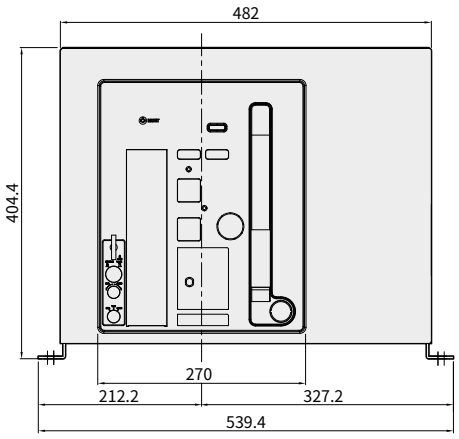
HGS/HGN Fixed Type 2,000 (630) ~ 3,200 A (HGS/HGN20 (06) ~ 32 B Frame)

Unit : mm

Front

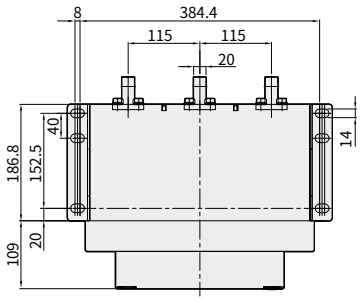


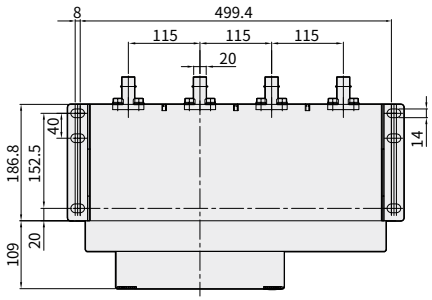
3P



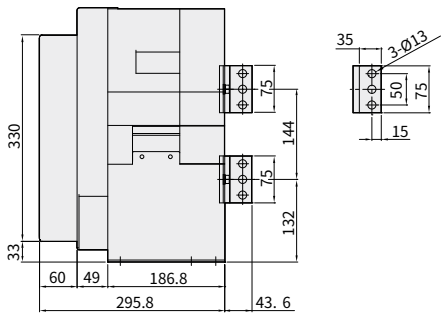
4P

Vertical Type

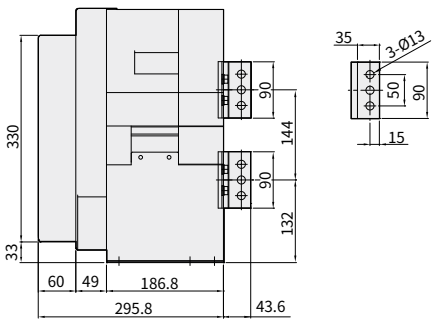




[630 ~ 2,500 A]



[3,200 A]

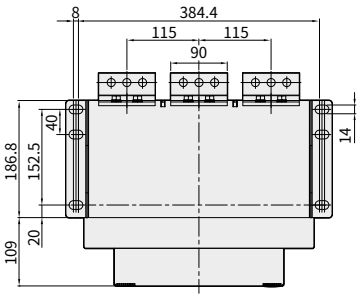


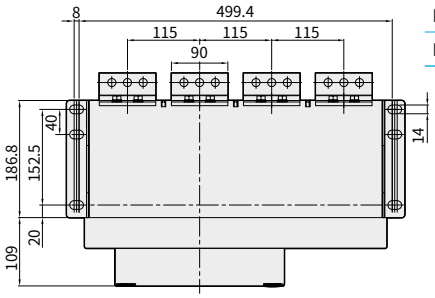
※ The drawing dimension of this page may be subject to change without prior notice.

Unit : mm

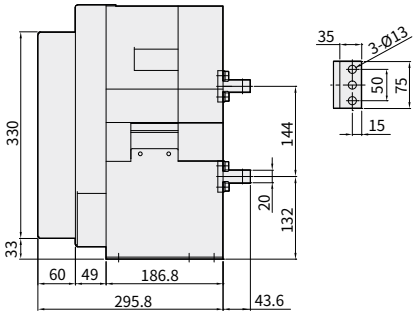
Horizontal Type

Model Name	Detail"A"
HGN20 (06) ~ 25	75
HGN32	90

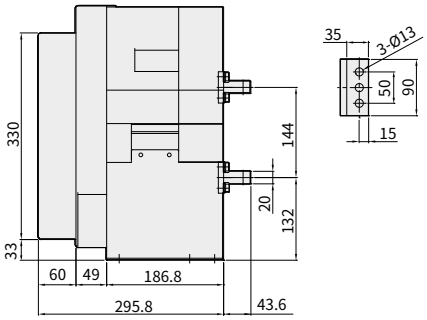




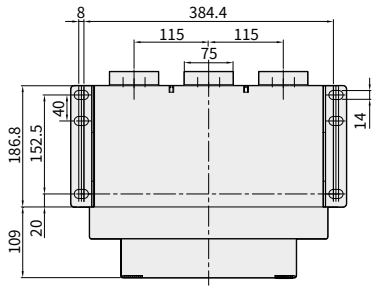
[2,000 ~ 2,500 A]

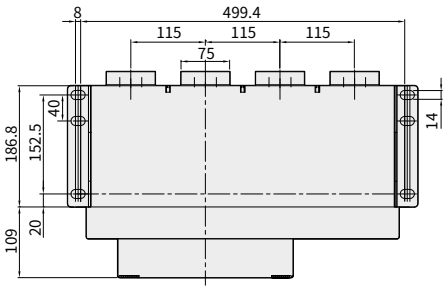


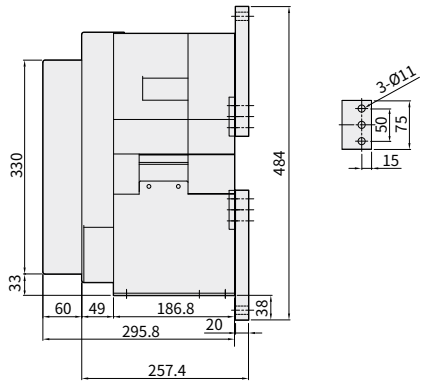
[3,200 A]



Front Type







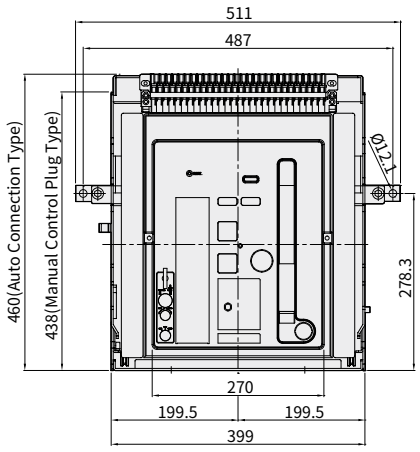
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

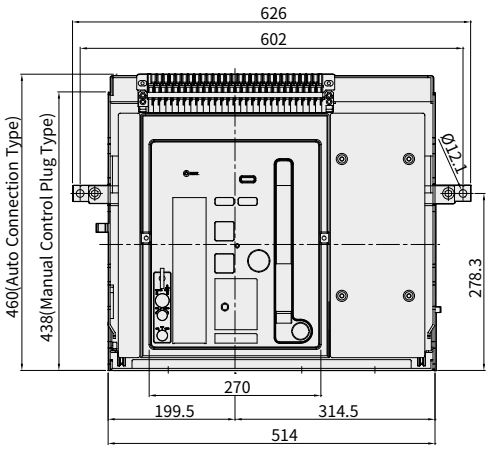
HGS/HGN Draw-Out Type 2,000 (630) ~ 3,200 A (HGS/HGN20 (06) ~ 32 B Frame)

Unit : mm

Front

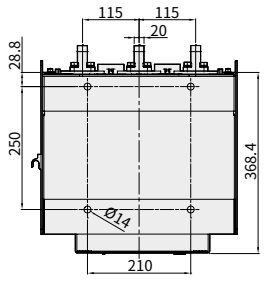


3P

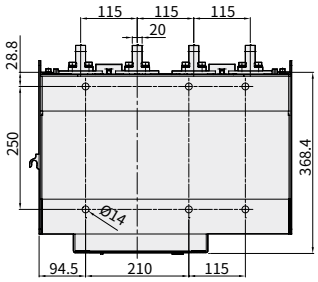


4P

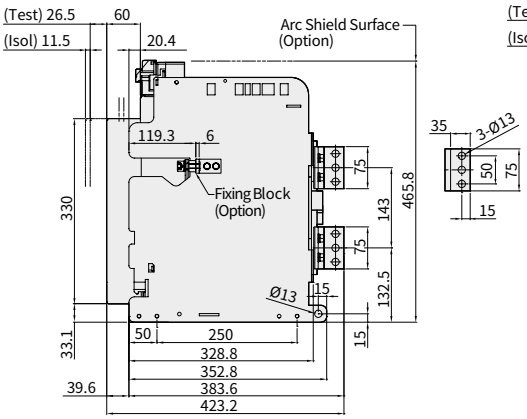
Vertical Type

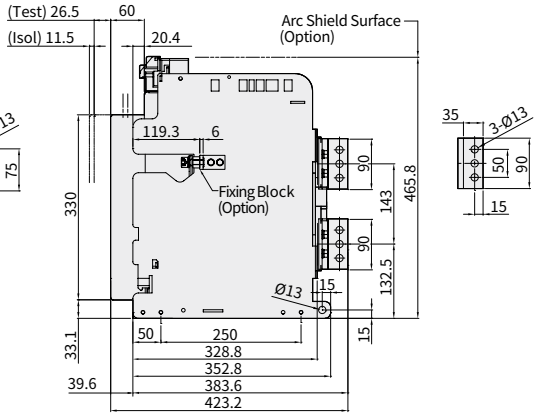


[630 ~ 2,500 A]



[3,200 A]

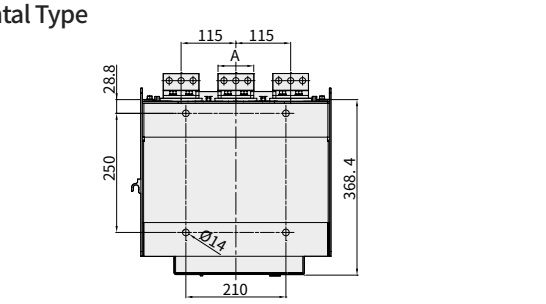


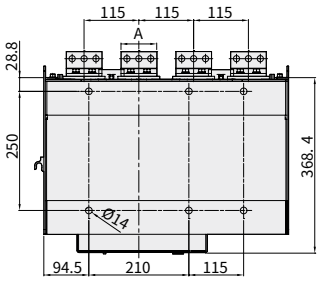


※ The drawing dimension of this page may be subject to change without prior notice.

Unit : mm

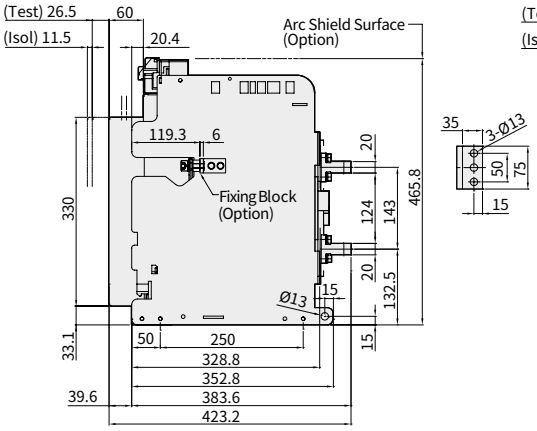
Horizontal Type



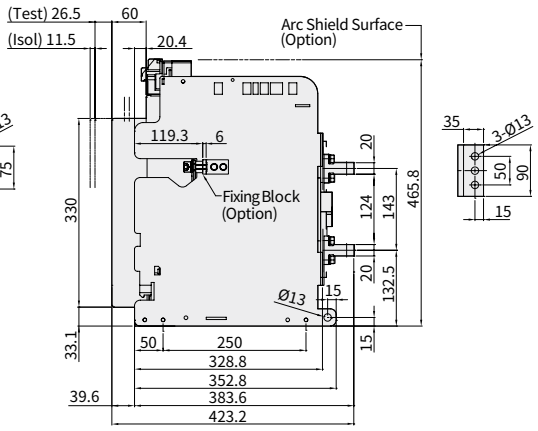


Model Name	Detail"A"
HGN20 (06) ~ 25	75
HGN32	90

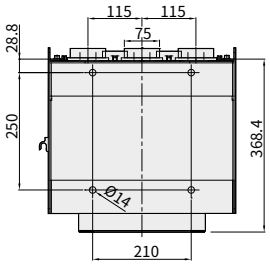
[2,000 ~ 2,500 A]

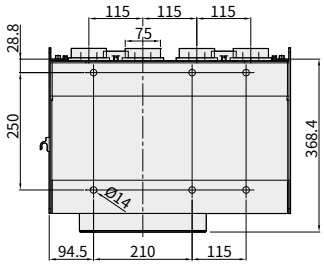


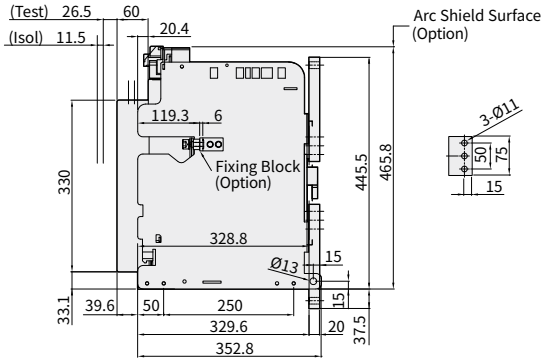
[3,200 A]



Front Type







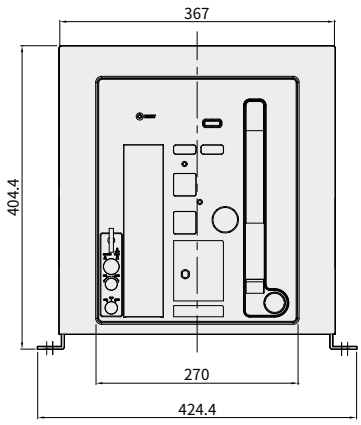
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

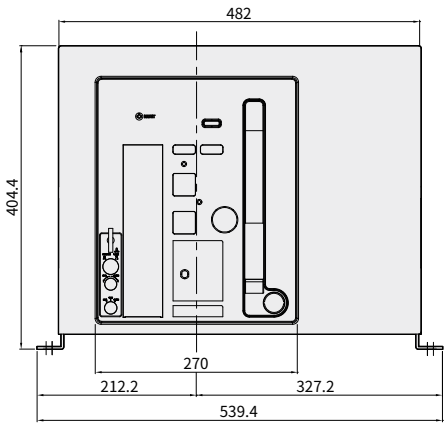
HGN Fixed Type 4,000 A (HGN40 B Frame)

Unit : mm

Front

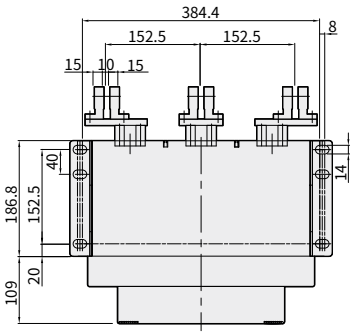


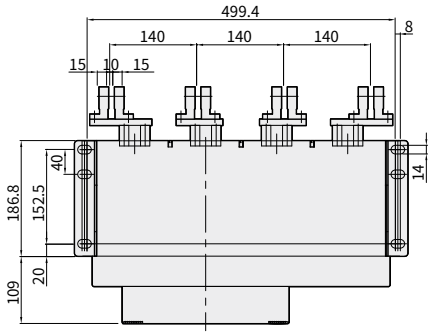
3P



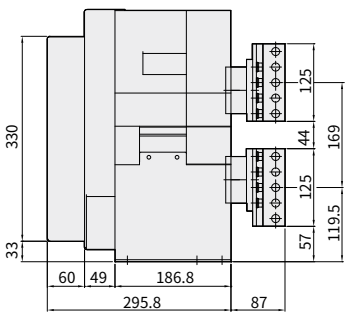
4P

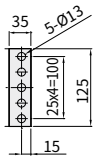
Vertical Type





[4,000 A]

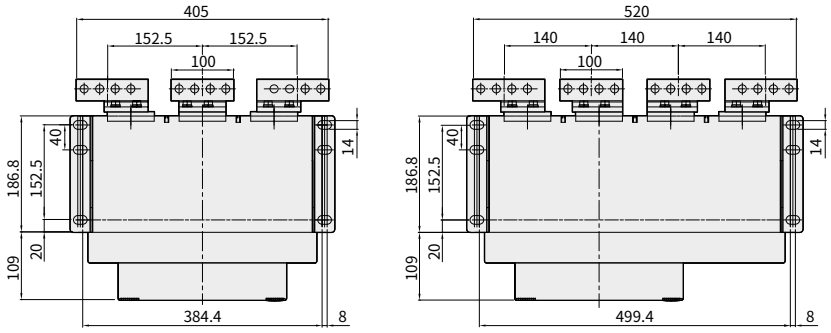




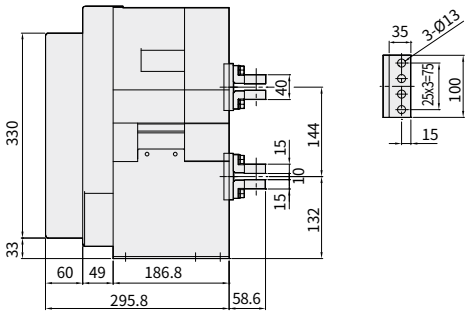
※ The drawing dimension of this page may be subject to change without prior notice.

Unit : mm

Horizontal Type



[4,000 A]



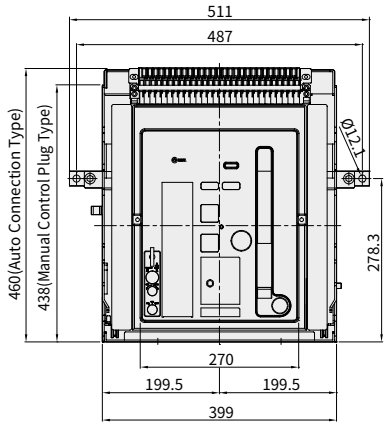
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

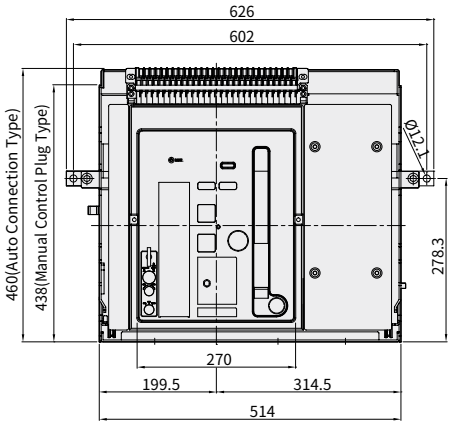
HGN Draw-Out Type 4,000 A (HGN40 B Frame)

Unit : mm

Front

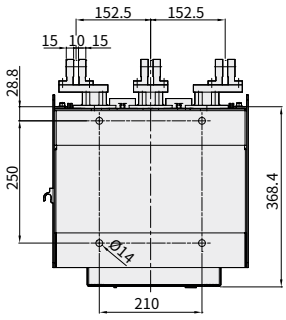


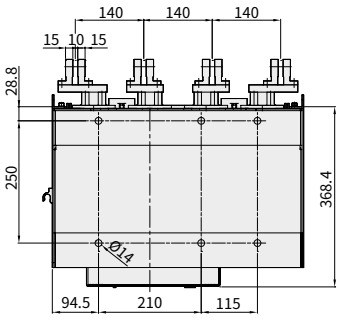
3P



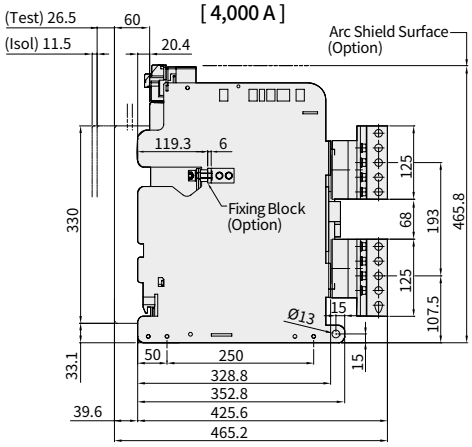
4P

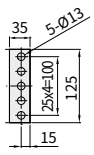
Vertical Type





[4,000 A]





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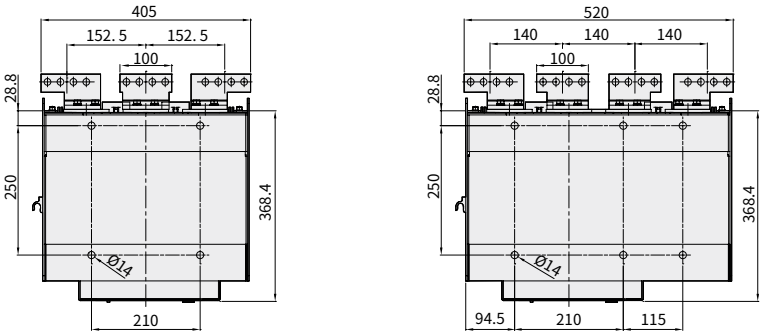
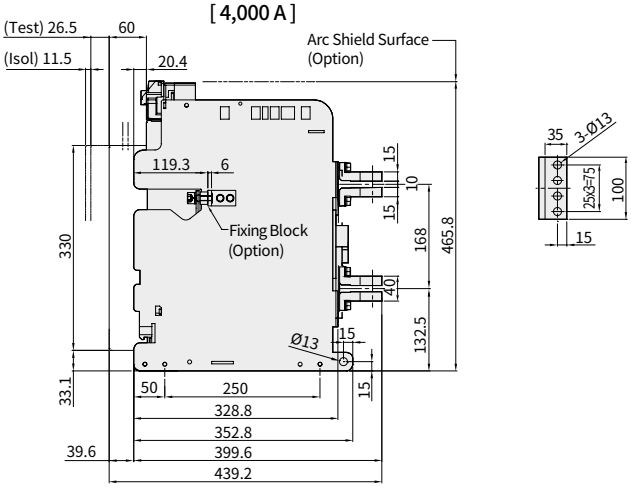
Unit : mm

Horizontal Type



[4,000 A]



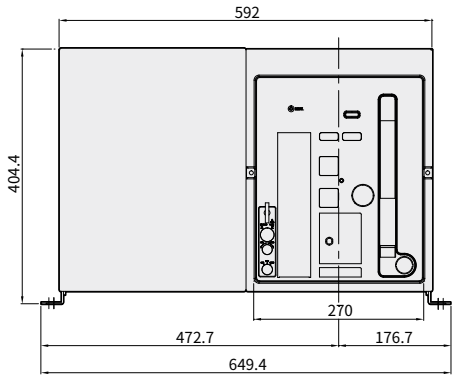
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

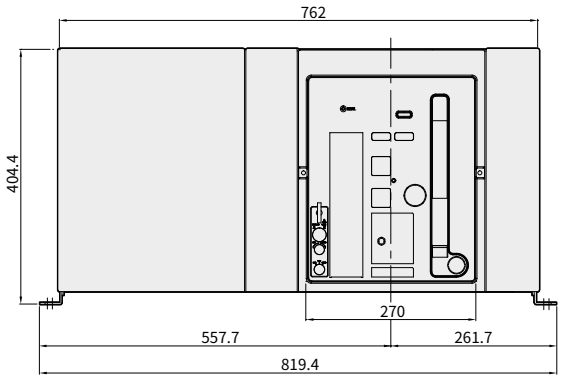
HGN Fixed Type 4,000 (3,200) ~ 5,000 A (HGN40 (30) ~ 50 C Frame)

Unit : mm

Front

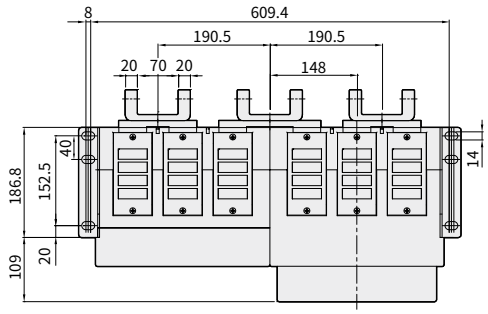


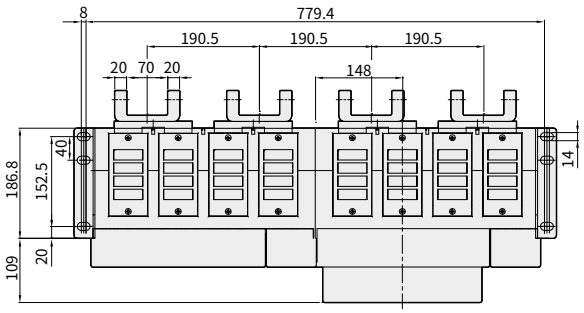
3P

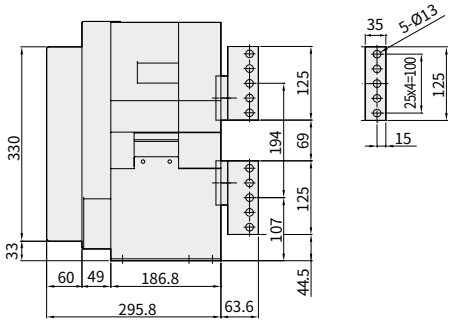


4P

Vertical Type



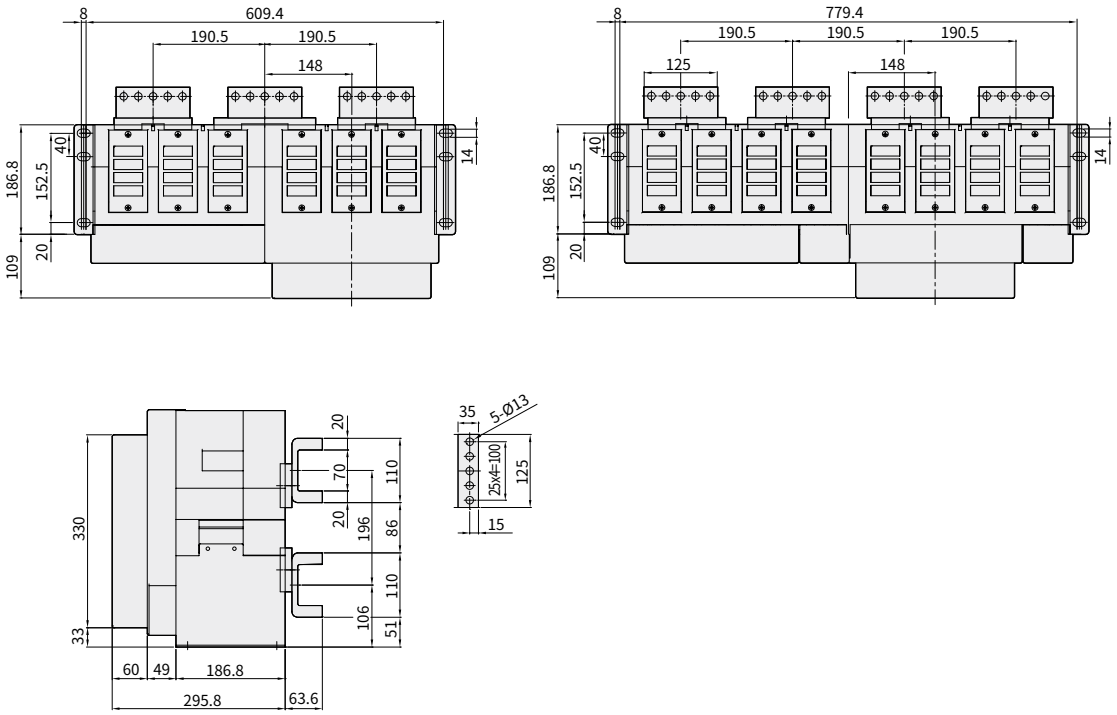




※ The drawing dimension of this page may be subject to change without prior notice.

Unit : mm

Horizontal Type



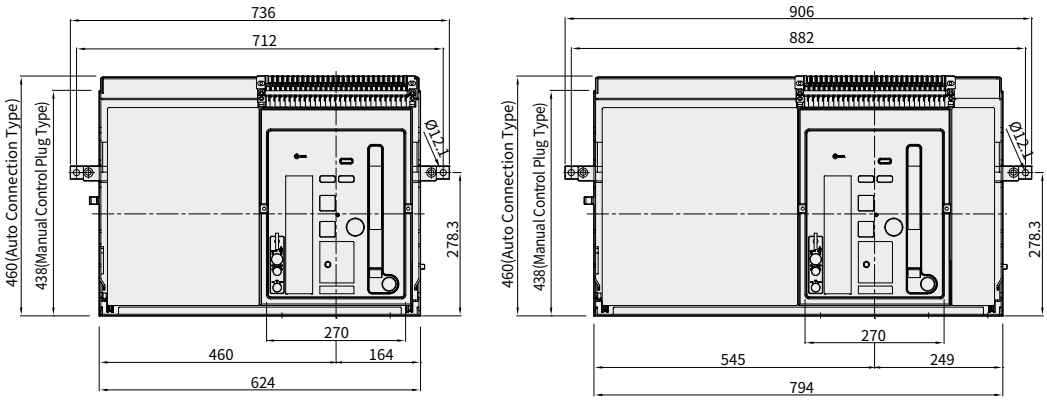
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

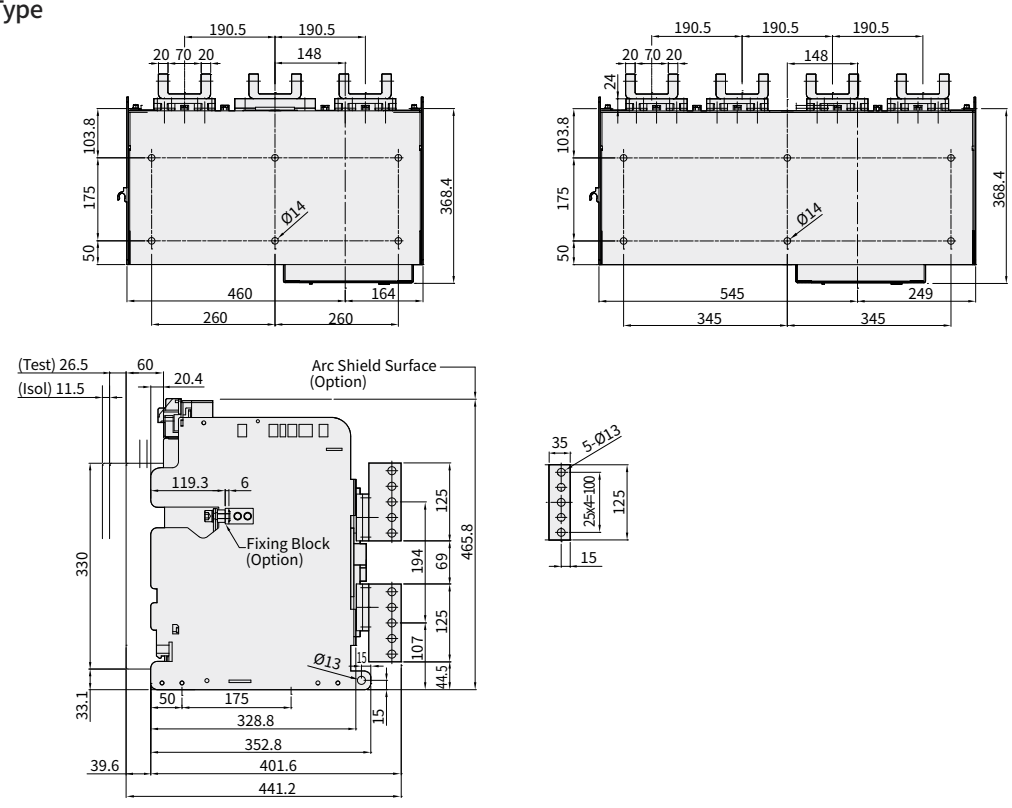
HGN Draw-Out Type 4,000 (3,200) ~ 5,000 A (HGN40 (30) ~ 50 C Frame)

Unit : mm

Front



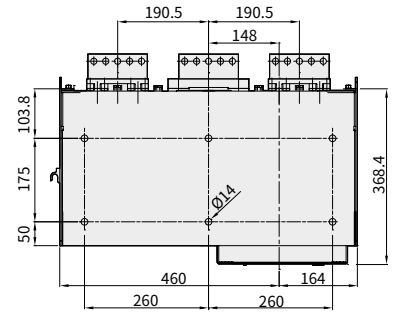
Vertical Type

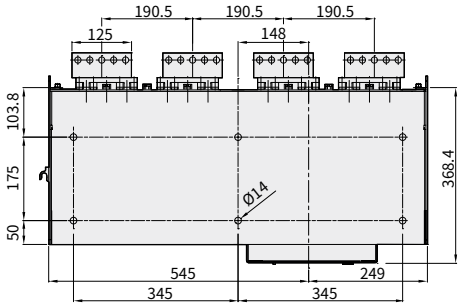


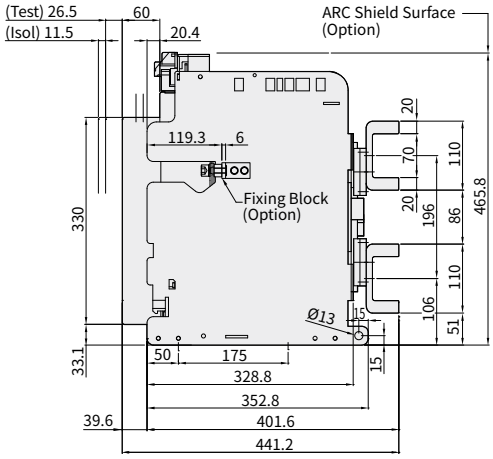
※ The drawing dimension of this page may be subject to change without prior notice.

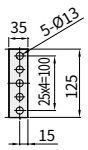
Unit : mm

Horizontal Type









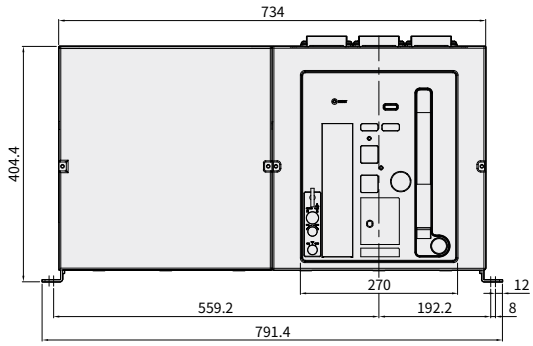
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

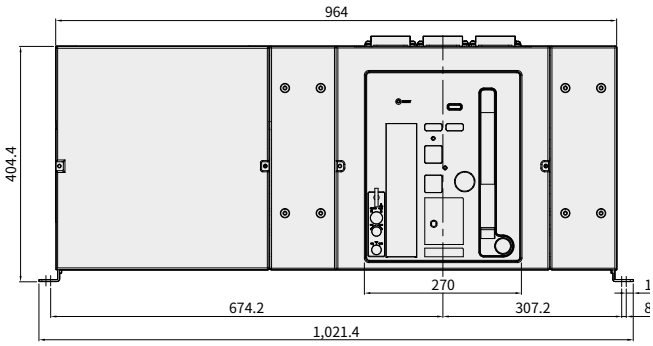
HGN Fixed Type 4,000 ~ 6,300 A (HGN40 ~ 63 D Frame)

Unit : mm

Front

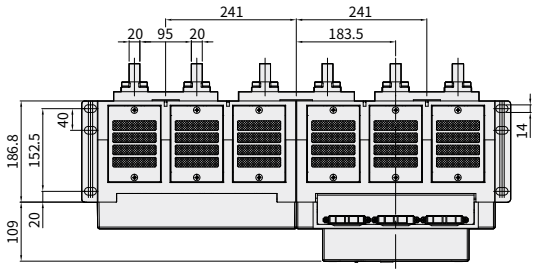


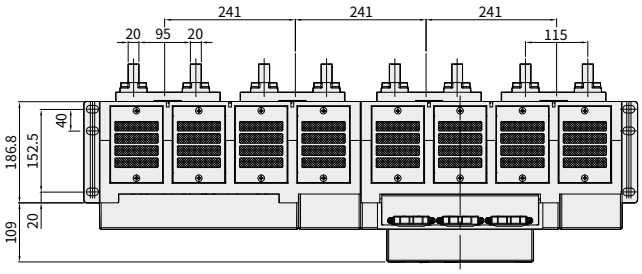
3P

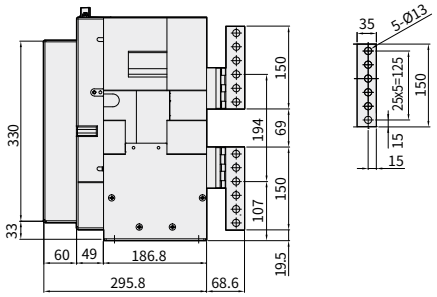


4P

Vertical Type



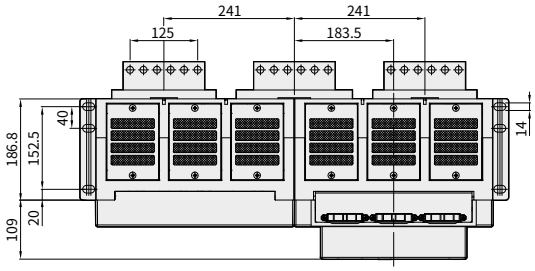


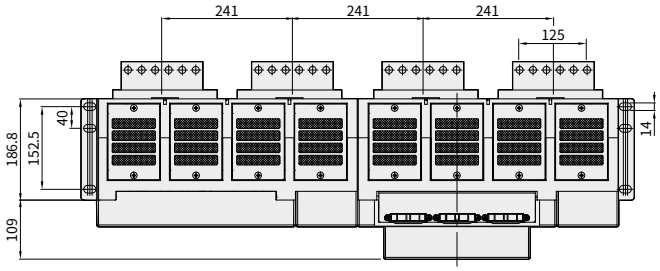


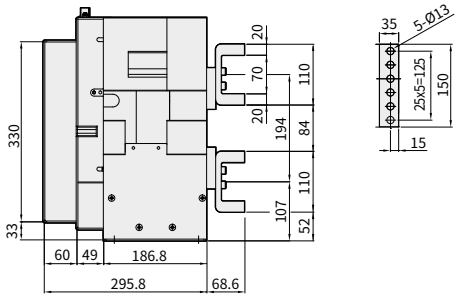
※ The drawing dimension of this page may be subject to change without prior notice.

Unit : mm

Horizontal Type







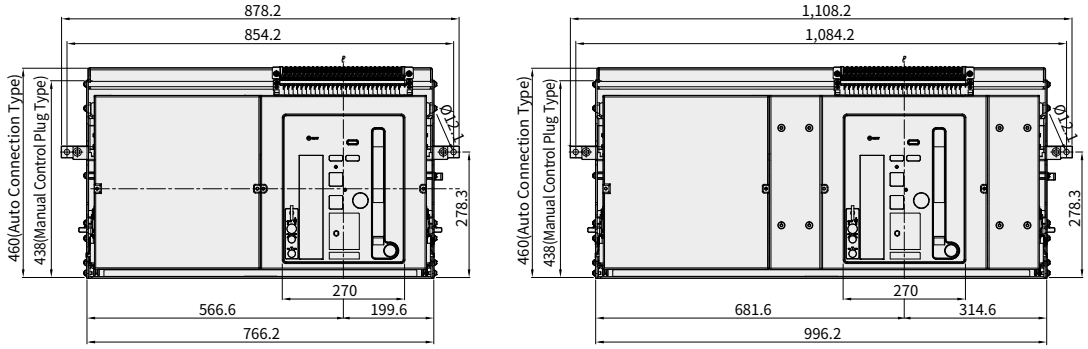
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

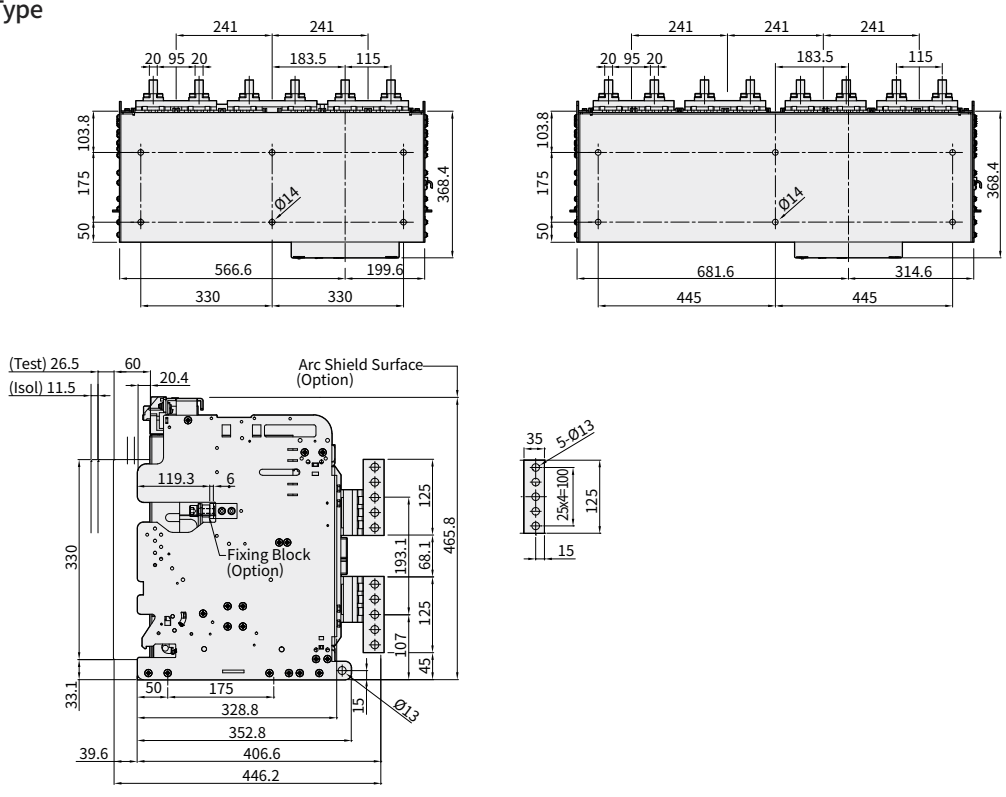
HGN Draw-Out Type 4,000 A (HGN40 D Frame)

Unit : mm

Front



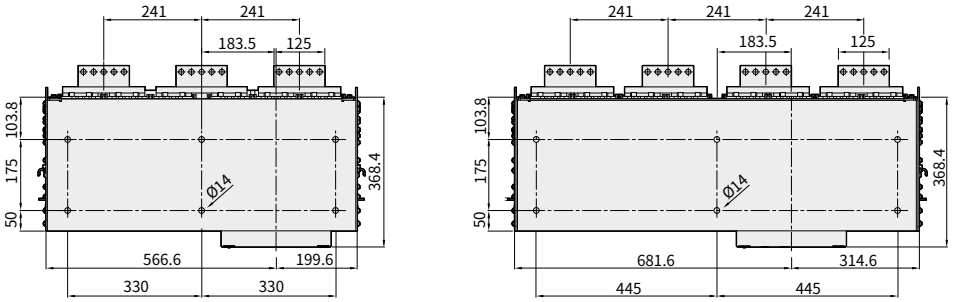
Vertical Type

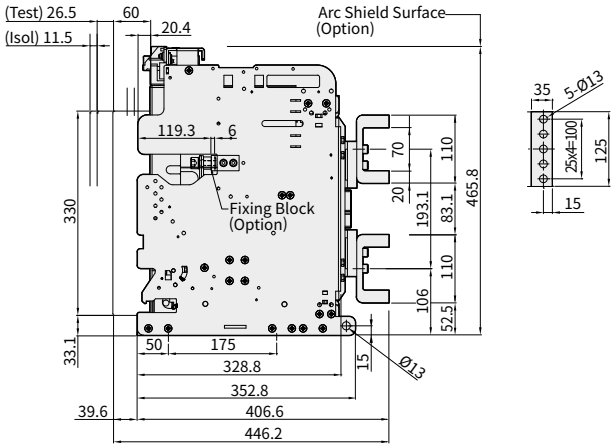


※ The drawing dimension of this page may be subject to change without prior notice.

Unit : mm

Horizontal Type





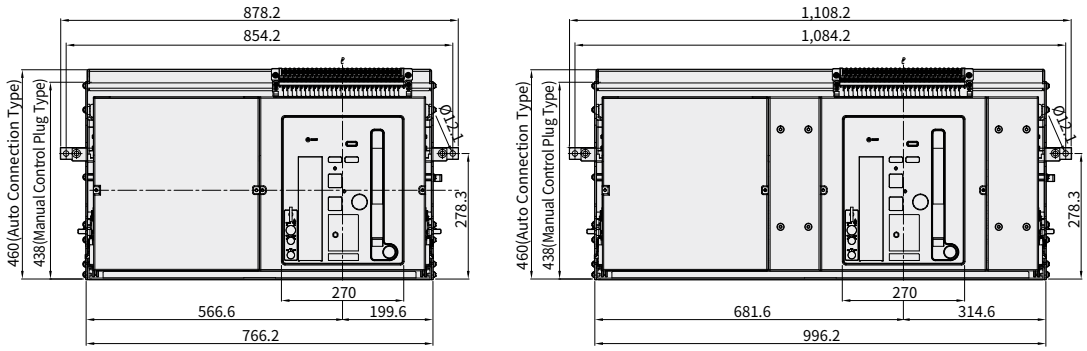
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

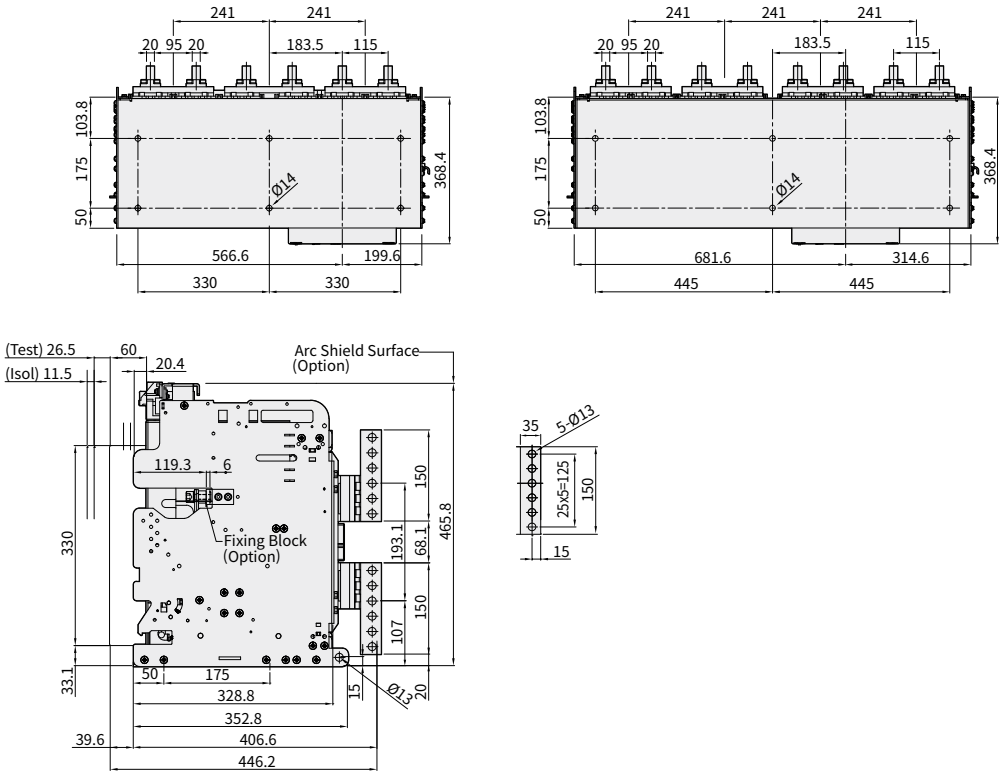
HGN Draw-Out Type 5,000 ~ 6,300 A (HGN50 ~ 63 D Frame)

Unit : mm

Front



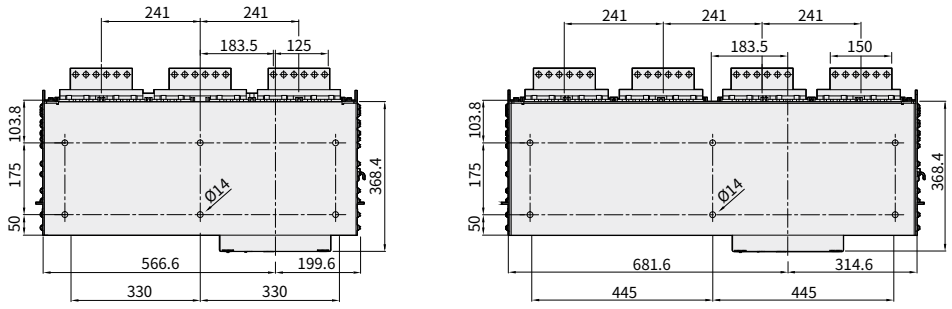
Vertical Type

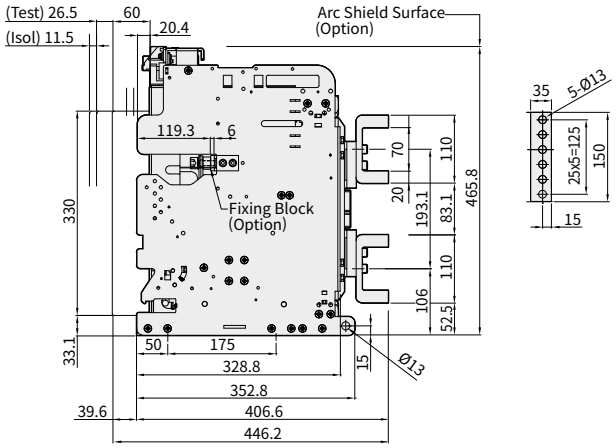


※ The drawing dimension of this page may be subject to change without prior notice.

Unit : mm

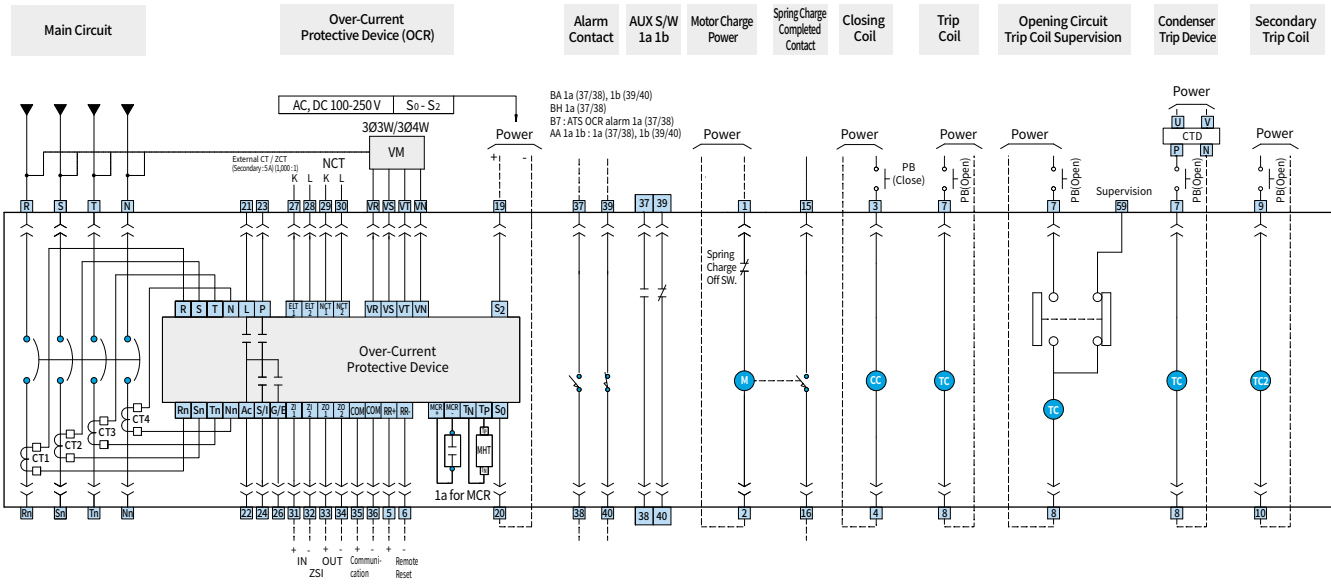
Horizontal Type





※ The drawing dimension of this page may be subject to change without prior notice.

Circuit Diagrams



Symbol Description

CT	Current Transformer
L	LTD Terminal
PT	Pre-Trip Alarm
G	Ground Fault Contact
S / I	STD/INST Contact
Ac	Common Contact
NCT	NCT (Neutral CT) Input
ZI	Zone Selective Interlock Input
ZO	Zone Selective Interlock Output
MCR+,-	MCR Input Terminal
Tp / Tn	MHT Output Terminal
M	Charging Motor
CC	Close Coil
TC	Trip Coil
UVT	Under-Current Voltage Trip Coil
CT	Magnetic Hold Trigger
SO /S2	OCR Power

- RR : Remote Reset
- VM : Voltage Module
- VR ~ VN : Voltage Phase Input
- R ~ N : Current Input
- Rn ~ Nn : Current Input

Terminal Description

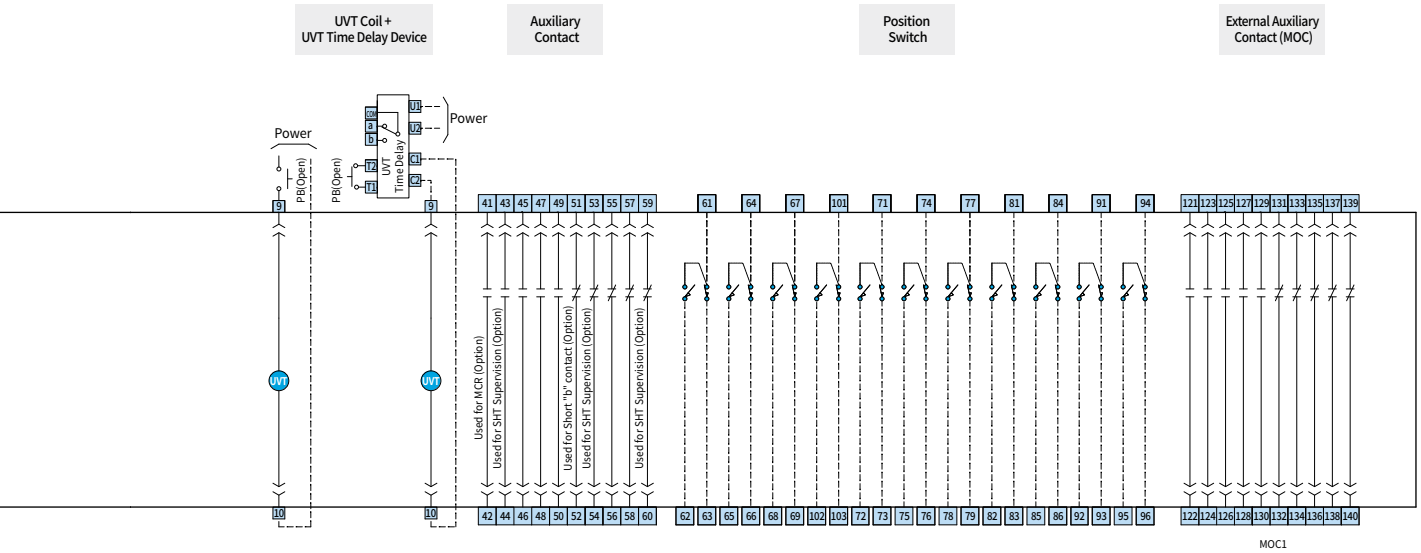
1 2	Charge Motor Power
3 4	Closing Coil Power
7 8	Trip Coil Power
9 10	UVT Coil Power
15 16	Spring Charge Switch
19 20	OCR Control Power
22 21	LTD Contact
22 23	Pre-Trip Alarm/Temperature Alarm Contact
22 24	STD/INST Contact
22 26	GFT/ELT Contact
22 30	NCT (Neutral CT) Input Terminal
31 ~ 34	ZSI (Zone Selective Interlock)
41 ~ 60	Auxiliary Contact
61 ~ 93	Position Switch

—— Manufacture's Wiring

---- User's Wiring

Disconnecting Device (Draw-Out Type)

※ This circuit diagram is equipped with the 'GPR-LA' type of OCR and please refer to page 35 to 38 for other types of OCR.



Test Position
61-62 ON
61-63 OFF
64-65 ON
64-66 OFF
67-68 ON
67-69 OFF
101-102 ON
101-103 OFF

Connection Position
71-72 ON
71-73 OFF
74-75 ON
74-76 OFF
77-78 ON
77-79 OFF

Isolation Position
81-82 ON
81-83 OFF
84-85 ON
84-86 OFF

Insert Position
84-85 ON
84-86 OFF
91-92 ON
91-93 OFF
94-95 ON
94-96 OFF

Control Jack Lay-Out

OCR													Operating					Auxiliary Switch									
POW	OCR Contact					ELT	N-CT	ZSI		COM	Temp	V Input		M	CC	TC	UVT	CHA	1a	2a	3a	4a	5a	1b	2b	3b	4b	5b
	COM	L	S/I	P/T	G/E																							
19	21		23		27	29	31	33	35	37	39	VR	VT	1	3	7	9	15	41	43	45	47	49	51	53	55	57	59
20	22		24		26	28	30	32	34	36	38	40	VS	VN	2	4	8	10	16	42	44	46	48	50	52	54	56	58	60
OCR Protection Relay													Operating Circuit						Auxiliary Switch									

OCR														
POW	OCR Contact					ELT	N-CT	ZSI		COM	Temp		V Input	
	COM	L	S/I	P/T	G/E									
19	21		23		27	29	31	33	35		37	39	VR	VT
20	22	24		26		28	30	32	34	36		38	40	VS	VN

- GPR Protection Relay -

Operating				
M	CC	TC	UVT	CHA
1	3	7	9	15
2	4	8	10	16

- Operating Circuit -

Auxiliary Switch									
1a	2a	3a	4a	5a	1b	2b	3b	4b	5b
41	43	45	47	49	51	53	55	57	59
42	44	46	48	50	52	54	56	58	60

- Auxiliary Switch -

Current Status of Acquired Standards

Approvals & Certificates

ACB

● : Acquired
◎ : In Progress (Expected)

Type of Certification	Approvals				
Type of Standard	KS	IEC	IEC	IEC	ANSI
Mark					
Testing Institute	KS	CE	DEKRA	Nuclear	KERI
Certification Country	Korea	Europe	Netherlands	Korea	Korea
HGS06 A Frame	●	●	●		
HGS08 A Frame	●	●	●		
HGS10 A Frame	●	●	●		
HGS12 A Frame	●	●	●		
HGS16 A Frame	●	●	●		
HGS20 B Frame	●	●	●		
HGS25 B Frame	●	●	●		
HGS32 B Frame	●	●	●		
HGN06 A Frame	●	●	●		●
HGN08 A Frame	●	●	●		●
HGN10 A Frame	●	●	●		●
HGN12 A Frame	●	●	●		●
HGN16 A Frame	●	●	●	◎	●
HGN20 A Frame	●	●	●		●
HGN06 B Frame	●	●	●		●
HGN08 B Frame	●	●	●		●
HGN10 B Frame	●	●	●		●
HGN12 B Frame	●	●	●		●
HGN16 B Frame	●	●	●		●
HGN20 B Frame	●	●	●	◎	●
HGN25 B Frame	●	●	●		●
HGN32 B Frame	●	●	●	◎	●
HGN40 B Frame	●	●	●		●
HGN32 C Frame	●	●	●		●
HGN40 C Frame	●	●	●		●
HGN50 C Frame	●	●	●		●
HGN40 D Frame		●	●		
HGN50 D Frame		●	●		
HGN63 D Frame		●	●		

● : Acquired
◎ : In Progress (Expected)

Type of Certification	Vessel								
Type of Standard	Korea	U.K	U.S.A	France	Japan	Germany	Germany	Italy	Russia
Mark	KR KOREAN REGISTER	Lloyd's Register	ABS	BUREAU VERITAS	ClassNK	GL OPERATING 24/7	DNV	RINA	RMRS
Testing Institute	KR	LR	ABS	BV	NK	GL	DNV	RINA	RMRS
Certification Country	Korea	U.K.	USA	France	Japan	Germany	Germany	Italy	Russia
HGS06 A Frame									
HGS08 A Frame									
HGS10 A Frame									
HGS12 A Frame									
HGS16 A Frame									
HGS20 B Frame									
HGS25 B Frame									
HGS32 B Frame									
HGN06 A Frame	●	●	●	●	●	●	●	●	●
HGN08 A Frame	●	●	●	●	●	●	●	●	●
HGN10 A Frame	●	●	●	●	●	●	●	●	●
HGN12 A Frame	●	●	●	●	●	●	●	●	●
HGN16 A Frame	●	●	●	●	●	●	●	●	●
HGN20 A Frame	●	●	●	●	●	●	●	●	●
HGN08 B Frame	●	●	●	●	●	●	●	●	●
HGN10 B Frame	●	●	●	●	●	●	●	●	●
HGN12 B Frame	●	●	●	●	●	●	●	●	●
HGN16 B Frame	●	●	●	●	●	●	●	●	●
HGN20 B Frame	●	●	●	●	●	●	●	●	●
HGN32 B Frame	●	●	●	●	●	●	●	●	●
HGN40 B Frame	●	●	●	●	●	●	●	●	●
HGN32 C Frame	●	●	●	●	●	●	●	●	●
HGN40 C Frame	●	●	●	●	●	●	●	●	●
HGN50 C Frame	●	●	●	●	●	●	●	●	●
HGN40 D Frame	●	●	●	●	●	●	●	●	●
HGN50 D Frame	●	●	●	●	●	●	●	●	●
HGN63 D Frame	●	●	●	●	●	●	●	●	●